NEXT GENERATION
WEAPONS OF MASS DESTRUCTION
AND WEAPONS OF MASS EFFECTS
TERRORISM

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## WMD and WME Terrorism

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Next Generation WMD and WME Terrorism
Overview of the Report

Since the al-Qaeda attacks on the World Trade Center and the Pentagon on September 11, 2001, there has been widespread concern that al-Qaeda would escalate to an attack against the American homeland using nuclear, biological, chemical, or radiological weapons – or what usually are labeled weapons of mass destruction (WMD). There also has been concern about another catastrophic terrorist attack entailing the non-traditional use of conventional means. For our purposes here, the latter attack is termed a weapon of mass effects (WME) attack. Though neither a WMD nor a WME attack has occurred since September 11, there is little reason to challenge the broad consensus that the risks of such attacks remain high – and will remain so for the foreseeable future.

Against this background, the Advanced Systems and Concepts Office (ASCO) of the Defense Threat Reduction Agency (DTRA) asked Science Applications International Corporation (SAIC) to analyze the dimensions of possible “Next Generation WMD and WME Terrorism.” Particular focus was to be placed on the potential groups that could carry out such attacks, what new groups or other entities might be attracted to the use of WMD or WME over the next 3-15 years, and what motivations might lead different terrorist groups or other entities to escalate to WMD violence. For this project, SAIC’s research team comprised SAIC personnel, personnel from the Terrorism Research Center (TRC), and outside experts.

The following report sets out the main results of the project. Section 1 summarizes the main findings and recommendations of the analysis, drawing on the work set out in detail in the sections that follow. Section 2 comprises a series of analytic papers by members of the research team that explore from different vantage points the dynamics of next generation WMD and WME terrorism. Section 3 examines possible U.S. responses to contain the threat of next generation WMD and WME terrorism. Particular emphasis is placed on new or complementary response initiatives to fill gaps in existing U.S. strategies, policies, and actions. This section concludes by identifying possible implications for DTRA programs, activities, and initiatives. Appendices include a series of other papers and think pieces prepared by outside experts for this project, including as part of a workshop on “Next Generation WMD and WME Terrorism” that brought together experts and officials to discuss this subject.

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1 This usage of the term “weapon of mass effects” differs from some other uses of this term. It focuses primarily on physical destruction comparable to that of so-called weapons of mass destruction - chemical, biological, radiological, and nuclear (CBRN) weapons. In so doing, it does not limit the term weapon of mass effects to use of conventional weapons or biological weapons on a small scale to cause widespread panic and disruption.
These papers are included here to provide additional perspectives on the threat of next generation WMD and WME terrorism.\textsuperscript{2}

\textsuperscript{2} As will become evident, this project drew on many different inputs from a range of authors. For the most part, an effort has been made in this report to foster consistency of usage. That said, the subject of this report also includes a variety of proper names and group names that are variously translated and transliterated into English. Rather than forcing all of the paper writers into a single “procrustean” usage, the decision sometimes has been made to stick with an author’s own usage, e.g., in the spelling of al-Qaeda. Thus, there are occasional inconsistencies in the spelling of some terms or names across the separate papers included within this report, especially in the Appendices.
1. The Dynamics of Next Generation WMD and WME Terrorism

- Today’s “current generation” WMD terrorism baseline comprises isolated and limited biological or chemical attacks by extremist groups or lone individuals prior to 2001; the still unsolved anthrax attacks of 2001; explosives-chlorine attacks by al-Qaeda in Iraq in 2006-2007; and long-standing efforts by the al-Qaeda-Jihadist movement to acquire WMD, punctuated since 2001 by a series of failed biological, chemical, or radiological attacks.

- Within the literature, many explanations are put forward for why there has not been a major terrorist WMD attack, including lack of motivations; excessive risks of failure compared to continued reliance on bombs and bullets terrorism; constrained capabilities; successful counter-terrorist activities; and terrorist timing.

- Looking out 3-15 years – the period taken in this report for “next generation” WMD and WME terrorism – the threat of a WMD attack will continue to increase.

- Historic, geopolitical, and technical trends, the pervasive role of the Internet as a terrorist enabler, and the spillovers of the war in Iraq all point toward continuing if not exponential growth of the numbers of extremist groups, while heightening the attraction and accessibility of WMD and WME as terrorist means.

- The threat of acquisition and use of WMD by the al-Qaeda-Jihadist movement will remain the most dangerous dimension of next generation WMD and WME terrorism.

- Both the Al-Qaeda core leadership and other senior individuals within the al-Qaeda-Jihadist movement have argued that WMD use – and possibly mass killing of innocents – is legitimate and fully justified according to Islamic teachings.

- Within that al-Qaeda-Jihadist discourse, WMD acquisition and/ or use also are seen to have a number of potential strategic payoffs for achieving the movement’s goals: retaliation for U.S. attacks; employment as a decisive weapon, an equalizer, or for its psychological impact; as a means of deterrence; and as a means of recruiting new supporters and rallying support among the wider Muslim audience.

- However, statements by both Osama bin Laden and Ayman al-Zawahiri – as well as the emphasis placed on justifying WMD use and possible killing of many innocents – suggest an ongoing debate within al-Qaeda’s leadership and the broader movement about whether excessive violence would undermine support from the wider Muslim audience ultimately needed to achieve al-Qaeda’s goals of Islamic renewal and a new Caliphate.

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1 Following common usage, weapons of mass destruction (WMD) are taken to be chemical, biological, radiological, and nuclear weapons. Weapons of mass effects (WME) are defined to entail the uses of conventional means in non-traditional ways to have a mass effect, measured in terms of casualties, destruction, disruption, and shock and awe.
Possible targets for al-Qaeda-Jihadist WMD use include not only major urban areas but also economic centers of gravity and strategic assets (e.g., oil and energy infrastructure) as part of its articulated strategy of “economic jihad”.

WME terrorism is an established al-Qaeda ambition, illustrated by the successful 9/11 attack on the World Trade Center as well as by repeated unsuccessful attempts since the mid-1990s to destroy multiple aircraft in flight.

Many other possibilities for WME attacks exist, which could well become a routinized centerpiece of next generation al-Qaeda-Jihadist terrorism.

Over the next 3-15 years, what is termed here “non-al-Qaeda” extremist groups could seek to escalate to WMD or WME violence, partly as a result of the many geopolitical trends which point toward a further rise of violent extremism and partly as a result of seeking new and more effective means to pursue their agendas.

Based on their ideological-strategic goals as well as their past uses of violence, future religious extremist and apocalyptic groups appear most disposed to use WMD or WME, while ethno-nationalist separatist groups appear least likely to do so.

The possibility of more discriminate use of WMD (e.g., without mass casualties or targeted on a distinct enclave or adversary) is a potential wild card that could shift the WMD use calculus of ethno-nationalist separatist, left wing and social revolutionary, and right wing terrorist groups; organizational dynamics is another wild card could lead to such WMD use by a splinter faction within these non-al-Qaeda groups or otherwise.

A WMD or WME attack by a lone individual is becoming more possible with a continuing trend toward a capability for greater and greater violence to come within reach of smaller and smaller entities – probably excepting nuclear weapons.

Leveraging the Internet as a channel of attack for damage and destruction – that is, network-based attacks for mass effects – will be an increasing next generation threat.

Next generation WMD and WME terrorism will likely include terrorist WMD or WME campaigns, repeated attacks linked in terms of timing, modalities, and purposes.

2. Responses to Next Generation WMD and WME Terrorism

Within the framework of existing U.S. goals, policies, and actions to counter the threat of WMD and WME terrorism, important gaps remain – and point toward a number of high payoff complementary response initiatives in intelligence; policy, doctrine, and operations; and norm and capacity building.

To lessen the risk of future terrorist surprise, existing intelligence monitoring and collection should be reviewed to ensure that sufficient attention is being paid to the WMD motivations, intentions, and capabilities of groups other than al-Qaeda.

The United States should expand its efforts to accelerate implementation of United Nations Security Council Resolution 1540 (obligating all states to put in place controls to prevent non-state actors from gaining access to WMD-related inputs), including possibly by partly reorienting the on-going Cooperative Threat Reduction Program.

A strategy should be put in place and implemented to influence terrorists’ WMD acquisition and use calculus. (See below for elaboration).

Building on the overall National Response Plan, a family of National Response Plans to a Terrorist WMD or WME attack should be developed; a National Response Plan for
an Anthrax Attack would be one place to start. This set of National Response Plans should include planning to deal with a terrorist WMD or WME attack campaign.

- Planning now for global political and military responses after a terrorist WMD attack - as distinct from consequence management - should be initiated, with a particular emphasis on clarifying U.S. political-military objectives in the wake of an attack, identifying needed capabilities to give the President a full range of response options, and not least, considering options for using the shock of an attack to transform global non-proliferation and counter WMD terrorism actions.

- Continued and expanded actions to build habits of international cooperation among states to counter WMD terrorism are needed, from prevention of acquisition through interdiction and disruption of an attack to responses afterwards.

- The United States should propose to the other major nuclear weapon states that they explore how to cooperate in supporting a non-nuclear weapon state in the midst of a terrorist nuclear event; eventually, a multi-state nuclear emergency response capability could be put in place.

- Plans, procedures, and mechanisms to alleviate the direct health effects on the American population of a terrorist biological attack - population protection - need to be put in place and sustained, perhaps with a Presidential-Congressional commitment to protecting the American population by a specified date certain, e.g., 2010.

- A technical feasibility study should be initiated of protecting nearby publics outside of the immediate zone of destruction from the nuclear fallout effects of a terrorist nuclear detonation; in light of that study, an informed decision should be taken about whether to pursue population protection against a terrorist nuclear attack.

- Actions to enhance public resiliency facing a terrorist WMD attack are a final top priority, including but not limited to some of the actions identified above.

3. **Influencing Terrorists’ WMD Acquisition and Use Calculus**

- Disaggregating among the different terrorist groups and their component entities - while seeking to identify potential leverage points for influencing each - is the starting point of an influencing strategy. Implementing a strategy to influence terrorists’ WMD acquisition and use calculus would call for both soft and hard power, actions by the United States and other government, and by non-government entities.

- The most promising leverage point for influencing the WMD acquisition and use calculus of the al-Qaeda-Jihadist movement (as well as the wider spectrum of non-al-Qaeda next generation terrorist groups) is their perception of whether WMD use would be smart - in terms of achieving their goals; its prospects for success; its effective use of technical, financial, organizational, and operational resources; and the risks to be run, compared to reliance on proven bombs and bullets terrorism or WME.

- For some al-Qaeda-inspired cells (as well as other non-al-Qaeda groups and entities), unease about the legitimacy and justifiability of WMD use may also be a leverage point.

- Perceptions of risk would be a key leverage point for influencing outsider aiders and abettors, that is, individuals, organizations, and states that are not members of a given group but whose technical, supply, or other support could well be critical to success.
Across different next generation terrorist groups and their component entities, cross-cutting influencing actions can be identified that provide a place to start. For example, actions to deny the benefits of WMD use and enhance global habits of cooperation would influence perceptions of the smartness of WMD use; actions to encourage a wider Islamic debate about the legitimacy of WMD use could well reinforce possible concerns within the al-Qaeda core leadership that the excessive violence of WMD use would alienate the global Muslim community and make it harder to achieve al-Qaeda’s longer-term goals; or buttressing habits of cooperation against outsider aiders and abettors would influence their perceptions of risk as would a stated readiness of the United States and other countries to hold state leaders accountable for any support to WMD terrorist groups.

Pursuit of a strategy for influencing terrorists’ WMD acquisition and use calculus is likely to be the most controversial recommendation herein. But even in the toughest case – that of the al-Qaeda core leadership – there are potential leverage points and influencing actions. For that reason alone, such a strategy warrants inclusion in buttressed U.S. and global responses to next generation WMD and WME terrorism.

4. Some Implications for the Defense Threat Reduction Agency

Three types of implications for the activities of the Defense Threat Reduction Agency (DTRA) stand out from this report’s analysis of the dynamics of and responses to next generation WMD and WME terrorism: changes at the margin of existing activities; exploratory analysis, assessment, and concept development; and new program thrusts.

With regard to changes at the margin of existing activities, DTRA’s ongoing program of WMD-related exercises offers an important opportunity to build global habits of cooperation, including by crafting exercises to support specific response initiatives (e.g., nuclear weapon state cooperation to help a non-nuclear weapon state confronting a nuclear terrorist incident), to build ties with Russia, China, and other non-allied partners, and to enhance responses to terrorist WMD or WME campaigns. Future WMD-related R & D priorities could include development of more sophisticated and reliable capabilities for modeling nuclear fallout patterns in urban environments. DTRA’s role as co-chair of the Global Initiative to Combat Nuclear Terrorism offers an opportunity to pursue an expanded mandate for that Initiative to include all types of WMD not simply nuclear weapons.

Drawing on DTRA’s core expertise, a top priority for exploratory analysis, assessment, and concept development would be to design and then assess possible architectures for protecting nearby publics from the fallout effects of a nuclear terrorist detonation. Political-military response planning also would fall under this category as would support for the development of a family of National Response Plans, again drawing on DTRA core expertise in the nuclear area.

Assessment of expanding the Cooperation Threat Reduction Program to include assistance to a wide range of countries outside of the former Soviet Union as part of accelerated implementation of UNSCR 1540 is a possible new program thrust.
Turning to the dynamics of next generation WMD and WME terrorism, the following summary is organized in terms of a number of key issues or themes:

- Definitions and assumptions;
- WMD or WME terrorism – the record;
- Trends influencing next generation WMD or WME terrorism – geopolitical and technical;
- The next generation al-Qaeda-Jihadist WMD threat;
- The next generation al-Qaeda-Jihadist WME threat;
- Network-based attacks against infrastructure and other targets as WME;
- Future WMD and WME threats from other extremist groups; and
- Individuals as WMD or WME attackers.

In addressing each of these issues or themes in turn, this section draws on the more detailed analysis provided by the papers of Section 2 and the accompanying appendices. Every effort has been made to distill accurately the results set out in that material – and references are provided to make it easier for readers to explore a point developed in greater depth below. On occasion, some overarching analytic judgments are drawn by the editor from the material that follows – often prefaced by a phrase such as “from the overall perspective of this study,” “drawing on the overall analysis,” or “extrapolating from this specific line of argument” to flag such editorial judgments for the reader.

1. Some Definitions – “Next Generation WMD or WME Terrorism”

The discussion that follows reflects a number of working definitions. The most important of these definitions are briefly set out here.

- Next Generation – “3-15 Years Ahead”. For our purposes here, the time-frame for exploring the dimensions of next generation WMD or WME terrorism is taken to be over the next 3-15 years. The out-year boundary of 15 years tracks well with the historical data which suggests that over the past half-century, the number of terrorist
groups has doubled approximately every 15 years. Historical data also suggests a comparable exponential growth in the number of terrorist incidents over time.1

- **Weapons of Mass Destruction – What to Include?** There are significant differences among the different weapons that often are aggregated into the category of weapons of mass destruction. Nuclear weapons and certain biological weapons have the most potential to cause mass destruction, measured in terms of either or both loss of life and physical destruction. Depending on the specifics, a nuclear terrorist attack and in some instances a biological weapons attack could have society-wide, long-term impacts on the U.S. economy. Neither a terrorist attack using “weaponized” or industrial chemicals nor an attack with a radiological dispersal device (RDD) are likely to impose as great a level of destruction. Nonetheless, this report follows accepted practice to include chemical, biological, radiological, and nuclear weapons within the WMD category.

- **Weapons of Mass Effects.** With the use of fully-fueled commercial airliners as flying bombs, the 9/11 attacks on the World Trade Center and the Pentagon comprised a step-level change in terrorist violence and exemplified a weapon of mass effects attack. In particular, that attack entailed two key dimensions of weapons of mass effects as that term is used here: first, the non-traditional or unconventional use of conventional means; second, mass effects, as measured separately or by the combination of a high number of fatalities in a rapid period of time, disabling or destruction of critical infrastructure, significant economic impact, and inducing high shock and awe in multiple audiences as well as widespread panic and disruption in the targeted country.2

2. **WMD and WME Terrorism – the record**

   The most striking features of WMD terrorism today are: first, the very small number of actual uses of biological or chemical agents by a terrorist group or a lone individual prior to 2001; second, a growing series of aborted, failed, or prevented attempts by the al-Qaeda-Jihadist movement to carry out a WMD attack in the period since the 9/11 attacks; and third, arguments within the al-Qaeda discourse justifying WMD use, including mass killing of innocents. As for WME terrorism, the 9/11 attacks provided the first successful example of a non-traditional use of conventional means to have mass effects.

2.1 **WMD Terrorism – Past Attacks**

   Illustrated by Table 1.1.1, virtually all of the publicly reported instances of WMD terrorism over the past two decades or so have involved either chemical or biological agents. There also were at least one planned, one threatened but not carried out, and one disrupted attempted RDD attack.3

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1 See the more detailed discussion of the historic data on the growth of terrorist groups, leaders, and incidents below in Stephen J. Lukasik, “Possibilities for Next Generation WMD and WME Terrorism,” Section 2, Part 2, pp. 3-15.


3 This reference to an aborted RDD attack in Turkey is based on discussion with officials of the Turkish National Police in early 2007. Apparently, al-Qaeda linked terrorists planned to use conventional truck bombs to destroy a facility that produced medical radioisotopes. Jose Padilla also has been charged with the
The goals of the entities that carried out these attacks varied widely. Those goals ranged from apocalyptic visions of triggering a global nuclear war (Aum Shinrikyo) through more intentional to carry out an RDD attack but in his case, he was arrested far in advance of any serious preparations or actions. Thus his case has not been included here. In 1995, Chechnyan rebels buried had threatened to carry out an RDD attack and Russian police uncovered cesium-137 buried in a Moscow park.
traditional political separatism (the Tamil Tigers or LTTE) to influencing a local election by incapacitating other voters (the Rajneeshees). In the case of the anthrax mailings in the United States in 2001, both the identity of the perpetrator as well as the goal remain unknown. However, there is speculation that the 2001 anthrax mailings were the work of a single individual.\(^4\) With regard to terrorist use of a nuclear weapon, no such attack has been prevented or occurred – although there is evidence of al-Qaeda’s efforts and interest in acquiring a nuclear weapon or nuclear weapon materials as well as considerable discourse among the al-Qaeda leadership and followers justifying use of a nuclear weapon.\(^5\)

2.2 WMD Terrorism – Speculations about the Lack of a Major Terrorist WMD Attack

Within the existing literature, summarized in Appendix 1 by Amanda Grosiak and Thomas Skypek, several different arguments are put forward to explain the lack of a major terrorist WMD attack so far.\(^6\) Among critical reasons cited are: lack of motivations reflecting the goals and objectives of specific groups; perceived excessive risks or costs in relation to expected benefits; constraints on capabilities; timing; and the role of successful counter-terrorist efforts.

More specifically, lack of motivations often is put forward as a primary reason to explain the decision not to escalate to the use of WMD by terrorist groups.\(^7\) It is argued that causing large-scale casualties and destruction would make it harder to achieve terrorists’ goals. In particular, for the large number of non-al-Qaeda political separatist entities, WMD use is seen as likely to undermine not enhance their efforts to coerce or induce a national government to accede to their claims for independent or autonomous status. Closely related, concern about the adverse or uncertain impact on their potential supporters, whether in a particular country or more widely, is highlighted as another reason why terrorists have chosen not to use WMD.\(^8\)

A perceived adverse relationship of costs-risks and benefits of WMD use is another possible explanation that is put forward. For many if not most terrorist groups, so this line of argument runs, traditional “bombs and bullets” terrorism is thought sufficient to pursue their strategic objectives. Escalation to WMD use would not offer sufficient benefits. Compared to bombs and bullets, it also is argued to be a more costly and risky course of action. Some of these perceived costs or risks are more tactical or well-defined – e.g., alienating the group’s audiences, ratcheting up counter-terrorist activities, or wasting resources and personnel. Failure also can have more intangible risks, so this explanation continues. In particular, it has been argued that for Jihadist terrorists, failure risks being perceived as not having God’s approval. Failure of whatever sort can result in a loss of reputation, support, and ability to

\(^4\) Several other attempted attacks or hoaxes were carried out by individuals in this period. They are not included here.

\(^5\) See the discussion in Rebecca Givner-Forbes, Section 2, Part 4.

\(^6\) See the discussion in Appendix 1: Amanda Grosiak and Thomas Skypek, SAIC, “WMD Terrorism Today - Terrorist Motivations and Capabilities Based on a Literature Search.”

\(^7\) Many of these factors figure prominently in the discussion below of terrorist groups and their future evolution by Andre DeMarce, Matt Kovner and Ned Moran, “The Current and Future Landscapes of Non-state Actors’ With the Possible Intentions to Use Weapons of Mass Destruction,” Section 2, Part 3, pp. 4-12. Also see Grosiak and Skypek, op. cit.

\(^8\) This explanation is elaborated in the discussion of future terrorist groups in DeMarce, Kovner, and Moran, Section 2, Part 3.
pursue the Jihadists’ goals.9 By contrast, the use of “bombs and bullets” is a proven, well-mastered technology and operational approach.

From the overall perspective of this study, this emphasis on the perceived costs and risks of using WMD gains credence from the record of terrorist attacks over the past decade. That record shows a strong predilection of terrorist groups, including al-Qa’eda, to stick with past attack patterns in terms of targets, weapons, and other modalities. Use of conventional explosives in many different variations – from car bombs to human bombs clearly predominates. (Even so, innovation does occur as reflected in the use of high-explosives and chlorine in a growing number of 2006-2007 al-Qaeda-in-Iraq attacks.)

Limited technical capabilities (as distinct from the costs-benefits of seeking WMD just noted) are often cited as a complementary or alternative explanation for the lack so far of a major terrorist WMD attack. As summarized below, multiple challenges include: difficulties in obtaining needed materials, especially for a nuclear device; complex problems of producing a nuclear device, even assuming access to materials; comparable problems in producing significant quantities of many biological agents and then in effectively disseminating them; difficulties gaining physical access to potential industrial sites in an attempt to cause a major chemical explosion; or the very robustness and hardness of nuclear power plants against an outsider attack using any number of conventional means.10

Particularly for a WMD attack by al-Qa’eda or its affiliated Jihadists, the disruption caused by the role of counter-terrorist efforts also has been emphasized as an explanation – but also why too much emphasis should not be placed on the record of the lack of a major WMD attack so far.11 It would take time to plan, organize, and then execute what would likely be a complicated operation, especially for an attack entailing use of a nuclear weapon. For the al-Qa’eda core leadership, the repeated disruption of their operations since the organization took shape in the early 1990s also could well have delayed their self-avowed interest in acquiring WMD weapons – first by being forced out of Sudan in 1996, then by being forced out of Afghanistan in 2002. Supporting this explanation in regard to al-Qa’eda, as the above table indicates, there have been quite a few aborted or prevented al-Qa’eda-Jihadist attempts to use at least biological or chemical weapons.

Extrapolating from this review, some explanations appear to have greater explanatory power for some terrorist entities compared to others. In that regard, it is important to distinguish al-Qa’eda and its affiliated or inspired groups and cells – with its Islamist religious-revivalist goals – from what will be often termed in this report the “non-al-Qa’eda” or more traditional terrorist groups – the variegated mix of groups with very different, more limited political goals that have been the “mainstream” of terrorism over the past decades. As Table 1.1.1 on page 3 of this section indicates, there have been a series of attempted, aborted, or even successful attacks with chemical, biological, or radiological weapons by al-Qa’eda or its affiliated organizations since 2002. By contrast, the early the use of a biological agent by the Rajneeshees (1984), the use of chemical weapons by the Tamil Tigers (1990), Aum Shinrikyo’s

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[11] Stephen Lukasik has recently argued this with the authors. It also figures in other assessments, including by U.S. government officials.
uses of anthrax and sarin (1994-1995), and the threat of a radiological attack by the Chechnyan rebels (1995) - or the non-al-Qaeda stand out as anomalies.

2.3 Justifications of Mass Killing and Use of WMD within the al-Qaeda-Jihadist movement

Within the al-Qaeda-Jihadist movement, as elaborated in the discussion below by Rebecca Givner-Forbes and Matt Kovner, arguments are made by different individuals to justify and legitimize the use of WMD (especially nuclear weapons) and mass killing. In particular, writings by members of what Givner-Forbes and Kovner call the al-Qaeda core leadership (represented by Osama bin-Laden and Ayman al-Zawahiri) and the “New Guard” leadership of al-Qaeda (represented until his death by Musab al-Zarqawi as well as by Sheik Nasir bin Hamd al-Fahd) set out justifications for mass killing. Within the writings of the latter “New Guard” leadership, moreover, there are even less questions about the justifications of using WMD and killing innocent civilians. Indeed, it has been suggested by Jarret Brachman in a think piece done for this project that rather than WMD, “[i]t is the mass killing that is the goal of the Jihadis.”

More specifically, the argument often made by both individuals within the al-Qaeda core leadership and the New Guard leadership is that any such innocent loss of life among Westerners would comprise fully justifiable equal or reciprocal retaliation for the deaths of innocent Muslims caused by the United States and the West. In that regard, these Jihadists argue that a WMD attack would be a justified response to the claimed loss of 4 million innocent Muslim women and children said to have been killed already by the United States and other Western powers. Closely related, the fact that the United States is the only country to have used nuclear weapons is cited as reinforcing the legitimacy of such use by

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Multiple Justifications of Use of WMD and Killing of Innocents

- “Equal retaliation” in response to U.S./Western killing of innocent Muslims
- U.S. has used WMD so cannot deny use to Jihadists
- Lack of Western regard for own citizens, global environment, or other human communities
- Western citizens elect and fund Western governments
- Prophet sanction of use of catapults to defeat enemy equated to indiscriminate violence or nighttime attacks - killing innocents and destruction acceptable
- Sharia requirement of warning the enemy has been met
- Proven ineffectiveness of less fatal weapons
- If deterrent threat fails, justified to keep from attacking Muslims
- U.S. will inevitably use WMD
- Prophet sanction of using Muslims as shields to defeat enemy equated to deaths of some Muslims acceptable

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12 See the discussion in Rebecca Givner-Forbes and Matt Kovner, ““To Discipline the Savage Cowboys” - An Analysis of Weapons of Mass Destruction in Jihadist Primary Documents,” in Section 2, Part 4, pp. 7-15.
13 See Jarret Brachman, “Jihadis and WMD – Less about the Weapons, More about the Mass Destruction” in Appendix II.
14 For detailed discussion, with references to writings and statements by bin Laden, al-Zawahiri, 9-11 conspirator Ramzi bin al-Shibh, and others of the core leadership as well as by Abu Musaab al-Suri, Nasr bin Fabd, Suleiman Abu Gheith, and others of the New Guard, see, Givner-Forbes and Kovner, op. cit., pp. 7-15; also see Brachman, Ibid., pp. 9-12.
The very resistance of the United States and the West to alleged “legitimate” Islamic demands is seen to reinforce the legitimacy of escalation to non-traditional means. Besides, so it is argued, Western citizens are fully responsible for the deeds of their governments – electing them and funding them.

Within this Jihadist discourse, considerable care has been taken by these writers to make the religious case that use of WMD and taking of large numbers of innocent lives is fully consistent with the Koran, the teachings of the Prophet, and Sharia.15 Thus, references often are made to the Prophet Mohammed’s justification of the use of catapults against towns under siege and the acceptability of killing innocent Muslim civilians if such deaths could not be avoided. According to this body of writings, moreover, the United States and the West have been fully “warned” of the dangers faced by their resistance, thereby meeting the injunction of Islamic law to provide such a warning prior to carrying out a major attack that could harm innocent civilians.

Extrapolating from the more specific justifications discussed at length below and summarized by the text box above, the overall trend appears to be toward more fluid justifications of use. Thus, among the new generation of leaders, an alleged inevitability of future WMD use by the United States as well as the ineffectiveness of lesser Jihadist military actions are both cited as justifications for use. Similarly, there appears to be a somewhat greater readiness among the new generation to justify attacks that kill large numbers of Muslims, though some restraints are still seen to operate. Indeed, as argued Jarret Brachman in Appendix II, for the most extreme Jihadists what may matter most is not use of WMD but mass killing with whatever means available.16

2.4 WMD Use, Mass Killing, the On-Line Jihadist Movement, and the Ummah

An Internet-based community of “on-line Jihadists” now exists, interacts, and carries on a continuing discussion of how best to serve the Jihadist cause.17 The Internet discussion among these on-line Jihadists focuses on how to acquire CBRN, how those weapons might be used, and against what targets. For them, justification of use is taken as a given.

By contrast, how the wider Islamic community across the world from the Levant to Southeast Asia – the Ummah – would respond to WMD use involving mass killing may be more uncertain. The very fact that the al-Qaeda core leadership and the new generation of leaders have devoted considerable efforts to justifying such use and killing suggests some concern about that audience’s reaction. The justifications clearly are responding to questions or concerns raised about the consistency of use of WMD with Islam’s teachings. Public opinion polling also indicates that a significant percentage of this wider Islamic audience does not support killing innocent civilians.18

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15 See the discussion respectively in Givner-Forbes and Kovner, Ibid., pp. 9-10, 12-16; Brachman, Ibid., pp. 6-12.
16 Ibid.
In addition, Ayman al-Zawahiri’s criticism of Musab al-Zarqawi’s use of indiscriminate violence also could indicate some concern about how the Ummah would respond to mass killing. A reaction of disapproval and disbelief within the radical community to al-Zarqawi’s alleged plans to carry out a chemical attack in Amman, Jordan also suggests that the wider community could respond negatively. In turn, al-Zarqawi’s denial of any such plans to use chemical agents in an attack in Amman also reinforces this speculation. For his part, bin Laden has recently criticized excessive use of violence by al-Zarqawi’s successors in leading al-Qaeda in Iraq. In turn, some Jihadist writings explicitly argue that the taking of innocent Muslim life was justified in religious texts only when it was not possible to tell apart men from women and children, during night attacks in that case.

Nonetheless, it may well be that any such uneasiness about taking innocent lives by the al-Qaeda-Jihadist leadership extends only so far as taking the lives of innocent Muslims, not others. As such, it would place no internalized constraints on using WMD against the West and especially against the United States.21

2.5 WME Terrorism – an Established al-Qaeda Ambition

As already stated, the 9/11 attacks on the World Trade Center should be seen as the first instance of successful al-Qaeda terrorism using conventional means in non-traditional ways to have mass effects. Less than a decade earlier, Al-Qaeda’s had bombed the World Trade Center in 1993 with the same goal of bringing down the Towers and causing thousands or tens of thousands of deaths. Al-Qaeda’s readiness to resort to WME terrorism is further evidenced by the disrupted 1995 Bojinka Plot aimed at attacking multiple aircraft over the Pacific Ocean and a decade later in August 2006, by its unsuccessful plan to explode improvised bombs in up to a dozen planes over the Atlantic Ocean flying from London to the United States.

2.6 Nuclear Weapons and Deterrence of the West

Rhetoric, acquisition and development efforts, and readiness to carry out mass effects attacks, all create a strong presumption that if the al-Qaeda core leadership succeeds in acquiring a nuclear weapon, it will use it to kill large numbers of people. However, both bin Laden and some members of the New Guard leadership have also spoken of nuclear weapons as means of deterrence.

With regard to bin Laden, one of the arguments made for Muslims to acquire nuclear weapons was that their possession “would prevent the infidels from inflicting harm on Muslims.” Prior to the U.S. overthrow of the Taliban regime in Afghanistan, bin Laden also

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19 See the discussion, Givner-Forbes and Kovner, op. cit., p. 16.
21 Givner-Forbes and Kovner, op. cit., p. 16
22 Quoted by Givner-Forbes and Kovner, op. cit., p.17.
claimed that al-Qaeda had acquired both a nuclear weapon and a dirty bomb. As for members of the New Guard, some leaders emphasize the effectiveness of nuclear and other WMD as means of deterrence. Among the “New Guard” leadership, in particular, there appears to be some type of debate about whether to employ nuclear weapons or use them as means of deterrence if other less fatal weapons will achieve the Jihadists’ goals.23

### 3. Some Trends Shaping Next Generation WMD and WME Terrorism

Looking ahead, a number of broad geopolitical and technical trends will shape next generation terrorism, including WMD and WME terrorism. In addition, the continued exponential growth of the Internet warrants stand-alone mention as a new and important enabler for next generation WMD and WME terrorism. The war in Iraq also cannot but have an important impact in ways still to be determined. Extrapolating from these trends, the threat of a WMD attack – and by different entities than simply al-Qaeda – will continue to increase in the years ahead.

#### 3.1 Geopolitical Trends

Globalization in all of its manifestations will remain one of the most important geopolitical trends.24 Globalization’s potential benefits are well known. At the same time, as examined in the paper by DeMarce, Kovner, and Moran in Section 2, globalization also will significantly add to the risk of next generation WMD and WME terrorism.25

Specifically, because of its impact in eroding social and political stability, governmental legitimacy, and established personal relationships in many nations across the globe as well as its role in undermining traditional notions of national sovereignty, globalization will continue to provide a growth medium for individual and group extremism. Under its impact, ethnic and sub-nationalist sentiments and separatist momentum will be further intensified. Where they exist, arbitrarily created post-colonial entities in regions such as Africa and the Middle East could well find themselves at even greater risk of becoming failed states. Globalization also can be expected to widen further today’s divide between the large parts of the Western and Islamic worlds, not least by its contribution to growing religious activism of many sorts.

A continuing exponential growth in the number of terrorist groups, leaders, followers, and attacks also will likely shape the prospects for next generation WMD terrorism.26 That

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25 For elaboration of the points that follow, see DeMarce, Kovner, and Moran, Ibid.
conclusion, elaborated in Section 2, Part 2 by Stephen Lukasik, is based on an analysis of past trends from 1945-2005 as derived from the data in the International Institute for Strategic Studies (IISS) database on “Selected Non-State Armed Groups.” By way of example, for the 15 year period of 1945-1959, four new armed groups were established that are still active, while in succeeding 15 year periods, 22, 55, and 157 new armed groups were established that remain active.27 Analysis of this IISS data on terrorist entities also suggests that the terrorist life cycle from recruitment to death or incarceration is growing shorter.

Several potential implications of this projected growth stand out. Overall, these new terrorist entities are likely to have goals spread across the spectrum of possible motivations. For that reason, the very growth in the number of new entities makes it more likely that one or more new extremist organizations would have a mix of political-religious motivations compatible with WMD use. In turn, while in some regions, it may be difficult for still additional groups to survive and expand, in other regions, there appears to be ample room for additional extremism. This includes parts of the Middle East, South Asia, and Southeast Asia, and Africa. Across all of these regions, moreover, new Islamic extremists would have access to an on-line Jihadist discourse which includes writings that justify the legitimacy of WMD violence.

Continuing challenges to the nation-state, as DeMarce, Kovner, and Moran discuss, are another geopolitical trend that will shape the characteristics of next generation terrorism overall.28 Across the developing world, difficulties of governance at best and the prospects for failed states at worst are one aspect of those challenges. Equally important, heightened religious-ethnic identification arising out of the dynamics of globalization is likely to continue to erode identification with the nation-state in many developing countries. In turn, within many multi-ethnic countries, internal alienation and disaffection from the established political-social order increasingly characterizes growing segments of the population.

Overall, the main impact of these challenges to the nation-state is likely to be heightened appeal of extremism of all sorts. But these dynamics also are likely to strengthen and expand the number of religious extremist groups, potentially more disposed to consider WMD terrorism.29 Further, the existence of increasingly alienated and disaffected individuals across Western Europe provides potential sources of terrorist recruits, fellow travelers and supporters, and ultimately insiders for any future WMD attack.

In a closely related geopolitical trend, many factors point toward a continued expansion of radical Islam in the Middle East and beyond. Reaction to globalization, the difficulties of governance in more traditional Islamic societies, and popular alienation stand out in that regard. The information revolution and the Internet, moreover, are making it all the easier for more extreme Islamic elements to communicate, proselytize, and influence the thinking within the wider milieu. Noted below, the war in Iraq has reinforced this process of radicalization.

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27 Ibid.
29 Ibid., p. 34.
perception of the war on terror as a war on Islam – a view fostered by al-Qaeda – also contributes to the growth of ideological extremism in Muslim countries. All of these developments again serve to undermine normative constraints on WMD use, while fostering support for more dramatic means to use against the West.  

Still another geopolitical trend influencing future WMD and WME terrorism is the continuing emergence and deepening of linkages between elements of organized crime and some terrorist entities. As discussed by Louise Shelley in Appendix V, instances of such linkages already are present in the countries of the former Soviet Union as well as between the drug cartel and terrorist organizations. Smuggling of nuclear-related materials and components uses the same network as smuggling of other commodities. Overall, these new linkages are likely to facilitate access to WMD-related inputs by terrorist groups. Established crime channels could be used for smuggling needed materials or components. More directly, a drug laboratory could branch out into the production of biological agents for sale.

Finally, the prospects for nuclear terrorism cannot be separated from those of future nuclear weapons proliferation. Though past projections of runaway proliferation over 50 years have repeatedly proved to be self-denying prophecies, there are good reasons today for concern about more widespread proliferation. Not least, if Iran cannot be stopped from acquiring nuclear weapons, the result could well be a cascade of proliferation in the Middle East. Similar concerns about a proliferation cascade in Asia due to concerns about a nuclear-armed North Korea cannot be dismissed. The implications for regional and global stability broadly, as well as for the risk of terrorist access to nuclear materials or weapons, will clearly partly depend on the specifics – which countries acquire nuclear weapons, with what internal political-social characteristics, with what provisions for security and control, and for what reasons. Equally so, there is little reason to challenge the basic presumption that more widespread proliferation will at the least make it harder to keep terrorists from gaining access to nuclear weapons – and could well facilitate that access.

3.2 Technical Trends

Technical trends all point toward lessened constraints on access to WMD by terrorist groups. Many of the same trends also are increasing the potential levels of violence within reach of individuals, including at least use of chemical, biological, and radiological devices. Consider several of these trends.

Particularly for nuclear terrorism, perhaps the most controversial linkage concerns the possibility that more widespread use of nuclear power will lead to more opportunities for terrorist access to nuclear weapons materials. The extent of this linkage is likely to depend heavily on at least two factors: first, are today’s projections of a future “nuclear renaissance” of widespread reliance on nuclear power to generate electricity proven correct; and second,

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31 See the discussion in Louise Shelley, “Trafficking in Nuclear Materials and Other WMD,” Appendix V.
33 For a discussion of these technical trends, see Lukasik, “Possibilities for Next Generation WMD and WME Terrorism,” op. cit., pp. 21-31.
what are the modalities of future uses of nuclear power, including the ultimate success of today’s proposals to develop new approaches to the nuclear fuel cycle that would minimize the diffusion of enrichment and reprocessing activities.

An increased availability of advanced military technologies is another factor shaping the prospects for WMD terrorism - but possibly in an unexpected direction. Examples of such technologies include more sophisticated shaped charges and other forms of conventional explosives, unmanned aerial vehicles and drones, man-portable ground-to-air missiles (MANPADS), anti-shipping mines, and even possibly midget submarines. Some of these technologies require less technical skill to use successfully, while others still require considerable technical expertise. Within that constraint, greater access to these types of advanced military capabilities - and to expertise in their use - would open up different options for terrorists to carry out damaging attacks.

For most terrorist groups, extrapolating from the more technical assessment, an increased availability of advanced conventional military technologies would provide another reason for sticking with traditional “bombs and bullets” terrorism. Such technologies would augment the potential impacts of attack while avoiding some of the risks of escalating to WMD violence. But the writings of both the al-Qaeda core leadership and the New Guard suggest that WMD still would have a powerful appeal to them - for shock impact, for deterrence, and in the case of nuclear and highly-lethal biological weapons, for their potential to kill far greater numbers of persons. In addition, the desire of the New Guard leadership to “top” 9-11 would suggest that more lethal conventional means would have limited impact on their calculation of whether or not to escalate to CBRN use.34

One final technical trend is likely to be the increasing technical sophistication of many terrorist groups. In part, increased technical sophistication would be a result of the trends already noted. But other factors also are likely to have this result, including use of new training means (e.g., simulators); the recruitment of disaffected insiders with specialized expertise (e.g., from within governmental agencies here or abroad with responsibilities for nuclear weaponry, from institutions of higher education as a means of gaining access to needed know-how, and from cutting-edge biological research firms); specialization within individual groups (e.g., typified already today by explosives experts who fly in to support particular attacks but also by widespread, multi-purpose use of the Internet); and more formal experimentation and testing of attack techniques (e.g., via test ranges).35 At the extreme, the possibility cannot be

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34 On “topping” 9-11, see Givner-Forbes and Kovaner, op. cit., p.4-18.
35 For a discussion of some of the ways that future terrorist groups could become more technically sophisticated, see Lukasik, op. cit., pp. 29-30.
precluded that an extremist group might attempt to kidnap individuals with critical skills, e.g., from bio-industry firms.

3.3 The Internet Factor

As exemplified by al-Qaeda and the wider Jihadist movement, the Internet increasingly is emerging as a multi-faceted enabler across the terrorist life cycle. At the “front end,” Internet chat rooms have become means of self-recruitment into the movement. They make it possible for alienated and disaffected individuals to recognize their shared perspectives and possibly to become increasingly radicalized. It is not even possible to guess how many of these radicalized individuals may go on to become terrorist supporters, operators, or leaders. But the personal history of some captured terrorists indicates that some of these individuals will make the transition from Internet chat rooms to actions. Further, this recruitment phenomenon will only grow, as access to the Internet becomes increasingly available even in remote areas.

The Internet also provides a means for the Jihadist leadership to speak to their audiences, influence supporters’ thinking, and sustain the movement’s morale. Both the al-Qaeda core leadership and its next generation successors have done so. Ultimately, the Internet can be a means to rally a wider community of radical and militant individuals and groups across multiple countries.

Operationally, the Internet also is transforming terrorist capabilities and activities. The Internet has clearly emerged as a means of communication in preparation for an attack. Internet resources also provide a web-based means to supplement more traditional on-the-ground target reconnaissance and attack planning. Individual training also can now be partly Internet-based. In turn, as discussed below, web-based operations and activities also are becoming a target of attack, while the Internet itself is becoming a possible means of attack for next generation terrorists. All of these uses of the Internet can be expected to increase further, resulting in turn in enhanced terrorist capabilities.

3.4 The Iraq War Impact

Like the 1980s war against Soviet forces in Afghanistan, the war in Iraq has become a zone of jihad for recruiting, training, and motivating a new generation of al-Qaeda-Jihadist fighters. Again like Afghanistan, there is every reason to expect that some, if not many, of these individuals will disperse globally. This will reinforce new trans-national, terrorist linkages being formed by opposition to the American presence in Iraq.

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Iraq Impact

- Recruitment, training, motivation zone
- New techniques
- Repeated use of explosives-chlorine mixture
- Negative views of United States among Muslims

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See Lukasik, Ibid. pp. 15-16.


The papers in the sections that follow do not explicitly deal with the impact of the Iraq war. However, this subject came up in the course of the project’s discussions - including at a workshop on Next Generation WMD and WME Terrorism. Given the importance of the Iraq war as a influencing factor, the editor has chosen to address this question briefly here.
Closely related, new techniques developed and used in Iraq by the terrorists will now become part of the established terrorist “tool-kit” regardless of the region of the globe. For instance, the increasing use in Afghanistan by the Taliban and its affiliates of suicide car bombing as a tactic provides one example. Reliance on the Internet is another. Increasingly sophisticated improvised explosive devices also stands out.

Two other aspects of the Iraq War may be particularly important for influencing next generation WMD terrorism. Now that there have been multiple and repeated attacks ascribed to al-Qaeda in Iraq using a mixture of conventional explosives and chlorine gas, a pair of potentially important thresholds has been crossed: the use of a chemical agent to terrorize and its use against not only American military personnel but also Muslim civilians. Particularly if there are additional uses of chlorine – or uses that result in very large numbers of casualties – these impacts would be intensified.

In turn, the war in Iraq has resulted in the rise of extremely negative perceptions of the United States among many Muslims around the globe. This could well provide a more receptive audience for Jihadist violence. It also could undermine possible concerns among the al-Qaeda-Jihadist leadership about the negative impact across the wider Islamic community of a WMD terrorist attack that killed large numbers of innocent American civilians on a scale exceeding that of the 9/11 attack.

4. Next Generation WMD and WME Terrorism

Turning to the specific terrorist groups and entities that will comprise next generation WMD and WME terrorism, al-Qaeda as well as its affiliated or inspired groups and cells will remain the most dangerous WMD terrorist threat over the next 3-15 year period covered by this project. Many possibilities also exist for WME terrorism, whether by al-Qaeda, another extremist group, or conceivably even a loner. WME terrorist attacks could be targeted on the United States directly or against critical infrastructure and other targets outside of the United States. Closely related, network-based attacks aimed not at disrupting information flows and the Internet per se but at “breaking things” could provide another means to have such mass effects. In addition, other non-al-Qaeda entities also could emerge with a readiness to use WMD. Ethno-nationalist and political separatist groups that so far have not considered WMD use might be attracted in the future to more tactical or discriminate WMD uses, including use of chemical or biological agents. Finally, though still constrained by technical feasibility, certain types of WMD attacks – particularly use of certain types of biological agents – could be within reach of individual extremists.

4.1 The al-Qaeda-Jihadist Movement – Perceived Payoffs from WMD Use

Within the al-Qaeda-Jihadist discourse, as already noted above, multiple lines of argument are used to justify use of WMD against the United States and the West. Increasingly the legitimacy of use appears to be taken as a given at least within the writings and statements of individuals.

39 Public opinion polling reveals this impact. See, for example, Kull, “Muslim Public Opinion on US Policy, Attacks on Civilians and al-Qaeda,” op. cit.
key Jihadist figures. In addition, as also discussed in by Givner-Forbes and Kovner in Section 2, Part 3, a range of different strategic purposes for using WMD can be discerned.40

Perhaps least reflective of a calculated and instrumental approach, use of nuclear weapons or other WMD is seen by some Jihadists as an appropriate act of retaliation to alleged prior U.S. attacks on innocent Muslim civilians, use of WMD or use of conventional explosives with WMD-like effects in Islamic countries, and comparable perceived Western atrocities.41

By contrast, three other perceived purposes or “uses” - employment as a decisive weapon, employment as an equalizer, and employment as a psychological weapon against opposing troops - all entail use of WMD not to “get even” but to force changes of U.S. policy. Those changes might come about due to the shock effect of a sufficiently destructive attack - as was the case with the Jihadist-cited U.S. use of atomic weapons to end the war in the Pacific against Japan. Somewhat differently, some Jihadists argue for WMD use as an equalizer, less intended to deliver a decisive shock than to equalize American conventional superiority and make the United States incapable of continuing to pursue its regional objectives. Use of biological and chemical weapons as well as radiological dispersal devices, are explicitly cited. The perceived psychological payoff of using chemical or biological weapons to erode the morale of opposing military forces also falls in this bin.42

Deterrence of the United States also figures as a possible “use” of WMD, including references to nuclear, chemical, and biological weapons. But the discourse suggests an apparent division within the al-Qaeda-Jihadist leadership on the conditions of deterrence. For some writers, an actual employment is needed for deterrence; for others, deployment alone could suffice.43

Finally, possession of WMD - or even claimed possession - is sometimes seen as an important means of recruiting new followers and rallying support among the wider Muslim communities around the globe. Possession helps to convey an image of Jihadist strength and

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an aura of invincibility.\footnote{Ibid., pp. 17-18.} This is seen to be so even if the capability is still lacking but there is widespread U.S. and Western fear expressed about al-Qaeda’s efforts to acquire such weapons.

By way of an aside, it bears noting that within the al-Qaeda-Jihadist discourse as analyzed in Section 2, there is for the most part little explicit discussion of which particular uses of WMD would best serve the different payoffs. This is so even though there is a great deal of chatter among the on-line Jihadists about this or that specific use of WMD. That said, it is possible to speculate about which types of WMD would fit best with the different perceived payoffs, or at least to do so from a U.S. perspective. Suffice it to suggest that both nuclear and biological weapons appear to stand out.


For the most part, outside experts assume that the target of an al-Qaeda WMD use would be a major urban area. This assumption is consistent with the extensive efforts made by the al-Qaeda leadership to justify mass killings of innocents. It also fits with the pattern of past attacks, including attacks on hotels, embassies, symbolic buildings, and public transportation.

At the same time, in thinking about future targets, another emerging theme within the al-Qaeda-Jihadist discourse should not be overlooked. This is an increasing emphasis on “economic jihad,” that is attacks seeking to undermine decisively the American economy and American economic well-being. These attacks are seen as taking place in parallel with more traditional political jihad attacks aimed at physical and human destruction.

In particular, economic jihad places emphasis on attacks against American strategic assets, not least oil and energy targets, at home and abroad. Still other attacks that would have a major economic impact would include attacks against American agriculture (e.g., the livestock and poultry industries) and against transportation choke-points (port and rail hubs). So viewed, use of a nuclear weapon or even a RDD would be an especially damaging means to attack oil refining capacity as well as certain critical ports. Certain types of biological agents would be particularly damaging for an attack on the livestock and poultry industries, with a potential to wipe out whole sectors.\footnote{For elaboration, see Ibid., passim.}

4.3 WME Terrorism by al-Qaeda-Jihadist Movement -- One Interim Next Step

Since the 9-11 attacks, fear of an al-Qaeda use of WMD clearly has been one of the central concerns of U.S. policy, strategy, and operations. This focus is warranted by the so far al-Qaeda-unique combination of a proven interest or ambition to acquire WMD, an extensive
justification for WMD use with large-scale loss of innocent life, and multiple perceived strategic payoffs for al-Qaeda's goals of using WMD.

At the same time, as argued by William Yengst in Section 2, Part 5, next generation al-Qaeda terrorism is quite likely to include mass effects attacks. The precedents already exist and al-Qaeda has shown an enduring interest in such attacks, exemplified by both the thwarted 1995 OpPlan Bojinka Plot to attack up to a dozen aircraft over the Pacific Ocean and the equally thwarted but comparable August 2006 plot to attack aircraft over the Atlantic Ocean. Many of the payoffs sought from WMD attacks could also be achieved with unconventional uses of conventional or non-traditional means. In that regard, as already noted, the attack on the World Trade Center towers was the first successful weapon of mass effects attack. Technical trends, including the increasing Internet-based networking of societal functioning at all levels – from individual communications to country-wide infrastructure – provide attractive targets. Unlike use of WMD, WME terrorism also may entail fewer questions being raised by al-Qaeda's wider audience in the Muslim world. Further, it could well be easier technically for al-Qaeda or another like-minded group to escalate to WME attacks or repeated WME attacks. For all of these reasons, WME terrorism needs to be included in this characterization of next generation terrorism.

There are various metrics for determining whether any attack has mass effects. A future attack might rank very high on any one of these metrics or some combination of effects might warrant its inclusion. In principle, the mass effects of a given category of attack, e.g., on economic infrastructure, could be magnified over time by carrying out successfully a campaign of attacks. In practice, however, it would be more difficult for al-Qaeda to sustain a campaign of repeated attacks in close proximity in a peacetime environment – vice in the midst of a conflict zone such as Iraq.

Possible means for a WME attack range widely. Means include:

- Non-conventional use of the kinetic energy available in a broad range of vehicles moving at different velocities (e.g., aircraft, trains, and ships) to strike buildings, public centers, bridges, and other targets;
- Attacks on agricultural industry sectors (e.g., poultry);
- Industrial explosions; and
- Any number of ways of contaminating flows and “breaking” critical infrastructure by damaging or disrupting operating equipment, hard-to-replace components, and similar control assets. (In addition, as discussed next, network-based attacks provide a closely related non-traditional means to have mass effects.)

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47 Mass effects terrorism by other entities is discussed below.

48 See Yengst, op. cit., Section 2, Part 5.
Executive Summary

Dynamics of Next Generation WMD and WME Terrorism

Using the preceding means, there are many potential terrorist attacks that potentially could have mass effects – and which would be within reach of a terrorist group such as al-Qaeda. As one starting point for thinking about mass effects terrorism, the initial Yengst analysis suggests the combinations summarized by Table 1.1.2 may be most threatening as means of weapons effects, assuming a single attack.

In addition, certain types of WME attacks would lend themselves well to being part of a more extensive terrorist attack campaign. From this perspective, still other attacks as summarized by Table 1.1.3 appear most promising for al-Qaeda or another terrorist entity seeking mass effects attacks.49

Stepping back from the more specific discussion, the Yengst analysis does not contend that all such WME attacks will occur at some point in the future. Nor does the analysis claim to have set out all potential WME attacks, e.g., not only the poultry industry but also the livestock industry would be vulnerable to a biological attack. Different attacks also vary in terms of their ease of execution, e.g., with forest fires being quite easy to start but contaminating water supplies much more difficult to carry out successfully. In turn, the extent

<table>
<thead>
<tr>
<th>Target of Attack</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear power plants, national laboratories, volatile chemical plants</td>
<td>Explosives, kinetic energy</td>
</tr>
<tr>
<td>Large sports arenas, stadiums, convention centers</td>
<td>Kinetic energy</td>
</tr>
<tr>
<td>Large office buildings</td>
<td>Kinetic energy</td>
</tr>
<tr>
<td>Extensive forest fires</td>
<td>Incendiaries</td>
</tr>
<tr>
<td>Large transportation bridges</td>
<td>Kinetic energy</td>
</tr>
<tr>
<td>Potable water aqueducts</td>
<td>Contamination</td>
</tr>
<tr>
<td>Chemical plants</td>
<td>Explosives</td>
</tr>
<tr>
<td>Chemical plants</td>
<td>Incendiaries</td>
</tr>
</tbody>
</table>

Table 1.1.2: Most Threatening WME Attacks – Single Attack

<table>
<thead>
<tr>
<th>Target of Attack Campaign</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cruise ships</td>
<td>Kinetic energy</td>
</tr>
<tr>
<td>Oil refineries</td>
<td>Incendiaries</td>
</tr>
<tr>
<td>Poultry industry</td>
<td>Biological</td>
</tr>
<tr>
<td>Levees and dams</td>
<td>Kinetic energy</td>
</tr>
<tr>
<td>Crops</td>
<td>Biological</td>
</tr>
<tr>
<td>Firework factories-urban area destruction</td>
<td>Explosives</td>
</tr>
<tr>
<td>Urban centers</td>
<td>Flooding</td>
</tr>
<tr>
<td>Oil and gas pipelines</td>
<td>Explosives/fires</td>
</tr>
<tr>
<td>Subway tunnels</td>
<td>Explosives</td>
</tr>
<tr>
<td>Lumberyards</td>
<td>Incendiaries</td>
</tr>
</tbody>
</table>

Table 1.1.3: WME Attack Campaigns

Still other attacks do not appear promising as WME attacks, as suggested by the Yengst analysis below.
to which elements within the al-Qaeda-Jihadist movement would find it attractive to pursue
one or another of these types of attack is a matter of judgment. What this analysis does
strongly suggest, however, is that additional mass effects attacks of some sort will likely be a
central feature of next generation terrorism and quite possibly a more important element than
it has been in the past.

4.4 \textbf{WMD and WME Terrorism – Other Entities than al-Qaeda}

The al-Qaeda-Jihadist movement comprises today the highest priority WMD or WME
terrorist threat. For reasons set out above, this movement also should be considered the
highest priority next generation WMD or WME terrorist threat. It would be a mistake,
however, to concentrate our attention exclusively on the al-Qaeda-Jihadist movement. Rather,
as argued in the DeMarce, Kovner, and Moran discussion of the future terrorist landscape,
there are several reasons to take seriously the potential for WMD or WME terrorism involving
the “non-al-Qaeda.”

First, the geopolitical trends highlighted above - including especially personal disaffection,
challenges to the traditional nation-state, the rise of cross-national ethnic, religious, and social
groupings often bound together by a myth of struggle against others, continuing population
flows across borders, and movements of anti-globalization itself - all point toward the further
rise of violent extremism across the world’s regions. The most likely result will be a greater
incidence of traditional “bombs and bullets” terrorism. But those same trends would help
create conditions that could make it easier or more likely for one or another extremist group
to escalate to WMD acquisition and use. Second, in the years ahead, national and
international responses to terrorism are likely to continue to improve, motivated in part by
memories of major terrorist attacks and moved ahead by learning from those past attacks. As
a result, the most extreme groups could well come under pressure to find new and more
effective means to pursue their agendas. Third, possibilities for more discriminate use of
certain types of WMD – especially biological and chemical weapons – could lessen the
internalized constraints against WMD use on the part of some non-al-Qaeda groups.

It is not possible to predict reliably which of today’s terrorist groups that have yet to show
an interest in WMD or WME terrorism might do so in the future. Similarly, it is not possible
to predict reliably now what new groups might emerge and seek to escalate to WMD or WME
terrorism. However, it is possible, on the one hand, to develop a typology of current and
future terrorist groups and, on the other hand, to speculate about which ideological types of
terrorist entities might be most disposed to consider use of WMD or WME in light of what
DeMarce, Kovner, and Moran term their “rationale for instrumental violence” and the
constraints on such use. (The rationale for instrumental violence reflects a group’s ideological-
strategic mindset and goals; its environment of actors and audiences with which the group
interacts or seeks to influence; and its driving organizational imperatives or dynamics.)

\textsuperscript{51} It also is possible to highlight some wild cards that could affect the WMD or WME calculations
of next generation terrorist entities.

\textsuperscript{50} See DeMarce, Kovner, and Moran, \textit{op. cit.}, passim.
\textsuperscript{51} See DeMarce, Kovner, and Moran, \textit{op. cit.}, pp. 5-8.
More specifically, Table 1.1.4 below, extrapolated from the DeMarce, Kovner, and Moran analysis, sets out one possible typology, along with some speculation on the disposition of different types of entities to escalate to WMD or WME violence in the future. In addition, it highlights certain “wild card” factors that could make different groups more prepared to contemplate use of one or another type of WMD. Bearing in mind the limits of generalizations, several points stand out:

<table>
<thead>
<tr>
<th>Type of group</th>
<th>Ideological-strategic mindset</th>
<th>Constraints</th>
<th>Balance of ideology and constraints</th>
<th>Wild Cards - options, organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religious Extremist</td>
<td>Destroy enemies of the faith</td>
<td>Risks alienating supporters</td>
<td>Most disposed to WMD-WME use</td>
<td>Organizational survival at stake; splinter group uses</td>
</tr>
<tr>
<td>Apocalyptic</td>
<td>Violence an end in itself</td>
<td>Divine</td>
<td>Most disposed</td>
<td>Access to WMD</td>
</tr>
<tr>
<td>Ethno-nationalist-separatist</td>
<td>Socio-political – redress political-societal grievances; gain political power</td>
<td>Indiscriminate violence may provoke massive crackdown; risks alienating supporters at home and abroad</td>
<td>Least disposed</td>
<td>Discriminate, targeted, or asymmetric use becomes possible – biological or chemical weapons; survival at stake; splinter group uses</td>
</tr>
<tr>
<td>Left wing and social revolutionary</td>
<td>Catalyze transformation of social order</td>
<td>Indiscriminate violence risks alienating supporters at home and abroad</td>
<td>Probably low but could change</td>
<td>Discriminate use becomes possible; traditional means failing</td>
</tr>
<tr>
<td>Right wing</td>
<td>Purify and cleanse society; limit or end minority rights</td>
<td>Indiscriminate violence may provoke massive crackdown; harm own constituency</td>
<td>Unlikely if indiscriminate – unless unique factor, e.g., concentration of Jews in NYC or Miami creates enemy enclave</td>
<td>Discriminate or targeted use becomes possible – biological or chemical weapons; splinter group uses</td>
</tr>
<tr>
<td>Single-Issue (e.g., environment, animal rights)</td>
<td>Narrowly defined source of “wrong policy”</td>
<td>Indiscriminate violence risks alienating own constituency, losing wider sympathy</td>
<td>Unlikely if indiscriminate</td>
<td>Discriminate or targeted use; splinter group redefines who is responsible for “wrong policy” to include public at large</td>
</tr>
</tbody>
</table>

Religious extremist entities appear most disposed to use of WMD or WME given their ideologies. Such groups are likely to become even more prevalent, moreover, because of the geopolitical trends already highlighted. At least some but not all of these religious extremist entities are likely to be constrained by concerns of alienating their...
supporters. In that regard, one or another of the Kashmir separatists could well be a prime candidate to move over time toward possible use of WMD.52

At the other end of the spectrum, ethno-nationalist separatist groups overall appear least likely to escalate to WMD or WME violence, given their politically focused ideological agenda, the risk of provoking a massive crackdown, and concern about alienating supporters. However, a specific group could take the step to use WMD or WME if its survival were at stake or if discriminate use were possible. Elements within the Chechens could be a case in point as could be the Tamil Tigers (LTTE).53

The respective ideological-strategic mindsets of left wing social revolutionary groups, right wing groups, and single issue groups all appear at odds with indiscriminate violence. Such violence also would have potentially serious risks of a government backlash and crackdown.54

However, more extremist right-wing groups could be prepared to use wholesale violence against an “enemy enclave” of ethnically, racially, politically, or nationally-defined communities. The most critical condition would be the fact that the target community occupied a discrete geographic space, thereby limiting potential damage to the group’s constituency. This could ultimately result in consideration of WMD use by more radical elements of such groups.55

Extrapolating from widespread concern about the backlash of indiscriminate violence, the possibility of more discriminate WMD use appears to be a potential “wild card” that could shift the calculus of all of these non-al-Qaeda-Jihadist entities. In varying degrees, chemical, biological, and radiological weapons all could be used in more discriminate or limited attacks – rather than in an attempt to cause large-scale destruction or very high numbers of casualties. Discriminate use could entail targeting a particular racial, ethnic, or geographic community, targeting key political-military sites, or targeting key officials.56 Precedents exist which might influence terrorist thinking more broadly, although the specific attacks involved al-Qaeda. UK police, for example, thwarted a plot of an al-Qaeda cell to use ricin to kill wealthy and prominent Jews in London. The anthrax mailings of 2001 targeted specific political and media figures. To the extent that the use of an explosives-chlorine mixture in Iraq has targeted American troops, this, too, could influence next generation entities thinking about uses of WMD.57

Organizational dynamics is still another wild card that could impact the likelihood of next generation WMD or WME use, especially by entities other than al-Qaeda-Jihadists. Fear that organizational survival was at stake could create pressures to escalate in whatever way possible. A splinter group – or a small group within the overall organization – also could be more prepared to use WMD or WME. In turn, an erosion

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52 See Ibid., pp. 8-10, 16-22. Also see Rodney Jones, “Violent Extremism in South Asia: Implications for Future WMD Terrorism” in Appendix VI.

53 See DeMarce, Kovner, and Moran, op. cit., pp. 10-12, 26-27.


56 Though such discriminate use would not entail mass destruction it would entail use of chemical or biological agents. It also would be an escalation from traditional bombs and bullets terrorism. For both reasons, it is included here.

57 On this issue of indiscriminate v. discriminate violence, see, Ibid., pp.11-5, passim.
of the effectiveness of traditional “bombs and bullets” strategy is a final organizational wild card.\textsuperscript{58} Here, too, there are some precedents. For instance, only a small core group was involved in the Aum Shinrikyo decision to use anthrax and sarin. In turn, their decision was motivated by fear that actions by the Japanese government were about to put the organization’s survival at risk.\textsuperscript{59}

- A redefinition of the source of the problem on the part of a terrorist group is another wild card that could influence whether some of today’s entities shift toward more extreme, indiscriminate violence. As discussed below by DeMarce, Kovner, and Moran, radical environmental groups, for example, focus their attention on damage being done to the environment by the practices of individual firms, governments, and organizations. As a result, their use of violence has been precise and targeted. Again extrapolating from this line of argument, were the publics at large, especially in advanced Western countries, to come to be viewed as the ultimate root cause of environmental destruction, the constraints on indiscriminate WMD use could be greatly weakened. At the most extreme, a small fringe or splinter entity could seek to “save the environment by killing the people”, that is, using possibly lethal and contagious biological agent to restore the balance between the globe’s population and the ability of the environment to support that population.

4.5 Individual Loners as WMD or WME Terrorists

The possibility that next generation WMD or WME terrorism could include attacks carried out by individual loners also warns against focusing exclusively on the al-Qaeda-Jihadist threat. Precedents again exist, e.g., the still-unsolved 1982 tampering with Tylenol and the 2001 anthrax mailings, both presumed to have been carried out by a lone individual.

Even more important, as suggested by Figure 1.1.1, it no longer is the case that extreme violence is the purview only of states. Instead, over time, the spread of advanced technology, the sales of military technologies, the diffusion of scientific knowledge, and the overall process of globalization are bringing a

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure1_1_1.png}
\caption{A Typology of Terrorist Groups – and WMD-WME Balance}
\end{figure}

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\textsuperscript{58} This factor is partly discussed in Justin Maquirk, Darcy Noricks, and Dominick Wright, “Terrorist Use of WMD - A Network Approach”, in Appendix IV.

\textsuperscript{59} This information about Aum Shinrikyo was related by Marc Sageman at a small group meeting on WMD Terrorism attended by one of the SAIC team.
capability for greater and greater violence into the hands of smaller and smaller entities, including individuals. 60 Within the WMD category, the one exception may be the direct production of nuclear weapons, which probably though not certainly still remains the purview of states.61

In addition, contrasted with groups, there are significantly less constraints on a loner contemplating a chemical, biological, or WME attack. Key differences include: no fear of alienating its audience or constituency; no inhibitions from group dynamics; and less concern about triggering a law enforcement crackdown.62 In addition, the lone operator is likely to be less likely to be detected by intelligence and law enforcement authorities, either in preparing or carrying out an attack. If suffering from mental illness, the lone individual may be both less predictable and not given to rational cost-benefit calculations in any case. Here, too, access to the Internet could be an enabler, whether in providing technical information or in helping to plan how to attack a particular target. (As noted above, for network based attacks the Internet would also be the means of attack).

With regard to possible major loner attacks, certain types of biological weapons appear to provide the most plausible route of a single individual seeking maximum deaths, destruction, or disruption - or “mega-terrorism”. Two such attacks that appear both within technical reach of a single individual and capable of mass effects - either tens of thousands of deaths or destruction of an important economic sector - are use of the Marburg virus to attack people and use of hoof and mouth disease to attack livestock. By contrast, there may be significant technical constraints on an individual’s ability to use other means to execute other “mega-terrorist” attacks.63

However, if the level of death, destruction, or disruption to be achieved is relaxed, potential for individual WMD or WME terrorism expands. Individuals could make use of other biological agents and chemical agents on a smaller scale. Innovative uses of conventional means also have been identified, e.g., including incendiaries to attack forests and urban areas, high-powered rifles to destroy critical power transformers, metallic “chaff” to short out power lines, and explosives used in a campaign against high visibility human targets.64

60  This changing relationship between the level of violence and the accessibility to smaller and smaller entities of the means to carry out very violent attacks was suggested to me by Brian Jenkins in the “Evil Genius” workshop sponsored by DTRA/ ASCO in June 2006.

61  Though this possibility was not raised by the authors below, even for nuclear weapons, the possibility should not be completely excluded that a well-funded, well-organized terrorist group with a territorial safe-haven could not out-source the procurement and production of a crude nuclear device - assuming it could rely on a future A.Q. Khan as its middleman.

62  The following draws on the remarks of Jeff Simon at SAIC’s Next Generation Terrorism workshop in February 2007. Also see Jeff Simon, “The WMD Terrorist Threat: Some Givens, Some Changes, and Some Uncertainties,” in Appendix III.

63  These conclusions draw on input from Barry Erlick, who also coined the term “mega-terrorism” in thinking about the constraints and opportunities for an individual seeking to carry out a terrorist attack.

64  The possibility of extreme violence by lone individuals was one of the conclusions of the “Evil Genius” workshop.
4.6 \textit{Network Attacks – for Mass Effects}

Modern society is becoming increasingly penetrated by networking technology. From the networking of physical objects to the networking of financial dealings, the Internet has become a societal and global command and control system. As explored in Section 2, Part 6 by Stephen Lukasik, the Internet also has resulted in a new cyber-space battlefield with new targets, specific vulnerabilities, and a myriad of channels of attack. Attacks across the Internet taking advantage of those channels of attack are labeled here “network attacks.” One possible purpose of such attacks would be to damage or destroy “things” – and for that reason, it warrants brief inclusion here as part of next generation WMD or WME terrorism.\textsuperscript{65}

For next generation WMD or WME terrorism, two issues are of particular importance: the spectrum of potential attacks that are conceivable; and the range of potential attackers. Consider each dimension in turn.

With regard to the spectrum of potential attacks, as set out in the Lukasik analysis, a useful typology focuses respectively on economy-oriented attacks and people-oriented attacks. Depending on the specific network-based attack, the impact would vary. Some of these attacks would not fall within the category of mass effects attacks directly though they might facilitate later, larger-scale attacks. Thus, a network based attack aimed at reputation assassination would have a physically limited impact but could be quite important politically. But network attacks could well have immediate mass effects in terms of loss of life, physical destruction or disruption, and other metrics, e.g., attacks on critical energy or oil infrastructure. Attacks that leveraged interdependencies across many economic sectors would be among the most damaging of the latter attacks.\textsuperscript{66}

Turning to potential perpetrators of network attacks, four potential attackers stand out.\textsuperscript{67} These are: al-Qaeda-Jihadists, loners, criminals and criminal groups, and other or future terrorist entities. In each case, it is possible to identify both motivations and precedents, including for mass effects attacks across the cyber space battlefield.

In particular, next generation terrorism could well include efforts by elements within the al-Qaeda-Jihadist movement to use the Internet as a means to carry out mass effects attacks. On the one hand, al-Qaeda already is leveraging the Internet for multiple purposes – recruitment, training, morale building, communications, and others. It would be a natural progression for “network-savvy” individuals to look for ways to use the Internet as an attack mode. The emphasis within the al-Qaeda-Jihadist discourse on the concept of Economic Jihad as well as the continuing attacks on oil infrastructure in Iraq reinforce the judgment that at some point these entities will take the step to network-based attacks against critical infrastructure with potential mass effects. Their targets could be in the United States or overseas, including especially oil refining and processing which is viewed by al-Qaeda as a strategic target.

\textsuperscript{66} Ibid., pp. 23-32.
\textsuperscript{67} Ibid., pp. 11-16.
Some observers may ask, however, whether mass effects attacks leveraging the networked nature of modern society would run counter to al-Qaeda's interests. It is true that the al-Qaeda-Jihadist movement depends heavily, as already noted, on the Internet for recruitment, operational coordination, funding, and other trans-national activities. They would lose a great deal if the Internet went down. But the types of attacks being examined here would not disrupt the flows of information on the Internet, which many believe is virtually impossible to "bring down." Instead, what sets this type of network-based attacks apart from more traditional cyber-terrorism is that it would leverage and use the Internet to access and then disrupt specific infrastructure control systems and operations.

5. Conclusion - The dynamics of Next Generation WMD and WME Terrorism

Based on the preceding discussion and on the more detailed analytic papers that follow, a number of over-arching judgments are warranted. By way of conclusion:

- Over the next 3-15 years, the number of terrorist entities should be expected to continue to increase, continuing an historic pattern of exponential growth in terrorist groups, leaders, and followers. Multiple geopolitical trends - many tied to the impact of globalization on individuals, groups, and nations - all comprise drivers for this emergence of more extremists groups. Many of these groups will be characterized by religious extremism; but there also will be many other motivating ideologies. The Internet increasingly will be a powerful and multi-faceted terrorist enabler, including WMD and WME terrorism.

- In parallel, technological trends point toward the capability to do extreme violence becoming accessible to smaller and smaller entities, including individuals. Though direct production of nuclear weapons probably exceeds the technical capabilities of all but states, terrorist groups could well obtain nuclear weapons by purchase, theft, or gift. Ties between terrorist groups and traditional criminal organizations are likely to make it easier for such groups to gain access to - and to transport - WMD.

- With regard to specific groups, the next generation WMD threat will continue to be most characterized by the threat that the al-Qaeda-Jihadist movement will successfully acquire and use any one of chemical, biological, radiological, or nuclear weapons. Aborted or failed attempts to use biological and radiological weapons already have occurred. The repeated use of chlorine-explosive mixtures by al-Qaeda in Iraq is no longer simply setting an isolated precedent but instead institutionalizing a new mode of terrorist attack. With regard to nuclear weapons, barring some unexpected reversal, the debate within the Jihadist community about the legitimacy and justification of WMD
use and mass killing appears increasingly to be over. At the least, the “use is justified” voices remain unanswered and appear to have won. Within the al-Qaeda-Jihadist discourse, multiple arguments also are being put forward that WMD use would help to achieve the movement’s strategic goals. Indeed, there is reason to conclude that what matters most to a significant constituency within the al-Qaeda-Jihadist movement is not use of WMD but mass killing of Westerners by whatever means available.

- For other non-al-Qaeda terrorist groups indiscriminate violence remains at odds with their rationale for instrumental violence. Nonetheless, some of these groups or elements within them could seek to escalate to the more discriminate use of chemical or biological violence in the next 3-15 years. In particular, for several such groups, more discriminate or targeted use of these weapons could come to be seen as a means to serve their ideological-strategic goals – without entailing too great a risk of alienating supporters or triggering a massive crackdown. This includes especially future ethno-nationalist-separatist and right wing groups. WMD use against an “enemy enclave” by right-wing or ethno-nationalist-separatists also could come to be seen as justified. Perhaps more speculative, the possibility should not be precluded that even less discriminate WMD use could come to be seen as a legitimate and necessary means in a global struggle by extreme environmentalists or a revolutionary global anti-globalist movement. In all of these cases, technical trends would make access easier to WMD.

- The possibility of WMD terrorism by loners also characterizes the next generation threat. Access to nuclear weapons is excluded. By contrast, significant if not necessarily always mega-terrorist biological violence is likely within reach of future loners.

- Next generation WMD terrorism could include increasing use of more discriminate, targeted WMD attacks. Depending on the terrorist group, as noted, more discriminate use could be perceived to have far fewer potentially adverse consequences. Particularly for use by groups other than the al-Qaeda-Jihadist movement, how their respective supporters and adversaries respond to any initial use could be an important influencer.

- Over the next 3-15 years, various types of weapons of mass effects terrorism could come to complement traditional “bombs and bullets” terrorism as a preferred method of attack. For the al-Qaeda-Jihadist movement, this step would flow naturally from the 9-11 attack as well as from other but thwarted mass effects attacks. Many different attack modes are possible, using conventional means in non-traditional ways and attacking high-value targets. Campaigns of more limited attacks also offer a route to mass effects. Over time, mass effects terrorist attacks could come to be as “routine” as today’s “bombs and bullets” attacks. They also could be a stepping stone to WMD attacks for groups that continue debating the payoffs and risks of taking that step. Network attacks to “break things” could emerge as one important type of such mass effects attacks.

- The final characteristic of next generation WMD and WME terrorism could well be terrorist WMD or WME campaigns. Such campaigns could entail use of any of the types of WMD. For groups or individuals, a campaign would provide a powerful force multiplier effect.
Section 1: Executive Summary

Part 2
Responses to Next Generation WMD and WME Terrorism

Lewis A. Dunn
SAIC

1 Introduction

Building on the preceding analysis, the SAIC project explored possible U.S. responses to the evolving next generation WMD and WME terrorism threat. No attempt was made, however, to set out a fully comprehensive U.S. response strategy. Instead, the analysis took existing U.S. strategies, policies, and activities to counter the threat of WMD and WME terrorism as its starting point and focused on identifying new response initiatives to fill possible gaps in today’s U.S. efforts. In addition, the analysis set out and assessed in greater detail a possible approach to fill one of the most prominent of those gaps – the need for a strategy aimed at influencing the WMD acquisition and use calculus of terrorist groups and their component entities, including al-Qaeda. The following discussion summarizes the key recommendations, which are set out in Section 3 of this report.2

2 U.S. Activities to Counter WMD and WME Terrorism: top priority complementary response initiatives

Existing U.S. policy and strategy documents set out a broad set of objectives for U.S. efforts to counter the threat of WMD terrorism. Many different activities are currently being pursued to achieve those goals. Against this backdrop, a number of high payoff complementary initiatives were identified to strengthen U.S. efforts to counter the evolving next generation WMD and WME terrorism threat. These new or

U.S. Objectives - from Existing Policy Documents

• Determine terrorists’ motivations, intentions, capabilities, and plans;
• Deny terrorists access to materials, components, expertise, and other enabling capabilities;
• Deter and dissuade terrorists from employing WMD or state support for terrorist use of WMD;
• Detect and disrupt terrorists attempted acquisition, movement, and/or use of WMD;
• Prevent and respond to a terrorist WMD attack, including managing the consequences of that attack; and
• Determine the nature and scope of a terrorist WMD attack

1 The analysis of U.S. responses was undertaken by Lewis A. Dunn. Although some of the other members of the overall project were involved in small group sessions on U.S. response initiatives, Dr. Dunn ultimately is responsible for the recommendations put forward herein. A short discussion of responses to the threat of network based attacks also is included at the end of Stephen Lukasik’s paper in Section 2, Part 6.

2 Section 3 also includes a discussion of the implications for the Defense Threat Reduction Agency, which is not summarized in this overview. For that discussion, see Section 3, Part 3 of this report.
complementary initiatives cover different functional areas – intelligence; policy, doctrine, and operations; and norm and capacity building. These initiatives also vary in terms of how difficult they would be to pursue and implement successfully. In particular, there are several high payoff initiatives whose successful pursuit would require overcoming tough technical, conceptual, or operational challenges. In summary here, the top priority initiatives are:

2.1 **Monitor non-al-Qaeda Groups’ WMD Interest**

While the Al-Qaeda-Jihadist movement will remain the most dangerous “next generation” WMD threat to the United, some other non-al-Qaeda extremist groups could consider acquisition or use of WMD. To lessen the risk of a future terrorist surprise, existing intelligence monitoring and analysis should be reviewed to determine whether sufficient attention is being paid to the WMD motivations, intentions, and capabilities of these other groups. Particular attention should be paid to the conditions under which the two most prominent Islamist non-al-Qaeda groups – Hamas and Hezbollah – or factions within those groups could escalate to WMD violence against a U.S. ally or the United States itself.

2.2 **Accelerate Implementation of UNSCR 1540**

Fully implemented, United Nations Security Council Resolution 1540 (2004) would be a major step forward in enhancing controls to prevent non-state actors from gaining access to WMD-related materials, components, know-how, and related items. It also would strengthen the norm of cooperation to prevent, disrupt, and respond to WMD terrorism by requiring countries to criminalize certain non-state activities. The United States should continue its efforts to work with other countries to accelerate implementation of this Resolution’s obligations. Specific steps could include modifying the on-going Cooperative Threat Reduction (CTR) Program to include support for accelerated implementation, especially now that CTR activities in Russia are phasing down and the Congress is supporting a more global role for CTR.

2.3 **Influence terrorists’ WMD acquisition and use calculus**

Another high priority action is to put in place a strategy aimed at influencing terrorists’ calculus about acquisition and use of WMD – including especially the calculations of the many different groups and component entities that comprise the al-Qaeda-Jihadist movement, outsider aiders and abettors, and possible state supporters. Such a strategy would begin to implement but go beyond the emphasis within existing U.S. counter-terrorist policy documents on deterring terrorist WMD use. This new initiative could draw on an emerging consensus within the U.S. analytic community on the key concepts of such an influencing strategy. It also would be an important complement to ongoing efforts to prevent terrorist

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3 In the course of the study, different terms were used for this element of U.S. efforts to counter the threat of WMD terrorism. Initially, we adopted the term “deterrence,” which is used in existing U.S. strategy documents and was used in the prior work of the principal author of Section 3 of this report. However, as argued in Section 3, Part 2, deterrence is too narrow a concept. Later the term “shaping” was used. This term has begun to gain popularity among experts. But shaping may well imply too great a U.S. capability to form or impact terrorists’ thinking. Ultimately, the choice was made to use the term “influencing.” This term highlights two key dimensions of this aspect of the proposed U.S. strategy: the search for U.S. actions that to quote the Random House Dictionary of the English Language definition would “move or impel (a person) to some action,” and the wider range beyond deterrent threats of punishment or traditional denial policies of such U.S. actions. The author thanks Jen Perry of ASCO for her persistence in asking that he clarify this terminology.
access to WMD as well as to interdict or disrupt a terrorist WMD attack in progress. (The report’s analysis of the elements of such a strategy for influencing terrorists’ WMD acquisition and use calculus – and its assessment of the prospects for success – is summarized below in this Overview.)

2.4 develop a Family of National Response Plans

Building on the overall National Response Plan, a family of National Response Plans to manage the consequences of a terrorist WMD or WME attack should be developed. Judgments will likely differ on what plans to develop, in what order. Development of a National Response Plan for an Anthrax Attack would be one place to start. This agent combines potentially high lethality as well as relative accessibility. Two other clear candidates for early action would be plans for responding to attacks with a radiological dispersal device (RDD) and with an improvised nuclear device. Another plan that should be included would focus on for early warning and response to a terrorist WMD campaign.

Development of a family of National Response Plans would strengthen U.S. capabilities to manage and mitigate the consequences of any type of attack. In turn, a more effective response would help strengthen public resiliency in the face of a future terrorist WMD or WME attack.

2.5 initiate political-Military Planning for responses after a Terrorist WMD Event

Planning should be initiated now on U.S. global political and military responses – as opposed to consequence management – after a terrorist WMD attack. One purpose of such planning would be to clarify U.S. objectives after an attack. Planning now also would help to identify capabilities needed to provide the President with a full range of response options in the immediate aftermath of an attack. Given that one purpose of an attack for al-Qaeda's core leadership would likely be to provoke an excessive U.S. response (thereby helping to rally public support to al-Qaeda), another purpose of political-military response planning now would be to help avoid potentially costly missteps later. Not least, political-military response planning also should consider how to use the shock of a terrorist WMD event to strengthen if not transform the actions taken by other states as well as the broader international community to counter WMD terrorism and prevent WMD proliferation.

2.6 building habits of Global Cooperation

Continued and expanded actions to build habits of global cooperation among many states to counter WMD and WME terrorism are essential. Building habits of global cooperation would have many payoffs across the counter-terrorist spectrum: prevention of access to WMD-related inputs; detection of terrorist WMD activities; disruption of planning, preparations, and other activities by a terrorist cell for an attack; interdiction of terrorist travel and transit; attribution of an attack; and responses to an attack. Building habits of cooperation would sometimes entail making use of or transforming an existing initiative. For example, there are many reasons to broaden the scope of the Global Initiative to Combat Nuclear Terrorism to include other types of WMD terrorism. More ad hoc actions also should be considered, e.g., multi-country exercises to detect and disrupt a terrorist WMD attack. Intensified efforts to bring into force legal and other buttresses for such cooperation also are warranted.
One important purpose of all of these cooperative actions would be to help nations identify gaps and put in place needed legal authorities as well as internal mechanisms, procedures, and working ties to support timely cooperation. Another purpose would be to reinforce the principle of and legitimize international cooperation. Not least, as already demonstrated by existing cooperative efforts, the informal working relationships created between specific individuals in many different countries also would facilitate cooperative actions if ever necessary.

2.7 pursue a Multi-State Nuclear Emergency Response Capability

The nuclear weapon states - in whole or in part - should join together to think through how to cooperate in assisting a non-nuclear state confronted by a terrorist nuclear event. There are many reasons to initiate that discussion among them. Intercepted transit of a nuclear weapon or a nuclear weapon incident could happen virtually anywhere on the globe. A terrorist nuclear incident could involve material, design, or even a weapon from one of the existing nuclear weapon states. Rendering safe an intercepted nuclear device could call for expertise available only from one or more of the nuclear weapon states. Many types of assistance from the nuclear weapon states to a non-nuclear weapon state also are conceivable: for example, to evaluate whether a nuclear threat was a hoax or real; to render safe a nuclear device uncovered on that state’s territory; or in the worst case, to help a non-nuclear state deal with the consequences of a terrorist nuclear incident.

In light of the sensitivity of such cooperation, it would be best to start small – with informal meetings to discuss the concept, consider what types of authorities and procedures might be needed, and to consider what capabilities individual countries could bring to bear. Over time, other activities, including exercises, could be added. Ultimately, the concept should be explored of a more formal multi-country nuclear emergency support team with on-call dedicated personnel and equipment to respond to a nuclear terrorist emergency anywhere around the globe.

2.8 move to Protect the American Population from a Terrorist Biological Attack

Plans, procedures, and mechanism to alleviate the direct health effects on the American population of a terrorist biological attack – what will be referred to here as population protection – should be put in place and sustained. This is especially so given a broad consensus within the official and analytic communities that a terrorist biological attack is the most likely near-term terrorist WMD use. Moreover, the basic conceptual requirements for significantly reducing the impact on the American public of a biological attack are known. Early detection of an attack through public health monitoring or more technical means, use of antibiotics and other medical interventions to alleviate the impact on infected persons, possible quarantine to prevent spread in the case of infectious agents, and other actions all would be part of an effective response.

Progress in population protection against a biological terrorist attack, however, has been very slow. In part, questions persist about how best to apply basic protection concepts in practice. Political will is still lacking to accept the financial costs of protecting population from a biological terrorist attack. It occasionally is suggested that a major effort to enhance protection against a biological weapons attack will only encourage a terrorist group such as al-
Qaeda to carry out such an attack given U.S. fears of it doing so. The direct payoffs in lives saved, disruption contained, and wider public impacts avoided, however, would be high. Further, as argued in Section 3, Part 2, moving forward successfully to protect the American population from biological attack would be one way to influence in turn terrorists’ WMD use calculus - by helping create a perception that biological attacks would not serve their objectives, would have too low a prospect of success, and would divert resources from other more promising terrorist operations. A Presidential-Congressional commitment to the goal of protecting the American population from bio attack by a specified date, e.g., 2010, would be one way to move forward to get the job done.

2.9 explore Protecting Near-by Publics from a Terrorist Nuclear Event

The feasibility should be explored of protecting nearby publics outside of the immediate zone of destruction from the effects of nuclear fallout from a terrorist nuclear detonation, whether an improvised nuclear device or a stolen nuclear weapon. The limitations and difficulties of protecting population from nuclear attack are well known - not least the need for very rapid warning and public action either to take shelter against fallout or to evacuate the zone of potential radioactive contamination. Nuclear population protection also conjures up images of Cold War civil defense, even though the threat is very different. These technical and political difficulties make this initiative the most challenging one explored in this report.

Nonetheless, concern that it is only a matter of time before a major American city is subject to a terrorist nuclear attack reinforces the importance of revisiting this issue. Moreover, at least in principle, the possibility exists that many lives could be saved outside of the immediate zone of destruction by actions to protect against the nuclear fallout from a nuclear detonation. To test that possibility, next steps should include development and assessment of alternative operational concepts for nearby-public nuclear protection. Such concepts could seek to net together real-time monitoring of the blast and post-attack environment, assessment and modeling of fallout patterns, warnings to nearby publics, and public information about what actions to take in response to warning (e.g., to shelter in place - and how). Based on such concepts, requirements could be identified and assessed, whether for research and development initiatives, operational planning, doctrine, and actions, financial commitments, and public information. Ultimately, it then would be possible to make an informed decision about whether nuclear protection for nearby-publics is too tough - and whether it is so always, in most cases, or only for certain types of terrorist nuclear attacks.

2.10 enhance Public Resiliency Facing Terrorist WMD or WME Attack

Actions to enhance public resiliency facing a terrorist WMD or WME attack are a final top priority complementary initiative. Public resiliency will be an important determinant of the immediate political, social, economic, and psychological impact of a terrorist WMD attack. Equally important, the extent of public resiliency will go far to determine whether a terrorist group achieves its goals in carrying out a WMD attack - in the case of al-Qaeda, shattering official and public resolve and leading to decisive reversals of U.S. policy and posture across the Islamic world. Increasingly acknowledged to be a key challenge, there already are ongoing U.S. counter-WMD terrorist activities that would help to enhance public resiliency, not least consequence management planning and exercises at all levels of government. In addition, many of the top priority initiatives identified above also would serve this goal - a family of
National Response Plans to foster a more effective, credible governmental response to manage the consequences of a terrorist WMD attack; well-thought out political-military responses to channel almost certain public calls for a response; and population protection actions.

3. **Influencing Terrorists’ WMD Acquisition and Use Calculus**

The lack of a strategy and supporting actions to influence terrorists’ calculations of whether or not to seek to acquire or to escalate to the use of WMD, as already stated, is a major gap in the overall set of U.S. activities to counter WMD terrorism. In part, the failure to fill this gap reflects the considerable skepticism among both analysts and officials about the ultimate effectiveness of any such influencing efforts. Nonetheless, as argued in Section 3, Part 2 of this report, an influencing strategy along the lines set out here can be a valuable complement to other U.S. policies and actions.

3.1 Some Key “Influencing” Concepts

A number of key concepts would provide the framework for a U.S. strategy to influence terrorists’ WMD acquisition and use calculus. These concepts reflect the assumption, discussed more fully in the main body of the report, that in many cases, a terrorist decision to seek to acquire and use WMD will entail an element of rational calculation about whether WMD use would serve the group’s goals - even while there may be other psychological, organizational, social, and cultural factors at work. Similarly, for outsider aiders and abettors - whether individuals, organizations, or states - there also will be an element of rational calculation involved.

- **Influencing Terrorists’ WMD Calculus.** U.S. and global actions should aim at influencing the overall terrorist WMD calculus regarding the perceived costs and benefits of escalating from more traditional “bombs and bullets” terrorism to the use of WMD (including whether or not to seek to acquire WMD in the first place) - or comparable assessments by outsider aiders and abettors. This emphasis on influencing calculations encompasses the concept of deterrence but it also points toward a broader set of actions that might be pursued than simply punishment or even denial. Instead, many different actions can be pursued to influence such thinking about WMD acquisition and use.

- **Disaggregate the Terrorist “Whom”**. There is a wide variety of “targets” of efforts to influence terrorists’ WMD calculus. These different potential targets can be disaggregated in terms of: first, the specific group; second, the types of individuals within or associated with group that are likely to be involved in any terrorist WMD attack - or what is termed below the group’s component entities; and third, the wider set of outsider aiders and abettors of a WMD attack (including individuals, organizations, and state supporters that are not members of the terrorist group and do not adhere to its animating ideology). Within al-Qaeda, for example, it is important to distinguish the core leadership of Osama bin Laden and Ayman al-Zawahiri, affiliated Jihadist groupings, inspired Jihadist cells, and internal aiders and abettors that support activities. There also are many other non-al-Qaeda groups, each with their own component entities. In some instances, these non-al-Qaeda groups are Islamist but not Salafist, e.g., Hamas and Hezbollah; in other instances, they are non-Islamist, e.g., the
Identify Potential Leverage Points. Any influencing strategy needs to be based on an identification of the potential leverage points that might be used in targeting specific groups and their component individuals as well as outsider aiders and abettors. In principle, there is a spectrum of such possible leverage points. Is the use of WMD -- and quite possibly the killing of innocent civilians -- justifiable and legitimate in the terms of whatever religious or moral teachings are adhered to by the group and equally so its wider public audience of potential supporters? Most broadly, how smart would be the use of WMD? This question of “smartness” has in turn many dimensions. Would acquisition and use be an effective means to achieve the goals that animate the group and its members? What is the feasibility of acquiring WMD or in carrying out a successful attack? Are there other, better ways to use existing technical, organizational, financial, operational, and other resources than seeking to acquire and then use WMD -- again related partly to the prospects for a successful attack? And how much risk would be involved in attempting to acquire and use these weapons -- or providing outside support to such an attempt? Depending on the group, the component entities within it, and the specific outsider aiders and abettors, the answers to such questions are almost certain to vary.

Disaggregate among the Types of WMD. Efforts to influence terrorists' WMD acquisition and use calculus should take into account the differences among the types of WMD -- chemical, biological, radiological, and nuclear weapons. In particular, depending on the specific type of WMD, different leverage points could take on greater importance. For instance, an effective strategy to protect population from a biological attack would undermine the al-Qaeda leadership’s perceptions of the prospects of carrying out a successful major biological attack, while at the same time, making successful discriminate use of biological agents less attractive to other next generation terrorist groups. In both case, a lessened prospect of success would likely influence assessments of the desirability of investing their resources in going down that attack pathway.

Think Broadly Regarding “Who” Does the Influencing. Many different players need to be involved in any such efforts to influence terrorists' WMD acquisition and use calculus as well as that of outsiders. At one level, governments have a role to play. To the extent possible, the United States should seek the support and involvement of other like-minded governments. This would include not only traditional U.S. friends and allies, but also other governments throughout the Muslim world. Influencing terrorists' WMD calculus, however, is not simply a government problem. There also is likely to be a role for international, non-governmental, and community organizations of many sorts. In some instances, even a prominent individual could contribute to influencing terrorists' perceptions, e.g., as with the role of Islamic clerics in encouraging debate within the wider Muslim community about the legitimacy and justifiability of WMD mass killing.
Use Soft and Hard Power, Words and Deeds. Influencing the WMD acquisition and use calculus of different terrorist groups and their component entities will call for a mixture of both soft and hard power or words and deeds. At the core of soft power could be efforts to foster a debate and influence perceptions of the legitimacy and justifiability of WMD use - both because such a debate could yet influence the thinking of less committed individuals and because of the impact of that debate on the perceptions of terrorist leaders of whether WMD use would be supported by their wider audiences. From a narrowly American perspective, what officials say can also influence perceptions around the globe of American intentions, policies, and ultimately whether the United States is seen to be a factor of “good or evil” in world affairs. Hard power, on the other hand, ranges across the spectrum of organizations from law enforcement to covert operations to outright military operations. It includes not only military power but also economic means. Of particular concern, the potential unintended consequences from the uses of hard power in increasing the perceived acceptability of WMD use among a terrorist group’s wider audience need to be carefully considered.

Seek Initial Cross-Cutting Influencing Actions. Finally, as argued in Section 3, Part 2, in implementing any such influencing strategy, top priority should be paid to any cross-cutting actions that might influence multiple groups and entities. Pursuit of these cross-cutting actions provides a starting point which can then be fine-tuned over time.

3.2 Influencing Terrorists’ WMD Acquisition and Use Calculus: Prospects for Success

Depending on the particular group and its component entities, the prospects for successfully influencing its WMD acquisition and use calculus vary. In large part, this reflects the availability of potential leverage points and of actions to take advantage of them. By way of illustration, Table 1.2.1 on the following page summarizes specific leverage points and associated influencing actions for a sub-set of the next generation WMD terrorist groups and entities discussed in the main body of this report. Several over-arching points - discussed fully in Section 3, Part 2 of this report - stand out:

- Across the different terrorist groups and their component entities, efforts to influence perceptions of the more instrumental aspects or “smartness” of WMD acquisition and use appear the most promising point of leverage. That is, an influencing strategy should aim first at impacting perceptions of the role of WMD acquisition and use in serving terrorists’ goals, its feasibility, its effective use of group resources, and its potential risk or backlash - all compared to more traditional “bombs and bullets” terrorism. Even in the case of the al-Qaeda core leadership, as discussed in Section 2, Parts 3 and 4 below, there are reasons to believe that it is concerned about the potential adverse impacts of excessive violence in pursuit of its goals - notwithstanding the arguments that use of WMD and mass killing is in principle justifiable, legitimate, and consistent with the teachings of Islam.
Table 1.2.1: Influencing Terrorists WMD Use Calculus – Influencing Actions vs. Groups-Component Entities

- Regardless of the group or entity, actions to deny the benefits of WMD use would help influence that perception of smartness. This relationship provides yet another reason to move forward with population protection from a terrorist biological attack. It also
reinforces the urgency of exploring seriously the feasibility of protecting nearby-publics outside the immediate zone of destruction in the event of a terrorist nuclear detonation. More broadly, well publicized actions to enhance global habits of cooperation against WMD terrorism also would payoff in terms of influencing terrorist perceptions of the feasibility and effectiveness of WMD acquisition and use.

- More controversial, efforts to encourage a wider Islamic debate about the justifiability and legitimacy of WMD use and the possible killing of large numbers of innocent civilians should be pursued. Once again, the purpose would be to influence perceptions of the smartness - not the justifiability - of WMD use. In particular, a debate within the Islamic community on this issue use could well create concerns within the al-Qaeda-Jihadist movement that WMD use would trigger a backlash among al-Qaeda’s Islamic audience, thereby making it harder to achieve al-Qaeda’s goals. In that regard, as argued fully in Section 3, Part 2, the considerable effort by al-Qaeda’s leadership to make the case for the legitimacy and justifiability of WMD use in terms of Islamic teachings suggests some sensitivity to the potential adverse impacts of excessive violence for rallying the wider Islamic community to the leadership’s ultimate goal of an Islamic renewal and recreation of the Caliphate. This speculation is given credibility, moreover, by statements by both Ayman al-Zawahiri and Osama bin Laden that have criticized the extreme use of force respectively by Musab al-Zarqawi and al-Qaeda in Iraq on the grounds that such violence alienated needed supporters.

- For some groups and entities, however, efforts to influence their own perceptions not simply of the “smartness” but also of the justifiability and legitimacy of WMD use should not be dismissed out of hand. This is especially so for the non-al-Qaeda groups and entities that in the future could come to think about WMD acquisition and use, e.g., Hamas or Hezbollah among Islamist groups or the Tamil Tigers among non-Islamist groups. In the case of these other groups, a carefully-argued justification for mass killing is lacking, unlike the case of the al-Qaeda-Jihadist movement. Such efforts to undermine perceptions of the legitimacy of WMD use even could prove useful in influencing thinking among less committed al-Qaeda inspired individuals and cells as well as potential recruits.

- Closely related, actions to reinforce analogous norms of individual, organization, and state responsibility against misuse of WMD-related inputs warrant pursuit. That effort would be aimed at influencing thinking among individual, organization, and state outsiders that could become unwitting or even witting aiders and abettors of a terrorist WMD attack.

- Particularly for those individuals that are less committed to a terrorist group’s goals as well as for outsider aiders and abettors, influencing perceptions of risk may be very important. Buttressing global habits of cooperation against WMD terrorism would be one way to influence those perceptions. For instance, actions could be taken to bring to justice and make examples of persons linked to terrorist pursuit of WMD capabilities. More routine but publicized cooperation to implement UNSCR 1540’s obligations would be less dramatic way to send that message. Influencing perceptions of risk also is important in influencing potential state supporters of terrorist acquisition or use of WMD. In that regard, consideration should be given to a U.S. declaratory posture - working with other states - to hold leaders’ accountable for supporting terrorist WMD acquisition or use. The specifics of response could vary depending on
the degree of direct or indirect involvement, thereby providing needed flexibility to deal with different degrees of state involvement.

By way of concluding this discussion of response initiatives, the importance of moving to put in place a strategy aimed at influencing the WMD use calculus of terrorist groups and their component entities is one of the central recommendations of this overall study of “Next Generation WMD and WME Terrorism.” This proposal is a controversial one. Skeptics continue to believe that such an influencing strategy would have little chance of success. However, as summarized by Table 1.2.1 and argued in detail in Section 3, Part 2 of this report, even in the toughest case – that of the al-Qaeda core leadership – potential leverage points and influencing actions can be identified. By taking those actions, the United States could well impact the core leadership’s WMD acquisition and use calculus. For that reason alone, it is timely to begin now to implement the type of influencing strategy set out here as part of the overall U.S. and global approach to contain the threat of next generation WMD and WME terrorism.
Section 2: DYNAMICS OF NEXT GENERATION WMD and WME TERRORISM

Part 1: Introduction

Turning to a more detailed exploration of the dynamics of next generation WMD and WME terrorism, this section of the report comprises a set of analytic papers on different dimensions of the challenge. Each of these papers slices into the problem of next generation WMD and WME terrorism from a different analytic perspective. Taken together, they paint a comprehensive picture of both continuity and change, old and new dangers in an evolving global WMD and WME terrorist challenge.

More specifically, Section 2, Part 2 – “Possibilities for Next Generation WMD and WME Terrorism” by Stephen Lukasik - speculates about the characteristics of the WMD and WME terrorist threat in the next 3-15 years in light of an examination of past trends and future technological possibilities. Section 2, Part 3 - “The Current and Future Landscapes of Non-state Actors’ With the Possible Intentions to Use Weapons of Mass Destruction” by Andre DeMarce, Matt Kovner, and Ned Moran - provides an overview assessment of the extent to which recourse to WMD violence would be consistent with the rationale for instrumental violence of the many different types of terrorist groups. Section 2, Part 4 - “To Discipline the Savage Cowboys” by Rebecca Givner-Forbes and Matt Kovner - is a more in-depth examination of how different elements of the Jihadist movement think about the acquisition and use of WMD. Section 2, Part 5 - “Next Generation Weapons of Mass Effects” by William Yengst - examines the possible non-traditional uses of conventional and other capabilities by terrorist groups to have mass effects. Section 2, Part 6 - “Mass Effects Network Attacks: A Safe and Efficient Terrorist Strategy” - explores possible actions by terrorist groups to leverage the Internet to carry out attacks that would have mass effects.
Part 2
POSSIBILITIES FOR NEXT GENERATION WMD AND WME TERRORISM

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1. Introduction

Despite its apparent specificity, the words used in the title of this study are, in the nature of words, ambiguous. The first step, therefore, is to identify the resulting issues and indicate the choices adopted here.

“Next generation terrorism” begs the question of what is a generation of terrorism. “Next generation copy” means a copy of a copy, and in families a generation refers to the birth of a child. If you define the current generation of terrorism as Islamic fundamentalism, does next generation terrorism mean what group will adopt similar terrorist tactics for a different cause? Does it mean the replacement of Islamic fundamentalists trained in Afghanistan in the Soviet era by their children trained in Iraq and Indonesia and the Maghreb in the recent past? If generations are defined by technologies, does Next generation mean far more sophisticated technologies likely to be commodities as of some date such as 2020?

The word “terrorism” has a number of definitions, and these can lead one in various directions, not all of which will be equally fruitful for analysis under the current project. Caleb Carr notes terrorism is simply the current name given to the practice throughout history of “warfare deliberately waged against civilians with the purpose of destroying their will to support either leaders or policies that agents of such violence find objectionable,” a formulation that includes conflict among states.1 Dictionaries define terror and terrorism in terms of intense fear created by the systematic use of violence by a group to intimidate a population or a government to grant their demands. The essence of both is that terrorism implies an agenda. This paper will, however, separate terrorism from war between states and consider the actions of international, sub-state or super-state, agents having agendas to change not only the policies of one or more states but the fundamental bases of their governments. In contrast, the doctrine of nihilism holds that conditions in the social organization are such as to make destruction desirable for its own sake and independent of any constructive program or possibility.2

The ambiguities of mass destruction and mass effects cause one to ask, “How much of what is enough to constitute “mass” in the categories of destruction and effects?” Starting

with the original meaning of WMD as nuclear weapons in an urban environment, prompt deaths of $10^5$-$10^6$ are understood. But there is a tendency to debase the coinage and settle for far less destruction and still label the attack one of WMD. One element necessary to incorporate into the WMD domain is spatial density of casualties and the rates of inflicting injury and death. Thus $10^3$ casualties in a ten-block area in an hour could qualify as WMD, certainly in their popular impact, even though this does not match the nuclear WMD criterion. Mass effects are similarly undefined. Are $10^6$ people without electricity for an hour a mass effect? Or does it have to be a week before it rises to the level of (implied) national disaster?

“Possibilities” is another flexible word. Some analysts require evidence that a proposed attack has been successfully demonstrated. Others want intelligence information that confirms that planning for such an attack is underway. At the other end of the spectrum of meanings for “possible” is that the attack does not violate any laws of physics. Slightly more demanding is that the proposed attacks require no more technical expertise than would plausibly be available to an attack team of a defined size and composition.

On a more fundamental level, defining the subject in terms of weapons is questionable, despite the technologist’s preoccupation with hardware. Political leaders have long recognized the greater importance of people. Seneca the Younger observed, “A sword is never a killer, it is a tool in the hands of killers.” Stalin said, “Ideas are more powerful than guns. We would not let our enemies have guns, why should we let them have ideas.” Mao Tse-Tung similarly noted, “Weapons are an important factor in war, but not the decisive one; it is man and not materials that counts.” These statements warn against overly focusing on weapons and the circumstances of their use.

With the above issues in mind, the following guidelines are adopted for the remainder of this study:

(a) Islamic fundamentalists constitute the only current terrorist cause capable in the near-term of mounting a major challenge to the United States. The starting point would seem to be, at least for the earliest part of the specified time frame of 15 years, a next generation wave of jihadists trained in the current generation of military and commodity technology, including information technology, augmented by disaffected Muslims already blending in with their western enemies, and spreading their influence into native-born recruits to Islam. The latter part of the time frame is open to political influences yet to appear.

(b) The activities of domestic groups intent on modifying U.S. policies regarding abortion, animal rights, and protection of the environment are unlikely to make the grade as a domain of terrorist acts, however violent they may be. They relate to single-issue domestic criminal acts having no international linkages and they do not have mass destruction or mass effects as

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Jihad can have a range of meanings to Muslims. The word means a striving for Islam, but also with a sense of struggling to do something that is not easy. Striving and struggling can cover a range of activities. It can be a personal struggle to improve oneself or a struggle as a part of a group for a similarly benign goal. It can even refer to a struggle by non-Muslims seeking to cause Muslims to do something forbidden them. But the use of the term in current political contexts, to refer to the use of arms and violence on behalf of Islam, is the meaning intended here, recognizing that this usage is a specific case included under, but not required by, the general definition.
their goal. On the other hand, the agendas of not-yet-emerged international terrorist groups could be those relating to poverty or human rights since these have a broader appeal. International linkages of aggressive criminal groups who recognize the inability of states to contain them, especially states already fully occupied with current threats is another possibility. The role of such groups in Russia since the collapse of the Soviet empire is a suggestive exemplar.

(c) If WMD and WME are evaluated in terms of sovereignty-threatening attacks, it is difficult to see what practical attacks could be mounted against the United States given its size, resources, and resiliency. But if the metric is political impacts on an administration’s possible loss of power in the next election, the threshold is much lower. Thus, lower numbers for defining “mass” in WMD and WME attacks are appropriate. While unlikely to threaten sovereignty in single attacks, repeated attacks at a sufficiently high rate, in well-designed campaigns could also represent a major threat.

(d) With regard to “possible,” the criterion used here is that the attack is plausible for a team of a defined size and composition. No showing of previous attacks of the same type, or against the same type of target, or of intelligence substantiating attacker intent will be expected at this point.

(e) With these considerations in mind, it would seem that the first direction to look is the why and the who questions, examining trends in terrorism and then looking into possibly later-emerging groups before addressing the how and the what matters involving technology, targets, and campaigns.

2. Why Do Terrorists Think The World Needs Them?

In thinking about causes for future terrorism, three issues are relevant. First, the cause or goal invoked must be such as to attract sustained group action, thereby distinguishing idiosyncratic personal dissatisfactions from broader calls for change. Second the cause must be such as to see the use of force as a necessary tactic. Third, the cause posed must be directed at, or represent an important influence on, U.S. power or freedom of action. In this case, the less local the cause the more likely it is to have systemic impacts on the United States.

2.1 Empirical Data on Terrorist Groups - Geographic Region, Motivations

One could approach the question of future terrorism analytically, using insights from psychology and sociology to reach general conclusions as to what causes dissent and raises it to the level of armed violence. An alternative, empirical and admittedly retrospective, is to ask what sub-state armed groups currently exist and what are the rationales behind their continued existence. Numerous databases provide such information. In the following, the database of the International Institute for Strategic Studies (IISS) will be used as a basis for an analysis of armed groups. This database is one of non-state armed groups, defined as:

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an organized and armed opposition force with a recognized political goal, acting independently from state or government. Groups are only included if they have an effective command structure. The definition covers groups that might be variously described as guerillas, militia forces, paramilitary or self-defense groups and also terrorist groups with political objectives that have caused significant damage and casualties over the years .... Armed groups with solely criminal objectives are excluded.

Before examining that data, several conventions used in encoding should be noted. The database lists country of origin of 341 groups satisfying the IISS definition. The following analysis uses this listing to locate the group geographically despite the fact that in some cases the focus of the group is on a neighboring state. The database lists year of establishment, though in some cases it will say, for example, “early 1990s, 1990s, or late 1990s.” These have been encoded as 1992, 1995, and 1998 for purposes of further analysis. The database gives each group’s operational status as active, under a cease-fire, or dormant, meaning inactive for the past twelve months. I have called the first “active” but lumped the last two into “dormant.” The database gives a brief description of the groups’ aims, from which I have abstracted even briefer descriptions, omitting some history. Finally, I have encoded these aims into four types: economic, political, social, and religious, with multiple characterizations possible. In this I have departed from the IISS definition, which calls all the groups “political”. Readers wishing to explore alternate motivation judgments can recode the groups on sheet labeled “original” and do their own sorts.

Table 2.2.1 summarizes the groups in the database. Note also that I have divided the eight areas into two subsets of four each. The first four areas comprise the bulk of the armed groups and include virtually all the Islamic groups. The last four include some Islamic groups but represent a wider range of other motivations. The last column is used to address some questions about the lifetime of armed groups. Since the focus here is on the 15-year future, one wants to be sure conclusions are not biased by short-term groups or causes having possibly limited life expectancies.

<table>
<thead>
<tr>
<th>Region</th>
<th>Total No.</th>
<th>Active Groups</th>
<th>Dormant Groups</th>
<th>Dormant/Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-east/North Africa</td>
<td>71</td>
<td>58</td>
<td>13</td>
<td>0.18</td>
</tr>
<tr>
<td>Sub-Sahara Africa</td>
<td>83</td>
<td>54</td>
<td>29</td>
<td>0.35</td>
</tr>
<tr>
<td>Central/South Asia</td>
<td>83</td>
<td>74</td>
<td>9</td>
<td>0.11</td>
</tr>
<tr>
<td>East Asia/Australasia</td>
<td>40</td>
<td>23</td>
<td>17</td>
<td>0.42</td>
</tr>
<tr>
<td>Europe</td>
<td>39</td>
<td>26</td>
<td>13</td>
<td>0.33</td>
</tr>
<tr>
<td>Russia</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>North America</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Caribbean/Latin America</td>
<td>15</td>
<td>14</td>
<td>1</td>
<td>0.07</td>
</tr>
<tr>
<td>Total</td>
<td>341</td>
<td>259</td>
<td>82</td>
<td>0.24</td>
</tr>
</tbody>
</table>

Table 2.2.1: Summary of Groups in Database
The database of 341 armed groups was sorted by the four motivational characteristics: economic, political, social, and religious. The inclusion of dormant groups is justified by the intent to look at the largest possible population of motivational factors that have occurred in the 20th century. Each of these was then examined in terms of the frequency with which that motivational factor occurs; the occurrence of each factor as a singlet, doublet, or triplet (there were no cases where all four factors occurred together); and the most likely pairing with the other factors. Table 2.2.2 displays these results:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Total</th>
<th>Percent</th>
<th>1 of 4</th>
<th>2 of 4</th>
<th>3 of 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>41</td>
<td>12</td>
<td>3</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>Eco/Pol</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eco/Soc</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eco/Rel</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td>317</td>
<td>93</td>
<td>166</td>
<td>134</td>
<td>17</td>
</tr>
<tr>
<td>Pol/Eco</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pol/Soc</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pol/Rel</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>44</td>
<td>13</td>
<td>4</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>Soc/Eco</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soc/Pol</td>
<td>31</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soc/Rel</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious</td>
<td>112</td>
<td>33</td>
<td>3</td>
<td>97</td>
<td>11</td>
</tr>
<tr>
<td>Rel/Pol</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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</table>

Table 2.2.2: Motivational Characteristics

The highlighting in bold calls attention to numbers that will be used in the following discussion.

Looking into the details of the 12% of the 341 cases where there are economic motivations, they consist of:

- Dissatisfaction with labor policies and globalization in Italy
- Economic discrimination of Catholics in Northern Ireland
- Dispute over ownership of land in Palestine
- Dissatisfaction with the distribution of oil revenues in Nigeria and Niger
- Dissatisfaction with globalization in Ecuador
- Dissatisfaction with income distribution in Columbia
- Two criminal goals, control of narcotics traffic in Mexico, and Hispanic gangs in the U.S.
The political motivations are by far the largest, occurring in 93% of the cases, and constituting the sole motivation in 49% of the cases. The range of causes and geographical focal points is astonishing, even within a particular country in some cases (where the different political motivations are separated by semi-colons):

- Corsica – separate from France
- Albania – unite with ethnic Albanians in Kosovo
- Greece – leftists/ anti-United States
- Italy – leftist, anti-United States/ NATO; anarchist
- Moldova – separate Transdnestria
- Spain – Basque autonomy
- Turkey – separate Kurds; leftist; Islamic government
- N. Ireland – unite with Ireland; remain in United Kingdom
- Russia – separate Chechnya, Dagestan, N. Caucasus

- Chile – leftist government
- Columbia – leftist government
- Ecuador – leftist government
- Peru – leftist government
- Haiti – rightist government
- Venezuela – rightist government

- Algeria – Islamic government
- Bahrain – Islamic government
- Egypt – Islamic government
- Jordan – Islamic government
- Israel – rightist government
- Iran – separate Kurds; Islamic government; leftist government
- Iraq – anti-coalition; Islamic government; separate Kurds; secular government; anti-Israel
- Libya – Islamic government
- Morocco – Islamic government; separate W. Morocco
- Palestine – Islamic government; leftist government; secular government
- Lebanon – Islamic government
- Saudi Arabia – Islamic government
- Tunisia – Islamic government
- Yemen – Islamic government

- Angola – separate Cabinda; equal representation in government
Burundi – equal representation in government
Pro-government and ethnic anti-government groups in Chad, Ivory Coast, Gambia, Guinea Bissau, Guinea, Liberia, and Sierra Leone
Djibouti – equal representation in government, Afar population
Congo – ethnic disputes between Hema and Lendu; pro-democracy
Eritrea – Islamic government
Ethiopia – restore rights to Ogaden population
Nigeria – Islamic government; separate Biafra, Yoruba; protect Ijaw, Hausa-Eulani
Mali – protect rights of indigenous people
South Africa – Islamic government
Rwanda – reestablish Hutu control
Sudan – secular democracy; separate Beja
Senegal – separate Casamance
Somali – separate or protect Hawiye, S. Gedo, Somaliland, Puntaland, Abgal
Uganda – Islamic government; Christian; rightists

Afghanistan – Islamic government; multi-ethnic government
Bangladesh – Islamic government; leftist; separate Chittagong Hills, Rohingyas Muslims

India – Islamic government; leftist; separate Tripura, Tal-Khamtis, Sikh, Bodo, Reong, Hmar, Meghalaya, Kamtapur, Manipur, Kukiland, Nagaland, Rabha, Bihar, Assam, Tamil, Karimgnj, Hailakandi, Karbi
India/Pakistan/Kashmir and Jammu – pro-Pakistan; pro-India; pro-independence; pro-self-determination; Islamic government
Nepal – leftist; democratic
Pakistan – separate Baluchi, Tamil, Mohair; anti-US; Islamic government
Sierra Leone – separate Tamil
Uzbekistan – Islamic government
Cambodia – anti-government
Indonesia – separate Aceh, W. Papua; Islamic government
Japan – anti-imperial system; apocalyptic
Laos – rightist; democracy
Malaysia – Islamic government
Myanmar – separate Karen, Mon, Shan, Palung; leftist; democracy
Philippines – Islamic government; leftist
China – separate E. Turkestan
Thailand – separate S. Thailand; Islamic government

Like the economic motivations, the social motivations account for only 13% of the cases. There is substantial overlap with the economic or political motivations in the United States,
South America, Africa, India, and Pakistan. There are only four cases where social motivation is unique:

- Right wing paramilitary forces fighting drug cartels in Columbia
- A group in Nigeria fighting to terminate criminal groups in Nigeria (oxymoron?)
- A group in Niger opposing exploitation of the environment
- A group in Rwanda seeking to protect the Congo from foreign influences

Religious motivations are the second-most frequent, occurring in 33% of the cases. There is an almost complete correlation with political motivations, where Islam sees itself as both a religion and a state. There are three cases where the group has a purely religious agenda:

- Two groups in Nigeria seeking stricter implementation of Sharia law in states adopting it
- A group operating in Bangladesh recruiting Muslims to fight in Kashmir

There are five cases that do not fit into the simple categories of most of the groups:

- A group in Pakistan seeking to purify Islam via violence operating in North America also
- A leftist group in Sweden that opposes capitalism
- A Muslim group operating in the U. K. that opposes western culture
- Two anarchist groups in Italy
- The Aum Shinrikyo apocalyptic group in Japan

2.2 Empirical Data on Terrorist Groups – Exponential Growth

The IISS database also can be used to examine the lifetimes of armed groups. This cannot be done precisely because 24% of the 341 cases in the database are listed as dormant, and this is an uncertain form of death. Cease fires can always be broken, and the IISS definition of dormant is simply that a group has apparently not been active during the past twelve months. Also groups change their name for whatever reasons drive them and this leaves ambiguous whether a group is the same group under different management or an evolution into a new group.

Instead the average age of the 259 active groups has been calculated as of 1 Jan 2006 based on their date of establishment. This yields an under-estimate of age since the groups are still alive and will continue to age until some go out of business. The result, at this point, is an average age of 15 years.

Table 2.2.3 below is also of interest for the rate of formation of armed groups. The table covers four 15-year periods. In the 15-year period 1945–1959, four armed groups were established

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that are still active. In the following 15-year periods, there were 22 (1960–1974), 55 (1975–1989), and 157 (1990–2004). Plotting these on semilog axes shows a linear relationship, indicating that the number of armed groups increases exponentially, tripling in roughly 14 years. For subsequent discussion, a terrorism generation is taken to be 15 years.\(^7\)

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<td>1973</td>
<td>1</td>
<td></td>
<td></td>
<td>2005</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 2.2.3: Rate of Formation of Armed Groups

Experimental data can be extrapolated in various ways depending on how one treats the error estimates for each datum. One extrapolation, weighing the four data points equally yields, as the number of armed groups at the end of the generation that started in 2005 and ending in 2019, about 660, or an increase of 400 over the number today (see Figure 2.2.1). Using only the three most recent data points yields 450 armed groups in 2019, or an increase of 200. Whatever the number, there is more terrorism in our future.

\(^7\) This identification of a generation with a factor of \(t\) is arbitrary. Generations of computer chips are defined by a factor of 2 increase in transistor density. If this trend continues and can be rationalized through modeling, it might be called Lukasik’s Law of Terrorism. One would hope that it is an artifact of the data, in which case I would be quite happy not to have my name identified with this depressing idea. Furthermore, even if true, exponential trends can not continue indefinitely. Where the point of exhaustion of terrorist resources is, at this point, unclear. But even if this trend does not have the staying power of Moore’s Law for computer chips, we can still be looking at an uncomfortable number of e-folding times.
Speculating about the causes of this accelerating growth points in many directions. The U.S.–Soviet Union confrontation in the cold war overshadowed lesser conflicts; the Soviet invasion of Afghanistan in 1979 stirred up Islamic groups (encouraged by U.S. support for the jihadists); the increasing availability of Russian arms in the 1990s; the increasing commoditization of destructive military and commercial technologies; an increasing tendency of groups to take matters into their own hands; a weakening of sovereignty and a tendency for states, many of which are artificial creations of departing colonial powers, to fractionate as their “glue” ages; increasing availability of internet-based technical information and covert communication that facilitate terrorist actions; U.S. actions that inspire counter-actions around the world; globalization that puts pressure on underdeveloped states and thus the sub-groups within them; media preoccupation with violence, conflict, and instability; etc. The subject is rich with possibilities. There appear to be fewer countervailing tendencies tending to peace, understanding, compromise, stability, generosity, and statesmanship.

The growth of active terrorist groups cannot be explained only by religion. If one calculates the fraction of groups formed in each generation where the motivations have a religious component, they are 0.40, 0.26, 0.38, and 0.36 for the four generations identified. Non-religious political motivations dominate the terrorism scene and this has been the case for the last 65 years.

Another way of understanding the increase in numbers of groups is to look at specific areas for each of the four generations covered by the IISS database. This has been done singling out Myanmar, Northern Ireland, Israel/ Palestine, and Iraq plus the generic areas of Islam, communism, and all other political. The results (see Table 2.2.4), counting both active and inactive armed groups are:
One notes that in relatively small geographical areas such as Myanmar, Israel/Palestine, and Northern Ireland, the number of supportable groups increases linearly with time, while in the cases of more broadly defined causes such as Islam or separatism the numbers increase exponentially. Communism also seems to have a more limited appeal. In market terms, limited areas saturate in terms of the available labor pool while broadly-defined causes have a larger potential pool of participants such as Muslims, tribes, etc.

If one looks at the relative contribution of these larger causes to the amount of armed violence in the world, one sees that they contribute in constant proportion: Islam provides about 25% of the total, and the various demands for political representation among historical subgroups provide 50%, after one has passed the initial stages (1945–1974) where the numbers for all causes are small and roughly uniform.

Since each terrorist group starts with its leader, the number of groups is a measure of the number of leaders. But leaders seek followers to multiply their effectiveness. The data in the IISS database can be read to provide a measure of foot-soldiers as well. The number of terrorists in the groups enumerated is shown below in Figure 2.2.2.

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8 This is not the case of Unabomber-type loners who seek to achieve their goals in their own solitary way. The DTRA-sponsored “Evil Genius” sought to define such people. Reference to the final report of that workshop is suggested.
This looks like the same kind of exponential growth that characterizes the increase in leaders. But plotting the data on a semi-log scale (Figure 2.2.3) shows that there are two different growth rates, one before 1968 and one after.
Data on followers is more problematic than for leaders. For some groups in the IISS database the number of members is unknown. For others the date of their establishment is unknown. Neither of these can be included in the arithmetic. Also, lacking is an estimate of the growth rate of a group, simply crediting the membership numbers to the date of establishment ignores this factor. The first two omissions push the curve to later times than it should be, while the last pushes the curve in the opposite direction. Absent further information, the two tendencies are taken to cancel each other out.

Counting leaders and followers is all very well, but the question then arises about their productivity. Is the actual number of attacks similarly increasing exponentially? For this issue there is a difference among databases in what constitutes an attack. To address this, the RAND-MIPT database of incidents has been used. The database distinguishes between domestic and international incidents. Domestic in this case does not refer to the U.S. but rather to attacks where terrorists commit attacks within their own country. International incidents are where they travel to another country to commit their attacks. The log of the sum of the two is shown below (Figure 2.2.4) as a function of time. Unfortunately the time scale is short since the database does not include domestic attacks before 1998.

The data, while somewhat scattered, suggest an exponential growth rate. What is interesting is that the three exponential growth rates are quite different. Leaders are emerging with an e-folding time of 10 years while followers are showing up with an e-folding time of 17 years. Apparently charismatic leaders have the same problem recruiting talent we all do. This suggests that while more numerous, groups may be getting smaller. These smaller groups are

9 See www.tkb.org.
not less effective, however, since attacks are growing with an e-folding time of 5 years, faster than membership is growing. Again this tendency to increasing productivity accords with experience in many areas of activity, where technology makes significant contributions to productivity.

A final class of information that can be wrung out of the data relates to the apparent proclivity of a population to turn to terrorism to pursue its aims. This is shown below in Table 2.2.5 where the current national participation in terrorist organizations is shown as a percentage of the population. Note that in some cases such as the United Kingdom, the participation rate is shown as a percent of a subpopulation, either Muslims or Northern Ireland, and for Corsica it is the population of Corsica that is used. In all other cases the total population is used despite the fact that in Turkey the terrorists are Kurds. Further work is needed to assess the likelihood that a person or small group will turn from dissent to violence. In cases where the terrorist population has major participation from the citizens of other countries, this will have to be factored in also.

<table>
<thead>
<tr>
<th>Country or Group</th>
<th>% Participation</th>
<th>Country or Group</th>
<th>% Participation</th>
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<tr>
<td>Ivory Coast</td>
<td>1.23</td>
<td>Senegal</td>
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<td>0.73</td>
<td>Uzbekistan</td>
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Table 2.2.5: Current National Participation in Terrorist Organizations as a Percentage of the Population
There is a distribution of participation rates and the average rate can be presented in various ways. One such is that the average for the majority of countries experiencing terrorism is 0.1± a factor of 5. An interesting question is why some countries, close neighbors and often sharing common problems, have no terrorism. Is it due to: Culture? Political structure? Quality of life? Major repression?

In terms of the next generation, at least, one can expect these trends and ratios to continue: slow growth (or decline) in the limited geographical areas where accommodations between contending factions may be reached and more expansive growth where the market for violence is not saturated. In the remainder of the study, further technology-based reasons why substantial growth in violence can be expected are presented.

Finally, previous studies, referenced later, have noted that offense and defense, attacker and defender, are closely coupled with each driving the other. Thus, the future of terrorism depends on the extent to which terrorists are trained in one generation and are the progenitors for the next generation, and on the mutual interaction of attackers and defenders. When a defender does not improve his performance, an attacker has little need to change those tactics that are demonstrably effective. But even a defender who retains an unyielding posture can expect some degree of escalation as attackers’ patience wears thin.

3. Who Decides to Become a Terrorist?

Two approaches can be taken to construct a taxonomy of what groups might adopt terrorist tactics. One approach starts with what is fundamentally new and different today to suggest technology factors inciting or empowering potential terrorist groups. That is, look at individual motivations and examine how a person might turn to violent protest. Then look at organizations, since each starts with an individual and grows based on the mutual attractions among its members. If conditions, internal or external to the organization, are “right,” growth proceeds, possibly with the organization’s internal structure and rationale evolving. Eventually it “ignites” and goes operational.

An alternative approach is to use the previously assembled database of past and current practitioners of terrorism, looking for general principles and behavioral factors to suggest thresholds or tipping points, when non-terrorist individuals or organizations turn to terrorism in lieu of other ways to achieve their goals. Rooted in the past, this approach runs the risk of not discovering anything fundamentally new. On the other hand, the first is quite speculative and can point one in unlikely directions. Both are used here.

3.1 Technology factors empowering potential terrorist Groups

A circumstance that distinguishes the present from the past is that of network-empowered individuals. While social interaction in the past has been driven by print media, electronic networks over the past 50 years have introduced greatly enhanced communication capabilities. Over the past decade, the result has been a quite different state of society. The sailor will talk of a sea change, the skier an avalanche, the technologist a quantum leap. Whatever the metaphor, the present state is qualitatively, not just quantitatively, different from the past.
Some of the changes that ubiquitous network information and communication has brought about are:

- The ability of individuals to communicate with each other and to access information anytime and anyplace. With some care these transactions can be concealed or obfuscated to the extent that their discovery or the inter-relations between them will be costly for a defender to uncover. Since “anyplace” is not limited to fixed locations, the battlespace is a continuum in time and space.

- The information available includes a massive amount of public information. Despite efforts to protect sensitive information, the workings of complex societies and systems require broad and open access. This information provides ample opportunities for attackers to assess the relative importance of targets and to understand their vulnerabilities both as an industrial sector as well as to focus attacks on individual people and facilities.

- Unfettered communication enables individuals otherwise unknown to each other to ascertain common interests, to have those common interests strengthened by persuasion, and to receive instruction that enhances the ability of a group to accomplish its purposes. The individuals thus attracted can include “insiders” whose information and access are highly valuable. In principle, all this can take place without fixed or dedicated facilities that can be put under surveillance, and with no face-to-face encounters that can be recorded and correlated.

- Such interest groups are typically small compared to the numbers and assets of corporations and governments. Thus they “fly under the radar” of most defender organizations. They can, in principle, be penetrated, but this is a labor-intensive process that does not scale well. In addition, since small groups have less inertia than large groups, they can innovate, evolve, and transform themselves at a much faster rate than the larger defender groups.

- Such ubiquitous networks provide important benefits to small groups: they enlarge the pool of potential adherents, they enable large numbers of people to provide resource support, and if attack groups are properly organized, they can provide alerting functions and reserves. In short, they enable finite groups to morph into movements. While groups can, again in principle, be discovered and eliminated, movements are far more intractable. Their goals are either satisfied, or they are overtaken by greater events.

- Small groups should not, however, be understood simply in terms of those observed to date. An essential aspect of the network is that it equally empowers mid-sized groups, and aids the growth of small groups into larger, and thus more powerful, ones. This will be true until the group grows to a size where diseconomies of scale set in, where the management of processes and transactions exact unreasonable costs. At that point, entities typically divide if they are to continue to grow.

The above observations are obvious based on even a cursory study of the internet, and point to emergent properties of the complex social systems enabled by anonymous and ubiquitous communication. Pornography, pedophilia, gambling, prostitution, identity theft, on-line financial crime, and stalking, are some of the current examples. Networks do not enable them, and are not new, but their scope has been increased enormously.
As networks grow in terms of users and nodes and penetration into business sectors, organizations and nations, so also does their capability in terms of access, information available, and functionalities provided. They are nowhere near their potential for malicious use as well.

Equally important is molecular biology as a technology-driven enabler. Both information technology and molecular biology received their scientific impetus in the 1950s, with the development of integrated circuits that made massive computing possible and understanding the structure of DNA and the genetic code and, ultimately the manipulation of living matter. The two share heavy dependence on the information concept of “code,” one for the logic sequences that direct computation, and the other for the molecular structures that govern cellular processes. The former demonstrated the full development of its power first, and this serves to provide a predictive window on the impact of the latter powerful technology.

Molecular biology can be, like computing, a personal enterprise. While large industrial teams work to bring scientific results to the market faster than can competitors, it is at the most fundamental level, a benchtop enterprise. Laboratory instrumentation is readily available and suppliers of chemical and biological materials are numerous. Firms today supply DNA sequences to order. Two million dollars will equip a state-of-the-art laboratory, one that can be staffed by half-dozen Ph. D. s and technicians. With so much academic and industrial activity worldwide, there is abundant background in which to conceal malicious activities. With the intense competitive pressures of the market and the fundamental danger of working with potentially dangerous microorganisms, tight security measures are the norm.

A recent editorial on what is now called “synthetic biology” notes that beyond simple genetic tinkering, the state of knowledge is such that now genes can be assembled to achieve living matter with any desired properties. Living matter, capable of replicating virtually without limit, has features in common with computer viruses and distributed denial of service events. The perpetrator need only start the process and available pathways and resources replicate the initiating actions exponentially.

The analogy between molecular biology and information technology extends to the people skilled in it as well. Just as computer hackers, and their more malicious counterparts, “crackers,” warp the technology for illegal objectives, so eventually will some biologists. The essential point is that, however benign information technology is, it is also a dangerous technology. This is true of molecular biology as well, inexpensive enough to be in unethical and malicious hands, dangerous enough to pose serious threats, and having the potential for causing damage faster than defenders can contain it. There is an analogy to fly-by-wire control systems for unstable high-performance aircraft, or overdriving one’s headlights in a fog. The downside to personal empowerment is one is buying a pig in a poke.

The common characteristic of these two technologies is that they do not require massive and visible facilities such as are characteristic of supersonic aircraft, nuclear weapons, space flight, and the like. These are technologies that can provide revolutionary capabilities from

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facilities within reach not only of the classical entrepreneur, but also of the classical terrorist. Used improperly, they are also quite capable of producing mass effects.

The preceding advances set the stage for the formation of groups that can challenge the existing social, political, or economic order. Potential groups such as terrorists, organized crime, gangs, conspiracies, and other attack groups are drawn from the ranks of disaffected individuals. To understand the possible actions of such groups and why they could put themselves on a path to growth, disruption, and large-scale violence, it is useful to look into the sources of individual disaffection and how they might draw individuals together in a common cause.

Personal disaffection can arise from:

- the harsh workings of economic markets
- outrage at injustices of governments
- inequitable outcomes of social forces such as polarization and exclusion
- long memories of historical events
- the guidance of religious or cult leaders promising spiritual rewards and
- charismatic leaders driven by destructive experiences in their past.

Each of these factors, as well as others, can potentially be a source of future terrorism. Consider some specific examples:

- The crushing forces of poverty, leading to hunger, sickness and death, lack of opportunity to correct this state of affairs, and hopelessness stemming from generations of neglect and mistreatment are directions to consider.
- Even in developed societies, the contrasts between rich and poor, north and south, expanding and static, comfort and suffering will become obvious. A widespread appreciation of injustice, greed, and arrogance will become a call for change. Since each society will have its own extremes of wealth and poverty, such feelings will at first be local, but will easily extend to more distant economic oppressors and could discover support regionally. Sub-Sahara Africa is but one such region blighted by disease, its resources exploited by the colonialists, its people enslaved, its governments incompetent, and its proud peoples capable of murderous rage.
- The conditions described are not unique to Africa, but are characteristic of indigenous peoples reeling from the rapid spread of industrialization during the 19th and 20th centuries. The current manifestation, the globalization of capital, goods, labor, and ideas, can be seen in the same light. Opening markets in underdeveloped countries with continued protectionist tariffs in developed countries, maintaining high prices on needed pharmaceuticals, and exploitation of natural resources without local development, all abetted by corrupt governments, will provide ample opportunities for the growth of violent movements within, or directed against, wealthy nations. The scope and direction that violence might take can not be predicted.
- Specific recruits to violence can be those persons doomed by AIDS or by epidemics yet to appear that governments are incompetent or unwilling to deal with. Refugees
and illegal immigrants, having dual loyalties and confined to ghettos and camps, or the poor rebelling against their masters, are still other examples.

- Social drivers, suggested by a multitude of metrics and by evidence visible from ubiquitous communication, mass media, and global travel will increase in importance as gross and growing inequalities become manifest.

- At an opposite extreme, consider a complex society managed by technological incompetents finding itself at the mercy of the skilled but under-appreciated technicians that operate it. This can manifest itself in violent labor-management disputes of the sort that characterized the 19th and early 20th centuries, giving rise to the revolution of proletariats.

- Also at the opposite end are the anti-technologists, those who see themselves increasingly intellectually marginalized by those who are “smarter.” The early 19th century Luddites are a case in point.

The drivers enumerated have always existed. The essence of the case made here is that network-empowered individuals now have low-cost and effective tools for pooling their ideas, for recruiting and organizing members, and for attacking the sinews of perceived oppressors. Since the characters of these not-yet-emerged groups can not be known, their proclivity for large-scale violence can not be assessed.

The prospect of al Qaeda recruiting from poor segments of populations has been studied. A classification of the poor recognizes four types: (a) the passive poor, who adapt to their situation and where fatalism prevails; (b) the political poor, who seek to improve their situation by participating in the political process and thus work from within; (c) the resisting poor, who resort to revolutionary activism; and (d) the surviving poor, who engage in illicit and criminal activities to counter unemployment or price increases. It is this last group that would provide the best candidates for terrorism since they already engage in typical terrorist fund raising activities such as ransom, narco-trafficking, and smuggling, and are familiar with operating covertly.

Furthermore, however much the technologies suggested empower individuals, they can have an even greater impact on small organizations. They are perhaps even more likely than are individuals to “go bad” because there are more opportunities for individual triggers to turn them malicious. Some possibilities are:

- R&D organizations, perhaps short of capital or experiencing problems in growth, encouraged by a severe superiority complex and staffed, in the nature of such organizations, by people who are unconventional or even weird.

- Security companies, having arms, power, and insider positions.

- Small countries, poor and corrupt, which are willing to “franchise” sovereign rights.

- Newly established countries “on the make.”

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Organized cults and religions, who by virtue of their advertised pipeline to the Supreme Being, overreach.

Opposition groups of all sorts who are already quasi-organized or exist within the framework of more conventional organizations and are captured by an extremist faction.

Leaders in situations where they operate without checks and balances.

Very wealthy individuals who see themselves as a law unto themselves and who have a bevy of retainers dependent on them and who see them as superior in power and intellect.

Rogue and failed states.

Subverting a state from within.

Militias.

Military organizations possessing powerful weapons and skilled in their use.

Law enforcement organizations having legal and political powers that enable them to avoid scrutiny.

Intelligence organizations.

Corporate takeovers by a group with a hidden agenda.

Private schools.

Declaring a “state” on some obscure island where the nominal owner has no ability to intervene.

Organizations within organizations.

Virtual organizations.

Banking secrecy laws, privacy laws, and the legal ability to create corporations, trusts, foundations, “public interest” organizations, and the like assist all of the above. The various suggestions lend themselves to mixing and matching to suit personal, organizational, operational, and national circumstances.

Compounding the difficulty of tracking individuals who are capable of changing their appearance, securing fake credentials, and stealing real identities is the prospect of creating “synthetic people.” A person is defined by their past, by the chain of people who can vouch for them. But with large mobile populations, and with large groups losing their “chain of evidence” due to wars and natural disasters, the possibility exists for creating identities without limit. Instead of breaking into computers to remove or change information, one can break in to create records for synthetic people. This is little more, conceptually, than the common construction of legends for covert operators and the creation of back-up documents and verification arrangements with real organizations. All that happens now is that someone looks up the person in question in the computer. The more unimportant the person the lower is the level at which such verification is performed. In various countries, privacy laws assist the deception by restricting allowable degrees of scrutiny.

3.2 Some Dimensions of Future Terrorism – Implications from the Data

Now return to the IISS database and recall what it has to teach us based on real people faced with current world conditions. The record examined goes back to 1922, a period of 84
years. The task at hand asks for a 3–15 year look-ahead. This is only a 25% jump from a well-established base of data.

That record says that terrorism mainly follows from political forces: separatism, annexation, self-determination, and concomitant factors such as organized religion, Marxism, and economic pressures. It is unlikely that these factors will be overridden in the nearer portion of the desired projection. Therefore, one asks which of these political areas can impact the U.S. in a major way.

There are two such areas. The first is instability in regions of energy sources and energy transportation routes: the mid-east, Nigeria, Russia, Venezuela, and routes through the Indian Ocean, east Africa, and the Indonesian straits. This aspect has been discussed earlier, with work continuing focusing on pipeline and tanker vulnerabilities, off-shore oil platforms and terminals, and instabilities in oil prices.\(^\text{12,13}\)

The second is regions of the world facing major disaster that will explode either in a fit of rage or sink into a pit of starvation, uncontrolled epidemics due to poor public health, or movements to a nuclear-armed Islam. Africa is the poster child for the former, Pakistan for the latter. Uncontrolled narcotics traffic, especially from the Golden Triangle, is a potent source of both economic incentive to violence as well as a source of funding for other terrorist activities. Opium poppy cultivation ranges from Turkey, Iran, Afghanistan, Pakistan, India, Myanmar, Laos, Thailand, Vietnam, China, Russia, and the Central Asian Republics. Cannabis is produced in Lebanon, Turkey, Afghanistan, Pakistan, Kazakhstan, India, Nepal, Thailand, and Cambodia. States in the region, if they are not producers, are involved in transport and provide important markets for the product. The overlay of these states on those noted in the analysis of the IISS database of armed groups is striking.

But in the latter part of the 3-15 year time period specified for next generation terrorism, there is a great deal of leeway for new organizational, economic, and social forces to develop. A number of these have been suggested earlier. The nexus of religious ferment, international criminal enterprises, increasingly expensive and uncertain energy sources, and the personal empowerment of “bench-top” technologies, assisted by automation and nanotechnology, suggest that in addition to more-of-the-same there will be an alarmingly large amount of what is totally revolutionary and unpredictable.

All this notwithstanding, the question remains how might the 400 new terrorist organizations that extrapolating from the data suggests could emerge find their place in the world. This is not unlike the business decision of where to set up a fast-food franchise. There are four “market segments” to consider: new competing terrorist organizations in the same place as currently experience their attentions, each pursuing the same causes as the present incumbents; new or “branch offices” in countries not yet adequately served by terrorists but pursuing the same causes as those currently; new causes and new countries; and market


segmentation into specialties such as support organizations. The first is obvious, recognizing that a new terrorist leader will always promise a hotter biscuit or recruit from an unplumbed part of the population. The second is a logical, though not very imaginative, version of the first. Nevertheless, if one looks at the countries in the spreadsheet posted on the project website, one notes that there are many that have a substantial Muslim population where franchises have not yet opened. In the new causes area, one notes that while there are 192 members of the United Nations, there are only 71 countries listed earlier. Since there are many countries with large social and economic problems, many countries with corrupt and/or autocratic governments, and many countries short on human rights, there would seem to be substantial room for new armed groups, especially since there are now so many active practitioners of the craft to provide inspiration and, potentially, practical assistance. The last possibility, that of specialization, is examined in the next section.

However, on the specific issue of whether WMD/WME would be involved, the position taken here is that it is not pivotal to the analysis. Violence will be practiced. There will be a distribution of violent acts, the most violent determined by the means available and political motivations to act with adequate effect. That some of these acts will involve WMD and some will be labeled “WME” is to be expected.

Whether any of these groups will engage in the use of weapons of mass destruction, or the somewhat easier to pull off mass-effect attacks, remains to be seen. Violent individuals are likely to be always with us and, given increasingly easier access to higher levels of destructive technology, they will have inevitably dangerous capabilities. In the face of this prospect, prudence suggests responsible national leaders had best not rely on a sudden conversion to universal benevolence.

So the bottom line is that terrorism is alive and well, a potentially growing field of endeavor, with good career prospects for new recruits. There is a plethora of technologies, experience, potential participants, causes, personal and group frameworks, and laws to assist in the operation of criminal enterprises and to protect them from scrutiny. One can, of course, adopt an opposite view, that terrorism is a phenomenon of the late 20th century and it will recede as events unfold. This seems akin to the behavior of passengers on the Titanic who picked up ice deposited on the deck and playfully threw it at one another. Time will tell, but prudence would seem to be in order pending evidence to the contrary.

4. **How Might Next Generation Terrorists Direct Their Efforts?**

The suggestion from growth trends in terrorism that there could be 400 new groups in the next 15 years leaves considerable room for economic, political, social, and religious innovation in the pursuit of violence. How might new groups direct their efforts?

A top-level projection into the future starts with the ideas in the Figure 2.2.5, “Possible Drivers of Next Generation Terrorism.” This has two parts, those ideas built on
current Islamic terrorism and a set of ideas that are independent of Islamic terrorism but which are certainly applicable to jihadists. The first are relevant to the nearer parts of the 15-year time period, while the second are more likely to see application in the later parts of the period. The “blobs” are intended to suggest uncertainty as to the timing when specific factors may become relevant. Plus any prediction about the future can move in either direction. But while such “time-of” predictions are frequently off either way, “fact-of” predictions have a higher accuracy rate.

Apart from the specifics suggested here, future prospects are obviously speculative. There are several indicators of an author’s level of confidence. Some statements are of the form: “In view of [observation 1], [observation 2]…, there is reason to believe X, Y…” Whether a reader accepts the logic chain is a matter of his or her training and past experiences. Statements of the form: “It is possible that X, Y, … can occur” promise nothing, but offering no chain of logic, they are stronger statement in a sense, because they can only be rejected by showing that X, Y, … are not possible, such as they contradict physical laws. Even combinatorial arguments that “the probability of their occurrence is less than ε, where ε is arbitrarily small,” will not suffice because probability arguments only relate to likelihood of eventual occurrence.  

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A common response to this kind of statement is to construct a model whereby X occurs, then estimating the probability per unit time of each step occurring, and then calculating an expectation value for when X might occur.
A third class of statements are those uncharitably called off-the-wall, totally out-of-the-box, or off-the-cuff. A member of this set might have been that of a person awakening on September 10, 2001 and saying, “I have an idea that the World Trade Center towers will be leveled to the ground tomorrow by 10:30 am after two fully-loaded passenger aircraft crash into them.” Such statements can easily be taken as overly imaginative and are easily dismissed, until one recognizes that a less pejorative word for “imagination” is “innovation.” The World Trade Center towers attacks were, by all accounts, innovative on the part of the attacker. Since we understand so little how the brain functions, there is currently no way to put limits on such statements, and one can only fall back on physical demonstrations of impossibility. When Horatio rebukes Hamlet, saying, “These are but wild and whirling words, my lord,” Hamlet responds, “There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy.”

4.1 possible drivers of next generation terrorism

For this discussion let me introduce some notation. Referring to Table 2.2.3 on pg. 9, call the 1975–1989 period Gen I, the period 1990–2004 Gen II, and the period 2005–2019 Gen III. Gen II terrorism was based on jihadists inspired by or trained in Afghanistan in the fight against the Soviet Union in Gen I. Gen III terrorism will be based on terrorists trained in Gen II in Sudan, Afghanistan, and Iraq-Pakistan, especially as the result of the U. S. pursuit of its global war on terrorism. Each generation gives rise to the next. In the longer term, while existing groups can be expected to adopt new ideas, the adoption of new ideas is perhaps more likely to occur in new groups unfettered by current leaders, current agendas, and current tactics in pursuing goals. Each new human generation always surprise us by doing things we have not seen or thought of or prepared for; however hard we may try. The new generation of terrorists is unlikely to depart from that pattern of behavior.

More specifically with regard to Figure 2.2.5, consider the nearer term. Bombs and bullets work impressively well and those trained in them will continue to use them because they constitute a winning game plan. At the same time, the al Qaeda “core” must be thinking ahead. It can not have escaped their attention that long-term projections of world oil production peaked in 2005–2006. Since Islam sits athwart about 75% of the world’s oil and all the transportation routes for that oil, and since we Crusaders run on oil, they must be thinking about how to capitalize on the nexus of those facts. Exacerbating the oil supply problem are the growing energy needs of China and India, among others. (Footnotes 13 and 14 point to on-going work by the author and by William Yengst relating to destabilizing energy markets).

This energy crisis will provide an unparalleled opportunity for al Qaeda to plan and its affiliates to execute. Using the Hubbert-based production projections, peak world oil production of 26 billion barrels/year (Bbbl/yr) can be expected to decrease to 20 Bbbl/yr during the Gen III period and to 15 Bbbl/yr in the following 10 years. Aside from the

occurrences, and showing that it is longer than the expected lifetime of the earth. Such arguments should be examined by subjecting the hypothesized model and the a priori probabilities to as rigorous analysis as the original statement is subjected.

economic impacts of the price increases that will accompany this drastically decreased production, there will be explosive effects on political alliances globally. These can be negative, as competition for available supplies increases, or positive as nations cooperatively pursue crash programs to develop energy alternatives.

Nuclear power is one alternative, already developed and to which interest is now returning. Increased reliance on nuclear power will, aside from its positive impacts on energy supply and environmental damage, greatly increase the threat of nuclear terrorism and nuclear proliferation. More nuclear facilities and power plants provide more terrorist targets for materiel theft, for attacks on now critical energy infrastructure, and for the release of radioactivity. Furthermore, nuclear power technology, in the hands of nations having an independent reactor fuel production capability, is implicitly related to weapon production through uranium enrichment processes, plutonium production, and chemical processing.

The use of state-of-the-art bombs-and-bullet technologies have been examined in considerable detail in earlier work. The guidelines for that work were to plan attacks that were feasible for a group of 20 - 40 people to execute against specific targets based on their presumed current vulnerabilities. The subject of future directions in the execution of conventional attacks has been extended recently by William Yengst, including in Section 2, Part 5 of this study.

The second set of drivers is shown in distinctively outlined ovals. Besides the nuclear issues that are directly linked to oil, there are four others, cyber, narcotics, space, and the return of Russia to a more energy-dominant and confrontational posture.

The discovery of an organized group in China systematically penetrating U.S. computers to steal technical and economic information serves as a warning that cyber attacks by organized state and sub-state groups is a reality. While state activities are normal and fall under espionage and information operations, the wording on the Drivers chart, "cybergangs," is intended to emphasize sub-state groups. While state teams are relatively limited in number, private groups represent a potentially much larger population. This area has been examined in more detail concurrently with the analysis reported here.

Chemical technology for use in illegal activities is found in the narcotics industry, where small clandestine laboratories are standard. One can expect small biological facilities to be equally possible under similar conditions. The predicted growth in terrorist groups will

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18 A private communication suggests that there are of the order of 15 such groups currently active, divided roughly between state and sub-state origins. Many more are projected in the near future.
provide motivation and staffing resources to enable terrorist groups to seize on the opportunities provided by continuing technological development. There already is a close relationship between terrorism and narcotics. The footprints of terrorism and narcotics are virtually identical and conventional narcotics is one source of terrorist funding now. While the development and production of chemical and biological weapons is unlikely to be either a high-revenue or high-margin business, terrorists are not in it for the money. But the current symbiotic relationship of the two can provide the origin for “boutique” operations that are less interesting to one but irresistible to the other.

The international scene will be “enlivened” by a return of Russia to its czarist/Soviet ways. Beyond its political drift, it is heavily influenced by criminal gangs, and these gangs operate internationally as well. Given the degree of criminality, Russia’s tactical nuclear weapons, or nuclear weapon technology, could find paths to terrorist groups. The Central Asian Republics are an easy example of the terrorist–“Russian” connection, and the earlier analysis of terrorist groups noted a number of Marxist/Maoist groups as well.

A final driver will be the development of private space activities. Commercial imagery for terrorist attack planning, and commercial launch services can drive events possibly as early as the end of Gen III.

4.2 Terrorist technology responses

Turning to terrorist behavior, Figure 2.2.6, takes the ideas of the first chart one-level down in detail. The text is detail within the bubble, not to be read on the timescale.
The projection here is that as Al-Qaeda restructures for Gen III, it will encourage the formation of specialized non-combatant groups in areas such as smuggling, specialized training, R&D, computer and communication support, and the like. Becoming professional smugglers, in addition to providing revenue, will be important when they acquire a nuclear weapon. That will be a once-in-a-lifetime opportunity. But if they wait until they have successfully acquired such a device, it will be too late to develop the smuggling skills necessary to bring it into the United States. In addition, smuggling illegal immigrants will provide a good underground railroad for the introduction of terrorists. Specialized training is addressed in more detail on the following chart.

R&D will be important for several areas shown in other parts of this chart and will be addressed there. Al-Qaeda will want to introduce encryption, voice scrambling, and steganography into their operations. Doing so will require technical support and quality assurance. They undoubtedly are aware of their loss of information from lost or captured laptops. This is a problem they share with the Veteran’s Administration and other agencies and businesses. It would seem sensible for them, as a minimum, to equip their laptops with self-destruct mechanisms.

Regarding attacks on energy facilities, their purpose would be to destabilize oil prices over a long period through attacks on ports, tankers, pipelines, refineries, and off-shore platforms and terminals. Such attacks will employ familiar explosive technology, plus the use of helicopters, small boats, shaped charges, and military standoff missiles.

Bombs and bullet attacks will broaden in several directions. The first is that of attacks on an entire city and its critical economic and social systems. There is a big difference between attacks in a city and attacks on a city. The former are simpler; the latter require far more research, planning, training, operational coordination, and number of attackers. The intent of a city attack is two-fold. The attack should be such as to reduce the economic effectiveness of the city for at least fractions of a year. This largely means damaging infrastructure in ways that take a long time to repair or to build alternate facilities. The New York City attacks examined included flooding the subways through the use of shaped charges to breech rail tunnels underwater, destroying enough bridges to reduce auto and bus commuter traffic into the City, destruction of the major transmission lines and a major electric power substation in Queens, destruction of the aqueducts bringing water into the city, and destruction of the Verrazano Narrows and the George Washington bridges.

Port cities are a specific case and an important target also. This is particularly so because of their function as transshipment points for rail and truck traffic handling imports and exports. In addition to physical facilities, use of radiological dispersal devices to keep port workers out will be significant in reducing the economic performance of the attacked city and the surrounding region. Ports are particularly attractive because while ship traffic can divert to other ports, the capacity of alternate ports in terms of cranes and the ability of the transportation system both locally and regionally to handle increased container movements is limited. The intent of such an attack would be to lever the economic damage to the city on a national scale, reducing national productivity and output, increasing unemployment, and creating large trade imbalances.
Another extension of bombs and bullets would be suicide attacks on public venues in the United States. Such attacks would impact the entertainment and retail sales sectors. Since the attacks are so easy and, therefore, could occur anywhere, large numbers of people will see themselves as threatened continuously. This will cause further havoc on municipal budgets as expenditures for police protection increase. Some of the funding would be drawn from health, fire protection, education, and other parts of the budget, having in turn the effect of further increasing the public’s loss of confidence in government.

The last area of the bombs and bullets driver is the increasing use of advanced military technology. Military technology constantly improves. Current technology or at least obsolete weapons from the previous generation find their way into commerce, either as direct sales, grey-market sales, black-market sales, or theft. Specific technologies include shaped charges, both military and custom-designed. Unmanned aerial vehicles will be useful for delivering explosives. Man-portable missiles are another advanced technology being sought if not acquired by terrorists. In the longer term, it should be expected that small submarines will come into terrorist hands, not widely perhaps, but useful for attacking some few well-protected targets of great criticality.

Cyber attacks can be expected to start with massive identity manipulation to steal the identities of real people but also to create synthetic people. Trust attacks will be used to muddy records to the extent that health records, credit card records, land transfer records, stock transfer records, and the like are sufficiently messed up that instead of current tolerable error rates of, perhaps $10^{-5}$, they might be increased to $10^{-3} - 10^{-2}$ or more. The last aspect of cyber attacks, one that relates to city attacks and energy attacks, is to get into operational control centers such as pipeline and rail systems. A train makes a very attractive kinetic energy weapon if it can be caused to derail, especially in a tunnel or in a way that destroys a bridge, or to release toxic or inflammable cargo.

Boutique drug operations are well suited for the production of castor beans and the production of ricin. There are other noxious botanicals that can also be used as weapons. From this it is a small step to the production of biological agents. The simplest, because of their ease in distribution, are spore-forming agents such as used in the October 2001 anthrax attacks that could have had a major impact on the postal system if it had been done on a larger scale. A later step could be the production of tailored pathogens. This has been the objective of military bio-weapons labs for many years. The production of terrorist weapons is easier because the dissemination is far simpler than for a military attack by a sovereign state. One does not need warheads and delivery systems. A single terrorist is a zero CEP precision weapon. There is one last aspect where collaboration of terrorists with the narcotics industry could be fruitful. This is the area of financial services. Both criminal organizations and terrorists move money illegally; the former to launder it; the latter to collect and distribute it, especially for large transactions such as would be required for the acquisition of nuclear weapons or larger military items.

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Nuclear proliferation can be expected to continue. Few nations, and after Iraq, perhaps none, will undertake broad scale military action against rogue proliferators given the chaos the attacker is likely to inherit. It is believed that North Korea has nuclear weapons, so eventually will Iran, and Pakistan’s weapons are already in a questionable state of long-term security given the presence of Islamic fundamentalist thinkers in the country and the government. Add to this the big unknown of whither Russia and its poorly guarded nuclear materials, and the possibilities for more nuclear states, including those in Muslim countries, increases alarmingly. Unless weapon security in new weapon states is stringent, and the degree to which this will be true is unknown, terrorists having control of one or more nuclear weapons seems to be a matter of “when” rather than “if.”

4.3 Terrorist education-related infrastructure

Turning to terrorist education-related infrastructure in Gen III, Figure 2.2.7 outlines some possible/expected developments. Gen II terrorism employed relatively straightforward technology: resolve at the end of a gun, a few pounds, or hundreds of pounds, of explosive, a detonator, a vehicle, some cell phones, email. It all works, and works well, all superb exemplars of the keep-it-simple-stupid principle. In addition it is cheap and reliable. Its use will continue since it is admirably suited to less-developed areas and it encourages the formation of distributed networks of terrorists lacking technical and financial resources.

But terrorists seek to innovate and excel too. Some of the ways that Gen III terrorists could respond is shown on above chart. Attacks involving infrastructure require trained operators. Training in open facilities has risks of discovery, especially after 9/11 emphasized...
that flight training of unusual students is worth looking into. For the attacks discussed here for Gen III, technical knowledge and skills will be required. Simulators are relative low cost and are commercially available. They can be operated in a completely black mode, or they can do white training as a cover and as a revenue generator. The chart shows a number of types of infrastructure operations that could use simulators in lieu of developing skills in potentially monitored facilities.

Gen III terrorists will also use the facilities of trade schools, though for less obvious purposes than those for which controlled simulators will be used. These include trade schools in the skills shown, all of which provide good opportunities both to place insiders in targets and to learn the practical details of the operation of complex industrial targets.

The third level of technical training is represented by institutions of higher education. There are good educational institutions in all parts of the world. In all of them, one can expect to find faculty and staff who can be recruited, bought, or coerced. States make good use of university faculty and facilities for research, development, training, and consulting. There seems to be no reason why off-the-books research and consulting could not be done for terrorist enterprises. The university people could be either witting or unwitting.

Finally there will be a need to hire professionals to serve as instructors, curriculum developers, and education and training managers.

In addition to the above human resource matters, Gen III terrorists will need test ranges to proof-test weapon concepts and to develop dissemination schemes. By test range is meant more than simply fighting new adversaries in new places. Ranges are facilities where experiments to refine warhead designs occur and where prototypes are validated for effectiveness and usability. Chemical, biological, and radiological weapons sound like good ideas until you actually have to make them work. Then all the Murphy’s Law features emerge: temperatures, pressures, vaporizers, particle size distributions, chemical incompatibilities, remote handling, quality assurance, reliability, packaging into innocent devices, etc. come to the fore. In the military development process, these factors come under the heading of weaponization, integration, and that dullest of all parts of the process, the “ilities.” Arming, fusing, and firing a stick of dynamite is relative easy. After that it gets complicated.

Three examples are worth noting. When terrorists in London put ricin on doorknobs, they failed to appreciate that the hand cream used as the vehicle was incompatible with ricin and destroyed it. Another example is how to avoid fratricide when sending two suicide bombers into different part of the same crowd, and how to assure that a bomber will not freeze at the last minute and fail to complete the firing sequence. The arming, fusing, and firing details are far more complex for a nuclear weapon, especially one that has been designed by a sovereign entity that has given some thought to command and control, delivery system integration, intended target, security, and reliability. Details, details, but that is where the devil is.

When viewed from the standpoint of the target, who only sees the flash and may hear the boom, terrorist attacks seem easy. They aren’t. They require careful recruiting, training, planning, and execution. Defenders are working to make attacks more difficult. Terrorists will have to work harder to accomplish their goals, whatever they may be.
5. Conclusions

- An examination of trends in sub-state armed groups since 1945 indicates that the number of active groups, a measure of leaders, has been increasing exponentially since then. The rate is such that the number of such groups triples about every 14 years. Similar exponential growth in the number of followers and number of attacks is seen, though at different growth rates.

- This tripling time, rounded to 15 years for convenience, is taken, for present purposes, to constitute a generation. In the semiconductor business, a doubling of component density is frequently taken to constitute a generation. But the rate of political developments and their social/ economic responses is such that a tripling seems like a better definition of what constitutes a significant change. Also, when one compares the generational growth intervals on the table on pg. 9 with one’s impressions from history, the 15 year interval seems to fit.

- While one is tempted to attribute the growth of armed groups to Islamic fundamentalists, the fraction of growth attributable to religious causes has been constant since 1940.

- By this accounting, a generation came to an end in 2004 and thus the “next” generation started in 2005, and, using 15 years, will end the last day of 2019.

- The concept of “mass” as used in WMD and WME is quite ill-defined and context-dependent. Any single act, for example, assassination, can have a mass effect, as in the case of Archduke Ferdinand in 1914. Assassination also has a mass effect if repeated at a sufficiently high rate in the case of a small country whose government is critical to U.S. interests.

- The rhetoric of the global war on terrorism emphasizes that it is a long war. This view is supported by the discussion here. Of 341 groups established since 1922, 75% are still active. Old terrorist organizations do not die, nor do they fade away. There is a replacement of leaders, changes of name, and mergers among groups. This, admittedly, makes bean-counting imprecise.

- The major cause of terrorism is to support of political objectives. As frequently noted, all politics is local, and since there are a lot of places that are “local,” there are ample opportunities for local dissatisfactions to escalate to organized violence. Much of this will impact the U.S. only indirectly, e.g., safety of embassy employees, military personnel, and U.S. tourists. Some terrorism, however, will be close to U.S. vital interests, especially when the world becomes increasingly connected and because as a superpower the United States is actively involved globally, in many different ways. But even when U.S. interests are not vitally challenged, local and regional terrorism will cause instabilities that can grow, due either to miscalculation on the part of terrorists or imprudence on the part of the United States or of powers with whom the United States is linked.

- After political causes, religion ranks second as a motivation of terrorist groups. For the most part this derives from Islam where by its theology and history it sees church and state as identical and indissoluble.

- The newest emerging technical threats are biological and cyber in nature. The former is well-recognized, not only because it has been used, but because it is ingrained as a part of military weapon development since WW II. With respect to cyber weapons,
this recognition is not the case, partly because it is much newer and has only recently become a concern of defense establishments. Perhaps bytes do not seem as dangerous as germs.

- Nuclear weapons will continue to be a threat. Nuclear proliferation seems to be proceeding at a rate of one country per decade. Looking at the new nations thinking about acquiring such weapons, concerns over the quality of weapon stewardship – and terrorist access – increase.21

- A central driver for future terrorism will be reduced worldwide oil production at a time developing nations are entering the market in a big way. The resultant price instability, even without being exploited as a target by terrorist groups, will send economic shocks throughout the world. This will translate into political and social causes, with the consequence of bloody competition and consequences.

- A second new factor will be the possible redirection of international criminal organizations into politically more aggressive channels. While crime normally lives off a social/economic system, and has an interest in keeping the system going so it can be exploited, the emergence of terrorist organizations as quasi-states will not pass unnoticed by major criminal organizations. They too could choose to be more direct actors than they already are, especially in vulnerable countries. Combined with their well-developed skills in clandestine activities, moving materiel around the world, and raising and handling large sums of money, criminal organizations could provide employment opportunities for some part of the predicted next generation of terrorists.

- There is a great deal more that can be extracted from the IISS database, plus other armed-group databases, that have not yet been examined. Relating trends in time and place with local political, economic, social, and religious events, and examining the programs of individual groups and their leaders, and their changes over time, may provide further usefully predictive insights.

- Questions of the impact of technology in specific cases and the role of emerging technologies for the future have been outlined. Thus, this paper should be viewed more as a reconnaissance probe than as leading to a set of definitive conclusions.

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21 A lengthy analysis of sixteen cases where nations found their weapons deployed under conditions of crisis or combat can be found in William C. Yengst, Stephen J. Lukasik, and Mark A. Jensen, “Nuclear Weapons That Went to War,” Defense Special Weapons Agency report, 1995. Unfortunately this draft has never received final approval for publication, but it can be made available for examination.
Section 2:
DYNAMICS OF NEXT GENERATION WMD and WME TERRORISM

PART 3
The Current and Future Landscapes of Non-state Actors with Possible Intentions to Use Weapons of Mass Destruction

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Executive Summary

- The current landscape of radical and violent groups with the potential intent to employ weapons of mass destruction (WMD) is comprised of three ideologically-defined categories of groups: religious extremists, ethno-nationalist/separatists, and right wing extremists.
- The sanctified, ‘holy war’ ideological-strategic mindset of religious extremist groups makes them most disposed to wholesale violence – including potentially large scale WMD use – against an expansive target set.
- Closer examination of the rationale for instrumental violence of prominent groups in each category, however, suggests that significant political constraints remain on WMD use.
  - The most important of these constraints is a concern that a potentially indiscriminate WMD attack may collateral harm or alienate key group constituencies and audiences.
  - The Al-Qaeda network possesses the most unconstrained and expansive intentions to employ WMD.
- With regard to the future landscape, the National Intelligence Council’s “Mapping the Global Future” report suggests that the dynamics of globalization will galvanize the emergence of global and sub-state “nations” defined along ethnic, religious, or ideological identities that rend and transcend traditional state-centric world order and structures.
- The emergence and flexing of these nations in pursuit of communal interests increases the potential that they will be brought into conflict with state structures – notably governments – as well as rival nations.
- In particular, the galvanizing effect and spread of radical Islam, growing ethno-nationalist identities and nations, and increasing immigration flows will have the effect of strengthening and proliferating Islamist extremist groups, ethno-nationalist/ separatist groups, and racist/ xenophobic anti-immigration and hyper-nationalist right wing groups.
- As a result of these changes, the number of future groups potentially disposed to WMD use will likely increase.
In particular, the strengthening and proliferation of Islamist extremist groups, such as Al-Qaeda, will pose a significant WMD threat.

Further, these future drivers and globalization dynamics will likely foster ethno-nationalist/ separatist groups of strong Muslim/ Islamist character from Muslim lands or Diasporas.

Technology advances and globalization will make access to WMD more feasible for home-grown groups and individual cells.

1 Overview

This part of the SAIC report assesses the disposition of current and future non-state terrorist and insurgent groups to conduct WMD terrorism. That assessment entails three progressive analytic phases:

- First, the potential disposition to extreme violence and WMD use is assessed for different types of ideologically-defined categories of groups - based upon their rationale for instrumental violence;¹
- Second, the more specific rationales for instrumental violence of prominent groups are explored to develop a finer-grained snapshot of the current landscape of WMD-disposed groups; and
- Third, building on the National Intelligence Council’s assessment of trends and developments shaping the 2020 world, some key aspects are set out that will shape the future disposition for WMD use of different groups.

2. The Concept of Rationale for Instrumental Violence

The disposition for WMD use of any radical group is shaped fundamentally by what is termed here its rationale for instrumental violence. A group’s rationale for instrumental violence is comprised of three interrelated characteristics: 1) the group’s ideological-strategic mindset and goals; 2) the environment of key actors and audiences that the group engages in pursuit of its goals as well as its strategy for doing so; and 3) key organizational imperatives and dynamics. As terrorism expert Bruce Hoffman notes:

Contrary to both popular belief and media depiction, most terrorism is neither crazed nor capricious. Terrorists use violence (or the threat of violence) because they believe that only through violence can their cause triumph and their long term political aims be attained. Terrorists therefore plan their operations in a manner that will shock, impress, and intimidate, ensuring that their acts are sufficiently daring and violent to capture the attention of the media and, in turn, the attention of the public and the government. Thus, rather than being seen as indiscriminate or senseless, terrorism is actually a deliberate and planned application of violence. Terrorism is also a means to communicate a message. Although the aims and motivations of different types of terrorists— left-wing and right-wing, ethno-nationalist and religious, single issue and broadly utopian— may differ, they all want maximum publicity to be generated by

¹ As discussed below, a group’s rationale for instrumental violence reflects its ideological-strategic mindset and goals, its environment of key actors and audiences as well as its likely strategy of engagement with them in pursuit of its goals, and its organizational imperatives or dynamics.
their actions and therefore aim at intimidation and subjection to attain their objectives. Equally important, the terrorist act is conceived and executed in a manner that simultaneously reflects the terrorist group’s particular aims and motivations, fits its resources and capabilities, and takes into account the “target audience” at who the act is directed. The tactics and targets of various terrorist movements, as well as the weapons they favor, are therefore ineluctably shaped by a group’s ideology, its internal organizational dynamics, the personalities of its key members, and a variety of internal and external stimuli.2

Against this backdrop, consider the three critical dimensions of a terrorist group’s rationale for instrumental violence.

The starting point is the group’s overarching goals. A critical distinction is the degree to which the group seeks through violence to change or manipulate the behavior of key actors and audiences rather than simply seeking to destroy them. Those group goals will influence in turn its perceptions of the instrumentality of WMD as a means to achieve those goals as well as potential constraints on WMD use. In this context, possible instrumental roles for WMD could include: wholesale, large-scale, indiscriminate destruction; causing mass casualties; strategic impact; tactical military utility as a replacement for conventional weapons; generating terror; and heightened drama or symbolism.

With regard to the second dimension of the rationale for instrumental violence, the key actors and audiences of the group’s environment include its perceived constituency, its primary adversary, those persons considered responsible for the group’s grievances, its allies, and the wider society. The group’s perceptions of these actors and audiences will shape its behavior and operations. This is so because group violence is designed to have various instrumental effects on these actors and audiences in pursuit of the group’s goals. So viewed, a terrorist group’s violence may be calibrated variously to: engage and influence its adversary, maintain support from a key constituency, retain favor from certain audiences, or maintain the audiences’ quiescence toward group operations. Depending upon the perceived level of tolerance of and reaction to particular types of political and instrumental violence of these actors and audiences, the group’s use of violence may be constrained.

Indeed, Daniel S. Gressang notes the importance of a group’s perceived key audiences in the design of violent campaigns:

... all terrorists are alike in at least one important way: they seek to acquire and maintain some degree of influence over an identifiable audience. While that audience may vary widely, the desire to have and exercise influence is seen as the most basic driving motivation of terrorists, regardless of additional motivational, ideological or theological imperatives.3

Gressang goes on to note that:

... this audience plays a critical role in determining the degree and scope of violence tolerable. If the terrorist’s principal purpose was to garner support and sympathy, or at least passive neutrality, there would be a level of violence and destructiveness beyond which the terrorist likely understands that actions would prove counterproductive.\(^4\)

Finally, certain organizational imperatives and dynamics will also affect a group’s rationale for instrumental violence, its resulting operations, and ultimately the group’s potential disposition for WMD use. These factors include the group’s structure and form; its organizational fitness and degree of cohesion; and its decision-making and control mechanisms. In particular, operational and strategic priorities, preferences, or goals may result from these internal organizational imperatives and dynamics. Sometimes, these organizational imperative and dynamics may significantly shape, and possibly supercede, ideological-strategic considerations and priorities in shaping a group’s use of violence. This may be so especially in any number of circumstances, for example, during periods of heightened stress, political crisis, or at a pivotal juncture in a group’s campaign; at a time of perceived existential threat; or in the midst of internal power wrangling and splintering among factions. One result can be a crisis-induced spike in the disposition for larger-scale violence and potential WMD use. As Martha Crenshaw sums up: “... acts of terrorism may be motivated by the imperative of organizational survival or the requirements of competition with rival terrorists groups.”\(^5\)

3. **Group Rationales for Instrumental Violence and WMD Use**

The following section examines the rationales for instrumental violence of a set of generic ideologically-defined categories of terrorist groups. In so doing, the analysis filters out those categories of groups with little to no disposition to WMD use, while identifying those categories most disposed to WMD use. Because organizational imperatives and dynamics vary across specific terrorist groups, this section does not address that dimension. Rather, the potential impact of organizational variables is examined in the following section that focuses on prominent specific groups in each category.

3.1 **Religious Extremist Groups**

Religious extremist terrorist groups – both fundamentalist and apocalyptic – are the most disposed to WMD terrorism. The divinely righteous, Manichean ideological-strategic mindset of religious extremists increases the imperative for extreme levels of violence. The perceived divine imperative and command to destroy the anointed enemies of the faith rather than seek engagement and dialogue with them disposes such groups to wholesale violence against expansively-defined communities of anointed enemies. As Gressang notes,

... those groups which actively seek to address an ethereal audience may be more prone to accept greater levels of violence and, perhaps, see considerable utility in the use of mass casualty-weapons. A greater emphasis on a deity may suggest a greater propensity to mass casualties, but does not guarantee use of such weapons. There may be, however, fewer cognitive barriers to creating mass casualties since an ethereal

\(^4\) Gressang, Ibid., p. 93.

primary audience allows the terrorist to rationalize and justify exceeding existing
behavioral and social barriers by citing divine will or other unverifiable criterion.  

In the same vein, Hoffman notes, "... though violence does still have an instrumental purpose,
it is also often an end in itself - a sacred duty executed in direct response to some theological
demand or imperative." For the apocalyptic religious groups, sacred violence serves as a
catalyst for the hastening of the religion’s final reckoning.

The perceived divine command to perpetrate violence against a wide array of anointed
enemies of the faith also absolves the holy warrior of personal moral and normative restraints
on violence. The religious extremist’s ultimate leader, constituency, and audience - all of
which the warrior strives by religious duty and piety to please - is God. Secondly, the
audience is the religious extremist’s wider religious community. As a result, the holy warrior is
not buffeted by the constraints and strictures of negotiating and engaging the other actors and
audiences and their attendant interests, expectations, and actions. Unlike the secular terrorist,
the holy warrior is less concerned with the need to calibrate and restrain instrumental violence
so as not to violate the normative sensibilities and/or political-social interests of, or otherwise
alienate or aggrieve, the temporal constituencies, audiences, and actors that the secular
terrorist group seeks to maintain or win over. On this point, Bruce Hoffman notes:

[Religious] terrorism thus assumes a transcendental dimension, and its perpetrators
are consequently unconstrained by the political, moral or practical constraints that
may affect other terrorists. Whereas secular terrorists, even if they have the capacity
to do so, rarely attempt indiscriminate killing on a massive scale because such tactics
are not consonant with their political aims and therefore are regarded as
counterproductive, if not immoral, religious terrorists often seek the elimination of
broadly defined categories of enemies and accordingly regard such large-scale violence
not only as morally justified but as a necessary expedient for the attainment of their
goals.  

This sanctification of extreme violence among the holy warrior’s associated leaders,
constituencies, and audiences has lead religious extremist groups to conduct some of the most
wanton and destructive terrorist attacks. On this point, Hoffman suggests that this "sense of
alienation also enables the religious terrorist to contemplate far more destructive and deadly
types of terrorist operations than the secular terrorist, and indeed to embrace a far more open-
edended category of ‘enemies’ for attack.”

Key actors and audiences for the religious terrorist center on adversaries anointed as
enemies of the faith. These enemies are typically defined in broad strokes along religious or
political lines. Quite different key audiences are seen to be God, the divine, and the group’s
religious constituency.

Some religious groups do include and consider more immediate, temporal actors and
audiences within their environment of struggle and seek to engage them to serve their ultimate

6 Gressang, op. cit., p. 94.
9 Ibid., p. 95.
religious-political goals in addition to serving the divine audience. The instrumental engagement of the temporal actors and audiences may take on an uncompromising, vengeful, and coercive nature - more ultimatum than dialogue. It also may involve wholesale violence. Thus, there is a correlation between the degree of religious extremism of a group’s ideological-strategic mindset and its degree of disposition to WMD use. For the religious extremist terrorist, WMD use is consonant with its rationale for instrumental violence in causing sanctified and wholesale mass casualties, destruction, and disruption, and landing a strategic blow or military defeat against enemies of the faith.

3.2 Ethno-Nationalist/Separatist Groups

Politically oriented groups such as ethno-nationalist/separatist groups are grounded in an ideological-strategic mindset that pursues socio-political goals. As a result, their rationale for instrumental violence is constrained, shaped, and calibrated in its scope, targeting, and ferocity by considerations of how to engage instrumentally those actors and audiences that are critical to achieving the group’s goals. Put otherwise, the use of violence by such ethno-nationalist/separatist groups is calibrated to engage its key actors and audiences for various ends – to attack, kill, and damage, to ingratiate the group with certain actors and audiences, or to cultivate sympathy or tolerance for the group and its actions. This constrained and nuanced rationale for instrumental violence reduces the disposition to WMD use of many secular groups. As Gressang notes, “For these [groups], the defining limits on casualties and weapons lies in the reaction and tolerance levels of the human audience. Cognitive barriers to WMD use are tied to public reactions, and to expected reactions, limiting the terrorist’s perceived range of available choices.”

More specifically, the goals of such ethno-nationalist/separatist groups generally seek the empowerment, defense, liberation, or autonomy of a defined ethno-nationalist community vis-à-vis an oppressive ruling government or society, rival community, or perceived occupying foreign power. These groups are typically motivated by political or societal grievances that they are seeking to redress through instrumental violence. At the same time, some ethno-nationalist/separatist groups – including Hezbollah, Hamas, and a number of the regionally-based Al-Qaeda affiliate groups - have religious dimensions as part of their ideological-strategic mindset in addition to political goals. That religious dimension may have a sanctifying and catalytic effect in compelling more wholesale violence.

The key actors and audiences of these ethno-nationalist/separatist groups typically are the central adversary, the group’s constituency, and potentially sympathetic external audiences. Instrumental violence is directed primarily at the ‘adversary’ actors, typically an oppressive ruling government or society, a rival community, or a perceived occupying foreign power. Ethno-nationalist/separatist groups typically seek to cultivate, maintain, and consolidate the political and operational support of a societal constituency for which the group purports to be fighting. Further, many ethno-nationalist/separatist groups also seek legitimization and political and operational support and sympathy from external actors. This leads them to present their struggle in terms of the righteous, defensive rebellion of a threatened community. In both cases, the group is compelled to design and calibrate its violence and other actions to avoid crossing the normative and political threshold of acceptable violence.

10 Gressang, op. cit., p. 95.
for its constituency. It must also be attentive to the reactions of external benefactors, including the risk that extreme violence might lead them to reassess their support. The group’s constituency also is typically in close physical proximity. These considerations constrain and shape the violent operations for the nationalist-liberation group.

Specific instances of violence are directly shaped by both the group’s ideological-strategic and political goals as well as its need to engage audiences integral to achieving its goals. As Hoffman notes, “[t]hese groups, accordingly, recognize the need to tightly control and focus their operations in such a manner as to ensure both the continued support of their ‘constituencies’ and the sympathy of the international community. What this essentially means is that their violence must always be perceived as purposeful and deliberate, sustained and omnipresent.” In particular, for ethno-nationalist/separatist groups, large scale and indiscriminant violence that imperils its constituency or provokes a severe retaliation by the adversary government or rival communities is often counterproductive.

Nonetheless, a primary adversary of ethno-nationalist/separatist groups is typically the government and its security forces. For that reason, such groups may have a greater disposition to WMD use in a battlefield context as an asymmetric weapon against superior conventional force. So viewed, WMD could be seen as a means to attack large, isolated government targets – such as military bases and security forces formations – with little likelihood of constituent collateral damage. On this point Dr. Jerrold Post notes, “These groups are significantly constrained from performing acts that indiscriminately involve mass casualties and will negatively affect the group’s reputation with their constituents and their international audience. But discriminate acts against their adversary, in areas where their constituents are not present, can be rationalized.”

In summary, for groups within the category of ethno-nationalist/separatists, indiscriminate WMD use is not consistent with its rational for instrumental violence. However, such groups could be attracted to smaller-scale discriminate attacks against adversary targets. The key consideration would be whether more discriminate use would cause significant but targeted destruction and disruption or land a strategic blow against its adversaries – but still avoid collateral harm to or the alienation of the group’s key constituencies and audiences.

3.3 Left Wing and Social Revolutionary Groups

The ideological-strategic mindset of left wing and social revolutionary groups centers on the goal of catalyzing a radical transformation of societal order and philosophy to realize their particular socio-political philosophy. Often, these ideological-strategic goals involve class and economic grievances and philosophies related to communism or socialism.

Left wing and social revolutionary groups share many of the same dimensions of nationalist/separatist groups. Its key actors and audiences are particular socially, economically, and politically-defined strata and groups within the immediate society and government that the group seeks variously to destroy, transform, or liberate to create the conditions for its socio-political ideology to take hold. The primary adversaries of these groups

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groups are the government and societal groupings or strata perceived as supporting the offensive prevailing societal order, i.e., the sitting government, the business classes, or the wealthy. Key audiences and constituencies the group seeks to defend, ‘liberate,’ and empower typically include the economic or political underclass. Further, similar to ethno-nationalist/separatist groups, left wing and social revolutionary groups also seek to garner attention, legitimacy, sympathy, and support for their struggle among external audiences and actors. Violence has an important symbolic dimension in focusing attention on their cause.

The varied nature of the societal strata and audiences social revolutionaries seek to engage, the various types of engagement they seek, and the typical close juxtaposition of the group’s adversaries and constituency within society all compel a more constrained, discrete, and refined design and targeting of violent operations. It is essential that use of violence avoid alienating or harming the group’s perceived constituencies. As Hoffman describes, “… left-wing terrorists’ use of violence historically has been heavily constrained. Their self-styled crusade for social justice is typically directed against governmental or commercial institutions, or specific individuals who they believe represent capitalist exploitation and repression. They are therefore careful not to undertake actions that might alienate potential supporters or their perceived constituency. Accordingly, left-wing violence tends to be highly discriminate, selective, and limited.”

Here, too, more discriminate violence could be attractive to such left wing and social revolutionary groups. As Jerrold Post argues, “Insofar as these groups are seeking to influence their societies, they are significantly constrained from indiscriminate acts that cause significant casualties among their own countrymen or cause negative reactions in domestic and international audiences. But discriminate acts against government or symbolic capitalist targets can be rationalized by these groups.”

Thus, for the left wing and social revolutionary group, WMD use is inconsistent with its rationale for instrumental violence. Large-scale destruction runs a significant risk of harming or alienating key constituencies and audiences and delegitimizing the group’s cause in their eyes. These groups’ typical goals of engaging and transforming society, rather than wreaking large-scale destruction on it, also reduce their disposition to WMD use.

### 3.4 Right Wing Groups

Most right wing groups have social conservative ideological-strategic mindsets that center on some combination of anti-federalist, libertarian, racist, and/or fascist philosophies and goals. Right wing groups often seek a ‘purifying’ of society that entails the polarizing and, sometimes ‘cleansing’ of society into politically, culturally, racially, or ethnically-defined homogeneous sects. The group and its constituent community are perceived as righteous or chosen and deserving of empowerment; those outside the group are often delegitimized and dehumanized and targeted for violence. In many cases, these groups seek to isolate or insulate
physically their constituent community from the wider, ‘impure’ society, and/or purify the wider society of perceived contaminating enemies. As Hoffman describes:

The right-wing terrorists believe that their nation’s survival is dependent upon the exorcism of these elements from its environs; only by becoming politically, racially, and culturally homogeneous can the state recover its strength and again work for its natural citizens rather than the variegated collection of interlopers and parasites who now sap the nation of its strength and greatness. … the majority of right-wing groups do not espouse any specific program of reform, preferring to hide behind vague slogans of strident nationalism, the need for racial purity, and the reassertion of governmental strength. In sum, the democratic state is somewhat reflexively assailed for its manifold weaknesses— notably its liberal social welfare policies and tolerance of diverse opinion.16

The key actors and audiences for right wing groups often involve a ‘brethren’ constituency defined along similar ethnic, racial, or political lines that the group perceives itself to be fighting for, and which typically reinforces and justifies the group’s violence. In many cases, the government and/or perceived ‘contaminant’ and corrupting elements of society – political classes, races, and ethnicities – are considered the right-wing group’s primary adversaries and targets of instrumental violence.

Similar to religious terrorism, the particular philosophies of many right-wing groups result in a rationale of righteous superiority and a readiness to commit large-scale – in some cases genocidal – violence against whole communities of perceived enemies. In addition, as Post notes, “Because right-wing terrorists generally dehumanize their enemies, attacks on target groups, such as black people, or, in Europe, enclaves of foreign workers, are justified by their ideology. Because of their delegitimization and dehumanization of the government, government facilities are targeted by such groups, including attacks on the seat of the federal government as represented in The Turner Diaries.”17

However, because immigrant and minority communities are typically close physical proximity with the indigenous society – the primary constituency for the right wing group – larger scale and more indiscriminant WMD attacks will likely be constrained for fear of harming the constituency they perceive themselves to be defending. Further, as Hoffman notes

[the right-wing terrorists see themselves, if not as a revolutionary vanguard, then as a catalyst of events that will lead to the imposition of an authoritarian form of government. Thus, like other terrorist movements, they too tailor their violence to appeal to their perceived constituency – be it fellow extreme nationalists, intransigent racists and xenophobes, reactionary conservatives, or militant anti-communists – and, with the exception of a handful of noteworthy, but isolated, indiscriminate bombings, they seek to keep the violence they commit within the bounds of what the ruling government will tolerate without undertaking massive repressive actions against the terrorist themselves.18

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16 Ibid., p. 236.
17 Post, op. cit., p. 149.
At the same time, given these groups’ particularly hatemongering racist and xenophobic ideological-strategic mindset, they easily could be inspired to launch increasingly wholesale violence against isolated ‘enemy’ enclaves or otherwise discrete ethnically, racially, politically, and nationally-defined communities. In this sense, these groups’ rationale for instrumental violence carries the profound potential, as yet unrealized and possibly constrained by political and strategic necessity, of future WMD use by more radical or fringe elements.

3.5 Single Issue Groups

The ideological-strategic mindset of single issue groups such as animal and environmental rights groups, anti-abortionists, and anti-globalizationists is comprised of activist political and cultural goals centered on narrowly-focused issues. These groups seek to employ instrumental violence not only to force a cessation of the offending action or policy but also as a dramatic means to raise awareness and the legitimacy of their concern.

The key actors and audiences for the single issue group typically are the perceived source of the policy or issue of grievance – most often, governments or corporations, abortion doctors and clinics in the case of anti-abortionists, and others depending on the issue. These entities also are seen as the primary adversary and target of violence. By contrast, the single issue group’s key constituencies often include a relatively small number of like-minded supporters and sympathizers as well as a larger potential constituency within the wider society. The group seeks to engage this latter larger constituency in order to rouse awareness, sympathy, outrage, and activism on the issue of concern. Their ultimate goal is to catalyze a larger movement in support of their struggle.

This desire to maintain and cultivate a supportive constituency and legitimize the issue and their activism within the larger society if not also the international community heavily constrains the use of violence by single issue groups. These factors shape their ferocity, tactics, and targeting so as not to disgust or alienate a perceived and potential constituency. As Post notes:

To date, the single-issue terrorists such as anti-abortion terrorists, eco-terrorists, and animal rights radicals have not used mass casualty weapons to make their points, probably because these are indiscriminate weapons that target too wide a spectrum of victims, not just those to whom they object most strenuously. It is possible that such terrorists would not want to inflict extreme levels of damage because it would adversely affect public acceptance of their agendas. Moreover, some might be deterred by the amount of government pursuit that such actions could catalyze.19

Thus, these groups are unlikely to employ WMD except in extremely small-scale and discrete attacks. For single issue groups, indiscriminate WMD use is inconsistent with their rationale for instrumental violence. Large scale, mass casualty and mass destruction attacks would run a high risk of collaterally harming and/or alienating perceived constituencies and the wider audiences they seek to rouse to awareness and sympathy for the group’s issues. Further, by violating social and moral norms, such attacks would likely delegitimize the group’s struggle in the eyes of their coveted constituencies.

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19 Post, op. cit., p. 149.
3.6 Organized Crime Groups; Non-Governmental Organizations; and Corporations

Organized crime groups, bearing many of the same clandestine, illegal organizational and operational hallmarks as terrorist groups, are motivated to conduct instrumental violence in order to amass and defend illegal profit and power. As such, key actors and audiences within the organized crime group's environment include adversaries who threaten the group or its criminal activities such as governments, law enforcement agencies, and rival crime groups. Key audiences include the local society in which the group operates.

Thus, such groups' recourse to violence is typically relatively discrete and targeted. It is tailored to be robust enough to deter, forestall, or frustrate activities against the group and maintain operational space. Similarly, the group will conduct instrumental violence against the local society in an effort to intimidate and shape it to serve as a permissive, or potentially supportive, societal milieu. At the same time, use of violence should not be so gratuitous or large-scale as to provoke a severe government/law enforcement riposte. It also seeks to avoid crossing a threshold that would turn the wider public and society against the group.

As a result, organized crime groups are unlikely to employ WMD terrorism because it would likely destroy the permissive and profitable societal environment in which they thrive. Nonetheless, such groups may threaten WMD use to deter or extort in extraordinary circumstances.

Transnational corporations and NGOs are growing powers within the international landscape. Were such actors to resort to violence, they would become de facto organized crime or terrorist/insurgent actors. For them, launching or threatening larger-scale, mass casualty, and mass destruction attacks would destroy the group's permissive and profitable environment.

4. The Current Landscape of Potential WMD Groups

This section will examine the particular rationales for instrumental violence and potential WMD use calculus of a selected set of groups within categories of violent groups potentially most disposed to WMD use. This section is by no means an exhaustive survey of potential groups disposed to WMD use, but rather a survey of prominent active groups in each category. This survey seeks to more precisely assess each group's current disposition to WMD use, if any.

4.1 Religious Extremist Groups

Al-Qaeda

Al-Qaeda's worldview and ideological-strategic mindset is shaped by the group's fundamental embrace of Salafism, which seeks to rid the Ummah of impure, mainly western, practices and establish a Muslim lifestyle strictly in line with the Koran and the Prophet's traditions. Al-Qaeda's goal is to overthrow apostate regimes in the Middle East – such as Saudi Arabia, Egypt, and Jordan – and re-establish the Caliphate over current and historic Muslim lands. As a means to achieving this goal and incorporating a Salafist-based Islamic
community, Al-Qaeda seeks to end Western support for apostate regimes, as well as the Zionist state of Israel.

The group is motivated by religious duty to wage a defensive jihad in the protection of Muslims and Muslim lands against enemies of the faith, and notably western ideological and military threats. The members of Al-Qaeda are unrestrained in perpetrating religiously justified violence. To that end, Saudi Cleric Sheikh Nasir bin Hamid al-Fahd sanctified WMD use against the West in his 2003 publication, “A Treatise on the Legal Status of Using Weapons of Mass Destruction against Infidels.”

In its battle with western powers, Al-Qaeda recognizes that it is outmatched in conventional military terms. The possession and use of WMD, therefore, is a great equalizer. It is a means to inflict mass casualties and mass destruction – a strategic blow – against its Western enemies in what is now perceived as a fight for the survival of its organization and ideology. Moreover, it regards collectively the American government and people as a cowardly foe, and thus susceptible to having its will broken by both the destructive physical effects of a WMD attack and the paralyzing fear associated with the detonation or release of a WMD.

Al-Qaeda’s WMD potential is all the more fearsome because of the organization’s complete freedom from traditional WMD deterrence. The leadership entertains little moral ambiguity in launching a mass casualty and mass destruction WMD attack against a western population; such an attack has been sanctified by a respected religious authority. Among other arguments, it is held that the organization is compelled to retaliate in kind against a U.S. government responsible for the deaths of millions of Muslims (Al-Qaeda official estimates range between 4 and 10 million). Moreover, from a logistical point of view, Al-Qaeda has little to fear in terms of punishment from a Western response to a WMD attack. Al-Qaeda has already lost its state-sanctioned safe haven with the fall of the Taliban government in Afghanistan; its members are hunted and dispersed around the globe; and a massive, aggressive, indiscriminate response on Al-Qaeda redoubts in the Muslim world may play to the organization’s advantage through collateral damage and offense to locals that may rally recruits and supporters.

The key rationale in how Al-Qaeda uses instrumental violence rests on the central audiences it is attempting to influence: western governments, the citizens of western nations, or the broader Islamic community. Vis-à-vis its U.S. and Western audience, there is little disincentive to launching mass-casualty WMD attacks against either the U.S. government or its civilian population. In dealing with an audience it perceives as only respecting the power to kill and destroy, more casualties will cause a greater psychological impact on that audience and result in greater influence for Al-Qaeda. But Al-Qaeda is unlikely to perpetrate a WMD attack in a Muslim country because it needs the support of the global Islamic community if its ideology is to thrive and if it is to attain successfully the goal of rebuilding the Caliphate. Sectors of the Islamic community currently provide recruits, funds, and safe havens for Al-

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Qaeda. The longevity of the organization coincides with the degree of support it enjoys among the community, with isolation causing Al-Qaeda to become obsolete.

Likewise, Al-Qaeda’s primary constraint to a WMD attack on the West is the reaction it could evoke among the key audience of the broader Islamic community. The group is cognizant that most Muslims may not share its self-righteous certainty regarding the morality of a WMD attack on western soil. Mindful such a tactic could repulse this community, Al-Qaeda has gone to great lengths to justify in religious terms the righteousness of a WMD attack, obtaining clerical authority and following Islamic rules of war regarding a forewarning of attack and an opportunity for the infidel to convert to Islam. In his communiqués Bin Laden has also stressed to the American people their power and responsibility to change U.S. government policy with their vote, thereby justifying their status as a viable target in the likely event they fail to heed his warning.

The memoirs of a key Al-Qaeda theorist, as well as statements from Osama bin Laden, indicate Al-Qaeda’s central leadership engaged in a spirited debate on whether to obtain and how to use WMD.21 The decision was reached to acquire WMD, specifically radiological weapons, and to use them as a deterrent against a U.S. attack on Afghanistan or other Muslim territories. In subsequent years, theorists such as Mustafa Nasar have pushed for a more aggressive first strike approach that has been seemingly adopted by Al-Qaeda’s leadership and foot soldiers. The driving strategic rationale for an aggressive WMD approach is the recognition that defeating the West conventionally will take “many years and enormous sacrifices.”22 Yet within that first-strike mentality, Al-Qaeda’s central leadership will be judicious in their timing and targeting selection, taking into consideration the impact of a WMD attack on the greater goals of the movement.

Thus, Al-Qaeda’s rationale for instrumental violence and WMD use centers on a divine mandate for, and sanctity of, extreme violence against perceived enemies of the faith - namely Western targets - as well as the perceived need for a weapon of mass strategic impact and destruction. Both motivations strongly dispose Al-Qaeda, its core organization, broader movement, and to a lesser degree its regional affiliates, (see below) to WMD use.

Vanguard Outpost Cells of the Al-Qaeda Movement

Since 9/11, Al-Qaeda has evolved from the more discrete terrorist vanguard network and operational and support corps of Al-Qaeda’s earlier years into a global jihadist movement comprised of a kaleidoscopic and amoebic network of globally atomized groups and cells. This layer of the Al-Qaeda movement and network is arguably the most threatening with regard to the long term Al-Qaeda jihadist terrorism threat and potentially its WMD threat. The modern day Al-Qaeda network has expanded around the world with viral dynamics, energized and carried by the movement’s pathogens of radicalization - the purchase and allure of its strain of militant and jihadist Islamist ideology, and the proliferation of ‘missionary’ or ‘expeditionary’ militant Islamist leadership figures and jihadist/ mujihedeen veterans. These jihadist pathogens exploit the sinews of globalization - the Internet, rapid transnational travel,

and multicultural Western societies - that have compressed time and space, increased ethnic, nationalist, and religious intimacy, and increasingly bound states together on economic, political, and security fronts. As a result, the Al-Qaeda ideology is able to transcend many of the societal and ethno-nationalist barriers and insularity that has long parsed and anchored the state-centric world order and geographic space and reach pocketed communities susceptible to the call to arms of jihadist militancy. The result has been, and is likely to continue in the near term to be, the viral cultivation, expansion, and consolidation of a globally adaptive constellation of expeditionary and homegrown Al-Qaeda-inspired and affiliated ‘vanguard outpost’ cells.

At the leading edge of this transformation seems to be a push into new geographic fronts by establishing cells and networks led by jihadist veterans of the Afghan and Iraqi battlefields and by rallying largely autonomous homegrown cells within nations deemed enemies of Al-Qaeda and the global Muslim community. Many of these vanguard outpost cells are comprised of homegrown operatives who operate at various degrees of autonomy and entrepreneurship vis-à-vis the Al-Qaeda core. These forms of vanguard outpost cells include those inspired and rallied by the Al-Qaeda ideology who are operationally disconnected from Al-Qaeda, to those who seek out Al-Qaeda sanction, guidance, and support for their entrepreneurial operations, to those recruited and set in motion by an Al-Qaeda handler or adviser who may remain in the shadows of support while the cell conducts its operations. From an ideological-strategic mindset and goals perspective, these cells largely follow the strategic guidance contained in communiqués and fatwas of leading Al-Qaeda figures which urge attacks on western targets with WMD if possible.

**Al-Qaeda Affiliates**

**Taliban**

Leading a nationalist insurgency but maintaining strong ties to Al-Qaeda and the global, militant Islamic community, the Taliban’s rationale for instrumental violence and WMD use is comprised of corresponding restraints and incentives.

From an ideological-strategic perspective, the Taliban’s focus on nationalist goals tempers the global jihadists’ agenda and acts as a restraint on Taliban WMD use. Taliban ideology is based on the pillars of strong Pashtun nationalism and a strict Sunni interpretation of Islam that calls for extreme social conservatism and the implementation of Sharia law. The central goals of the Taliban are to expel Coalition forces from Afghanistan, topple Hamid Karzai’s secular government, and re-establish the Islamic Emirates of Afghanistan. The Taliban’s embrace of global Islamic jihad is secondary to the nationalist goal but still a critical element of the group’s vision for a future Afghanistan. In re-establishing its authority over Afghanistan, the Taliban would allow foreign radicals to use their country as a hub for the global jihad.

In its pursuit to regain power in Afghanistan, the group has adopted new tactics such as the use of suicide bombers to exploit vulnerabilities in Coalition force protection, joined with other mujahideen groups to reach the strategic goal of expelling foreign troops, and provided order and social services in regions neglected by the central government. A Taliban WMD attack, and the immediate and severe pressure it would bring on the organization and its
supporters, would be a disadvantageous decision. The resurgence of the Taliban owes a great deal both to their sanctuary in the Pakistani tribal provinces along the Afghanistan border and to the continued patronage of Pakistan’s Inter-Services Intelligence (ISI). Taliban’s use of WMD would outrage the international community, place immense pressure on Pakistan to crack down on Taliban elements in the border region, and undermine the position of ISI sympathizers supporting the Taliban.

As an ally of Al-Qaeda, the Taliban does subscribe to an anti-western worldview and religiously-justified violence to include the use of WMD against western targets. Moreover, the Taliban adopted the use of suicide bombers – a previously taboo tactic in Afghanistan – after observing its effectiveness in operations perpetrated by foreign jihadists in Iraq. From a targeting standpoint, there is little within the religious dimensions of the Taliban’s ideological-strategic mindset or operational code that would preclude more discreet and limited WMD attacks against either hard targets of Coalition convoys or soft targets of reconstructions projects, NGOs, and Afghan citizens working or cooperating with the Afghanistan government.

However, as long as the ethno-nationalist/ separatist goals prevail and the organization continues to unite various indigenous groups against the central government, the Taliban is likely to avoid the divisive impact of launching a larger-scale, mass casualty WMD attack. A potential Taliban WMD scenario could be envisioned in which the Taliban takes control of sizeable territory, if not all of Afghanistan, and acquires WMD as a deterrent against Coalition or Afghan forces to protect its enclaves or the country.

Thus, the Taliban’s rationale for instrumental violence and WMD use is a hybrid between dominant ethno-nationalist/ separatist motivations, goals, and audiences, and strong undercurrents of Islamist/jihadist sanctity for violence, disposing the group to smaller scale and discriminate WMD attacks against foreign troops and the government but designed to avoid significant collateral damage of key societal constituencies.

**Salafist Group for Call and Combat (GSPC)**

The rationale for instrumental violence and WMD use, organizational imperatives, extensive European network, relationship with Al-Qaeda, and new-found mission of the GSPC indicate that the organization is disposed to WMD use, particularly against a western, likely European, targets.

Formed as a splinter group of Algeria’s GIA in 1996, the GSPC has since fought the Algerian government with the goal of establishing an Islamic state in Algeria and pursued high profile attacks against Western targets on the European continent as part of the global radical Islamic struggle. Its cause regarding the former is virtually lost; the numbers of core fighters in Algeria have dwindled to 500-1,000, most of who are confined to remote geographical locations. It has lost the key ideological and logistical support of the community, and it continues to be hunted by ever-more effective Algerian security services. The diminution, if not failure, of the nationalist struggle eliminates a prime constraint for the GSPC in its rationale for instrumental violence and WMD use: the potential that such attacks might harm or alienate the key constituency and audience for the group in the form of the Algerian community.
Given the dire circumstances in Algeria, GSPC has renewed its focus on expanding its reach into North Africa and the European continent and cementing its ties with Al-Qaeda. The organization has a long history with Al-Qaeda; many of its original members had fought with bin Laden in the Afghanistan jihad against the Soviet Union, and successive GSPC emirs have voiced support for Al-Qaeda’s jihad against America. As of late September 2006, Al-Qaeda’s Ayman al Zawahiri announced a more formal alliance with and a new role for GSPC, to be “a thorn in the necks of the American and French crusaders and their allies, and a dagger in the hearts of the French traitors and apostates.” This closer ideological and operational alliance between the GSPC and Al-Qaeda likely infused the GSPC with Al-Qaeda’s more extreme and potent global jihadist ideological-strategic mindset and rationale for instrumental violence and WMD use, thus making the GSPC more disposed to larger scale and more indiscriminant WMD use similar to Al-Qaeda.

GSPC’s most attractive asset as a terrorist organization, and potentially most ominous regarding a WMD attack, is the extensive network of members and affiliates concentrated in France, and also spread across the European continent. Moreover, GSPC’s loss of a national focus and tighter embrace of the global radical Islamic struggle has expanded its recruitment base of angry, young Muslim occupants in Europe’s cities. In fact, European security services have uncovered cells in Germany, Italy, Spain, France, Belgium, Netherlands, and Britain with plots of mass civilian casualty attacks, one of which included the use of chemical weapons.

GSPC’s founding pledge to limit attacks to Algerian government and military targets attracted thousands of recruits and served as a popular alternative to GIA and its gruesome targeting of thousands of Algerian civilians. However, as the organization began suffering losses in manpower and logistics, it rescinded - in operations, if not in public policy - its prohibition of attacks against civilians. Such a revision of operational code at a time of extreme external pressure indicates that organizational imperatives and dynamics had a dominant effect on GSPC’s rationale for instrumental violence and potential use of WMD. When pushed into a corner, it sought to defend and preserve its organizational integrity and a raison d’être as a militant organization - against any target – even at the price of jettisoning the pursuit of a long term, ideological strategic goal.

Thus, the GSPC’s rationale for instrumental violence and WMD use is driven by an increasing adherence to the Al-Qaeda brand of jihadist extremist violence, organizational imperatives of survival driving to group to more extreme levels of violence, and diminishing targeting constraints as the group’s ethno-nationalist/separatist goals erode. This rationale for instrumental violence disposes the group to increasingly large-scale and indiscriminant WMD use in the vein of Al-Qaeda.

Al-Qaeda in Iraq

Al-Qaeda in Iraq’s ideological-strategic mindset and goals do not constrain the use of WMD against foreign troops. The group believes that its actions are mandated by Islam and, are therefore, sanctioned by God. The group seeks to drive Coalition troops from Iraq, dethrone the current Iraqi government, and install an Islamic state. To that end, the leader of Al-Qaeda in Iraq Abu Hamza al-Muhajer has publicly recruited Muslim scientists to assist in

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mounting WMD attacks, specifically radiological and biological, against US forces serving in Iraq. According to al-Muhajer, the expertise of the scientists can serve the jihad, and American bases in Iraq are perfect locations to test their unconventional weapons.24

In some respects, Al-Qaeda in Iraq has compromised their ideology for the sake of a secular, almost nationalist, cause. The group has moderated their traditional tactics (gruesome taped beheadings) and targeting (Shiite civilians and mosques) because it reduced the group’s critical support within the Iraqi community. Thus, the need to influence an Iraqi audience and win their support constrains a WMD attack on Iraqi civilians, regardless if they are traditional enemies such as Shiites or ‘government collaborators.’ The target of a WMD attack would be confined to foreign forces on Iraq’s soil – an operation around which everyday Iraqis, as well as the broader Islamic community, can identify and rally towards. Moreover, a WMD attack on American forces would send the desired message to Al-Qaeda in Iraq’s subsidiary audience – the American population - that the war effort is too costly in lives and money, and pressure must be exerted on the US government to end its military campaign in Iraq.

The high-level Al-Qaeda leadership retains a significant level of control over the strategic and tactical direction of its Iraqi legion. Evidence of this control was demonstrated in Ayman al-Zawahiri’s 2005 letter to Zarqawi, in which he rebuked the Jordanian for targeting states outside of Iraq, and for failing to consider the detrimental, long-term implications of perpetrating mass casualty attacks on Shiite civilians, and recommended conducting an insurgency around which other Iraqi militant groups could align.25 Indications are that Zawahiri’s approach was adopted by Zarqawi and his successor, Abu Ayyub al-Masri. Given this level of command and control, it is unlikely the group would engage in a WMD attack outside the strategic framework provided by Al-Qaeda central. U.S. forces would be the WMD target, ideally in an isolated environment, such as a military base.

Thus, Al-Qaeda in Iraq’s rationale for instrumental violence and WMD use is driven increasingly by provincial political and nationalist considerations of its particular environment - carrying with it the operational constraint of needing to cultivate societal support and avoid alienating key constituencies and audiences with attacks - along with continuing strong undercurrents of the Al-Qaeda brand jihadist sanctification of violence. These motivations and dynamics dispose the group to small to medium scale, discriminate WMD attacks against foreign troops and facilities.

Jemaah Islamiyah (JI)

JI’s overall rationale for instrumental violence is unlikely to sanction WMD attacks. The organization is constrained by the Muslim Indonesian audience they are attempting to influence. JI’s ideological-strategic mindset is to create a pan-Islamic South East Asia, particularly focused in Indonesia. JI attacks soft, western targets in Asia; thus, an attack with harmful fall-out on the surrounding Asian population would be counter-productive to the organization’s goal of inspiring a popular, Islamic uprising. However, the potential exists for minority elements within JI aligned to Al-Qaeda’s worldview and who employ impetuous

tactics to conceivably launch a discriminate, low-grade WMD attack on a western target in Asia.

The group cannot be thought of as a unitary actor; a crucial division exists within the organization on how best to reach the pan-Islamic goal. A minority embraces the Al-Qaeda anti-western world view and subsequently seeks out western targets in Indonesia for high-profile terrorist attacks. The majority, however, “believes these tactics undermine a long-term strategy of building military capacity and using religious proselytization to create a mass base sufficient to support an Islamic Revolution.”

This active terrorist cadre within JI, previously led by the now incarcerated, infamous operative Hambali, engages in high-profile, mass casualty attacks against soft, western targets in Asia—hotels, nightclubs, etc. The perpetrators of these attacks tend to operate outside the formalized administrative and command structure, citing an interpretation of Islamic doctrine that allows for small cells or individuals to carry out jihad in cases of emergency without the consent of the organization leadership. In this sense, some JI attacks are compelled by particular organizational fractures, dynamics, and imperatives driving some cadres to maintain organizational raison d’être, relevance, and survival by staying on the offensive—a mentality that could motivate ever increasing levels of violence and a WMD attack. As JI operative Noordin Top has stated, “Our enemies will destroy us if we don’t destroy them first.”

The JI membership perpetrating high casualty attacks against western targets not only driven by Al-Qaeda’s jihadist ideology, but is also engaged in an intimate, mutually beneficial relationship with Al-Qaeda that involves financial and logistical support and shared personnel. In one instance, JI sent a specialized science operative to Afghanistan to develop an anthrax program for Al-Qaeda, a situation that draws into relief a scenario in which JI could be connected to a WMD attack: the freelance, militant wing acting in coordination with, and at the behest of, Al-Qaeda.

Thus, JI’s rationale for instrumental violence and WMD use must be differentiated for each of its main groupings—the central more ethno-nationalist/separatist-oriented group and the minority jihadist grouping. The main group’s rationale for instrumental violence is dominated by ethno-nationalist/separatist motivations and goals and attendant constraints on its levels of violence and targeting so as not to harm or alienate key societal constituencies, thus severely diminishing its disposition for larger-scale WMD use. However, the minority grouping’s jihadist and sanctified rationale for instrumental violence and its particular organizational imperatives drive it to more extreme and indiscriminant levels of violence, disposing it to larger-scale WMD use.

4.2 Right Wing Groups

National Socialist Movement

The National Socialist Movement (NSM) is the largest and most active white supremacist group in the United States and its ideological-strategic mindset espouses a modernized,

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Americanized Neo-Nazi ideology. The NSM condemns Jews, African-Americans, other minorities, and the immigrant community and seeks to deny them US citizenship and civil liberties. Thus, the ideological-strategic mindset of NSM centers on a hatred for specific racial groups and is conducive to WMD attacks. However, the secular goals of the organization – limiting or ending the rights of minority groups – act as a WMD use constraint.

Through its acts, writings, Internet presence, and recording label, NSM has two targeted audiences: 1) the white supremacist community; and 2) the broader white American population. The rise in influence and popularity of NSM is due to the decline of rival neo-Nazi organizations and also its concerted effort to bring members of various white supremacist groups into its fold. However, the group is primarily focused on a political agenda. To that end, NSM public rhetoric feeds off anti-immigrant sentiment and fear of minority crime in seeking increased support among the broader white American community. The virulently hateful rhetoric against targeted groups that could inspire a WMD attack is a necessary element of NSM’s message to the former audience, while the aim of achieving more moderate, political, secular goals dominates the message to the latter.

NSM has not been attributed to any significant terrorist attacks. The group’s primary activities are holding demonstrations and spreading its message through periodicals and an increasing Internet presence. NSM articles have offered instructions on forming explosives, and a member was discovered to be offering military and weapons training at a farm in Ohio.

The group maintains a paramilitary structure, whereby individual members are given military titles – private, sergeant, general, etc. However, the effort of NSM to attract as many members of the white supremacist community under the group’s umbrella as possible indicates the central leadership has little control over its members and affiliates.

At present, a NSM WMD attack would likely be outside the group’s instrumental use of violence. However, the hateful ideology, rhetoric, and violent images produced and disseminated by the group against the targeted adversary communities raises the potential for either an extremist splinter cell or inspired outside sympathizer to launch a WMD attack against the anointed enemy communities. This potential is increased if the target community homogeneously occupies a discreet geographic space, such as an enclave, limiting potential collateral harm to the group’s constituency or key audiences.

4.3 Ethno-Nationalist/Separatists

Hezbollah

Hezbollah’s secular and nationalist aspirations outweigh its adherence to a radical Islamic ideology. As such, its disposition to WMD use is constrained by traditional ethno-nationalist/separatist considerations: ensuring the continued support of its constituency and garnering external sympathy. As part of its ideological-strategic mindset, the organization espouses a hatred of Israel and seeks its destruction, but is not defined exclusively by that relationship. The group is also an active and powerful political and social force in Lebanon,

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28 See Anti-Defamation League Profile of National Socialist Movement; available from www.adl.org; Internet; accessed on 5 November 2006.
serving in the Parliament and Cabinet and independently providing constituent services to its base support of Shiites in southern Lebanon and the southern suburbs of Beirut. As the ‘Party of God’, Hezbollah members adhere to a religious ideology; however, the group was formed as a national resistance movement and has continued to fight politically for the empowerment of Shiites within Lebanon’s political structure, all of which underscore that Hezbollah’s core ideological-strategic mindset, motivations, and goals are largely ethno-nationalist/ separatist in nature.

Hezbollah’s militancy is expressed in guerrilla campaigns and in perpetrating or planning terrorist operations. In either form, the group is likely logistically capable of a WMD attack, for example launching rockets at an Israeli chemical factory, attacking an Israeli embassy abroad with a WMD, or smuggling a WMD to Palestinian terrorist groups. However, the group has always used conventional weapons in their attacks that traditionally sought secular goals – driving multi-national and American forces from Lebanon, capturing hostages for future exchanges of Hezbollah prisoners—and not the more religiously extremist aims often disposing groups to WMD use.

Hezbollah’s organizational structure supports a centralized command and control over militant operations. While operational commanders have a good deal of flexibility regarding decisions in the field, a WMD attack – given its inherent high level strategic implication – would not occur without prior approval by the leadership Majlis al-Shura. The Majlis measures actions against the long-range goals of the Hezbollah movement and is thus likely to be responsive to popular sentiment acting against WMD use. Furthermore, the organization depends on and is loyal to the governments of Syria and Iran; a decision to take action that undermines these governments’ ability to support Hezbollah is unlikely to occur. The involvement of state actors, even those as unpredictable as Iran and Syria, in Hezbollah’s WMD decision-making act as a further constraint on potential WMD use, as it is in neither state’s interest to be linked with a WMD attack by a terrorist organization.

Thus, Hezbollah’s rationale for instrumental violence and WMD use is constrained and shaped by its prevailing ethno-nationalist/ separatist ideological-strategic mindset and goals and its desire to avoid harming or alienating key societal constituencies and audiences. While Hezbollah’s radical Islamic undercurrents may sanctify relatively indiscriminant suicide bombings and guerrilla attacks against perceived foreign enemies, its ethno-nationalist/ separatist and political drivers and constraints do not dispose the group to larger-scale WMD use. Smaller-scale and discrete WMD use against enemy military and government targets may in severe circumstances be rationalized.

Hamas

Despite a charter that calls for the destruction of Israel and establishment of an Islamic Palestinian polity, Hamas’ ideological-strategic mindset is ultimately focused on the real-world struggle of resisting Israel and creating an independent Palestinian state. While Hamas may be sympathetic ideologically to the global jihadist movement, it does serve an ill-defined Ummah and pursues the rebuilding of a Caliphate. Hamas decision-making regarding the use of instrumental violence reflects an acknowledgment of responsibility for a real-life constituency— the Palestinian people— and the ramifications of a WMD attack would threaten Palestinian security and interests in building a stable, independent future.
Hamas’ ability to be attuned to Palestinian popular opinion and act accordingly is a significant reason for their electoral success and rise to power. With a strong majority of the Palestinian population consistently supporting a two-state solution to the Palestinian-Israeli crisis, it also serves as a powerful constraint on a Hamas WMD attack on an Israeli target. The radical elements of Hamas ideology that could potentially dispose the group to WMD use have been subsumed by the broader concerns of building support within the community, providing social services to its constituency, and attempting to govern all of the Palestinian Territories as head of the Palestinian Authority.

Reaching a consensus position after extensive internal debate is a fundamental principle of Hamas. A thoughtful decision-making process allows the leadership time to consider the strategic implications of the group’s action, which, in the case of a WMD attack, acts as a constraint given the reasons outlined above. Moreover, Hamas has traditionally maintained tight discipline throughout the organization, especially in adhering to policy regarding the use of violence. When Hamas has entered past cease-fires at the behest of the Palestinian Authority and popular sentiment, its militant wing has demonstrated a far greater adherence than other participating Palestinian groups. In turn, this indicates that the decision of the Hamas leadership to refrain from WMD use would be respected by the group’s operatives, decreasing the likelihood of a Hamas-affiliated fringe group independently perpetrating a WMD operation.

Thus, similar to Hezbollah, Hamas’ rationale for instrumental violence and WMD use is constrained and shaped by its prevailing ethno-nationalist/separatist ideological-strategic mindset and goals, and desire to avoid harming or alienating key societal constituencies and audiences.

**Liberation Tigers of Tamil Eelam (LTTE)**

Aspiring to secular goals and adhering to a secular ethno-nationalist/separatist ideological strategic mindset, the LTTE is not disposed to larger-scale WMD use. The group seeks to create an independent homeland, known as the Tamil Eelam state, for the minority Tamil population in the northern and eastern provinces of Sri Lanka.

LTTE is constrained from WMD use by the Tamil audience they seek to influence and whose support is critical to the group’s mission. In addition to the secular-minded Tamil community in South East Asia, LTTE is reliant on funds from the Tamil expatriate communities, many of whom live in western societies, and have demonstrated they will cut funding if attacks are indiscriminate and cause significant civilian casualties.

LTTE engages in insurgency warfare and also conducts terrorist attacks that focus predominately on the Sri Lankan military and Sinhalese political establishment. The Tigers have integrated a battlefield insurgent strategy with a terrorist program that targets not only key personnel in the countryside but also senior Sri Lankan political and military leaders in Colombo and other urban centers. In one case very early in its struggle, LTTE launched available chemical weapons prior to raiding a military facility because it was desperately low on conventional weapons. However, the tactic backfired, as the wind blew the chemical back into the LTTE fighters. The group refrained entirely from its use in succeeding decades.
Most notorious among LTTE forces are the Black Tiger suicide squads, which have conducted attacks against Sinhalese civilian populations, targeting civilians on mass transit, Buddhist shrines, and Colombo office buildings. These operations demonstrate LTTE is capable of indiscriminate, mass casualty civilian attacks, considerably in line with WMD use. However, the Black Tiger operations against civilians caused LTTE to lose considerable funding from Tamil expatriate communities, and prompted scorn from the international community. As a result, such attacks were curtailed. As a WMD attack would invoke a similar response, it is unlikely such an operation would be sanctioned by the LTTE leadership.

Thus, the LTTE rationale for instrumental violence and WMD use is rigidly shaped by the group’s ethno-nationalist/separatist ideological strategic mindset and attendant considerations of calibrating the ferocity, scope, and targeting of violence to further political goals and avoid alienating key constituencies and audiences. As such, the LTTE, while prosecuting highly sophisticated, robust, and deadly insurgent and terrorist attacks against the Sri Lankan government and other enemies, is unlikely to employ WMD attacks due to political and constituency constraints.

5. The Future Landscape of WMD Groups

This section will forecast the future landscape of WMD-disposed groups by identifying future ‘drivers’ germane to WMD terrorism and discussing their likely effects in shaping the landscape of WMD actors.

The future drivers selected for this study are drawn from the National Intelligence Council’s 2004 “Mapping the Global Future” estimate for 2020. The key drivers identified by the report germane to future WMD groups are quoted and set off in bold lettering, followed by the TRC assessment of their likely impact in shaping the future landscape of WMD-disposed groups. The headings for each section are TRC’s.

5.1 Challenges to Nation State Structures

“The nation-state will continue to be the dominant unit of the global order, but economic globalization and the dispersion of technologies, especially information technologies, will place enormous new strains on governments.”

Growing connectivity also will be accompanied by the proliferation of transnational virtual communities of interest, a trend which may complicate the ability of state and global institutions to generate internal consensus and enforce decisions and could even challenge their authority and legitimacy. Groups based on common religious, cultural, ethnic or other affiliations may be torn between their national loyalties and other identities. The potential is considerable for such groups to drive national and even global political decisionmaking on a wide range of issues normally the purview of governments. The Internet in particular will spur the creation of global movements, which may emerge even more as a robust force in international affairs. For example, technology-enabled diaspora communications in native languages could lead to the preservation of language and culture in the face of widespread emigration and cultural change as well as the generation of political and economic power.”


30 Ibid., p. 77.
Globalization’s transformative dynamics on the state-centric world resemble a kaleidoscope turning to morph and recast communal identities and groupings organized around the nation-state into modern global and sub-state nations defined along ethnic, religious, and ideological lines. These modern nations are rending, transcending, and supplanting the traditional civic nationalist identities and geographic groupings long anchored within the state-centric international order. As these modern nations are galvanized, they will seek to flex their newfound solidarity and strength in pursuit of their communal interests and goals—likely communal empowerment, liberation, and/or autonomy—bringing them into conflict with the structures and strictures of the traditional state-centric system and its governments. The flexing of modern nations, particularly those with radical activist or violent ideological-strategic mindsets, will strengthen some existing terrorist groups and cultivate emergent groups.

The Internet and global communication mediums will serve as catalytic forces in creating these modern nations, unmoored from the geographic space, state system, or societal norms and laws that had long served as inhibitors and buffers to globally diffuse like-minded peoples easily coalescing to their peculiar ideologies as a global and sub-state communities. These nations serve to reinforce particular ideologies—rationalizing, justifying, and compelling the tenets of the ideology and associated actions—as well as link and organize members and constituents around the world, thus creating truly global movements.

The dynamics of globalization driving the recasting of traditional state-centric identities and civic nationalism into new modern global and sub-state nations that rend and come into conflict with traditional state governments and powers will serve as the primary drivers shaping the landscape of radical, and WMD-disposed groups.

5.2 **Recast Identities and Modern Nations**

*Part of the pressure on governance will come from new forms of identity politics centered on religious convictions and ethnic affiliation. Over the next 15 years, religious identity is likely to become an increasingly important factor in how people define themselves. The trend toward identity politics is linked to increased mobility, growing diversity of hostile groups within states, and the diffusion of modern communications technologies.*

- The primacy of ethnic and religious identities will provide followers with a ready-made community that serves as a ‘social safety net’ in times of need—particularly important to migrants. Such communities also provide networks that can lead to job opportunities.*

The galvanizing of modern global and sub-state nations increases the potential for the emergence and strengthening of activist, and possibly violent groups. These dynamics will likely particularly strengthen and proliferate ethno-nationalist/separatist and religious extremist groups that are theoretically moderately and highly disposed, respectively, to WMD use.

5.3 **The Mixing Global Community**

*With migration on the increase in several places around the world—from North Africa and the Middle East into Europe, Latin America and the Caribbean into the United States, and

31 Ibid., p. 79.
Increasing global migration flows and multi-ethnic/religious societies—particularly in instances when elements of the indigenous society perceives the immigrants as a cultural, physical, or economic threat or ‘contaminant’—may exacerbate sectarian tensions and anti-immigrant violence in the ‘destination’ regions noted above. This environment and societal sentiment will likely strengthen, proliferate, and energize—with societal operational support, recruits, and ideological-political legitimacy—right wing xenophobic, anti-immigrant, racist, and hyper-nationalist terrorist groups in violence against minorities and immigrants, and, in so doing, increase the potential for their use of WMD. As noted earlier, the violently racist and xenophobic ideological-strategic mindset of right wing groups dispose them to WMD use.

5.4 Increasing Internal Conflict and Ethno-Nationalist Identities

“Weak governments, lagging economies, religious extremism, and youth bulges will align to create a perfect storm for internal conflict in certain regions. ... Although a leveling off point has been reached where we can expect fewer such conflicts than during the last decade, the continued prevalence of troubled and institutionally weak states means that such conflicts will continue to occur. Some internal conflicts, particularly those that involve ethnic groups straddling national boundaries, risk escalating into regional conflicts. At their most extreme, internal conflicts can result in failing or failed states, with expanses of territory and populations devoid of effective governmental control. Such territories can become sanctuaries for transnational terrorists (such as al-Qa’ida in Afghanistan) or for criminals and drug cartels (such as in Colombia).”

“Lagging economies, ethnic affiliations, intense religious convictions, and youth bulges will align to create a ‘perfect storm,’ creating conditions likely to spawn internal conflict. The governing capacity of states, however, will determine whether and to what extent conflicts actually occur. Those states unable both to satisfy the expectations of their peoples and to resolve or quell conflicting demands among them are likely to encounter the most severe and most frequent outbreaks of violence. For the most part, those states most susceptible to violence are in a great arc of instability from Sub-Saharan Africa, through North Africa, into the Middle East, the Balkans, the Caucasus and South and Central Asia and through parts of Southeast Asia. Countries in these regions are generally those ‘behind’ the globalization curve.”

The transformative dynamics of globalization recasting the global community into modern global and sub-state nations will catalyze and cultivate growing ethno-nationalist identities and groupings that will flex against existing governments, societies, and residual nationalist groupings of the state-centric global order to pursue communal interests and goals, likely those of empowerment, liberation, and autonomy. This will result in the strengthening, proliferation, and increased activism of ethno-nationalist/separatist groups in the regions noted above, and the increased potential of those groups employing campaigns of instrumental violence and possibly WMD attacks against repressive governments, their agencies or symbols of power, or threatening rival ethno-national communities.

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32 Ibid., p. 13.
34 Ibid., p. 97.
nationalist/separatist groups would likely employ highly discriminate small to medium scale WMD attacks that seek to avoid collateral damage to their community and constituency, as well as avoid outraging or alienating coveted constituencies and audiences. However, as such ethno-nationalist/separatist conflicts proliferate, the potential increases for ethno-nationalist/separatist groups to adopt increasingly extremist rationales for instrumental violence and WMD use. Further, the proliferation of ethno-nationalist/separatist actors and conflicts also increases the potential that the conflicts may escalate in violence to WMD use.

The strengthening and proliferation of ethno-nationalist/separatist groups, likely directly confronting governments, may further increase the attractiveness of WMD as an asymmetric weapon against the superior conventional forces of the state.

Failing and fragmenting states may produce de facto ethno-nationalist/separatist groups comprised of the remnants of the state, potentially including the former elements of the government or military with access to CBRN weapons or engineering expertise and material.

5.5 Growing Religious Activism

"Many religious adherents—whether Hindu nationalists, Christian evangelicals in Latin America, Jewish fundamentalists in Israel, or Muslim radicals—are becoming ‘activists.’ They have a worldview that advocates change of society, a tendency toward making sharp Manichaean distinctions between good and evil, and a religious belief system that connects local conflicts to a larger struggle."

"At the same time, the desire by activist groups to change society often leads to more social and political turmoil, some of it violent. In particular, there are likely to be frictions in mixed communities as the activists attempt to gain converts among other religious groups or older established religious institutions. In keeping with the intense religious convictions of many of these movements, activists define their identities in opposition to ‘outsiders,’ which can foster strife."

The growing landscape of activist religious groups increases the potential that these groups may adopt violence and/or support existing militant religious groups, thus strengthening and proliferating violent religious extremist groups. The religious militant’s Manichean worldview, perceived divine command and sanctity for violence, and limited concerns for extreme violence damaging or alienating its perceived constituency or key audiences, reduces constraints on large-scale and indiscriminant violence, including WMD terrorism, against expansively-defined categories of anointed enemies of the faith.

5.6 The Spread of Radical Islam

"The key factors that spawned international terrorism show no signs of abating over the next 15 years. Experts assess that the majority of international terrorist groups will continue to identify with radical Islam. The revival of Muslim identity will create a framework for the spread of radical Islamic ideology both inside and outside the Middle East, including Western Europe, Southeast Asia and Central Asia."

35 Ibid., p. 79.
36 Ibid., p. 81.
This revival has been accompanied by a deepening solidarity among Muslims caught up in national or regional separatist struggles, such as Palestine, Chechnya, Iraq, Kashmir, Mindanao, or southern Thailand and has emerged in response to government repression, corruption, and ineffectiveness.37

“The spread of radical Islam will have a significant global impact leading to 2020, rallying disparate ethnic and national groups and perhaps even creating an authority that transcends national boundaries. Part of the appeal of radical Islam involves its call for a return by Muslims to earlier roots when Islamic civilization was at the forefront of global change. The collective feelings of alienation and estrangement which radical Islam draws upon are unlikely to dissipate until the Muslim world again appears to be more fully integrated into the world economy. Radical Islam will continue to appeal to many Muslim migrants who are attracted to the more prosperous West for employment opportunities but do not feel at home in what they perceive as an alien culture.”38

“There are indications that the Islamic radicals' professed desire to create a transnational insurgency, that is, a drive by Muslim extremists to overthrow a number of allegedly apostate secular governments with predominately Muslim subjects, will have an appeal to many Muslims.

Anti-globalization and opposition to US policies could cement a greater body of terrorist sympathizers, financiers, and collaborators.”39

“Facilitated by global communications, the revival of Muslim identity will create a framework for the spread of radical Islamic ideology inside and outside the Middle East, including Southeast Asia, Central Asia and Western Europe, where religious identity has traditionally not been as strong. This revival has been accompanied by a deepening solidarity among Muslims caught up in national or regional separatist struggles, such as Palestine, Chechnya, Iraq, Kashmir, Mindanao, and southern Thailand, and has emerged in response to government repression, corruption, and ineffectiveness.”40

Radical Islamist ideology will resonate with the Muslim global Diaspora, offering a perceived righteous and sanctified path to empowerment and redress of perceived grievances and sense of alienation vis-à-vis the West. The spread of radical Islam and its potential to rally and galvanize Muslim Diasporas in the West, radical militant networks, and local/regional militant Islamist groups to create a global movement increases the potential that militant Islamist groups will strengthen and proliferate, in turn, increasing the threat of WMD use by militant Islamist groups.

Additionally, as French scholar Oliver Roy has observed, the “deterritorialisation of Islam” has contributed to a loss of identity among second and third generation Muslim immigrants living in western societies.41 Seeking acceptance, these young Muslims find a welcoming community within radical mosques or the circles of radical preachers espousing an extremist global jihadist ideology. Historic precedent demonstrates that most destructive terrorist attacks perpetrated by global jihadists against targets in western society (9/11 attacks,

37 Ibid., p. 93.
38 Ibid., p. 81.
39 Ibid., pp. 93-94.
40 Ibid., p. 15.
London bombings) are committed by this type of individual. As noted above, disciples of extremist religious ideology are prime candidates for WMD use.

The transformative globalization dynamics recasting the state-centric world order into global and sub-state ethnic, nationalist, and religious nations may also cultivate the proliferation of Muslim ethno-nationalist/separatist groups with degrees of Islamist character and motivation, or rally together and synergize such existing regional/provincial groups, such as those in the regions mentioned above. The greater the religious extremism of the group, the greater its rationalization of larger scale, more indiscriminate violence, including WMD, driven by a rationale of a transcendent divine mandate for, and sanctity of, extreme violence against anointed enemies of the faith.

5.7 The Climate For International Terrorism and Global Insurgency

“Pressure from the global counterterrorism effort, together with the impact of advances in information technology, will cause the terrorist threat to become increasingly decentralized, evolving into an eclectic array of groups, cells, and individuals.”

“While taking advantage of sanctuaries around the world to train, terrorists will not need a stationary headquarters to plan and carry out operations. Training materials, targeting guidance, weapons know-how, and fund-raising will increasingly become virtual (i.e. online).”

“Even if the number of extremists dwindles, however, the terrorist threat is likely to remain. Through the Internet and other wireless communications technologies, individuals with ill intent will be able to rally adherents quickly on a broader, even global scale and do so obscurely. The rapid dispersion of bio-and other lethal forms of technology increases the potential for an individual not affiliated with any terrorist group to be able inflict widespread loss of life.”

As the transformative dynamics of globalization, international counter-terrorism operations, and certain information technologies drive many terrorist groups and networks—notably Al-Qaeda—to become increasingly atomized and diffuse, parallel advancements in personal technologies and the Internet will serve to empower and enhance these groups operationally, including in the employment of WMD. The proliferation of information communication technologies, labeled the ‘democratization of technology’ by Thomas Friedman “enables more and more people, with more and more home computers, modems, cellular phones, cable systems and Internet connections, to reach farther, into more and more countries, faster and faster, deeper and deeper, cheaper and cheaper than ever before in history.”

This proliferation of information communication works to lower the barriers to acquisition of WMD in a number of ways, including the increased availability of weaponization knowledge, and the erosion of moral and ethical norms restricting the use of WMD.

The Internet in particular will serve a powerful role in enhancing operationally atomized and homegrown militant groups. The Internet will serve as a viral pathogen, proliferating

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42 National Intelligence Council, p. 94.
43 Ibid., p. 94.
44 Ibid., p. 94.
radical and militant ideologies globally, transcending many traditional state and societal barriers and buffers that had insulated communities from radical ideologies, and resonating in communities whose particular pernicious conditions or grievances make them especially susceptible to militant ideologies promising a path of empowerment, redress, and vengeance.

The Internet will also serve in an organizing capacity, orienting globally diffuse groups to the strategic goals of particular ideologies and enabling relatively clandestine transnational organization between various groups to create networks and ‘swarming’ operations. Further, as noted earlier, these emergent transnational nations or communities defined along a common ideology will serve to collectively reinforce and heighten radical ideologies, transcending the tempering social and moral norms of mixed and insulated societies where the ideology is a minority or banned. The reinforcing collective mindset of these nations may lead to a spiral of increasing radicalism and militancy, thus increasing the potential for a fevered and collectively justified rush to extreme levels of violence and the use of WMD.

Finally, the Internet will serve to enhance operationally these groups by serving as a resource for militant ‘state-of-the-art’ tradecraft, weapons engineering guidance, and WMD development and acquisition information. Prior to the proliferation of information communication technologies states were the only actors with the resources to acquire WMD and, therefore, controlled the dissemination of the knowledge required to construct WMD. However, today’s information and communication technologies provide a global repository of knowledge that has the potential to store and disseminate useful information regarding the acquisition, construction, weaponization, and delivery of WMD.

Thus, amidst this transforming landscape of radical militant actors, the confluence of increasingly atomized militant groups rallied and organized along the ideological-strategic mindsets of religious extremism, ethno-nationalism/separatism, and extremist right wing agendas, with the operationally empowering effects of personal technology advancements, WMD technology availability, and the WMD information resources on the Internet will lead to an increase in the number of atomized groups with a rationale disposed to WMD use and the operational capabilities to acquire and employ WMD.

5.8 The Future of WMD Terrorism

“The Religious zeal of extremist Muslim terrorists increases their desire to perpetrate attacks resulting in high casualties. Historically, religiously inspired terrorism has been most destructive because such groups are bound by few constraints. The most worrisome trend has been an intensified search by some terrorist groups to obtain weapons of mass destruction. Our greatest concern is that these groups might acquire biological agents or less likely, a nuclear device, either of which could cause mass casualties.

- Bioterrorism appears particularly suited to the smaller, better-informed groups. Indeed, the bioterrorist’s laboratory could well be the size of a household kitchen, and the weapon built there could be smaller than a toaster. Terrorist use of biological agents is therefore likely, and the range of options will grow. Because the recognition of anthrax, smallpox or other diseases is typically delayed, under a ‘nightmare scenario’ an attack could be well underway before authorities would be cognizant of it.
- The use of radiological dispersal devices can be effective in creating panic because of the public’s misconception of the capacity of such attacks to kill large numbers of people.
With advances in the design of simplified nuclear weapons, terrorists will continue to seek to acquire fissile material in order to construct a nuclear weapon. Concurrently, they can be expected to continue attempting to purchase or steal a weapon, particularly in Russia or Pakistan. Given the possibility that terrorists could acquire nuclear weapons, the use of such weapons by extremists before 2020 cannot be ruled out.”  

Consonant with earlier assessments, the more atomized and homegrown terrorist groups - particularly religious extremists whose rationale for instrumental violence compels and sanctifies WMD use - have the potential to become increasingly operationally empowered and dangerous as biological and nuclear weapons technology becomes increasingly available.

6. Conclusion

The current landscape of radical and violent groups with the potential intent to employ WMD use centers on three ideologically-defined categories of groups: 1) religious extremists; 2) ethno-nationalist/ separatists; and 3) right wing. The sanctified, ‘holy war’ ideological-strategic mindset of religious extremist groups makes them most disposed to wholesale violence, and potentially large scale WMD use, against an expansive target set. While the rationales for instrumental violence associated with each of these categories are, to varying degrees, consonant with WMD use, upon closer examination of the rationales for instrumental violence of prominent groups in each category, there remain significant political constraints to WMD use. Key among these constraints is a concern that a potentially indiscriminant WMD attack may collaterally harm or alienate key group constituencies and audiences.

The future drivers of the National Intelligence Council’s “Mapping the Global Future” report which forecasts key global changes to the 2020 timeframe suggest that the dynamics of globalization will galvanize the emergence of global and sub-state nations defined along ethnic, religious, or ideological identities that rend and transcend traditional state-centric world order and structures. The emergence and flexing of these nations in pursuit of communal interests increases the potential that they will be brought into conflict with these state structures - notably governments - as well as rival nations.

In particular, key drivers such as the galvanizing effect and spread of radical Islam, growing ethno-nationalist identities and nations, and increasing immigration flows will have the effect of strengthening and proliferating Islamist extremist groups, ethno-nationalist/ separatist groups, and racist/ xenophobic anti-immigration and hyper-nationalist right wing groups respectively, thus increasing the number and activism of groups potentially disposed to WMD use. The strengthening and proliferation of Islamist extremist groups, primarily Al-Qaeda and its affiliates, in particular will pose a significant WMD threat. Further, these future drivers and globalization dynamics will likely cultivate ethno-nationalist/ separatist groups of strong Muslim/ Islamist character from Muslim lands or Diasporas. Technology advances and globalization drivers will operationally empower the homegrown groups and individual cells of more atomized global movements, making WMD technology and expertise increasingly available.

45 Ibid., p. 95.
To Discipline the Savage Cowboys

An Analysis of Weapons of Mass Destruction in Jihadist Primary Documents

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1. INTRODUCTION

Jihadist primary documents indicate significant interest in weapons of mass destruction (WMD). This is a relatively recent phenomenon; the concept of WMD is not indigenous to Islamic civilizations, having been imported from the West. The Jihadist interest in these weapons is thus not entirely self-generated, but a reflection of rising Western fears and apprehension around WMD.

The term and concept of “weapons of mass destruction” was imported into Arabic from English, and the West’s particular preoccupation with this class of weapons and the threat they present has also been imported into the Arab, and thereby Jihadist, conscience. While the research into WMD conducted by the al-Qaeda core group in Afghanistan predated 9/11, a subsequent explosion of reportage and an increase in public discourse on the topic of terrorists and WMD, especially after the invasion of Iraq on this premise, elevated interest in these weapons among the international Jihadist movement.

American commentary on the vulnerability of the U.S. to WMD attacks also attracted attention to these kinds of weapons. Abu Ubaid al-Qureishi, one of the first senior al-Qaeda leaders to publish openly on the potential use of WMD by terrorists, remarked on the West’s fear of these weapons urged and terrorists to see this fear as indicative of vulnerability:

Overall, studies conducted into this field show that the acquisition of Weapons of Mass Destruction by Jihadist groups is the greatest nightmare America faces. This means that it has to be possible.1

Al-Qureishi urges Jihadists to pay attention to “the nightmares of America,” as expressed in U.S. media and government reports on national security vulnerabilities, because these topics may provide clues of avenues of possible attack.

In order to learn the enemy’s points of weakness, it is necessary to look at what Western strategists and analysts say in their studies of security gaps and dangers, both the real and the imagined, which threaten the safety and security of American society. These fears must be studied carefully, because many of them point out to us weak points in American society.2

2 Ibid.
Thus, attracted by the scent of fear, individuals in the international Jihadist movement have homed in on WMD as a potential keystone to future Islamist victory.

This paper examines primary documents produced by members of the international Jihadist movement on these weapons. For the purposes of this paper WMD are defined as chemical, biological, radiological, and nuclear weapons (without judgment of potential to yield mass casualties). This paper undertakes to expose and analyze the discussion and emerging ideology around these weapons as assessed from the texts of speeches, manuals, and writings attributable to the Jihadist movement.

The content of examined materials was assessed in concert with relevant secondary sources to describe interest in various weapons, identify Sharia legal and pragmatic justifications for utilizing WMD, deduct strategic considerations of using WMD, and determine capabilities to the extent that they could be discerned from these sources.

11 Explanation of Terms

For the purpose of this paper, the international Jihadist movement was divided into three groups: the al-Qaeda core organization; “the New Guard:” clerics, leaders, and groups growing to prominence in the post 9/11 era who share the basic ideology of al-Qaeda; and the Online Jihadist community, which is united to the other two groups by shared ideology. These classifications are not meant to imply rigid divisions, but represent a useful way to parse and analyze the large, interconnected community that makes up the global Jihadist movement. The division into these three concentrations allows for the representation of differences in the missions, ideas, strategies, and objectives among these groups that can impact the way they regard WMD. It also generally conforms to organizational realities on the ground.

The al-Qaeda core refers to the core organization presumed based in Pakistan and Afghanistan, oriented around Osama Bin Laden and Ayman al-Zawahiri. In this paper, the term “al-Qaeda” refers exclusively to this core group in existence before the global metastasization of the al-Qaeda/Salafist-Jihadist movement after the war in Afghanistan in 2001. In present terms, the al-Qaeda core refers to Osama Bin Laden and Ayman al-Zawahiri and any remaining members within their immediate circle.

“The New Guard” refers to the international Jihadist movement, including offshoots of al-Qaeda, which has emerged since the 9/11 attacks. This term encompasses individuals who may have been associated with the al-Qaeda core in Afghanistan, but are now active in the international Jihadist movement.

The Online Jihadist community represents the foot soldiers and supporters of the Jihadist movement whose primary spaces for discourse and community-building are exclusive web forums and associated web sites. While members of these sites are largely anonymous, available analysis of this community reveals that it includes active terrorists, active supporters, and passive supporters. Members of the Online Jihadist community are connected to the other two groups through these virtual spaces: New Guard leaders, clerics, and terrorist

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3 Secondary sources were also leveraged when useful.
4 Gleaned from admissions by Online Jihadists and reports on members of Jihadist forums whose identities have been exposed.
groups as well as the al-Qaeda core have been observed to frequently utilize the Internet to interface with the Online Jihadist community.

2. **INTEREST**

2.1 **Al-Qaeda Core**

Discoveries by US forces in Afghanistan, uncovered terrorist plots, admissions by captured al-Qaeda operatives, and multiple investigative media sources indicate that the al-Qaeda core explored adding WMD capabilities to its arsenal. Although the al-Qaeda core has refrained from releasing comments or information on their interest in WMD in the past four years, there is no data to suggest that their appetite for WMD has waned. Given that al-Qaeda has maintained “the right to kill 4 million Americans,” they will continue their quest for effective mechanisms to achieve this toll. ⁵

**Chemical and Biological Weapons**

Data exists from a variety of sources confirming al-Qaeda’s strong interest in chemical and biological weapons. Recovered al-Qaeda manuals and instructional documents describe the manufacture and use of these weapons, and the eleventh volume of *The Encyclopedia of Jihad*, a compilation organized by the Salafist theorist and Bin Laden mentor Abdullah Azzam, is devoted specifically to the ways to build and obtain these weapons. ⁶ As reported by sources and discovered by U.S. forces, al-Qaeda built multiple, amateur laboratories in Afghanistan for the purpose of developing chemical and biological weapons. ⁷ Al-Qaeda also tested these weapons; videotapes discovered in Afghanistan show cyanide being tested on dogs, an event confirmed by U.S. satellite imagery and the testimony of captured al-Qaeda operative Ahmad Ressam. ⁸ Documents captured from a computer linked to Islamic militants in Saudi Arabia and Bahrain showed plans for a delivery vehicle for hydrogen cyanide – a chemical combination used in Nazi concentration camps. ⁹

At least three purported plots attributed to the al-Qaeda core involving chemical weapons have been uncovered: a planned 2002 cyanide attack in London, ¹⁰ a plot to deploy chemical weapons in New York City, and initial plans by al-Qaeda operative Ramzi Yousef, who carried out the first World Trade Center bombing, to contaminate the ventilation system of the World Trade Center with hydrogen cyanide in 1993. ¹¹

Similarly, multiple reports document al-Qaeda efforts to procure biological weapons, including anthrax, botulinum toxin, and ricin. In the remnants of the al-Qaeda camp in

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¹⁰ Salama and Hansell, 619.
Derunta, Afghanistan, captured documents revealed plans for a biological processing facility focused on manufacturing anthrax to be supervised by Zawahiri and Mohammed Atef. Zawahiri also funded and recruited scientists to develop an anthrax program in Pakistan and later Indonesia. Under interrogation, the notorious operative “Hambali” of the al-Qaeda affiliated Jamaah Islamiyah declared that al-Qaeda had successfully developed anthrax. This claim was subsequently confirmed by U.S. forces who found traces of high-grade anthrax at al-Qaeda safe houses in Afghanistan.

**Radiological Weapons**

Al-Qaeda operatives Jamal Ahmad al-Fadl and Abu Zubaida claimed under interrogation that al-Qaeda had obtained a radiological device, commonly called a “dirty bomb.” This claim was not corroborated and may have been an intentional bombast aimed at confusing counterterrorism efforts and invoking fear of an exaggerated al-Qaeda capability. Pakistani journalist Hamid Mir claims that al-Qaeda attempted to construct and test a device, employing an Egyptian scientist named “Engineer Sa’ad” to build a dirty bomb using materials purchased on the Russian black market and smuggled into Afghanistan. According to Mir’s account, the attempt to test the dirty bomb in the year 2000 did not go smoothly, and Engineer Sa’ad lost an eye in the experiment.

While corroborating data that al-Qaeda successfully developed a radiological weapon is unavailable, U.S. forces in Afghanistan recovered documentary evidence of al-Qaeda’s interest in these weapons. A manual entitled “Super Bomb” discovered in the Kabul home of Abu Khabab, an al-Qaeda operative responsible for developing al-Qaeda’s non-conventional weapons capabilities, contained a blueprint for a radiological bomb. Other documents seized from training camps and safe houses in Afghanistan confirm that al-Qaeda had pursued an understanding of radiological devices.

**Nuclear Weapons**

Of the many data points relating an al-Qaeda interest in nuclear weapons, the most ominous is the report of a meeting between Zawahiri, Bin Laden, and Sultan Bahiruddin Mahmood - chairman of Pakistan’s atomic energy commission and expert in uranium enrichment methods. Mahmood’s interrogation confirmed that the meeting occurred in Afghanistan three weeks before the 9/11 attacks and focused on al-Qaeda’s nuclear aspirations, but that no nuclear material was ever transferred to al-Qaeda. Other signs of al-Qaeda’s interest in these weapons include diagrams of U.S. nuclear power plants discovered in al-Qaeda facilities in Afghanistan and the arrest of a militant in Germany for attempting to purchase roughly 48 grams of uranium in 2002.

Hamid Mir claims that al-Qaeda made traction in procuring a nuclear weapon. Mir told the Al-Arabiya news network that Osama Bin Laden told him that he had a nuclear weapon.

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12 Ibid, 70-71.
13 Gunaratna, Rohan, Presentation in Albuquerque, New Mexico, 10-05-06.
14 Suskind, 251.
15 Spyer, “Al-Qa’ida and Weapons of Mass Destruction.”
17 Suskind., 620.
18 Salama and Hansell, 621.
while Ayman al-Zawahiri told him that al-Qaeda had a “suitcase nuke” – a small, highly-portable nuclear device – which had been purchased on the black market. 19 Mir insists that al-Qaeda is reserving these weapons for deterrence purposes and has already infiltrated “nuclear materials” into the United States. 20 There is no corroborating evidence to support Mir’s claims. He remains the only journalist granted access to Bin Laden following the 9/11 attacks. According to Mir, al-Qaeda has referred to its aspiration to target the United States with a nuclear weapon as “American Hiroshima.” 21

Of the three classes of Jihadist actors described in this paper, the al-Qaeda core has exhibited the most effort in procuring and manufacturing WMD of various kinds. The failure to deploy any of the weapons successfully obtained – like anthrax and cyanide – may be due to the difficulty of weaponizing these substances and transporting or sending them to desired targets outside of Central Asia.

2.2 The New Guard

A few New Guard groups and cells have demonstrated an interest in pursuing WMD. The Iraqi-based Jordanian terrorist Abu Musaab al-Zarqawi funded and supported an elaborate and potentially massive chemical attack against targets in the capital of Jordan, to include the U.S. Embassy. 22 Prior to his ascendency as leader of the al-Qaeda spin-off in Iraq, Zarqawi also developed chemical weapons while working with the Kurdish terrorist group Ansar al-Islam. 23 Crude chemical weapons labs, possibly the fruits of Zarqawi’s efforts, have been uncovered in Iraq, 24 and in 2004 U.S. troops discovered a roadside bomb containing sarin nerve agent. 25

Western Europe has seen its fair share of WMD threats in the time since 9/11. In Chechnya, the Russian military seized cyanide-based poisons that it claimed were earmarked for use in Europe. 26 On March 17, 2002, authorities discovered traces of ricin in a Paris subway. 27 Moroccans were arrested with nine pounds of potassium ferro-cyanide which they planned to use to poison the water supply of the U.S. Embassy in Rome. 28

The United States also came into the crosshairs of a New Guard Jihadist cell with potential plans for a WMD attack. In June 2004, British authorities arrested eight Islamic militants in possession of plans of U.S. landmarks, including the New York Stock Exchange

19 “Al-Qaeda Obtained a Nuclear Bomb and a Dirty Bomb.”
20 Ibid.
21 Ibid.
23 Gunaratna, 10-05-06.
and the International Monetary Fund, as well as information on explosives, and radiological materials.  

Some New Guard clerics and leaders have also communicated their enthusiasm for WMD explicitly in writings, including Saudi cleric Nasr Bin Fahd, who wrote the fatwa approving their use and Abu Musaab al-Suri, who has stated that he like to have used WMD in the 9/11 attacks as well as that he would still like to use radiological and nuclear weapons against the United States.  

2.3 Online Jihadist Community

Online Jihadists’ interest in WMD is evident from their efforts to amass and distribute manuals, documents, and information on a variety of CBRN substances. Chemical and biological agents, including anthrax, sarin gas, mustard gas, VX, botulinum toxin, ricin, plague, cyanide mixtures, white phosphorus, chlorine gases, hydrogen sulfide, sodium azide, and other substances have been referred to as potential weapons in documents and discussions on Jihadist forums. Efforts by a handful of individuals to collect and distribute information on nuclear and radiological bombs are also evident.

For Online Jihadists, who play the role of foot soldiers in the international Jihadist movement, acquiring and distributing information on these weapons is a matter of honor, even if successful procurement, weaponization, and deployment is practically improbable. This is especially evident in their interest in nuclear weapons. Nuclear weapons are discussed as if they are a realistic, available tool in the arsenal of the international Jihad, partially out of braggadocio and honor considerations. “Perhaps nuclear weapon and missiles are technology of the mid-nineteen forties,” writes “No 1,” an online Jihadist who compiles information on nuclear weapons and distributes it on forums, “but the followers of Satan from among the people of Cross, God curse them, have insisted on prohibiting the Mujahideen from this field of weaponry.” He continues with obvious bluster: “That is, until now, for the Mujahideen have become familiar with technological fields, by God’s power, and have expanded their understanding of this technology. It is now within their ability to achieve leaps in manufacturing this kind of strategic weapon, even in the kitchens of their homes.”

Online Jihadists also discuss other, less complicated non-conventional weapons, some of which can possibly be manufactured in kitchens (or procured from commercial sources). Ricin and cyanide are among the most common foci of non-conventional weapons discussions because of their relative accessibility.

At least one Online Jihadist has been apprehended while taking steps to carry out a non-conventional attack based on knowledge gleaned online. Younis Tsouli, a twenty-two year old British citizen, was arrested in September, 2005. He was discovered with information for making a suicide vehicle bomb including an undisclosed CBRN element, and accused of plotting to use the bomb against an American target. From his Internet activities, Tsouli

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29 Salama and Hansell, 620.
garnered both technical know-how and a network of people in ten countries, including Bosnia, Saudi Arabia, and Pakistan, to help him carry out his plans.

3. JUSTIFICATIONS FOR ACQUISITION AND USE OF WMD

3.1 Al-Qaeda Core

Bin Laden has reportedly claimed that the acquisition of WMD is a religious obligation for Muslims for deterrence purposes. With regard to the employment of WMD, Al-Qaeda has made few explicit comments. The organization instead discusses justifications for mass casualty attacks, justifying the impact rather than the type of weapon used. Rather than discuss WMD as an independent category of attacks, Al-Qaeda focuses on explaining their prerogative to take thousands of American lives, while mentioning that WMD could be their mechanism of choice. For instance, Al-Qaeda spokesman Suleiman Abu Ghaith asserted Al-Qaeda’s “right to kill four million Americans - two million of them children - and to exile twice as many and wound and cripple hundreds of thousands.” He then asserted the legality of using chemical and biological weapons to do so: “Furthermore, it is our right to fight them with chemical and biological weapons, so as to afflict them with the fatal maladies that have afflicted the Muslims because of the [Americans'] chemical and biological weapons.”

Al-Qaeda relies on multiple arguments addressing different facets of enemy behavior and uses diverse legal approaches to justify mass casualty attacks. “First strike” use of a WMD by Islamic terrorists comes with one strong disincentive: the possibility of alienating a broader Muslim community repulsed by such tactics yet whose support is critical to Al-Qaeda’s success. To address this issue, Bin Laden and the Al-Qaeda leadership have engaged in a multi-year propaganda campaign to convince a Muslim audience of an Islamic legal basis and legitimate justifications for an attack and to prepare them for its eventuality. Their argument is three-fold: a mass casualty attack on certain enemies is justified under an “eye for eye” principle; citizens of Western democracies are responsible for their government actions and are, therefore, legitimate targets; and legal justifications supporting the legitimate use of WMD are derivable from Sharia law.

Eye for an Eye: Reciprocity of Casualty Tolls

Al-Qaeda leaders have warned Americans that they will not “dream of security” until Muslims around the world enjoy the same. Bin Laden has proclaimed that the time of

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34 This is reflective of an Islamic sensibility that does not traditionally divide weapons into “non-conventional” and “conventional.” While this dualism has been borrowed from the West in “New Guard” writings, Al-Qaeda core discussions have used the dichotomy of smaller scale, more-targeted operations - such as the USS Cole and US embassy attacks in Kenya and Tanzania which sought only government and political targets - versus mass, indiscriminate violence - such as the 9/11 attacks. In only a couple of cases have AQ-core members referred directly to WMD, yet their stance on the use of these weapons can be drawn from references and arguments for mass casualty violence against the United States.


retribution for the millions of Muslims killed directly and indirectly by U.S. actions has arrived. He claims that the discrepancy between American-on-Muslim and Muslim-on-American death tolls represent “an unfair division... The time has come for us to be equal... Just as you kill, you are killed. Just as you bombard, you are bombarded.” 37 Writings by 9/11 conspirator Ramzi bin al-Shibh and al-Qaeda spokesman Suleiman Abu Ghaiheit argue that al-Qaeda is justified in killing four million Americans. 38 Al-Qaeda arrived at the four million figure in a perverse calculation that holds the U.S. responsible for Muslim non-combatant deaths in Afghanistan, Chechnya, Sudan, Somalia, Iraq, Palestine, Kashmir, Indonesia, Philippines, Macedonia, and Bosnia. 39 (The announcement of this calculation also pre-dated the occupation of Iraq and so does not include the death toll from the invasion and the post-conflict experience).

Osama Bin Laden viewed the United States’ own use of WMD, specifically nuclear weapons, as further legitimacy for responding in kind. In Bin Laden’s view, the United States set the historical precedents for using WMD against foreign adversaries in World War I and World War II. Bin Laden cites the use of nuclear weapons against Japan as the defining event in the history of US foreign relations:

That which you are singled out for in the history of mankind, is that you have used your force to destroy mankind more than any other nation in history; not to defend principles and values, but to hasten to secure your interests and profits: You who dropped a nuclear bomb on Japan, even though Japan was ready to negotiate an end to the war.

It is immaterial to Bin Laden and al-Qaeda that the United States dropped a nuclear weapon on a non-Muslim country; the significance of the Hiroshima and Nagasaki bombings is that they revealed the true nature of how the United States deals with the outside world.

**Exceptions to Religious Injunctions against Killing Protected People (Women, Children, and the Elderly)**

Terrorists advocating the use of weapons of mass destruction or “conventional” mass casualty operations like the 9/11 attacks are compelled to provide an argument for the legitimacy of such attacks in the face of Islamic prohibitions against killing women, children, and the elderly. Al-Qaeda provided a lengthy explanation after the 9/11 attacks explaining why the Jihad against the United States justified the abrogation of Islamic protections on certain groups. These included citing Prophetic precedents in which Mohammed was compelled to inflict casualties among women and children because they could not be distinguished from combatants or were involved in the conflict in support capacities.

The prohibition against the blood of women, children, and the elderly is not an absolute prohibition... We say that a number of protected people were among the

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39 Ibid.
victims of the September operations in America, but they do not fall outside the conditions that permit killing them. 40

Among the conditions listed for the permissibility of mass casualty attacks is the inability to distinguish between combatants and non-combatants. Al-Qaeda argues this is fulfilled whenever the United States is the target. Al-Qaeda considers most American civilians combatants because they support the government through the payment of taxes and by participation in elections. Indiscriminate attacks that kill protected people are also justified if they are reciprocation for the deaths of Muslim women, children, and elderly attributed to American actions. Thus, when Suleiman Abu Ghaith asserted al-Qaeda's “right” to the blood of four million Americans, he was careful to specify that two million of those could be children, according to al-Qaeda's calculations.

Al-Qaeda also asserts that “it is allowed for Muslims to kill protected ones from among unbelievers when [the Muslims] are using heavy weapons that cannot distinguish between combatants and protected ones,” comparing this to the Prophet’s use of catapults against intractable enemies who did not respond to lesser means of force. 41 This is an idea explored in greater depth among the New Guard: if the enemy fails to respond to lesser attacks, it brings the escalation in the scale of attacks upon itself. Prophetic precedents of using catapults and burning enemy fields and structures are used in formulating the Sharia (religio-legal) justification for this argument.

The Democratic Process and Justifying Mass Death

American citizens are regarded as legitimate targets of terrorist attacks, including mass casualty operations, because they have the power to control U.S. policy through their votes, and because their taxes fund the American military machine. Bin Laden explained his rationale directly to the American people in a 2002 open letter: “The American people are the ones that choose their government of their own free will... The American people are the ones who pay the taxes... The American people are the ones who fund the attacks against us... The American army is part of the American people. This is why the American people cannot be innocent of all crimes committed by the Americans and the Jews against us.” 42 In recorded speeches issued in 2005 and 2006, Ayman al-Zawahiri echoed this idea that the public involvement in government within democratic societies justifies holding the public collectively accountable for the actions of their governments and militaries. 43

According to Sharia law, the Crusader people of the West are combatants at war with the Muslims because they choose their leaders and parliaments by their own free will: they choose the executive authority that commits aggression against Islam and Muslims, and they choose the legislative authority that monitors the executive

41 Ibid.
authority... These people also pay the taxes that fund the campaigns of aggression against the Muslims." 44

**Adequate Fulfillment of Islamic Preconditions to Attack**

In the aftermath of the 9/11 attacks, members of the Muslim community criticized al-Qaeda for failing to follow the Prophet Muhammad's example of warning the enemy of an imminent attack and offering the opportunity to avert said attack by converting to Islam. 45 Subsequently, Bin Laden and other leaders in the militant Jihadist community have extended direct, mass appeals to guide Western society, and America in particular, in their conversion to Islam. 46 These offers were intended to appease the broader Muslim community by adhering to Islamic standards of warfare requiring Muslims to precede attacks by providing fair warning, extending an invitation to Islam, and providing adequate time for the enemy to amend behavior and consider the invitation to Islam before attacking. The perceived failure of Americans to heed al-Qaeda's advice or answer its invitation, along with their continuing support of U.S. government policy in the Middle East through elections and taxes enables al-Qaeda to demonstrate to a target Muslim audience that the prerequisites for an attack were fulfilled.

**Geographic Limitations to Justifications of Use**

While such weapons may be used as a deterrent against all of al-Qaeda's enemies, Americans are singled out in references to WMD and mass casualty attacks. Al-Qaeda may also consider Israeli or Jewish targets to be justifiable recipients of WMD. Its ideological documents group the international Jewish community and Americans into one single, united enemy, and speak of them jointly. 47 According to the al-Qaeda statement discussing the legitimacy of the 9/11 attacks, "America's status among Muslims is the same as that of the Jews." 48 As such, justifications for WMD against Americans could implicitly include justifications for the same against Israeli or Jewish targets, especially if such attacks could be carried out without high casualty rates among bystanders of other backgrounds, such as Palestinians and Israeli-Arabs.

**3.2 The New Guard**

As the global Salafist movement has expanded, a number of New Guard leaders have emerged to provide strategic and religious guidance to the faithful. New Guard Jihadist leaders follow in the mold of the al-Qaeda core and express respect and obedience to Osama Bin Laden and Ayman al-Zawahiri but represent some deviation in their strategic analysis and interpretations of Islamic jurisprudence. This is the natural outcome of the al-Qaeda core's isolation at a time when the international Jihadist movement has exploded worldwide, producing more active visionaries and leaders. Those who have circulated publications on the subject of WMD have been more explicit in their views than the al-Qaeda core and have expressed some variances in how they regard these weapons.

45 Scheuer, Michael (published as "Anonymous"), Imperial Hubris: Why the West is Losing the War on Terror (Washington, D.C.: Brassey's, Inc.), 2004, pps. 152-158.
46 Ibid.
47 Often referred to collectively as “the Zionist-Crusader alliance.”
First, they discuss the use of WMD against a broader range of targets, referring not only to Americans, but to generic enemies and undefined groups of “infidels.” It is possible to infer some geographic limitations to deployment of WMD out of pragmatic considerations (see “Strategies”), but the range of legitimate, justifiable targets is wider than that discussed by the al-Qaeda core. Second, the New Guard has released publications which explicitly discuss WMD, whereas the al-Qaeda core has made few direct references to WMD.

Three New Guard publications discuss WMD in-depth. One is “Abu Musaab al-Suri’s Response to the American State Department,” a statement written by a highly influential strategist and operational planner whose influence in the post-9/11 Jihadist movement is arguably unparalleled by anyone but Bin Laden and Zawahiri.  Although a declared member of al-Qaeda, al-Suri’s post 9/11 publications reflect ideological autonomy from the statements of Bin Laden and Zawahiri. A second publication is “A Letter Regarding the Use of Weapons of Mass Destruction against the Infidels,” penned by Saudi cleric Nasr bin Fahd. Bin Fahd is a less significant personality than al-Suri, but his fatwa on the subject of WMD has been widely circulated and has received the endorsement of the Global Islamic Media Front, the preeminent Jihadist media organization. The third document on WMD was published on the website of Jordanian cleric Abu Mohammed al-Maqdisi, although its precise authorship has not been specified. The publication is entitled “Nuclear, Chemical, and Biological Wars in the Field of Jurisprudence,” and discusses different Sharia interpretations of the use of WMD.

Debate within the New Guard

These writings provide evidence of an ongoing debate on the subject of Jihadists and the legality of WMD use among clerics. Both Bin Fahd and the author of “Nuclear, Chemical, and Biological Wars” (here on called “NCB Wars”) focus their writings on defending their theological justifications of WMD attacks as if responding to opponents. In the section of his fatwa, “Doubts and Responses,” Bin Fahd responds to the arguments of unnamed critics whom he describes as arguing against the legality of WMD attacks. “NCB Wars” also references a debate around the conditions under which WMD attacks by Jihadists are legal. The debate among hard line clerics regarding the use of WMD may have spurred the publication of these documents, and also provides data that the New Guard might be divided on the issue. To date, however, no New Guard clerics and Jihadist leaders have circulated documents disputing the pro-WMD camp. The existence of this disagreement may be

50 Although al-Suri was a member of al-Qaeda in Afghanistan, since 9/11, he has emerged as a leading figure in the international Jihadist movement through the widespread publishing of his strategic documents and books. Because of his influence in the post 9/11 international Jihadist movement, he is most currently prominent for his role in the “New Guard.” Further, he is no longer in contact with the al-Qaeda core since he’s been imprisoned.
52 “Nuclear, Chemical, and Biological Wars in the Field of Jurisprudence,” Published by Minbar al-Tawhid wal-Jihad (“The Pulpit of Tawhid and Jihad”), www.tawhed.ws. Minbar al-Tawhid wal Jihad, provides an online library of thousands of significant Salafist ideological, strategic, and tactical documents, of which this publication is one.
53 Bin Fahd, 21-26.
54 “NCB Wars,” 8.)
inferred from their silence on the WMD issue, and Bin Fahd’s need to counter them in his fatwa.

The author of “NCB Wars” claims that “no one has argued for their [nuclear, chemical, and biological weapons] absolute ban,” clarifying that the debate revolves around the conditions under which Muslims may use such weapons against their enemies, and whether or not modern political dynamics meet these conditions. The author opines that conditions for use should include the proven ineffectiveness of “less fatal weapons... to overcome the enemy” and asserts that nuclear, chemical, and biological weapons may also be used “if it is determined that the enemy will inevitably use these weapons [on Muslims]. “ In different ways, all three writings suggest a diversity of religious views on WMD within the ranks of the New Guard.

Theological Arguments for Using WMD

New Guard justifications for the use of WMD are three pronged: First, they address critics who claim that there are religious injunctions against WMD violence. Second, they employ eye-for-an-eye, reciprocity arguments based on the fact that the United States and other countries possess these weapons, and have used or will use them on Muslims. Third, they claim that lesser weapons have been rendered ineffective in combating Islam’s enemies, especially the United States. New Guard commentators on WMD also echo Bin Laden’s argument that the acquisition of WMD, if not the deployment, is a religious obligation for Muslims.

Exceptions to Religious Injunctions against Killing Protected People and “Wreaking Havoc upon the Earth”

Bin Fahd identifies the “three most prominent doubts that arise in the context” of the use of WMD. These include religious prohibitions against “wreaking havoc upon the earth,” meaning destroying the environment, as well as killing protected people (women, children, and the elderly) and killing any Muslims who may happen to be living among the targeted infidels. In a section of his fatwa entitled “Doubts and Responses,” Bin Fahd addresses each of these injunctions by providing the conditions under which they cease to apply.

Bin Fahd echoes the al-Qaeda core in claiming that it is not possible to target men and avoid women, children, and the elderly when using “heavy weapons.” For historical precedent, he, al-Suri, and the author of “NCB Wars” all refer to Mohammed’s use of catapults. “[The] catapult can be used as a reference in the use of other weapons that cause general death,” Bin Fahd writes. For all three authors, catapults represent the closest thing to an indiscriminate, mass casualty weapon at that historical period, and the Prophet’s use of them is applied to modern circumstances to sanction the use of WMD.

Bin Fahd also looks at another battle in which the Prophet scorched land in order to defeat an enemy in spite of the Koranic prohibition against “wreaking havoc on the earth.” “The Messenger of God... attacked the Bani al-Natheer [the tribe of al-Natheer], and they

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55 Ibid, 7-8.
56 Bin Fahd, 21-26.
57 Ibid, 21-22.
58 “NCB Wars”, 14
barricaded themselves. So the Prophet, peace and blessings upon Him, cut down the palm trees and set them on fire. ” Like the Bani al-Natheer, the Americans are safely barricaded in their homeland, and so unconventional means may be used to attack them even if it destroys the land and kills protected peoples.

**The Killing of Muslims in WMD Attacks**

As for the possible presence of Muslims in targeted areas, Bin Fahd references the conclusions of previous religious scholars who determined that Muslim prisoners could not be used as human shields by the enemy: “And this [Jihad] is not restricted due to the presence of Muslim prisoners, or refugees, young and old, women or men, even if we know about [their presence], because there is no way to avoid killing them while adhering to the imperative to defeat the infidels, and whatever cannot be avoided is forgiven.” The use of Muslims as shields in the time of the Prophet is extrapolated to refer to locations of mixed Muslim and non-Muslim populations in modern contexts.

Bin Fahd’s conclusions that the deaths of some Muslims are acceptable in the service of the mandate to fight Jihad against the infidels are perhaps what make his fatwa the most “extremist” of the body of commentary on the use of WMD by both the AQ-core and the New Guard. These conclusions allow for liberal targeting, to include locations with considerable Muslim populations. Bin Fahd believes that Muslims who die in Jihadist attacks are justifiably sacrificed for the greater good, rationalizing that such attacks “defend the Muslim collective.”

Further, Bin Fahd believes the blame for these deaths falls not on the Mujahideen, but on the enemy that “uses Muslims as a shield” or on Muslims who willingly live among or harbor the enemy. This argument could be used to support attacks in European cities with large Muslim populations or in Muslim countries that radicals accuse of harboring the enemy, such as Jordan and Kuwait. Bin Fahd provides no numbers suggesting an acceptable Muslim casualty rate, leaving it to the attackers to decide if a WMD operation against specific targets can be justified by its benefit to what he terms the Muslim collective.

**The Democratic Process Makes Everyone a Combatant**

Al-Suri employs the same logic used by Bin Laden and Zawahiri to justify attacks against civilians of democratic nations: “[Civilians] vote into power and fund (through taxes) governments that attack Muslims, making them legitimate targets.” Al-Suri uses this logic in urging the use of “dirty bombs” against the United States. He advocates that the Jihadist movement “adopt the slogan of ‘dirty bombs for a dirty nation,’” explaining: “Let the radiation harm the American people who vote for the killing, destruction, and usurpation of the peoples’ resources and the malignant arrogant way in which they control others.” He also notes that, had there been “weapons of mass destruction on the planes that hit New York and Washington on 11 September . . . we could have rid ourselves of a large number of voters who elected Bush for a second term in office.”

**Reciprocation in Posture and Response**

While the global Jihadist movement has become feared for its skill in fighting asymmetric warfare, al-Suri, Bin Fahd, and the author of “NCB Wars” argue that it is obligatory for Jihadists to match the posture of the enemy in possessing WMD. All three reflect fear that a
primary goal of the Jihad – to force the United States and its allies into an isolationist posture and end all mechanisms of political, economic, and military interference in the Islamic world – cannot be met without the acquisition of WMD. “The sanctioning of the use of these modern weapons in this instance is for the purpose of treating the enemy the same way it treats us and in light of what is known about these weapons in terms of their psychological effect of creating fear and confusion, which are two of the most important elements in [causing your enemy] to fail in war,” reads “NCB Wars”. Bin Fahd concurs: “... and if the infidels were not to be deterred from attacking Muslims except through the use of these weapons, then it would be permissible to use them, even if that led to the killing of every last one of them and the destruction of their crops and lineage.”

Al-Suri argues that because the United States has already employed WMD against its adversaries, non-Muslim and Muslim alike, then it is justifiable that anyone, “infidel or Muslim” respond in kind:

In its aggression against mankind since World War II, the United States has used all types of weapons, including nuclear and chemical weapons – all kinds of conventional weapons and weapons of mass destruction. It killed 250,000 souls in Hiroshima and Nagasaki within a half hour, while hundreds of thousands were injured and millions driven blighted. It used chemical weapons in Vietnam, Korea, and other locations. During the Kuwait war, and the recent war [on the Taliban], it bombed Afghanistan and Iraq with thousands of depleted uranium shells. This caused cancer in thousands of civilians and poisoned groundwater and large areas of land with nuclear radiation.... Why should someone who defends himself against the United States be denied the same weapon the U.S. would use against him?

Al-Suri says that attacking the United States with “dirty bombs” employs “tit-for-tat logic, given the ugliness and viciousness... of the U.S. administration in its war in Afghanistan and Iraq.” His claim that the United States has already used WMD against Muslim countries lends strength to his argument that the U.S. has already provoked a legitimate retributive strike, and fulfills the conditions for attack outlined in both the Bin Fahd fatwa and “NCB Wars”.

**Geographic Limitations to Use**

Although Bin Fahd may establish the theological justification for striking diverse targets with WMD, it is more difficult for him and others to establish strategic justifications for targeting areas with considerable Muslim populations because of the public backlash such an event would precipitate from moderates and radicals alike.

In his writings mentioning WMD, Abu Musaab al-Suri restricts the discussion to the United States, although he refrains from explicitly ruling out other targets. His declaration that his “new motto” is “dirty bombs for a dirty nation,” applies directly to the United States. He has also asserted the necessity of a WMD attack against the United States. “Strik[ing] the United States with weapons of mass destruction ... will be eventually possible, God willing. More importantly, it is not only possible, but has also become necessary,” he writes.\(^{59}\)

\[^{59}\] Al-Suri, “Abu Musaab al-Suri’s Response to the American State Department.”
Al-Suri divides non-Muslim nations into two separate categories: those with whom negotiation is possible and those with whom it is not. Mujahideen may be able to negotiate a peace with certain non-Muslim countries: he cites Spain and the Philippines as nations which have adjusted their policies accordingly in response to conventional attacks. Al-Suri does not believe such restraint will work on the United States; WMD attacks are the only way to make the U.S. incapable or unwilling to pursue its aggressive and controversial foreign policy objectives in the Muslim world. “Only [after the United States is attacked by WMD] will mankind live in harmony on this planet,” he argues.

For Europe, he is willing to attempt a less destructive path first. “If Europe is willing to make the effort, it will find us most sincere in what we say, most faithful in what we pledge, and most fierce in our fighting. They have experienced this third trait, let them try the second. He urges Mujahideen to avoid attacking countries that “have not attacked Muslims or ended the state of aggression and withdrew their forces from our countries, such as Spain...” His softer approach towards non-U.S. enemies as well as his restriction of WMD discussion to the United States communicates the geographic limitations of al-Suri’s legitimization of the use of these weapons. Al-Suri illustrates the difference between how al-Qaeda should deal with the United States versus other nations in his blunt reflection on the difference between the 9/11 attacks and the Madrid train attacks. “I have said that I feel sorry for those who died in the legitimate bombings in Madrid who had no association with our war. I am equally sorry that there were no weapons of mass destruction on the planes that hit New York and Washington on 11 September.”

Like the al-Qaeda core, elements of the New Guard refer to a combined American and Jewish enemy axis and may support a WMD attack against parts of Israel. Al-Suri makes clear in his lengthy tome “A Call to Global Islamic Resistance” that Jihadists should not seek to attack Muslim populations, but parts of Israel with small Arab populations would not fall under this prohibition. Abu Musaab al-Zarqawi, the former leader of al-Qaeda’s spin-off in Iraq, specified that he would use chemical weapons against Eilat and Tel Aviv – primarily Jewish cities with few Arabs.60

3.3 Online Jihadist Community

The Online Jihadist community relies on the guidance of both the al-Qaeda core and New Guard leaders for legal justifications of terrorist operations. The Nasr Bin Fahd fatwa is the most widely circulated analysis of WMD. Comments on the subject of WMD on important Jihadist websites reflect acceptance of al-Fahd’s assessment of their legality for use against “infidels,” referring to a broad range of non-Muslim enemies. This fatwa has been endorsed by the Global Islamic Media Front, a highly active organization responsible for producing and distributing statements, publications, and videos by terrorist groups and influential Salafi figures and circulating them on Jihadist websites.

For the most part, members of Jihadist forums do not engage in discussions of the legitimacy of using WMD. Instead, they accept Bin Fahd and others’ approval of the weapons and focus their attention on their acquisition and manufacture. Participants of discussions on these forums offer opinions on the strategic benefit of certain tactics, but do not as often

delve into theological justifications because they lack the religious credentials to issue fatwas, or opinions on theological matters. For them, it is sufficient to refer to the writings of Bin Fahd and al-Suri for religious justifications, and focus on educating themselves and each other about these weapons, how they may be manufactured or obtained, and different venues and targets for their deployment.

Geographic Limitations to Use and the Online Jihadist Community’s Impact on New Guard and Al-Qaeda Leaders

Jihadist forums reflect a strong preference for WMD attacks in the United States over any other country; the United States is the imagined target in most discussions of potential WMD attacks. This may have an impact not only on the targeting decisions of members of this community, but on the New Guard and al-Qaeda core as well. Views of those on Jihadist forums can be considered a sample of the international radical Islamic community in general. Because it is from this community that both first generation and second generation al-Qaeda groups attempt to recruit supporters, their opinions impact the decisions of these operatives in whom to target and how.

There has been one example of the potential impact of the opinions of the international radical Islamic flock on a Jihadist leader’s decision to use weapons of mass destruction. In April 2004, a Jordanian terrorist cell funded and supported by Abu Musaab al-Zarqawi plotted and nearly carried out a chemical attack against targets in Amman that had the potential to kill up to 80,000 Jordanians. The Jordanian government thwarted the operation and uncovered the plot to the public. The reaction among radical circles was characterized by disapproval and disbelief, compelling Zarqawi to issue a statement on Jihadist websites claiming that the plot had been a fabrication of Jordanian intelligence, and denying that he would ever target any country – except Israel – with WMD. In the case of WMD attacks, the knowledge that the United States stands out as the most deserving recipient of such attacks while attacks on other targets are controversial may impact strategic calculations by operatives who design attacks to impact not only their enemies, but also supporters.

4. STRATEGIC CONSIDERATIONS IN ACQUIRING AND USING WMD

4.1 Al-Qaeda Core

Deterrence and Coercion

The memoir of Abu Walid al-Masri, a senior al-Qaeda operative, provides valuable insight into the early, internal debate among al-Qaeda’s leadership on the issue of WMD. According to this source, the leadership developed an ambitious plan to acquire and store radiological devices on American soil to be detonated in response to future U.S. attacks against Afghanistan or other Muslim lands. The hawkish contingent of the leadership won out by stressing the Mujahideen’s responsibility to protect “the people, the states, the wealth and the

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62 Ibid.
Islam of Central Asia” from potential WMD attacks by the U.S. or Israel. Al-Qaeda’s deterrence calculations have also been mentioned by Hamid Mir.

While the previously mentioned plan was ultimately unsuccessful, it reflects an early strategic perspective that the acquisition of WMD would provide the Mujahideen and its community with a deterrent to repel attacks from conventionally superior enemy forces. Indeed, Abu Khabab, responsible for developing al-Qaeda’s WMD capability, referred to himself as “the protector of the Mujahideen” in his writings on the subject. Bin Laden expressed this idea in a 1999 interview with Pakistani journalist Rahimullah Yusufzai: “It would be a sin for Muslims not to try and possess weapons that would prevent the infidels from inflicting harm on Muslims.”

**Procuring or Using WMD to Attract Recruits and Support**

In the world of radical Islam, displays of strength attract recruits and supporters more so than any other form of propaganda. The 9/11 attacks and the instant worldwide notoriety which resulted allowed al-Qaeda to transform itself into a global movement. In the Shia branch of Jihad, Hizballah’s shows of strength against the Israelis both during the Israeli occupation of Lebanon culminating in 2000 and during the summer of 2006 led to a surge of support among both Sunni and Shia Muslims in the region for that organization. Conversely, al-Qaeda in the Arabian Peninsula suffered a severe falling off of support and recruits once Saudi forces began effectively curtailing their activities and the group failed in three consecutive attack attempts. The al-Qaeda core is therefore under pressure to manufacture an image of strength in order to continue to attract recruits to the movement it has started.

As al-Masri relates, the al-Qaeda leadership determined that continuing to speak publicly of an exaggerated WMD capability would not only have a deterrent value against U.S. aggression, but would also be useful in rallying support from within the Muslim community, “bestow[ing] some credibility on the Mujahideen, and maybe some respect, moral influence and an aura of invincibility in the minds of the people.”

**Staying Relevant: WMD as a Means to Stay Atop the Jihadist Hierarchy**

Thwarted al-Qaeda plots against the United States have been grandiose, designed to yield casualty rates in the same category of as the 9/11 attacks. Such plots include a thwarted operation to detonate liquid explosives on up to ten transatlantic flights between the United States and the United Kingdom. Another plot involved crashing a plane into the U.S. Bank Tower in Los Angeles. While al-Qaeda possesses the capability to carry out smaller scale

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63 Salama and Hansell, 625-626.
64 “Al-Qaeda Obtained a Nuclear Weapon and a Dirty Bomb.”
66 Ibid, 624
68 Salama and Hansell, 626.
terrorist attacks in the United States, their uncovered or disrupted plots indicate a desire to follow the 9/11 attacks with something of a similar scale. Supporting this is the revelation that Ayman al-Zawahiri reportedly called off a chemical weapons attack on the New York subway because it would not kill enough people. Yet another plot discovered on Zawahiri’s recovered laptop involved plans for a large-scale anthrax attack on Washington D.C. Hamid Mir has also supported this assertion, noting in his comments to al-Arabiya that Bin Laden is planning an attack in the United States designed to be “bigger than the 9/11 attacks.”

WMD are an appealing choice for al-Qaeda to guarantee a casualty rate on par with the 9/11 attacks. An attack of significantly less impact could precipitate accusations that the group has been weakened and could hurt recruitment.

### 4.2 The New Guard

**Deterrence and Coercion**

Like the al-Qaeda core, New Guard leaders express ardent beliefs in the unique effectiveness of WMD as a deterrent. The author of NBC Wars looks to Western military history as evidence of the deterrent power of these weapons. “We find that some countries used chemical weapons during World War I, but no one used them during World War II, and the only reason for that is the possession of several countries of this weapon. Hence, no one used it out of fear of response... an adversary will not attack his enemy if he knows that [the enemy] possesses a weapon like that, out of fear of retaliatory response.”

New Guard leaders also discuss the weapon’s use as a tool of political coercion: to compel the United States to avoid attacking Muslim countries out of fear of reprisal and to coerce the US to change its existing policies and abandon its efforts at occupation and influence in the Muslim world. Abu Musaab al-Suri believes that WMD are the key to stopping U.S. and Western threats against Muslims. Al-Suri refers to President Truman’s strategic logic for dropping atomic bombs on Japan, saying that the situation faced at that time by the United States in its conflict with imperial Japan mirrors the current situation of the Mujahideen in their confrontation with the American enemy.

Hours after the United States struck Japan with two nuclear bombs, the US President at the time declared the following to Americans and the world: that he regretted the death of civilians and innocent people, although [their deaths] were necessary to shorten the war and save lives. He explained that the Japanese enemies were imperialists who attacked neighboring countries. They did not observe the ethics of war. They killed and tortured prisoners.

... This is logical, as you can see. And this logic fully applies to the conduct of the United States today. The objective [in using WMD against the US] is to shorten the wars of the United States and save lives. The Americans have killed and tortured prisoners. They committed vulgar acts on them. They used depleted uranium and cluster bombs, and violated the laws of war and the Geneva conventions. The whole world has admitted to this, including US Congressmen. Why should they not be...

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71 Gunaratna, 10-05-06.
72 “Al-Qaeda Obtained a Nuclear Weapon and a Dirty Bomb.”
73 “NCB Wars,” 19.
attacked with weapons of mass destruction if this can lead to peacefulness among mankind, as US President [Truman] put it . . . .74

In a frank assessment, al-Suri acknowledges that to defeat the United States through conventional means would take “many years and enormous sacrifices.” Thus, “an attack on the United States with WMD has become necessary... by means of decisive strategic operations with weapons of mass destructions including nuclear, chemical, or biological weapons.” He asserts that these weapons are ultimately needed in order to teach Americans to respect their demands. As he puts it, the Mujahideen need WMD “to discipline the savage cowboys.”75

**Deploy, then Deter?**

The New Guard is divided on the strategic use of WMD. According to “NCB Wars,” some believe that the Mujahideen’s mere possession of such weapons may be sufficient for deterrent or coercive purposes. 76 Others think that they must use these weapons at least once in order to prove that they possess and can deploy them. The author of “NCB Wars” argues that, though WMD should be acquired for deterrence purposes, they should only be used if “less fatal weapons” have not been effective on the enemy: “If it is possible to overcome the enemy using less fatal weapons, then the latter should be used and these weapons [of mass destruction] should be abandoned...”77

Al-Suri argues the opposite; that WMD should be used if they can be obtained, not simply acquired for deterrent purposes: “I hope infidels or Muslims who possess these weapons will attack the United States and do a favor to mankind . . . . [I]f I possessed these weapons, I would not have written this statement. . . . I would not have needed the pen had I possessed a sword.”78 He also argues that the planes hijacked on 9/11 should have contained WMD. “Had I been consulted about this operation, I would have urged that the planes be international flights and carry weapons of mass destruction.”79

**Strategic Use of WMD in Iraq**

Abu Hamza al-Muhajir, Zarqawi’s replacement as Amir of al-Qaeda in the Land of the Two Rivers, is the only New Guard leader to explicitly urge a WMD attack in an Arab country. In September 2006, al-Muhajir urged scientists and engineers to come to Iraq to build non-conventional weapons to use against American bases:

To the people of distinguished expertise and highest skills, scientists in the fields of chemistry, physics, management, electronics, media, and other in-depth specializations, especially nuclear scientists and explosives engineers: We say that we are in need of you. The field of Jihad is big enough for your scientific ambitions. The large American camps are an ideal place to test your non-conventional bombs - germ bombs, dirty bombs, and the like.80

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74 Al-Suri, “Abu Musaab al-Suri’s Response to the American State Department.”
75 Ibid.
76 “NCB Wars,” 14.
77 Ibid, 15.
78 Al-Suri, “Abu Musaab al-Suri’s Response to the American State Department.”
79 Ibid.
80 Transcript of Abu Hamza al-Muhajir audio recording. Obtained from Jihadist website www.alekhlaas.net
Al-Muhajir believes that WMD can be used to effectively cripple - both physically and psychologically - a significant asset to the U.S. effort in Iraq: well-protected bases. Al-Muhajir’s call to use WMD in Arab lands has not been challenged since it was written. Technically speaking, the damage from a dirty bomb could be limited to within a U.S. base, not impacting Iraqis in the area.

However, the “germ bomb” that al-Muhajir mentions has far-reaching implications, as bio-warfare in the Middle East could spread across the region. Rather than a new norm, this suggestion is an anomaly. Al-Muhajir is not a cleric, and this invitation of his is not a fatwa. Significant New Guard clerics have not yet responded to the “germ bomb” call. This is possibly because they believe it to be bluster on al-Muhajir’s part, designed to psychologically impact enemy forces.

Similarly, the possible use of cyanide to poison Shia Iraqi soldiers while they ate a Ramadan fast-breaking meal was a psychological tool rather than a deadly weapon. The poisoning only killed a handful of soldiers, but the psychological ramifications of using a non-conventional weapon and the ability to strike enemies within the protected confines of their base made the attack significant and valuable to the insurgency.81

4.3 **Online Jihadist Community**

The al-Qaeda core is the most obscure in their public discussions of WMD. The New Guard is more specific, openly discussing general strategy. Online Jihadists are the most granular in their discussions, focusing on WMD at the tactical level, sharing ideas for obtainable weapons and possible targets.

Online Jihadists meet in restricted-access “planning forums” in order to discuss potential attacks, tactics, and weapons. Most of their discussions focus on aspects of conventional attacks: explosive components, explosive devices, kidnapping, and assassination.82 However, they have exhibited an interest in non-conventional weapons and compiled some basic information on their manufacture and potential use in terrorist attacks.

**Psychological Impact**

Of the three levels of the Salafi movement discussed for the purpose of this paper, Online Jihadists most often discuss the psychological impact of deploying WMD against perceived enemies of Islam. For example, the unknown author of a document on chemical weapons suggests that two kinds of poisonous gases be used in a CW attack, with one chemical agent selected for its ability to kill and the second selected for its ability to disfigure, yielding a high casualty count and gruesome imagery. He suggests a nerve agent, which would cause the majority of fatalities by stopping the function of the heart and lungs, combined with a second agent to blister the skin and membranes and create air bubbles in the blood which would

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Terror Web Watch publication series, Terrorism Research Center, weekly editions between January 2005-October 2006.
cause bleeding from the nostrils and ears. The injuries and deaths from this chemical agent, he writes, “would be of the ugliest kind... and would instill the most terror.”  

Considerations of psychological and information operations (IO) considerations may have a role in driving Online Jihadists’ attention to nuclear weapons. Although this “foot soldier” level of the Jihadist movement is unlikely to develop any nuclear capability in the foreseeable future, they may understand that their expressions of interest in nuclear weapons will be noticed by Western nations, contributing to their consternation about the threat of nuclear terrorism. Online Jihadists are aware that their activities are observed to an extent, especially in forums and on websites that are not password-restricted. At least one statement from an alleged al-Qaeda spin-off group has been posted to an open access Jihadist site threatening to attack the U.S. with nuclear weapons (discussed below). Also, the open access “al-khayma” site contains several pages of information on nuclear technology, some of it in English, including a graphic of a mushroom cloud and a description of the nuclear detonation at Hiroshima.

**Strategy at the Ground Level: Tactics and Targets**

Unlike New Guard and al-Qaeda core clerics, online Jihadists forego discussions of grand strategy and focus on tactics: what weapons to use, how to use them, and potential targets. As foot soldiers rather than visionaries or leaders, they circulate the legal justifications and any strategic guidance provided by New Guard or al-Qaeda leaders and take it upon themselves to take action based on this guidance.

**Chemical Weapons**

The most commonly discussed non-conventional type of weapon is chemical weapons or “poisons and poisonous gases,” as they are often referred to in the parlance of Jihadist forums. Cyanide, sarin gas, chlorine gases, and poisons are the most common topics of CW discussions. Online Jihadists portray these substances as the most easily obtainable and deployable of all non-conventional weapons. “The experts from among the Mujahideen know that the weapon that is the most fatal, the most terrifying, and is also the cheapest is: poisonous gases. If one could come up with a way to deliver the payload without harming the person carrying and using [the gases], it would be the favorite weapon to terrorize the enemy and to use against the Infidel armies,” writes the unknown author of a chemical weapons’ instructional document entitled “The Ethereal Killer.”

The targets of chemical attacks proposed on Jihadist websites are spaces selected either because they would facilitate the deaths of a considerable crowd of people, such as sports stadiums or because they are establishments of symbolic significance to radical Muslims, such as synagogues and nightclubs. The author of “The Ethereal Killer” provides a list of generic target groups which he recommends for chemical attacks. The list appears in the document as such:

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83 “The Unique Invention, the Ethereal Killer.” Chemical Weapons document obtained from the Jihadist website Mawsaw al-Adad.
85 “The Unique Invention, the Ethereal Killer.”
- Establishments of licentiousness
- Theaters
- Malls
- Jewish temples
- Dance floors
- Trains (but not in a station because there are security cameras)
- Schools
- Hospitals
- Restaurants and bars
- Places of usury [author’s note: financial institutions]
- Cinemas
- Closed sporting events
- Casinos
- Churches located in Islamic countries (if they are targeted, resultant benefits or harm to the Muslim community need to be taken into consideration)
- Government buildings

Shortly after “The Ethereal Killer” was circulated on Jihadist forums, a member of the restricted access al-Saf. net Jihadist website recommended a chemical attack on the Washington D.C. metro system.

I think that the best thing is to concentrate our efforts on carrying out a variety of operations of the kind that Mohammed Atta carried out in America. These kinds of operations and attacks are what create a real effect in the world because the victims are American citizens. When you look at the best targets, you find that the Washington Metro is a great target for a chemical attack. Here is a map of the metro [map attached]. The metro is very crowded at the station “Metro Center” between the hours of eight and nine thirty in the morning. 86

The member, who called himself “Awaiting Martyrdom,” explained the factors supporting his target choice. He supports an attack on Americans because of the international impact; he selected the Metro Center metro station because of the dense crowds that gather at the downtown choke point during peak commuter times. His pragmatic thought process, like that of the author of “The Ethereal Killer,” is typical of Online Jihadists’ avoidance of higher-level theological or strategic issues in favor of a focus on tactical level specifics.

**Biological Weapons**

The anonymous author of a Biological Weapons manual widely circulated on Jihadist forums describes their appeal such: “Biological weapons include the following characteristics: they require little or no cost or human losses, and can be used in aerosol form or in artillery charges.”

He describes a number of methods of delivery:

86 Chemical Attack Suggested on Washington Metro, post to al-Saf. net (now defunct), August 10, 2005.
An explosion of a bomb or missile that disperses a chemical or biological substance over wide areas.

A crop spraying device or plane that disperses a substance over a city.

A truck which drives through a city and spreads dust over the streets of the city in crowded areas.

A small bomb, cartons, or boxes which contain a vapor and release it in crowded areas like subway tunnels (or closed sporting arenas, or venues of entertainment - the best places are those with central air conditioning)...

- ... an aerosol system with the strength of an explosion, a spray device, or an insect or animal carrying the infection...
- ... Personal objects [that]... carry lethal microbes: the Native Americans were infected with smallpox by blankets contaminated with microbes.

Most of “Biological Weapons” is devoted to the plague as a potential biological weapon, including instructions for cultivating a sample of the plague virus. He references historical information regarding the potential use of the plague in bio warfare, including [sic] its use by the Chinese in WWII, who dropped plague infected fleas over Japan, and the cultivation of the plague as a bio weapon in an aerosol delivery system by the Soviets and Americans during the Cold War. He also provides an indication of the effect a bio warfare attack using the plague could have in the United States:

In the year 1970, in a report by the World Health Organization, it was reported that an aerosol release of 50 kilograms of dried powder at a concentration of 10x6 (15 s) microbes above a city of 5 million people in an economically developed nation like the United States could yield 150,000 infected and 36,000 dead. This report had not taken into consideration the additional cases of infection that would result by the originally infected people spreading the illness to others.

“Biological Weapons” also discusses the use of botulism as a biological weapon, and presents the general contours of a plan to use botulism in concert with a suicide attack:

Clostridium botulinum poisons... are considered to be among the most destructive poisons because they act immediately on the nervous system and cause the muscles and respiratory organs to fail. These poisons resist fever to an extent, as well as gastric acid. Their effects are similar to food poisoning. The clostridium microbe multiplies in fresh meat and causes it to rot. The strength of the poison is limited in the presence of heat, which invites the question of how it could survive the heat of an explosion. It might be possible to position the poison somehow away from the heat of the explosion, and transfer the poison onto, for example, legs or shoes in the case of a suicide operation. There may also be a way to specially design something to spit the poison out of the exhaust pipe of a car as an alternative to an aerosol.

Botulinum toxin, sometimes referred to as “rotten meat poison” in Arabic, is mentioned in other documents on Jihadist websites as well. Two poison manuals reference it, and a recipe

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87 It actually was the Japanese that released plague-infected fleas in China.
88 “Biological Weapons,” 12.
for making it has been circulated on Jihadist sites. The recipe contains instructions for making botulinum toxin out of meat and cow or horse dung.

In addition to botulinum and plague, recipes and an instructional video for making ricin are readily available on Jihadist forums. One member of the al-Firdaws planning forum suggested that ricin be combined with a suicide bombing. He expressed confidence in the ability of Jihadists to weaponize ricin. “Are you aware, my brothers, that this wonderful bean,” he said, referencing a picture of castor bean, “has a glorious future as a biological weapon with which we will launch attacks against our enemies?” Another discussant recommended that ricin be delivered through the ventilation systems of “cinemas and other closed places where the infidels go to relax... [especially] in cinemas where they watch movies offensive to Islam.” Another Jihadist document on poisons suggests that homemade grenades could be made containing shrapnel coated in ricin and that air pellet guns with ricin-filled pellets may also be effective.

**Radiological and Nuclear Weapons**

Three documents providing information on how to extract materials to be used in a dirty bomb are widely circulated on Jihadist forums. The author of the manuals goes by the user name “no 1,” also known as “Laith al-Islam.” No 1 reports that he has spent two years “studying nuclear physics on Jihadist and international [Internet] forums,” but claims no formal education or technical or laboratory experience.

The three documents each describe how to extract three “radiological” substances from commercially available materials. The three substances are radium (not the isotope 235), barium, and beryllium. Much of no 1’s data is factually incorrect, and he refers to the radiological devices he is attempting to describe as “nuclear bombs” (see Capability). However, his documents, collectively entitled “The Nuclear Bomb of Jihad,” garnered massive, unprecedented attention on Jihadist forums, indicating the appetite of this population for nuclear weapons knowledge.

In addition to no 1’s documents, at least one statement from an alleged Jihadist group has been posted to Jihadist websites threatening a nuclear attack on the United States. The statement bore the signature of “the al-Qaeda Organization, Europe and America Branch.” The statement threatened that the United States or other “Crusaders” could be targeted by a nuclear attack:

> Let all know that we have not been neglecting to strike the Americans and the Crusaders in the heart of their home, within their lairs and towers and dens. . . Their sky and land is targeted by us. Just so they know, we in the al-Qaeda organization are occupied with preparing operations that will not only be painful but, by He who created the skies without a pillar, will reach American and the Crusaders after they

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refused the truce offered by our Sheikh Osama Bin Laden... We close by assuring the Islamic Umma by saying that the result of the enriching related to nuclear production, or the ability to do so, is not the monopoly of the Crusaders or the Christians, the false tempters of the world. We are keen in our efforts to produce bombs which are small in size but large in impact and, by God (and there is none other but him), this will be the first of our goals and actions within the homeland of America...  

**Attack Plots**

Within this on-line Jihadist discourse, one particular non-conventional weapons attack suggestion stands out because it has been repeated and discussed on multiple forums – letters laced with cyanide or ricin, mailed either at random into the United States or sent to specific individuals. A member of a Jihadist forum revealed that his inspiration for the idea came from the Unabomber, who sent explosive packages to his targets. He posted an explanation of the idea along with a recipe for making ricin, and asked other members of the forum to perform online reconnaissance to locate random addresses in the United States to target. Another discussant on a separate forum recommends the same kind of attack, except employing cyanide contaminated letters. He provides instructions on how to combine the cyanide with DMSO (an agent to aid penetration into the skin) and coat the letter with the substance. Yet another planning forum member suggests a similar delivery mechanism, using letters or packages rigged to release white phosphorus when opened.

The author of “The Ethereal Killer” lays out a plan to attack generic locations on his target list by placing different chemical elements in glass containers around a very small amount of explosive. The explosive is designed to be just powerful enough to break the glass, combining the chemicals and releasing poisonous gases into the air. He recommends using hydrochloric acid, potassium permanganate, and potassium cyanide and provides information on the commercial availability of these substances. He suggests deploying the device in crowds (so that noise will muffle the sound of the small explosion) or in the ventilation systems of target buildings.

Abu Khathifa al-Shemi, the author of a manual entitled “A Course in Poisons and Poisonous Gases,” describes a weapon and delivery system for an attack, but neglects to specify targets. He provides a crude design for a missile containing sodium cyanide and sulfuric acid packed around an explosive core of TNT. He also recommends coating a grenade with cyanide or another poison. He mentions the possibility of spraying chemicals from a “low flying airplane,” but provides no instruction or detail on the subject.

93 “Message to America,” obtained from Jihadist website “the Lions of Jihad” (now defunct), January 3, 2005.
96 “The Unique Invention, the Ethereal Killer.”
5. **CAPABILITIES**

5.1 **Al-Qaeda Core**

**Chemical and Biological Weapons**

The Al-Qaeda core possesses the capability to obtain or make dangerous chemical and biological agents - namely cyanide and anthrax (See: “Interest”). Al-Qaeda has not demonstrated its ability - through attacks, testing, or instructional manuals⁹⁸ - to weaponize these agents to act as weapons of mass destruction. They also may face difficulties in positioning or delivering these weapons to desired target countries.

**Nuclear Weapons**

Evidence gathered from Jihadist websites, Al-Qaeda camps and safe houses in Afghanistan, and other sources of intelligence suggest that Al-Qaeda does not now nor has ever possessed a nuclear weapon. Existing documents suggest a high degree of interest, but little actual capability - at least at the time of the Afghan invasion in 2001. This does not mean that a nuclear terrorist attack is impossible or even improbable over the long term – especially if the Al-Qaeda core can work in concert with New Guard affiliates and leverage its network to co-opt others – Muslim or non-Muslim – who can help them.

Al-Qaeda strategist Abu Ubaid al-Qureishi has expressed optimism that Al-Qaeda could obtain a ready-made nuclear weapon. “The mission of the Jihad movements in the [nuclear] arena is difficult but not impossible,” he wrote, “logically speaking, it should be a matter of supply and demand.”⁹⁹ Al-Qureishi referenced research on the lack of security at Russian nuclear sites, and implied that Al-Qaeda could buy or steal a nuclear weapon or nuclear materials on the black market.¹⁰⁰ Al-Qureishi referenced a study from the Center for Non-Proliferation Studies which assessed security at ten different Russian nuclear sites and found that “a number of buildings devoted to storing great quantities of plutonium and enriched uranium – enough of it to manufacture nearly 70,000 nuclear bombs – had no armed guards, no security perimeters, no surveillance cameras, and no radiation detectors at their entrances and exits.”¹⁰¹

Al-Qureishi wrote this paper sometime before his death in 2002. Al-Qaeda’s progress, if any, in obtaining plutonium or enriched uranium through “supply and demand” has not been commented on in any subsequent publications from the group. However, data suggests that Al-Qaeda may have made connections with Pakistani scientists who were able to provide the group with nuclear weapons blueprints of unknown sophistication. If technologically-skilled and resource-rich elements of the Al-Qaeda organization were able to obtain HEU or plutonium in the future, they may be able to successfully assemble a device.

Examinations of other Al-Qaeda nuclear weapons documents and materials by technical experts reveal a range of sophistication, from information that is “remarkably inaccurate or naïve” to more advanced data on particular aspects of nuclear technology, like the nuclear fuel

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⁹⁸ Of all instruction manuals available or reported on in the public domain.
⁹⁹ Al-Qureishi, “The Nightmares of America.”
¹⁰⁰ Ibid.
¹⁰¹ Ibid.
cycle. According to David Albright, who studied a number of documents discovered in Afghanistan, only a small percentage of weapons manuals and other recovered materials focused on nuclear weapons in particular or even WMD generally. In his assessment, none of the materials implied that al-Qaeda had been successful in acquiring nuclear weapons or nuclear materials. Neither did environmental tests conducted at suspect sites turn up any trace of HEU or plutonium. Albright concedes, however, that evidence at these sites suggests that al-Qaeda burned, destroyed, or secreted away documents on nuclear weapons that may have been the most incriminating or significant. An accurate assessment of the group’s progress in procuring either a nuclear weapon or its components may thus be obstructed by the destruction and loss of certain key documents.

As for infiltrating a device into the United States, al-Qureishi highlights the southern border with Mexico as a potential entrance point: “Two hundred and fifty four million people, 75 million cars, and 3.5 million trucks entered America from Mexico, [according to data] from 1996. At the 38 official points of entry, only five percent of this huge amount is inspected. These are numbers which call for contemplation.”

On the Way to a Nuclear Weapon: A Dirty Bomb

In the course of exploring ways to build a nuclear device, both the al-Qaeda core in Afghanistan and those behind the cache of resources on Jihadist websites have amassed a useful store of information on how to build dirty bombs. Also, there are numerous examples of individuals at various levels of the al-Qaeda organization and the international Jihadist movement confusing the two in their discussions, referring to dirty bombs incorrectly as “nuclear bombs.” Because of this tendency to confuse the two, reports like that passed on by Hamid Mir that al-Qaeda may have “nuclear bombs” or “nuclear materials,” may actually refer to dirty bombs and radiological materials. These devices are considerably easier to make, but do not equal the destructive capability of nuclear weapons.

While nuclear aspirations outstrip capability, al-Qaeda could settle for a dirty bomb. The confusion between dirty bombs and nuclear bombs is beneficial from a propaganda perspective; if al-Qaeda successfully detonates a dirty bomb, it may try to claim to its supporters in the Islamic world that it set off a “nuclear” device. This message would resonate in certain Islamic communities where the public is not educated in the difference between the two types of weapons. Moreover, the technology, skills, and materials needed to build a dirty bomb are potentially within al-Qaeda’s reach.

5.2 The New Guard

Recent attention on the specific topic of dirty bombs from Abu Musaab al-Suri (“dirty bombs for a dirty nation”) and Abu Hamza al-Muhajir may indicate a growing awareness of this particular kind of weapon and efforts towards acquiring it could ensue. Al-Suri and Bin Fahd have also discussed nuclear weapons, and al-Suri, while working for the al-Qaeda core,

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102 Albright.
103 Ibid.
104 The public in countries with only peripheral involvement in the Cold War did not get the almost daily influx of information and reportage on nuclear weapons and technology that American citizens received, and thus may be only vaguely familiar with the concept of these weapons.
may have been part of an unsuccessful attempt to procure uranium.\textsuperscript{105} While some progress may have been made towards making a radiological device or obtaining nuclear components, no data available in the public domain supports that New Guard elements possess either a radiological nor nuclear weapon.\textsuperscript{106} Abu Musaab al-Suri has stated outright that he does not have any WMD.\textsuperscript{107}

However, elements of the New Guard in Europe and Iraq have demonstrated the ability to obtain or manufacture ricin and cyanide (see examples under “Interest”). Further, the large-scale WMD attack Zarqawi plotted and nearly carried out against targets in Amman demonstrate that ambitious and resource-rich elements of the New Guard have the core capabilities to plot potentially successful chemical WMD attack. Certain chemical and biological attacks have thus been shown to be within their reach.

5.3 Online Jihadist Community

Ideas and enthusiasm for non-conventional weapons abound. But with some exceptions (e.g., recipes for ricin), there is very little authoritative information on how to actually obtain or manufacture and deliver these weapons. One recent exchange on the al-Nusra planning forum demonstrates this. “Azzam 2000” wrote: “In the name of God, the Merciful and the Compassionate, I would like assistance in making a chemical weapon, such as sarin gas, or another kind.”

Members of the forum had little information to provide him. One member pointed him to an English language website with weapons information at www.roguesci.org. Another posted a link to the English-language video tape made by American survivalist Kurt Saxon on how to make ricin.

The discussion highlights a dynamic observed on these planning sites since their inception. In spite of the enthusiasm and discussion around the weapons, little technical information is available. Much of the information on WMD posted to Jihadist forums comes from English language Internet sources: for instance, roguesci.org, the Natural Born Killers 2000 handbook, or the original patent for making ricin. Also, unlike with conventional weapons, these forums do not yet have members claiming broad experience in non-conventional weapons to answer questions or provide information.

Among other sources available to them are some limited manuals which appear to have originated with the al-Qaeda core group. These sources are the most technical and detailed of those available online. Two manuals on the manufacture of poisons, poisonous gases, and toxins (discussed below) provide significant information, although they do not seem to communicate the level of detail necessary for an entrepreneurial Jihadist to manufacture or procure and successfully weaponize the chemical and biological agents described to kill more


\textsuperscript{106} While some might cite the example of Jose Padilla, an American citizen who allegedly planned a dirty bomb attack, as evidence to the contrary, Padilla’s legal case conducted three years after the initial report of his alleged plot did not confirm any plans to carry out a dirty bomb attack. Information in the public domain is thus insufficient to support that Padilla made any progress toward a dirty bomb.

\textsuperscript{107} Al-Suri, Abu Musaab, “Abu Musaab al-Suri’s Response to the American State Department.”
than a handful of people. This could have been a reflection of a lack of success in the experiments, or a lack of forecasted success in weaponizing the products. It could also reflect a strategic decision to keep some tactics and techniques confined to a select group of terrorist associates, rather than aim for their widespread dissemination over Jihadist websites as has been done with conventional terrorist tactical knowledge.

**Moderately Sophisticated Materials**

There exist a few manuals of varying detail on the manufacture of poisons, poisonous gases, and toxins. Two of them contain the minimum level of detail necessary for an entrepreneurial Jihadist to have success at replicating the instructions successfully: the manual written by Abu Khazifa al-Shemi, and another containing a compilation of lab reports in which these substances are produced and injected into rabbits.

Several resources for making ricin are also available on Jihadist forums. These include the original patent for ricin, which describes its manufacture, and at least two different Arabic language recipes. The most detailed and specific instructional material circulated on Jihadist sites on the manufacture of ricin is an English-language video made by American survivalist Kurt Saxon. This video goes through the manufacture of ricin step-by-step with highly detailed, easy to follow instructions. Multiple members of Jihadist planning forums have bragged about successfully making ricin. 108

The limitation of these materials is that they do not contain instructions for dissemination methods that would allow them to be leveraged as WMD. The two most detailed manuals on chemical weapons instruct in three methods of dissemination that would yield minimal casualties. The first method is injection. The second is cutaneous delivery by mixing the substances with DMSO, a substance used in skin creams to deliver ingredients into the skin. The third is coating the shrapnel in a grenade with cyanide or other poisons.

The case is the same for the materials discussing ricin. The recommended delivery mechanisms severely limit the potential of the agent to serve as a weapon of mass destruction. Ricin is discussed in terms of its use in individual assassinations, such as by mailing ricin-laced letters to targeted individuals or random members of a target population. Recommendations for somewhat larger scale attacks, such as building ricin-contaminated grenades or deploying ricin through ventilation systems, are not accompanied by instructions or additional information, and the necessary steps to carry these ideas to fruition are not described.

**Basic Information**

**Chemical Weapons**

Basic instructional materials are available on Jihadist planning forums for the manufacture and dispersal of some chemical agents, such as cyanide (both potassium cyanide and hydrogen cyanide). However, the effectiveness and thoroughness of these recipes is questionable. With chemical agents, the most considerable obstacle in leveraging them for WMD is the delivery system, and the descriptions of delivery systems or dispersal mechanisms available are limited.

One discussant in a Jihadist planning forum has suggested creating a missile filled with nerve gas to attack “Crusader and Jewish bases,” but did not provide or solicit any information on how to build such a weapon or obtain the nerve gas.  

The manual on poisons and poisonous gases also provides some basic information on the deployment of certain chemical agents. The first dispersal method calls for the manufacture of a missile with “thin walls,” containing an unspecified “poisonous substance” packed around an explosive core. The missile would contain “a small enough amount of explosives... not to interfere with [the dissemination of] the poison.” The second method is to build a metal cylinder with openings in the side walls containing tubes of pressurized poison gas and a very small amount of explosive in the middle. The explosive is designed to puncture the tubes, forcing the pressurized gas out of the openings in the cylinder. Of the delivery systems described in online forums, none are likely to result in mass casualties; well-positioned conventional explosives could yield higher rates of fatalities.

**Biological Weapons**

Besides ricin, detailed instructions in procuring or manufacturing other biological agents are not readily available on Jihadist websites. The manual entitled “Biological Weapons” contains instructions for cultivating a plague specimen in a laboratory, but there is little information on how to successfully deploy it as a bioweapon. While general delivery mechanisms are listed, instructions on transferring the specimen from Petri dish to carrier animal or device and transfer to target population are not provided.

**Nuclear and Radiological Devices**

Online materials demonstrate only a crude understanding of nuclear and radioactive bombs. The two are often conflated, with materials referring to radiological devices incorrectly as “nuclear bombs.” An examination of the document series entitled “The Nuclear Bomb of Jihad” published by no 1 revealed that most content focused on radiological devices, not nuclear weapons. Even on the subject of radiological weapons, the content was general or incorrect. What little information there was on nuclear weapons in “The Nuclear Bomb of Jihad” had been taken from English language sites such as commondreams.org. This information was not technically detailed, but described nuclear reactions and nuclear explosions at about the same level which may be encountered in a high school text book.

On the subject of radiological devices, these documents presented only rudimentary and often incorrect information. The radiological substances suggested were barium, radium, and beryllium, with a focus on radium. No 1 did not discuss the isotope radium-237, but instead the stable radium element which is not an effective radiological weapon; it took forty years of handling this element for Marie Curie to finally succumb to leukemia. No 1 demonstrates throughout his documents that his ambition exceeds his technical expertise. For instance, he recommends attempting to procure uranium from black sands along the Red Sea. While Egypt has processed these sands for a variety of minerals, no 1 fails to remark on the machinery needed to extract uranium from the black sands. Further, the uranium would have to be enriched for it to be useful in WMD.

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109 “To the Brother Engineer,” post of May 21, 2006.
Other documents discussing nuclear weapons provide brief information on how nuclear weapons are assembled or on how nuclear reactions work. The information provided is copied from English language websites, and presents nothing resembling instructional material. Some materials on this subject also propagate false information, such as one document describing the fictional substance red mercury.  

While Online Jihadists are pursuing exploratory research on dirty bombs and nuclear bombs, these technologies are likely to elude this “grassroots” level of the Jihad movement. Nuclear technology will remain beyond their reach for the foreseeable future, and dirty bombs are out of their grasp at the current time. Most of the training and instructional materials on Jihadist websites focus on the basics of conventional attacks: how to make, find, and mix various explosive components or how to kidnap or kill an “infidel” living in the Muslim world. While more advanced materials can be expected to emerge in the future, information on higher level weapons and attacks is at this time superficial.

6. **FORECASTS**

6.1 **Obstacles to Effectively Using WMD**

Individuals at all levels of the international Jihadist movement are attracted to WMD for their potential to tip the balance of power between the Mujahideen and their enemies. Some of these individuals are also in active pursuit of these weapons, conducting research on how to make or obtain them. The al-Qaeda core has made technical progress in its pursuit of WMD but multiple obstacles currently impede the Jihadist effort to effectively acquire and utilize WMD.

The first hurdle in this process is religious and ideological. The conspicuous silence from a number of important New Guard leaders and clerics on this subject signifies a lack of approval for their use, either for religious reasons or strategic ones, such as the risk of alienating Muslim populaces from which Jihadists need to attract support. Online Jihadists, who represent a sample of al-Qaeda’s far flung international supporters and the foot soldiers of the global Jihad, focus most of their discussions on conventional weapons. While there is a noticeable appetite for WMD among some on-line Jihadists, most concentrate on conventional attacks like suicide bombings, either because they are easier or because they are more ideologically palatable.

6.2 **Rebuke Mitigated by Targeting America or (parts of) Israel**

To stave off a backlash, it is in the best interest of a group or cell wishing to carry out a WMD attack to strike the place least objectionable to the community of radical Muslims: the United States. Al-Qaeda’s justifications for mass casualty attacks focus on the United States as do the WMD threats of a New Guard leader like Abu Musaab al-Suri. Even Israel could be a controversial place for a WMD attack because of the presence of so many Arabs and because the land is, in the minds of many Muslims, Arab land (Palestine). However, WMD that would not contaminate the land (nearly anything short of some types of biological as well as a nuclear attack) and could be directed at a dense concentration of Israeli Jews could be broadly accepted as legitimate. Abu Musaab al-Zarqawi was counting on this sentiment when he

denied that he would ever carry out the chemical plot of which he was accused except against Eilat and Tel Aviv.

6.3 **Technical Hurdles Overcome by International Cooperation and Recruiting the Educated**

The effort to acquire WMD is a collaborative one: the al-Qaeda core has reached out to Pakistani scientists for help; the New Guard utilizes the Iraqi theater as a space for knowledge exchange; and Online Jihadists from all over the world share information and discuss methods, tactics, targets, and techniques in interactive, dynamic online forums. The strengthening of international networks, communication, and access may help Jihadists overcome technical and practical challenges to WMD use. Jihadists are aware that certain challenges can be surmounted by effective international networking. Al-Qaeda strategist Abu Ubaid al-Qureishi highlighted the particular opportunities that globalization brings to the terrorists aspiring to WMD in his article “the Nightmares of America.”\(^{111}\) Abu Musaab al-Suri alludes to the possibility that fruitful connections with nuclear states may someday be possible.\(^{112}\) Online Jihadists are also well-positioned to be useful resources in the international Jihadist effort to procure WMD: they live all over the world and many are not known terrorists and therefore can move and operate more freely. They can use their Jihadist forums not only to communicate laterally, but also to interface with New Guard organizations and, potentially, the al-Qaeda core.\(^{113}\)

The Online Jihadist phenomenon also benefits al-Qaeda and New Guard groups because it is a powerful recruiting tool with which to target a specific segment of the international Muslim population. Members of this community are primarily computer owners.\(^{114}\) In the Muslim world, with a generally high disparity of income and low computer penetration, this means that they are wealthy. A significant number of them have demonstrated multilingualism, speaking English, French, Dutch, or German in addition to Arabic. Technical forensics and content analysis suggest that a significant number are located in the Western world, primarily in Europe. Technical prowess is highly regarded and actively sought on these forums. By functioning as a recruiting mechanism and a portal of access into the world of radical Islam, Jihadist forums can fill the ranks of supporters with the wealthy, the technically and scientifically gifted, and other human assets in locations throughout the world to assist in their endeavors.

6.4 **Intensified and Protracted Conflict Will Make WMD More Appealing and Acceptable**

If the United States and non-Islamic nations become increasingly involved militarily and politically in the Islamic world, there is more likelihood that the theological preconditions to using WMD will be fulfilled in the minds of the wider population. If certain Western countries persist in confrontations with the Islamic world in the face of conventional attacks

\(^{111}\) Al-Qureishi, “The Nightmares of America.”

\(^{112}\) Al-Suri, “Abu Musaab al-Suri’s Response to the American State Department:” “I hope that governments like [North] Korea’s will not abandon their nuclear programs. I hope that Iran will expel [IAEA Director Mohammed] Baradei who conducts inspections there…. “

\(^{113}\) A letter discovered in Abu Musaab al-Zarqawi’s house indicated that members of the al-Qaeda core used Jihadist forums for private communications as well as public statements. Available at: www.ctc.usma.edu/harmony.asp

\(^{114}\) Jihadist forums are difficult to access from cybercafés due to state surveillance and a lack of privacy.

"To Discipline the Savage Cowboys" [2-4] 32
and entreaties to change, over time such weapons of last resort will become more appealing to hardliners and more acceptable to others. Conversely, if Western-Islamic relations improve and Jihadists are viewed as maintaining an excessive level of violent response, the use of WMD would become less acceptable and risk alienation of the very Muslim communities whose sympathies Jihadists work hard to engage. Therefore, the theological and pragmatic considerations that surround the use of these weapons is subject to change with the evolution of international political dynamics and unfolding world events.

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1 Introduction

1.1 History

Since the late 1960s, terrorists have employed a wide spectrum of small-arms and high explosive weapons to perform assassinations, create casualties, and on occasion, damage selected facilities such as government offices, police stations, market places, shopping centers, and restaurants. During the past 35 years, thousands of attacks have been made worldwide by a few dozen terrorist organizations. The weapons used in these attacks were chosen primarily because of their ready availability, low costs, and ease of implementation.

Beginning in the early 1980s, a few terrorist organizations began using larger high explosive devices aimed at important targets (military, political, economic, or religious centers) and intending to convey a message to their ethnic, political, and/or government adversaries. Examples of several large-bomb attacks and their terrorist organizations are as follows:

- South Quay Newspaper Publishers in London (9 February 1996). IRA.

These attacks involved bomb sizes from one to more than 10 tons of explosives, in some cases with homemade “witch’s brews” rather than military quality munitions. The attacks were delivered by vehicles ranging in size from large vans to dump- and tank-trucks. Again, the weapons and delivery means were chosen because of easy access to explosive materials, availability of vehicles, low costs, and ease of implementation.

On 11 September 2001, the United States experienced and the world witnessed the first of what can be classified as next-generation weapons. Al-Qaeda terrorists attacked the World Trade Center in New York City and the Pentagon in Washington, D.C. by employing kinetic and thermal energy from the fuel of four hijacked airliners impacting their targets to accomplish destruction. Fatalities from these attacks were 2,973 (i.e., 2,602 at WTC, 125 at...
Pentagon, and 246 in the four aircraft). Destruction included all seven buildings in the WTC complex, including its two 110-story Twin Towers, 25 nearby buildings damaged, and one subway station crushed plus devastation to a wing of the Pentagon. Analysts generally considered these attacks to be successful because they caused high casualties, extensive economic losses, sent strong military and political messages, provided prompt visible images, and in terms of terror, generated extreme shock and awe among the population. This event was more than a simple evolution from previous attacks; it was a revolutionary step in weapon effects and attack planning.

Al-Qaeda has openly stated a desire and mad efforts to obtain Weapons of Mass Destruction (WMD) such as nuclear, chemical, biological or radiological devices developed, produced, and deployed by military forces. Fortunately, these weapons are very difficult to acquire, costly, involve handling of hazardous materials, and as a rule are carefully secured and defended by the nations that possess them. It is generally assumed that no terrorist organizations currently have the resources, scientific talent, or time to develop their own WMDs. The United States and allied nations have focused extensive programs on preventing and denying those possibilities. However, the emphasis on WMD leaves a technological gap which terrorists might choose to exploit - what can be described as Weapons of Mass Effects (WMEs). There are several unconventional or non-traditional means for employing conventional weapons or natural phenomena to produce extreme casualties and damage; therefore, it is important to define WME in greater detail and establish measures or tests of their qualifications as WMEs.

12 Purpose and Scope

An important question the United States must address is: “Will terrorists attempt to implement a ‘Step Level’ increase above the September 11, 2001 attack?” The purpose of this paper is to examine whether there are unconventional weapon mechanisms and related vulnerable target sets that would qualify for attacks leading to extensive damage and casualties, but less than the extreme effects achievable with WMD.

For our purposes, WMEs must entail a high probability of causing extensive casualties (loss of lives), extreme damage, and military, political, and/or economic impacts as discussed in Subsection 1.3. Seven generic classes of weapons or damage mechanisms have been identified that terrorists might choose to employ. These weapons or mechanisms, not listed in any order of preference, are:

1. Kinetic Energy
2. Incendiary (Fires)
3. Release of Toxic Gases
4. Indirect Biological Agents
   (Food and water sources)
5. Industrial Explosions
6. Flooding
7. Contamination, Poisoning, and Breaking

Each of these mechanisms deserves further description and explanation as provided in Sections 2 through 8 of this chapter. Most are characterized by release of naturally stored
energy or inherently lethal features. They are usually found and available throughout our society and can be obtained at relatively low costs. Most do not require special development, production, handling, smuggling, or training by terrorist personnel to implement. As each category is described, four dimensions are addressed:

- Definition of the concept (principles and techniques at work).
- Short vignettes of attack procedures and effectiveness.
- Illustration of at least one hypothetical attack option.
- Attack feasibility and whether it is becoming more likely over time.

A critical issue in selecting weapons or damage mechanisms is the vulnerability of the target to be attacked. Clearly, small arms and small explosive devices, when delivered with sufficient accuracy, can kill people, destroy vehicles, and damage soft structures. Terrorists began using large conventional explosives in order to hold harder structures at risk from longer standoff or miss distances. Use of kinetic energy proved the ability to destroy hard reinforced concrete buildings, the dominant form of construction in American and European cities. In brief, weapons and their intended targets must be considered as related sets to ensure effective attacks. Consequently, as this chapter addresses the seven weapon mechanisms, it is necessary to identify candidate targets that would be vulnerable to their effects.

The primary challenge of this analysis is to determine whether the various weapon or attack concepts, including their appropriate target types, are capable of producing what can be classified as “mass effects”. This point deserves further thought.

- Any single measure (e.g., fatalities, damage to critical infrastructure, or loss of life-support) might be sufficiently high or excessive to qualify as mass effects.
- Collectively, lesser levels of casualties, infrastructure damage, area destroyed, loss of functional capabilities, and economic impacts may also qualify as mass effects.
- The size of area destroyed by fires, flooding, blackouts, loss of gas supplies, or destroyed shelters and housing may be important. A small area destroyed in a high-rise industrial city (e.g., San Francisco earthquake, WTC, or New Orleans flood) may qualify as mass effects; whereas, a much larger rural area must be devastated to cause the same impact. Therefore, the geography of the attack region (rural or urban) is important.
- The extent of critical functions destroyed and their period of loss until repaired or replaced are important factors in assessing mass effects. For example, a few percent loss of gasoline fuel supplies may be inconvenient but would not be nearly as important as the loss of 80-90 percent of the nation’s production capacity. Likewise, the brief loss of electric power may be inconvenient but is not so critical as a month-long blackout. From an economic standpoint, the most effective attacks are those that destroy virtually all of selected critical, multiple-dependent functions such as fuel, electric power, water, or transportation.
- Some parameters for assessing mass effects are not quantifiable and must be treated in qualified terms (e.g., High, Medium, or Low). For example, psychological impacts such as surprise, shock, and awe from an attack strongly influence the degree of terrorism but they cannot be measured in numerical terms.
It is possible to define a set of seven measures of effectiveness as listed below. In most cases, minimal thresholds are suggested to qualify as sufficient to be considered mass effects. Although the thresholds are not hard limits, they are used as guidelines in assessing any given concept. A combination of measures (each having lower thresholds) may also be sufficient to qualify as “mass effects.” No upper limits are proposed since terrorists are likely to strive for as much damage, casualties, and terror as can be achieved.

a. High prompt fatalities and missing (or severely injured).
b. Size of areas devastated (with distinction between rural or urban locations).
c. Number of key infrastructure facilities destroyed.
d. Extent of economic losses (value of damage, cost of repairs, loss of markets).
e. Duration of functional downtime before returning to pre-attack capabilities.
f. Degree of terrorism (visible impacts, shock, awe, and repeatability).
g. Ease of weapon or mechanism acquisition, implementation, low cost, and little training or expertise needed by the terrorists.

The above methodology suggests a 49-element matrix to be evaluated (seven weapon/mechanism categories and seven measures of effectiveness). The scope of this paper does not permit detailed analytic treatment of each matrix element; however, it is possible to assess qualitative performance (e.g., High, Medium, or Low) or judge the measures on a scale of zero points (Low) to 10 points (High). In this manner, an overall assessment can be made concerning the concepts for selected applications and those deserving close monitoring and/or further studies.

13 Definition of Mass Effects

An initial problem is to assess the candidate measures (a through g) listed above to establish minimal levels that might be acceptable to qualify as mass effects. What follows is one attempt to do so, with the author’s subjective judgments concerning those levels. Other persons may suggest different levels. But the main point is that at some level, there will be what can be considered mass effects.

a. Fatalities and Casualties: For years, terrorists have used the number of fatalities, missing, and casualties as a primary goal. This continues to be an important measure but fatalities and missing are far more important than injured. An attack that accounts for at least one thousand fatalities and missing is considered a realistic attack goal.
b. Size of Area Devastated: This is used to express the extent of damage. For rural attacks, areas greater than ten square miles are a minimal goal. But for heavily built-up urban locations, one square mile would represent significant damage.
c. Critical Infrastructure Facilities Destroyed: Damage or destruction at key facilities that support political, military, or economic capabilities are most important. For example, destruction of a single refinery, power plant, transportation chokepoint, government center, regional communications, or control system would be sufficient as a goal. Destruction or damage to multiple facilities would be even better.
d. Extent of Economic Losses: To have a significant impact on United States and most Allied nation economies, the value of losses from damage, repairs, and lost labor or
markets should be at least $10 billion. Smaller financial impacts are annoying but not sufficient to require civil or political actions and to be considered mass effects.

e. Duration of Functional Downtime: The perception of attack success depends on what is damaged and how quickly it is restored. When quality-of-life functions and major industries are out of operation, the population becomes severely stressed. For example, in Iraq and many countries during World War II, people endured loss of electric power and gasoline for many months. By contrast, loss of life-support functions (water, heating fuel, food, and medical care) causes people to demand restoration of reliable services in a matter of days. A qualitative judgment is required to determine minimal downtime depending on what is lost and for how long.

f. Degree of Terrorism (Visible Damage, Shock, and Awe): An event’s surprise factor, degree of horror, extent or duration of effects, and perceived ability for the terrorists to repeat the attacks enhance the degree of terrorism on the population. These parameters are qualitative and subjective but they contribute to the terrorist’s goals.

g. Satisfaction of Terrorist Operational Capabilities: Attack weapons or mechanisms must be within the capabilities of terrorist organizations in terms of being easy to acquire, low cost, easy to handle and deliver to intended targets, having a low risk of failure, and needing little training or expertise to operate.

Although any of the above measures might be sufficient to influence a terrorist planner’s goals, combinations of multiple measures with somewhat lower threshold levels may also be sufficient to qualify as mass effects. Logic suggests that single measures must be extremely high, extensive, or horrible to qualify. Examples of shock and high casualties include the 9/11 attack on the World Trade Center (2,974 people killed) and the Aum Shinrikyo’s sarin nerve gas subway attack on March 20, 1995 (only 12 persons killed but 75 hospitalized and 5,000 injured in a matter of minutes). Logic also suggests that if two measures are satisfied to lesser thresholds, the concept may still qualify as mass effects. Likewise, if a concept satisfies three measures at perhaps one-third the suggested thresholds, it could qualify. This empirical relationship remains to be determined and is left for the reader to consider.

One method for assessing mass effects is to relate the measures to other well-known historical events. For example, analysts generally accept the nuclear attack on Hiroshima (August 6, 1945) as representative of mass effects. In numerical terms, it was characterized by:

- 140,000 prompt fatalities, plus hundreds of additional deaths from 1950 to 1990 due to long-term radiation effects.
- Virtually everything destroyed inside a 4.4 square mile area.
- Heavy structural damage to a radius of 3 miles and some glass broken to 12 miles.
- 90 percent of city buildings destroyed (mostly by fires).

On a comparable scale, hurricane Katrina (25–29 August 2005) laid waste from Cuba, across Florida, the Mississippi Sound, and Louisiana (New Orleans), and caused the following damage and casualties:

- Over 1,500 dead and 705 missing (after one week).
240,000 households evacuated from an area of 90,000 square miles.

80 percent of New Orleans flooded (290 square miles).

Oil terminals and platforms destroyed with loss of 1.43 million barrels per day of production (95 percent of total regional capability). Eight refineries damaged and shut down for more than a month.

Mississippi River channel closed to shipping for 13 days.

60,000 people employed in shipping industry lost jobs.

Tourist industry shut down (accounted for 15 percent of $10 billion industry).

Overall cost of losses and repairs, estimated at $125 billion.

On a smaller scale, Texas City experienced the accidental explosion of two ammonium nitrate fertilizer and sulfur-loaded ships (Grandcamp and High Flyer, each with the equivalent of 1.9 Kt TNT energy) on April 16 and 18, 1947 in Galveston Harbor. Their combined blast, shock, poisonous gas, and fire effects accounted for the following damage and casualties:8

- 377 fatalities and 2,000 severely injured.
- Destruction of Monsanto chemical plant valued at $19 million.
- Two oil refineries and their tank-farms destroyed by fires.
- 15 city blocks flattened (total loss of structures).
- Some windows broken across the bay at 11 miles radius.
- Damage to city facilities placed at $75 million.

By comparison, the Allied fire-bombing attack against Dresden (Germany) on the night of February 13-14, 1945, caused smaller physical damage but resulted in higher casualties. That night, the city’s railroad center was filled with nearly 400,000 refugees, passing through to escape the Russian Army advance from the east. A total of 3,750 tons of high explosive bombs (1,750 craters) plus 650 incendiary bombs initiated a firestorm in the city that caused the following results:9

- 135,000 fatalities occurred; although, Berlin reported 200,000 dead.
- 35,400 residential structures destroyed (only 7,421 were undamaged).
- 11 public utilities including electric power, gas, and water were destroyed.
- Center city (1.28 square miles) was flattened, including trainloads of refugees.
- 185 trams destroyed and 92 kilometers of tram electrical wiring were torn down.

Fire bombing attacks against Hamburg, Darmstadt, and Tokyo (Japan) far exceeded the area destroyed in Dresden but did not cause as many casualties.

One could compile an extensive list of natural disasters and wartime attacks that caused staggering amounts of damage and high casualties. Unfortunately, analysts often disagree upon which are “massive” and which are merely tragic events. All four of the above examples exceeded the destruction and/or the casualties experienced by the September 11 2001 terrorist attacks; consequently, they are probably acceptable examples of mass effects.
Although the seven weapon or mechanism categories selected for this study may not achieve the same levels as these examples, the measures (a through g) should permit a sufficient assessment to rank their potential.

The subsequent sections of this chapter are devoted to exploring and evaluating the concepts and their target sets in terms of the four dimensions set out above—principles and techniques; attack procedures and effectiveness; an illustrative attack option; and attack feasibility. It should be noted that some attack concepts could hold out the prospect of mass effects but be judged not feasible for a terrorist group. These attack concepts still warrant discussion if only because terrorist capabilities could change over time. A summary analysis of results and conclusions is presented in Section 9. References and source materials are listed in Section 10.

### 2. Kinetic Energy Impacts

#### 2.1 Definition of the Concept

High kinetic energy can be achieved by a broad range of vehicles. Commercial airplanes (similar to Boeing 757) used in the 9/11 attacks weigh more than 100,000 pounds and can impact targets at velocities over 150 miles per hour (>220 feet per second). Since kinetic energy is determined by half the mass (weight divided by gravity) times the square of impact velocity, this represents at least 75 million foot-pounds of energy. The approximate kinetic energies of other candidate delivery vehicles are presented in Table 2.5.1.

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Typical Weight</th>
<th>Average Velocity</th>
<th>Kinetic Energy (ft.-lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Airplane</td>
<td>100,000 lbs.</td>
<td>220 ft./sec.</td>
<td>75 million</td>
</tr>
<tr>
<td>Light Private Airplane</td>
<td>13,500 lbs.</td>
<td>150 ft./sec.</td>
<td>4.7 million</td>
</tr>
<tr>
<td>Passenger train (6 cars)</td>
<td>100 tons</td>
<td>50 mph</td>
<td>82.7 million</td>
</tr>
<tr>
<td>Ocean Liner Ship</td>
<td>80,000 tons</td>
<td>15 knots</td>
<td>1,550 million</td>
</tr>
<tr>
<td>River Barge/Tug Boat</td>
<td>2,000 tons</td>
<td>5 knots</td>
<td>4.4 million</td>
</tr>
<tr>
<td>Automobile</td>
<td>2,000 lbs.</td>
<td>50 mph</td>
<td>0.2 million</td>
</tr>
<tr>
<td>18-Wheel Tractor/Trailer</td>
<td>50,000 lbs.</td>
<td>50 mph</td>
<td>4.1 million</td>
</tr>
</tbody>
</table>

Table 2.5.1: Potential Delivery Vehicles with Representative Kinetic Energies

Examination of Table 2.5.1 reveals that hijacked commercial airplanes, which destroyed large concrete and steel structures upon impact on 9/11, rank third in terms of available kinetic energy. There are hundreds of buildings in the United States including the Sears Tower (Chicago), Congress, and White House (Washington, D.C.), and the Pyramid building (San Francisco) that could be destroyed by a single airplane impact. Commercial airplanes could cause enormous casualties if they crashed and dispersed fuel into large sports events (e.g., football stadiums, basketball arenas, soccer fields) where crowds of 20,000 to 100,000 people convene. Similarly, attacks against convention centers during presidential political campaigns could cause as many as 20,000 casualties while sending a strong political message. In terms of destroying key transportation facilities, large aircraft could cut bridge spans such as the Golden Gate Bridge (San Francisco) or Verrazano Narrows Bridge (New York).
Light airplanes (such as Piper Cub, Beechcraft, or Cessna aircraft) flying at 100 mph can deliver only about six percent as much energy upon impact. Although these planes are unlikely to destroy large structures, they can severely damage apartment buildings as several accidents have demonstrated. On October 14, 2006, a four-seat Cirrus SR-20 struck the 39-40th floors of a condominium on Manhattan Island. Two people in the airplane were killed, 21 in the building were injured (including 6 firemen), and the event caused over $2 million in damage. Small aircraft could be used effectively in a Kamikaze mode to attack oil tankers or cargo ships and would have a good chance of sinking or setting the ship on fire.

A passenger train traveling at a modest speed (50 mph) has sufficient mass and kinetic energy upon derailment to destroy a railroad bridge (e.g., over the Mississippi River) or tunnel (e.g., into New York City). This concept was investigated, while developing a hypothetical terrorist concept to interdict the U.S. railroad system. Specific railroad accidents include the Newark Bay railroad bridge destroyed (September 15, 1958) and the Baltimore rail tunnel wreck and fire (July, 19 2001).

The enormous mass of ocean liners and freighters, despite their relatively slow speeds, makes them capable of sinking other ships or destroying reinforced concrete structures upon impact. One cruise ship could ram and sink another cruise ship at sea, putting 10,000 people at risk. Ships can also destroy wharves, piers, levees, and canal locks. The freighter Bright Field, which was 760 feet long and carried 56,000 tons of corn, lost rudder control and destroyed the downtown New Orleans Riverside Wharf facility. It knocked down a five-story hotel building, devastated 12,000 square feet of wharf, and blocked the Mississippi River to traffic for five days from December 14-19, 1996. A medium-size river barge (1,600 tons) and its pushing tugboat (400 tons) have sufficient energy to knock down concrete bridge piers and abutments at speeds of a few knots. They have the advantage of very shallow draft (6 to 8 feet); therefore, they can maneuver into shallow waters to engage railroad or highway bridge pillars or destroy piers, dams, levees, wharfs, or cargo-handling terminals. Examples of accidents of this type include the Tampa Bay Sunshine highway bridge (29,040 feet long collapsed by container ship Summit Venture on May 9, 1980). The Arkansas River Bridge was hit by the barge Jumbo and collapsed on May 29, 2002. Details of damage levels for thirteen bridge pier and abutment accidents caused by barge and ship collisions were evaluated for DARPA in 2003.

2.2 Attack Procedures and Effectiveness

Most kinetic energy attack missions can be planned by a group or cell of roughly six terrorists, provided they have sufficient expertise and money to purchase equipment, safehouses to operate from, transportation, food, and supplies. A couple of personnel would study the target, including surveillance to determine its functions and work schedules. Attack plans, normally formulated by a team leader, would be defined in detail including sequence and timing of events.

In the case of hijacking commercial airplanes, the process has been severely complicated since 9/11 by improved air terminal and airline security. While it took 19 terrorists only a few days to convene and acquire tickets and mere minutes to secure the aircraft after takeoff, the possibility of repeating that process is not likely today. Because commercial aircraft have
long range capabilities, it may be possible to obtain an airplane in a foreign country and fly it to the intended target in the United States. Virtually anyone inside the United States can rent or lease small aircraft at local airports if they have sufficient money and evidence of pilot training. Thus, the ability to carry out small-airplane attacks is considerably more likely than for large commercial passenger aircraft. (Cargo aircraft could be another possible target since security for these aircraft has not been as stringently upgraded after 9/11).

Trains run on specific schedules, which are advertised and readily available. Therefore, derailment of a train can be planned and implemented with a high degree of success at a specific time and track location. Two or three terrorists can prepare and emplace small mines or dynamite (e.g., 5 or 6 pounds) or cut the tracks with welding torches within minutes of the intended attack time. This was a common practice of resistance fighters in Russia, France, and Netherlands during World War II. Derailing explosives can also be detonated by remote control or by a pressure switch under the tracks.

Hijacking a large ocean liner is easier in terms of security than an aircraft. But this attack requires more trained personnel with sufficient knowledge of ship operations, steering, communications, and seamanship. There have been relatively few successful ship hijackings in recent years.

2.3 Example Attack Options

One hypothetical attack would be the Panama (or Suez) Canal. When a ship enters one of the major canal locks, it could be hijacked and rammed against the lock gates to damage the 20 ton steel structures and sink the ship in the lock. The result would be to block the canal. Although this would not cause many casualties, it would prevent movement of dozens of ships per day. The Panama Canal passes about 37 United States bound oil tanker and cargo ships each day and the Suez Canal handles close to 50 ships per day. In addition to destruction of a multi-million dollar ship, the canal and its cargo would be shut down for weeks to months.

Another example of a kinetic energy attack would be to derail a train at the eastern entrance to the Gateway Bridge over the Mississippi River into downtown Saint Louis, Missouri. The train’s momentum would destroy the bridge span and structure, thereby forcing rail traffic to travel several hundred miles north or south to cross the river. Damage repairs would take several weeks to a few months and the economic impact would be measured in hundreds of millions of dollars. The effects of this attack could be extended significantly by performing similar derailments on the east-west railroad bridge across Lake Pontchartrain (or at Westwego five miles west of New Orleans). By destroying a few bridges over the Mississippi River terrorists could cut the United States in half with respect to rail traffic.

2.4 Feasibility of Attack

An ocean liner sinking in the Panama Canal could be implemented with a high probability of success. The canal is only protected by relatively few Panamanian personnel, who do no on-board inspections of recognized and scheduled ships. Cruise line security would be the primary obstacle. Terrorists could penetrate without being spotted, captured, or engaged.
Attacks on rail bridges across the Mississippi would encounter little or no obstruction. Most U.S. railroads employ roving security inspections of critical facilities but they are only periodic and could probably be avoided. It is extremely hard to detect buried explosives under tracks when hidden in ballast rock adjacent to steel rails. A partially weld-cut rail would not be seen. Simultaneous attacks against several bridges along the river could be conducted by roughly two-dozen personnel. Germany was forced to deploy 15 divisions of troops (10 percent of its eastern front forces) from 1942 to 1945 in an unsuccessful effort to stop railroad attacks by Russian resistance.13

3. **Incendiary Weapons (Fires)**

3.1 **Definition of the Concept**

Large-scale firestorms in U.S. cities do not represent a major threat because construction codes and practices during the latter half of the 20th century turned to steel, masonry/brick/stone, and glass structures, reducing use of flammable materials. Modern buildings also contain automatic sprinkler and fire warning systems. When Allied bombing commands dropped thousands of tons of incendiary weapons on German cities during World War II, they learned the cities do not burn well unless they are first bombed with high explosives to shatter, splinter, and expose wood and flammable materials to fire effects. Dresden and Japanese city incendiary attacks were preceded by explosive bombing (see Subsection 1.3: Dresden). Terrorists will not have the ability to bomb before initiating fire attacks; therefore, they must pick targets that already possess high quantities of flammable materials. Four target types come to mind:

- **Forest Fires:** The U.S. Forest Service often reports 75 to 100 lightening strikes during major thunderstorms in Pacific Northwest forests. Many lightening strikes start fires, which the Forest Service responds to with mobile firefighter teams before they can spread out of control. The Japanese floated balloons carrying incendiary munitions from Honshu Island across the Pacific with the intent of starting forest fires in the United States northwest between September 1944 and April 1945. A few arrived but they were quickly extinguished. Fortunately, the forests were damp during winter months.14 Although these attacks were unsuccessful, forests along the West Coast represent large areas of exposed, high value timber subject to fire dangers, particularly during dry summer and fall months. Forests are particularly vulnerable to large numbers of initial fires and have been the targets of arsonists.

- **Sawmills and Lumberyards:** Many towns and cities in the United States have sawmills and lumberyards containing stacks of lumber products. Likewise, Home Depot and Lowe’s Home Centers maintain supplies of exposed lumber products. There are currently 1,854 Home Depot outlets and 1,300 Lowe's Home Centers in the United States.19 These centers are located in more than 1,000 communities and represent vulnerable targets for incendiary attacks that could spread to adjacent structures.

- **Oil Refineries and Tank-Storage Farms:** Oil refineries are hard targets to destroy with blast explosives because of their thick steel, high pressure, high temperature cracking and distillation towers and extensive network of high pressure steel piping and valves. However, some processing elements and oil products (e.g., gasoline, kerosene, and heating fuels) are stored in soft (thin steel) tank farms. If a refinery can be attacked
with shape-charge munitions (e.g., Rocket Propelled Grenades) to open up tanks and cause product spills, the facility becomes vulnerable to incendiary munitions and extensive fires.

- **Volatile Chemical Industries:** A number of United States industries employ explosive or flammable chemicals in producing their products. Examples include production of fertilizers, fireworks, paints, solvents, plastics, and materials such as alcohol, ethanol, and benzene. Subsection 6.1 summarizes damage and casualties produced at major industrial complexes as a result of explosions and fires. The modern ethanol plant at Malta Bend, Missouri, located near the town on an exposed hill next to a cornfield, would be an inviting target for terrorists. Targets of this type contain the fuel in raw materials or products needed to sustain and spread effects once an attack has been initiated.

Incendiary devices are available throughout the country as consumer products. Magnesium-based automobile and truck safety flares can be purchased in quantity from automobile shops or through Amazon.com Sales. A 36-unit Safety Flare pack (weighs 16.2 pounds with half-pound flares, 1-inch diameter by 10 inches long) cost less than $150 (about $4 each). Flares burn for 20 minutes and make ideal munitions for targets that permit easy access. Another classic concept is to fill a quart container with fuel oil or gasoline with a cotton cloth wick (commonly called a Molotov Cocktail). Between October 22-26, 2006, a southern California arsonist set 10 forest fires using incendiary devices made of 6 to 10 wooden matches arranged around a burning cigarette and secured with duct tape or rubber bands. When dropped in dry fields, forests, or exposed lumber, simple, low cost devices can initiate extensive fires.

For targets where access is not easily achieved, terrorists could use safety flare guns to launch incendiary shells to ranges of about 100 yards. Flare guns are available in 12-gauge, 25 mm, and 37 mm diameter sizes. They are similar to revolvers in design with smooth bores and rocket cartridge-loaded shells containing phosphorous that burns for several seconds. Guns cost about $125 and cartridges cost about $2 each. They can be purchased in quantities for boating safety and signaling purposes. These munitions permit terrorists to initiate fires at short stand-off ranges, beyond access fences; although, they clearly identify the launch source. Rocket Propelled Grenades (RPGs) are widely used by insurgents and terrorist organizations throughout the world to attack armored vehicles because of their penetrating shape-charge warhead. A single terrorist can launch the weapon from a 10-pound 40 mm diameter smoothbore tube against stationary targets at ranges up to 500 meters (1,600 feet). A skilled soldier can launch 4 to 6 RPGs per minute. RPG warheads penetrate an inch of armor or 3.5 feet of solid timber. They self-destruct after 4.5 seconds of flight and normally start fires in flammable materials.

**3.2 Attack Procedures and Effectiveness**

Terrorists could lease a helicopter, fly over national forests, drop several hundred burning flares over an area of 100 square miles, and ditch the helicopter at a remote location. An easier concept would be to drive through the forests on motorcycles or in automobiles and throw burning flares or Molotov Cocktails into stands of vegetation. National Forests of
Pacific coast states or Southeastern states would be ideal target areas during summer and fall months. It is useful to review results of a few forest fires:

- On October 25, 2003, San Diego County experienced a fire in the Cleveland National Forest. It destroyed 273,000 acres of timber (427 square miles), totally destroyed 4,847 homes and structures, and killed 14 people. The financial loss exceeded $750 million. This fire was set by a lost camper looking for help.
- The Cedar and Paradise fires in San Diego County during October 2003 were pushed by 50 mph Santa Ana winds. In 10 hours, they jumped two interstate freeways, burned 400,000 acres (625 square miles), destroyed 2,507 homes, killed 16 people, and injured 64 people. Financial loss was placed at over $1 billion.
- The Twin Pines fire 90 miles east of Los Angeles burned 60 square miles of forest overnight on October 26-27, 2006. Five firefighters were killed while protecting community structures.

These examples may appear small from the standpoint of ‘mass effects,’ but they required 3,500 to 5,000 firefighters and virtually all available fire trucks and aerial tankers in southern California to contain them. The fires burned for several days and required continuous firefighting. Terrorists could initiate several fires of these sizes in a matter of hours and exhaust available fire fighting capabilities.

Consider an extreme event, the forest fire initiated by the May 18, 1980 violent eruption of Mount Saint Helens in southwest Washington. The pyroclastic lava flow and highly charged gases devastated 150,000 acres (234 square miles). Within this area, Weyerhaeuser Company lost 68,000 acres (106 square miles) of Tree Farms (36,500 acres of quality timber, 26,000 acres of young trees, and 5,500 acres of meadows). The burned area included 19 bridges and 221 homes. Fifty seven people were killed. It cost $64 million to clear the area and replant 18.4 million seedling trees over 45,000 acres. Virtually no firefighting was possible because of few access roads, high temperatures, dust, smoke, and molten lava.

An alternative concept would be for a terrorist armed with a few flares to walk into a Home Depot or Lowe’s outlet, light the flares, drop them among stacks of lumber, and leave. Recent examples of lumberyard fires and resulting damage include:

- Fontana (CA), November 7, 2006: A 640 acre (1 square mile) fire was caused by sparks from a welders torch out of control in 50 mph winds and it threatened hundreds of homes in Fontana and Rialto. Damage was estimated at $1.2 million.
- Columbus (OH), July 20, 2006: Firebrands were flying across the street when firefighters arrived and the lumberyard main building, three pickup trucks, and most of the inventory were burned. Part of downtown Columbus lost electric power and residents in neighboring houses were evacuated.
- Parowan (Utah), April 18, 2006: A four-alarm fire broke out at the Parowan Lumberyard and burned for three days. Damage was set at $2 million.
- Salt Lake City (Utah), 17 June 2004: Members of the Earth Liberation Front (ELF) ignited fires in a Stock Building Supply warehouse full of lumber. The building and three forklifts were destroyed. Estimates placed the loss at $1.5 million. The FBI
investigated this arson because ELF set dozens of fires and caused damage estimated at $110 million.

Individually, these events were not sufficient to qualify as ‘mass effects,’ but they could burn out of control and spread to adjacent structures. The mode of attack could also be repeated at multiple centers by small teams of terrorists, similar to the ELF campaign.

3.3 Hypothetical Attack

Consider a team of six to eight terrorists armed with RPG launchers and several flare guns. They could approach the perimeter fence at a refinery at night (e.g., El Segundo Boulevard in Los Angeles or Wilmington in Long Beach) and select vulnerable oil or gasoline tanks as targets. At a specified time, RPG weapons would be launched, two or three rounds into each selected target. Terrorists carrying flare guns would follow within seconds with a barrage of 4 to 6 flares at the same targets. Thus, each vulnerable element would receive up to three RPG rounds and six flares to ignite spilled fuel.

On March 23, 2004, a fire broke out at the Shell Oil refinery in Wilmington (Long Beach). A coker unit burned and the refinery had to be evacuated. The facility, capable of processing 107,500 barrels of crude oil per day was shut down for nearly a week. As a result, the cost of diesel fuel along the west coast increased from $1.06 to $1.40 per gallon due to production loss. In a similar situation, the Kuwait National Petroleum Company was forced to shut down a 200,000 barrel per day refinery at Shuaiba after a small explosion in its heavy oil unit. All employees were evacuated while firefighters put out the flames and made repairs.

3.4 Feasibility of Attack

There is little doubt that terrorists could perform attacks against forests, timber sawmills, lumber outlets, and oil refineries within the United States Forests and lumber industry targets would be no problem to penetrate. Attacks against oil refineries and tank farms would be harder due to security and on-site firefighters. Flares and other incendiary devices are readily available at minimal costs. If terrorists are unable to acquire weapons to permit standoff attacks, one or two team members could penetrate refinery security to set small explosive charges against the walls of storage tanks and critical elements. Nationwide, dozens of oil refineries and their product storage tanks are vulnerable to this form of attack.

4. Release of Toxic Gases

4.1 Description of the Concept

Toxic gas is strictly an anti-personnel weapon. It has virtually no effect on structural facilities or functional systems. A 1994 study sponsored by the Defense Nuclear Agency (DNA) showed that large quantities of gas are needed for any open-air applications in which the area of interest approaches a square mile. Specifically, nine production plants, transportation tank car accidents, and military events were studied as indicated in Table 2.5.2. Typically, it took 0.5 to 1 hour for heavier-than-air gases to spread from their release points before dispersing in the atmosphere. Release of a gas is subject to many variables (e.g., winds, moisture, temperature, type of gas, and dispensing mechanism). Therefore, there is a factor of five uncertainty in predictions of the areas covered per ton.
<table>
<thead>
<tr>
<th>Attack Location</th>
<th>Date: (d/m/y)</th>
<th>Type of Gas</th>
<th>Weight of Gas Material (Tons)</th>
<th>Cloud Area (Square Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhopal, India</td>
<td>3/12/84</td>
<td>Methyl Isocyanate</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Richmond, CA</td>
<td>26/7/93</td>
<td>Sulfuric Acid</td>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>Ypres, France</td>
<td>22/4/15</td>
<td>Chlorine</td>
<td>150</td>
<td>32-40</td>
</tr>
<tr>
<td>Bari, Italy</td>
<td>2/12/43</td>
<td>Mustard</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>3/9/88</td>
<td>Chlorine</td>
<td>Few</td>
<td>5</td>
</tr>
<tr>
<td>Gore, OK</td>
<td>4/1/86</td>
<td>Uranium Hexafluoride</td>
<td>14.5</td>
<td>9</td>
</tr>
<tr>
<td>Institute, WV</td>
<td>12/8/85</td>
<td>Aldicarb Oxime</td>
<td>~2</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>Somerville, ME</td>
<td>4/3/80</td>
<td>Phosphorus Trichloride</td>
<td>30</td>
<td>~5</td>
</tr>
<tr>
<td>Superior, WI</td>
<td>30/6/92</td>
<td>Benzene/Hydrocarbons</td>
<td>95</td>
<td>40-50</td>
</tr>
</tbody>
</table>

Table 2.5.2: Representative Open-Air Releases of Toxic Gases

These examples reveal an important consideration with respect to terrorist use of such materials. It takes large quantities (weights), when released in open air, to cover significant areas with casualty producing or lethal levels of gas. Production, handling, and dispersal of materials, some of which are expensive and controlled substances, are not attractive for terrorist attacks. However, a more practical alternative, is to release the gas in a closed facility where its effects are not dispersed. For example, it is much more effective to release the gas in the air conditioning system of a major building, inside an airplane, ship, train, underground tunnel, or subway system. In these cases, victims are trapped and forced to breathe the toxic gas.

A 1999 study for the Defense Nuclear Agency investigated gas release disasters in 4 railroad tunnels, 3 highway tunnels, and 6 mining tunnels. Again, there were uncertainties due to variations in characteristics of the facilities, environmental conditions at the time of release, explosion or fire, and availability of trained rescue crews. However, the extent of casualties and fatalities approached large fractions of the people at risk. Several events involved the release of Carbon Monoxide (CO), a colorless and odorless gas, which could be interesting to terrorists.

Carbon Monoxide forms when carboniferous materials are burned with insufficient oxygen. It is about 25 percent heavier than air and sinks to flooring or collects in pockets. More important, it has an affinity for blood, roughly 300 times greater than oxygen. One percent in the air can be lethal to humans. CO combines with hemoglobin, making it impossible for blood to carry oxygen. About 70-80 percent CO in the blood is lethal in seconds. The treatment for CO poisoning is immediate respiration, fresh air, and 95 percent oxygen.

This material is interesting because it can be produced in large quantities at little cost using common hydrocarbons such as wood, coal, methane, or natural gas burned in oxygen-starved ovens or by running gasoline engines. However, there are also drawbacks since the gas is invisible, odorless, and requires bulky high-pressure cylinders or drum tanks to store in cool places at pressures of 6,000 psig. CO and air form an explosive mixture (CO turns into CO2) and it is corrosive to metals; therefore, shelf-life in metallic containers is limited. It becomes
chemically active at temperatures greater than 90 degrees Centigrade (194 degrees Fahrenheit).\textsuperscript{29} Workers handling the material should use CO sensors to detect possible leaks. However, terrorist organizations could choose to accept these risks to use the highly toxic gas.

Terrorists could decide to use more lethal gases such as sarin, methyl isocyanate (Bhopal disaster in Table 2), mustard, chlorine, or Ricin to reduce the quantities needed. The Japanese Aum Shinrikyo cult developed and produced sarin for attacking the Tokyo subway system. On 6 January 2003, British agents raided an Al-Qaeda laboratory in Wood Green, London, where Castor Beans were being grown and used to produce Ricin as an aerosol.\textsuperscript{47} However, these more toxic gases entail an exceedingly risk process of production, handling, and dispersal. Gases of this type require acquisition of expensive and controlled chemicals. They take considerable time to develop and are dangerous to produce or disperse.\textsuperscript{18} Therefore, for the sake of evaluation, we will assume terrorists use high pressure canisters of CO. Carbon Monoxide was the primary gas involved in several disasters: 1) BART Subway (San Francisco) that injured 39 people (January 17, 1975), 2) Salang Pass (Afghanistan) highway tunnel explosion that killed 700 and injured 200 Soviet troops (November 2, 1982), and 3) Balvano (Italy) freight train fire in the Galleria Delle Armi tunnel (March 3, 1944) that killed 509 war refugees.\textsuperscript{28}

4.2 Attack Procedures and Effectiveness

As an attack scenario, assume a party of four terrorists, posing as tourists, arrives at the Port of Miami ship terminal in preparation for a two week vacation cruise to the West Indies. They bring along luggage including a trunk containing their sport SCUBA gear (masks, flippers, and regulators) plus four high-pressure tanks (each about 17 inches long by 5 inches diameter) or alternatively, medical cylinders marked “Oxygen” for use to treat Emphysema. In fact, the tanks are full (~25 cubic feet each) of CO gas. Assuming a one-percent lethality level, the four tanks would provide sufficient gas to fill 10,000 cubic feet of air to lethal levels. The cruise ship with over 2,000 passengers and crew of 2,500 would sail for Puerto Rico. After the ship was well at sea and most passengers were asleep, the terrorists would carry the gas bottles into the air-ventilation system equipment room and exhaust them through a flexible rubber hose into the air-circulation fan/vent system. The gas would be pumped throughout the ship to all cabins over a period of hours. The terrorists would wear rebreathing SCUBA masks to protect themselves during this operation.

Recent examples of ships that suffered ventilation system spread of viruses are:

- **February 13-25, 2005:** The Norwegian Crown cruise ship suffered a ventilation system spread of the Norwalk virus that infected half its passengers and at least 27 of the 1,190 crew. Norwalk virus is an intestinal illness that causes gastrointestinal distress for a few days.\textsuperscript{31}
- **Week of December 22, 2002:** The Grand Princess cruise ship on a 7-day Caribbean excursion to New Orleans suffered a ventilation system problem that sickened 50 passengers and 30 crew with Norwalk virus.\textsuperscript{32}
- **October 31, 2003:** The Pacific & Orient Cruise Line ship Aurora suffered an attack of Norwalk virus after leaving Southampton, England, for Greece. A total of 580
passengers and 28 crew became ill, the ship was forced to stop at Gibraltar, and it was
not permitted to dock in Greece.33

There is no doubt carbon monoxide or other toxic gases could be distributed as efficiently
as the virus on these ships. One would expect several hundred fatalities and perhaps two or
three thousand passengers and crew would be sickened by the attack.

4.3 Feasibility of Attack

According to a RAND Corporation (Center for Terrorism Risk Management) study of
“Maritime Terrorism: Risk and Liability,” about two percent of people embarking on ships
pass through metal detectors or are physically inspected. Only the largest passenger liners
(e.g., Cunard Lines) scan bags with X-rays before being taken to cabins.30 There is no
evidence that cruise lines test the contents of medical or sports equipment (oxygen or air
tanks) or bottles of liquids and creams. Thus, the feasibility of performing a gas attack of the
type described above is very high. The cruise industry is opposed to increasing security by
rigorous inspections because of time delays and high costs.

5. Indirect Biological Agents

5.1 Definition of the Concept

Military quality biological weapons are used for attacks against combatants. They employ
highly effective biological agents such as anthrax, smallpox, or plague bacteria. By contrast,
the concept presented here involves indirect attacks using more common and more readily
obtained biological agents against food and water supplies that support large segments of
civilian populations. Terrorists might employ Bird Flu to attack the poultry industry,
chemicals to poison fish habitats, virus to destroy edible crops and livestock, or virus to
contaminate the air conditioning systems of buildings and ships. All these concepts are strictly
anti-personnel mechanisms that cause casualties but do no significant damage to facilities or
infrastructure.

Bird Flu (Avian Influenza)

Terrorists might develop and produce quantities of H5N1 virus or Bird Flu to attack the
poultry industry in the United States or Allied nations. The virus is life-threatening to
humans; use against the poultry industry could have catastrophic impacts. For example,
during an outbreak in Pennsylvania in 1983, farmers had to destroy 17 million chickens.
Early in 2006, poultry sales in Italy plunged seventy percent when H5N1 occurred in only wild
birds. In November 2006, Japan halted all Korean poultry imports and destroyed 6,000
chickens due to an outbreak of Bird Flu. Japan imported 318 tons of chicken meat from
South Korea in 2005.38 At the end of November 2006, South Korea began slaughtering 677
dogs, 300 pigs, 236,000 poultry, all stray cats, and destroyed 6 million eggs in an effort to stop
spreading the virus. By that date, 153 people world-wide had acquired the disease.56 Today,
the United States produces almost 9 billion broiler chickens and a quarter of a billion turkeys
in a widely dispersed industry worth almost $30 billion a year. Poultry farms across the nation
would represent prime targets for a terrorist initiated pandemic.
The H5N1 virus was found in Hong Kong in 1997 and 2001. It causes neurological dysfunction and death in most birds, especially waterfowl, chickens, crows, and pigeons. It is transmitted from one bird to another by direct contact or ingestion through saliva, feces, and blood. However, the virus evolves with a high rate of mutation and can infect animals and humans. There is no effective treatment once it enters the body. Consequently, over $10 billion dollars worth of poultry has been lost and $1 billion or more is being spent worldwide this year to research the disease. The American Scientist Magazine warned in 2005 that an avian influenza pandemic could kill from 5 to 150 million people.34

**Fish Contamination and Oxygen Depletion**

Fish contaminated with Mercury compounds are a serious problem because the poison interferes with the human brain and nervous system. A number of industries make products requiring mercury and have dumped their waste in streams, rivers, and lakes. Examples of high-mercury dependent products include batteries, fluorescent lamps, petroleum refining, lime production, electrical components, and medical instruments. The soluble wastes have contaminated many varieties of fish, including salmon, pike, walleye, bass, sea tuna, dolphins and swordfish. Gold mining and processing companies have contaminated most streams in central California with mercury compounds. The process known as ‘bio-magnification’ increases the concentration of heavy metal pollutants from one link in the food chain to another (big fish eat small fish) and the longer a fish lives, the more toxins build up in its body.

A second form of pollution is known as ‘oxygen depletion’, which results when fast growing aquatic plants consume free oxygen in lagoons and swamp areas. California experiences this problem at lagoons from San Diego to Los Angeles. This occurred at Los Penasquitos in the Torrey Pines State Reserve where Cord Grass, Eelgrass, and ferns used in pet fish tanks have taken root. They propagate at unusually high rates in marsh and sub-tidal areas and consume so much oxygen that all fish, shellfish, birds, and most vegetation die.35

However, contamination of water requires considerable quantities (measured in tons) of waste materials to destroy large fish habitats and infect significant numbers of fish. The process can take months to years to build-up to critical levels. Therefore, these modes of contamination are probably not interesting to terrorists.

**Dispersal of Virus**

Legionella (Legionnaires’ disease) is a virus that thrives in damp or aquatic environments and is easily dispersed through air conditioning and ventilation systems. It was first identified during a convention in Philadelphia in 1976 when 221 people were infected and 34 people died.6 The organism is so common that in Australia, roughly one-third of the population is born with antibodies in their blood. Outbreaks of the disease have been experienced among seamen in Barcelona, Spain, (February 16, 1999) and New Zealand (November, 9 1998).

Legionella bacteria are found in water supplies and can be contracted by humans through inhalation.37 It is an ideal mechanism for use by terrorists in closed buildings or ships. Terrorists could produce a pressurized tank full of virus at a covert laboratory, smuggle it under the guise of medical oxygen, and exhaust it into the ventilation of a building or ship similar to the method described for dispersing Carbon Monoxide in Subsection 4.2. The
production process may be expensive due to the need for carefully controlled laboratory conditions. It requires trained personnel and handling of hazardous materials.

**Contamination of Foods**

Escherichia Coli (E. Coli) virus is a strain found in the intestines of many cattle, deer, goats, sheep, and wild animals. It is transmitted by eating meat of infected animals (spread during the slaughtering process), drinking raw milk, or petting infected animals in zoos. It causes bloody diarrhea within 5 to 10 days after contact and leads to kidney failure in humans. Unfortunately, anti-diarrhea medications and antibiotics can not be used in treating the disease since they cause kidney complications. Recently, the USDA found another virus (Phage), that is helpful in treating E. Coli because it attacks the bacterium cells, injecting them with DNA that multiplies to kill the disease. Phage apparently has no adverse effects on humans.

In September 2006, the United States experienced an outbreak of E. Coli in spinach crops grown in the California central valley. By October 13th, over 200 people had been infected and three died. The Food and Drug Administration (FDA) forced farmers in the region to destroy crops. A halt was placed on shipments and sale of raw spinach in 10 states and people were warned of the threat in 26 states. On December 4th 2006, a Taco Bell food outlet in Township, New Jersey, reported an outbreak of E. Coli in which 65 people fell ill. In this case, California grown scallions were thought to carry the disease. Deliveries of food were halted to 1,100 restaurants and food outlets in Northeastern states.

E. Coli is related to Marburg virus and is a cousin of the Ebola virus. In December 1994, an outbreak of Ebola occurred in Gabon (Africa) and by February 1996, 13 people had died from eating butchered chimpanzee meat. On 4 December 2001, the World Health Organization (WHO) reported seven more deaths from the same source.

E. Coli or Ebola virus could be obtained by terrorists in the form of contaminated meat, milk, or vegetables. It could be cultivated in production quantities at remote farms inside the United States or carried into the country (e.g., on routes used by illegal aliens or drug smugglers). Laboratory animals such as rabbits or rats could be used to reproduce the virus and infected animals could be slaughtered, ground up, and fed to cattle or distributed over lands where crops such as spinach and scallions are grown.

Similar to fish contamination described above, this concept would require handling large quantities of infected materials. Production of the virus in quantity would require trained personnel working in a laboratory-like facility. Efficient dispersion of the materials over croplands would require that they be converted to a water-slurry and sprayed over the fields with crop-dusting aircraft. It would take several months of crop growth to determine if the virus had contaminated the products. For these reasons, the concept may not be attractive for terrorist operations.

**Attack Procedures and Effectiveness**

Although biological concepts have the potential for causing large numbers of casualties, the most effective concept with the least amount of effort and lowest costs on the part of terrorists appears to be propagating Bird Flu. Various methods for cultivating the disease and
moving it into the United States appear to be possible. For example, the most obvious would be to smuggle infected birds or their infected remains (e.g., blood and ground meat mixed with bird feed) to a remote breeding farm inside the United States. Or it would be possible to obtain infected birds and set up a “breeding farm” on the Mexican or Canadian sides of the border.

Means of infecting poultry farms also could vary. Baby chicks infected with the disease could be covertly released into large commercial chicken farms throughout the United States to spread the infection to thousands of maturing birds. Or infected chickens could be slaughtered; their blood and ground meat mixed with grain, and the contaminated grain smuggled across the United States and released by helicopter or light aircraft over commercial chicken farms.

5.3 Hypothetical Attack Scenario

The concept of employing avian flu would be relatively low cost and could be performed by a terrorist cell composed of a half-dozen personnel with limited expertise. Access to a remote farm where the Bird Flu virus could be cultured and reproduced would be required. Bird feed and laboratory Bird Flu test equipment might cost a few thousand dollars. Lease of a helicopter or light aircraft to distribute infected chicks or feed would also cost a few thousand dollars. The operation would take less than a year to set up and become effective. All three methods of operation could infect millions of chickens and turkeys with avian flu in a matter of weeks. Even with careful inspection, thousands of contaminated poultry products could enter the United States food chain and many humans could become casualties. Even if casualties were prevented by careful inspection and destruction of infected birds, the industry would be virtually ruined financially. Millions of birds would be destroyed, industry inspection costs would increase astronomically, and a major sector of the national food chain would become unusable.

5.4 Feasibility of Attack

Of the above biological concepts, the most attractive from a terrorist standpoint would be Bird Flu against the poultry industry or the release of Legionnaires’ disease in a closed environment such as a building or ship. Both concepts are feasible. However, release of a virus requires more expertise, handling of hazardous materials, and is limited to the size of facility attacked. The Bird Flu concept is less likely to be detected during preparation and implementation. It could cause significant economic impacts and depending on the ease of transmission from birds to humans considerable loss of life. Bird Flu would be extremely difficult to contain once it propagates into wild bird flocks, since they migrate across nations and seas.

6. Industrial Explosions

6.1 Concept Description

There are a number of industries scattered throughout United States cities that produce or process highly volatile and explosive materials. If a terrorist organization can penetrate their facilities and initiate explosions in the products, processes, or stored materials, extensive damage and secondary fires could be generated that might destroy entire communities. Several accidental explosions of this type have occurred in the United States and foreign
countries, many of which could qualify as mass effects. The following accidents illustrate the potential for industrial disasters.

**Oppau, Germany (September 21, 1921)**

The I.G. Farben lacquer and menthol plant and BASF ammonium sulfate plants were built in 1865 on the bank of the Rhine River near the town of Oppau, Germany. The cartel produced fertilizers, paint, and explosives for the German military during World War I. After the war, the plant was expanded to produce fertilizer. Its storehouse contained 4,000 tons of ammonium nitrate on the day of this event. An accidental explosion of 15 tons of ammonium sulphate in a laboratory area set off a chain reaction that caused close to 1,000 tons of nitrates to detonate. The resulting blast generated a crater 300 feet wide by 600 feet long with a depth of 135 feet. Calculations place the size of the explosion at about 450 tons of equivalent TNT. The resulting damage included:

- Most of the plant was destroyed (only four chimneys remained standing). It took three years to reconstruct the facility.
- Every house in Oppau (0.3 to 1 mile from the explosion) was severely damaged including 300 totally destroyed. Over 500 people were killed and 1,500 injured.
- The town of Edigheim (1.5 miles away) was badly wrecked.
- Nearly all windows in the city of Mannheim (4 miles distant) were broken. The shock waves broke some windows in Frankfort 44 miles distant.
- Stores and factory roofs were damaged in Worms (12 miles), Frankenthal (4 miles), and Ludwigshafen (3 miles).
- Overall, 4,500 families were left homeless, 1,100 were killed, and over 2,000 were injured.

The BASF facility was rebuilt, heavily bombed during World War II, and it was reconstructed again after the war. It suffered a second accidental disaster on July 28, 1948. In this case, lacquer fumes ignited and triggered seven explosions that caused fires in the menthol plant. Several blocks of the large complex, mostly warehouses, were left in ruins. Estimates place the largest blast at 13-18 tons of equivalent TNT. Again, the cities of Mannheim and Ludwigshafen were heavily damaged. Total fatalities were estimated at 200-250 people. It took several years to rebuild the facility after this event.

**Enschede, Netherlands (May 13, 2000)**

The S.E. Fireworks factory was located in a working-class neighborhood of Enschede, across the street from three-story homes and apartment buildings and several blocks from the downtown railroad station. The factory had concrete slab walls and products were stored in an adjacent warehouse and reinforced-concrete bunker. On the afternoon of this disaster, a fire broke out in the production area causing two minor blasts. Flares ignited and a spectacular display of fireworks lit up the sky. People came out to watch the display when an enormous explosion occurred that destroyed 400 homes and damaged 1,000 more with fires. The explosion left a crater 85 feet in diameter and 35 feet deep. It was calculated to be equivalent to 5 tons of TNT. Four city blocks, including the train station, were destroyed or heavily damaged. Windows were broken on the far side of town at a distance of 3,500 feet and fires burned in the city for three days.
Fireworks factories are common sources of large explosive accidents. China, Brazil, and Mexico experience disasters almost every year as they prepare for holiday celebrations. Other industries that have experienced large explosions in recent years include paint and solvent manufacturing as well as fertilizer plants.

6.2 Attack Procedures and Effectiveness

Penetration of a hazardous materials facility is the most difficult step in this attack concept. Such facilities usually have high fences, walls, and security guards to ensure safety and prevent accidents. Some industries maintain fire-fighting units and equipment at their facilities. A cell of 10-12 highly trained terrorists could form inside the United States with a leader/planner, target analysts, scroungers and logistics personnel to secure a hiding place, transportation, equipment, food, and other supplies, plus 6-7 commandoes (with expertise in demolitions and small arms) to implement attacks. Although terrorists would not have to fight their way into commercial facilities, they might be engaged by guards or police at sensitive facilities such as nuclear power plants, explosive production plants, or government laboratories.

Less difficult attacks could be conducted against chemical industry and paint plants. For example, Sherwin Williams has major factories in Emeryville, California and South Chicago. Fire destroyed a $32 million Sherwin Williams plant and burned 1.5 million gallons of paint in Dayton, Ohio on May 27, 1987. A new Dutch Boy paint factory at Fernley, Nevada occupies 170,000 square feet and produces 20 million gallons of paint per year. A large Dutch Boy plant at Cavite, Philippine, burned in 2002 and destroyed the facility plus all machinery, raw materials, and products.48

6.3 Feasibility of Attack

There is little doubt that trained and dedicated terrorists could attack and destroy hazardous industrial plants in the United States. Many commercial industries are vulnerable and located in or near urban areas where they could cause huge secondary fires and extensive casualties. Costs for increasing security at industrial plants throughout the country would be very high, with a comparable impact on the economy.

7. Flooding

7.1 Definition of the Concept

Flooding is a phenomena that occurs when water at an elevated level flows into lower terrain where it is trapped. It often occurs along coastlines when storm winds push a base surge of water to heights of 10-20 feet above normal tide levels. Consider the hurricanes of the past two years along the Gulf or Mexico and Eastern seaboard as summarized in Table 2.5.3.49 In these cases, base surges and heavy rains caused flooding in low-lying areas for several days and caused roughly 10-20 percent of the damage and fatalities, although winds, fires, electrical, and gas failures caused the preponderance of damage. The unique exception was Hurricane Katrina, which had a base surge over 20 feet high and broke levees along Lake Pontchartrain, Louisiana. The lake drained into below sea level areas of New Orleans and flooded about 80 percent of the city for a period exceeding two weeks. This caused at least $100 billion in damage and most of the casualties experienced in the city as described in Subsection 1.2.
There are regions in the United States where they could induce flooding or assist storms to extend flooding. Consider the Great USA Flood of 1993. From May through September 1993, wide-spread flooding occurred in mid-western states from North Dakota, down the Mississippi and Missouri Rivers, to Louisiana. Floods caused by overflowing levees resulted in fifty fatalities and damage costing about $15 billion. Nearly 150 rivers and tributaries overflowed, 75 towns were completely flooded, 10,000 homes were destroyed, 15 million acres of farmland were inundated, and tens of thousands of people were evacuated. Opportunities for terrorist attacks to induce flooding exist at many locations throughout this region.

An extreme example of a levee break was a breach in the lower Colorado River near Yuma, Arizona, which drained into the Salton Basin in 1905 to create the Salton Sea (an area of 300 square miles, 50 miles long, and 70 feet deep). The levee was repaired in 1907 to prevent further flooding, but the sea remains today. Elsewhere, the Sacramento-San Joaquin River Delta represents a disaster waiting to happen. California’s Central Valley, a rich agricultural region, relies on 2,600 miles of earthen levees to hold back runoff water from the Rocky Mountains. During the past 25 years there have been 36 levee breaks that flooded the communities of Linda, Olivehurst, and Marysville. In 1997, the Feather River flooded Marysville and caused $500 million damages, killed six people, and required evacuation of 120,000 people from their homes. In 2003, a U.S. Army Corps of Engineers survey found that 89 miles of these levees needed significant repairs. In November 2006, the state passed a funding initiative to begin rebuilding the levees.

In 1979, the United States Army Engineer Waterways Experiment Station showed by analysis and sub-scale tests that an earth-fill dam or levee will wash out if water flows over its crest with a depth of about 3 feet. Because most earthen dams and river levees are constructed with crests 20 to 30 feet wide, it would require relatively large explosive charges (10-20 tons of TNT) placed on the surface to crater the crest sufficiently to allow withheld water to flow freely through the breach. This form of attack, with huge explosive charges, is not attractive to terrorist; although, an alternative would be to ram the dam or levee with a sizable ship or barge to create a breach as suggested in Subsection 2.1.
7.2 Attack Procedures and Effectiveness

The Dartmouth Flood Observatory monitors and maps regions of the United States and foreign countries that flood each year. This information, along with detailed descriptions of specific levees, canal locks, and terrain basins can provide terrorists with sufficient data to plan attacks.

Hypothetical Target Selection

The rebuilt levees in New Orleans following Hurricane Katrina at 17th Street Canal (failure one-quarter mile long), London Avenue Canal, and Industrial Canal (failure 200 feet long) could be candidate targets. They are being improved during rebuilding. Under normal weather conditions, they contain only a 1.6- to 3-feet head of water between Lake Pontchartrain and the Mississippi River in New Orleans. The Industrial Canal permits transit of small ships from the lake to the river but an attack to destroy its locks or adjacent levees would not release sufficient water (i.e., no storm surge) and would take weeks to flood the city.

By contrast, the Mississippi River-Gulf Outlet channel was built in 1963-1965 by the Army Corps of Engineers to provide a direct channel from the Gulf of Mexico into New Orleans Harbor. Used by large ocean-going ships, this channel (originally 650 feet wide) was cut through soft soil and enlarged by dredging over time to 1,500 feet wide. The Mississippi-Gulf locks are now 31.5 feet deep and 75 feet wide. The channel requires dredging yearly by the Army Corps of Engineers at a cost of $22 million and is more attractive as a target. It holds salty water back from 20,000 acres (31 square miles) of Louisiana wetlands. In 1965, Hurricane Betsy sent a tidal surge up the channel, which breached its levees, killed 80 people, and caused $2 billion damages. Residents in the area claim the channel provides a superhighway for tidal surges of Gulf storms; therefore, they have resisted Corps of Engineers plans to build larger locks.

Attack Concept

Terrorists could hijack an ocean liner or cargo ship during its 76-mile transit up the Mississippi River-Gulf Outlet channel into New Orleans. Accelerating the vessel to high speed within roughly one mile of the locks, it would easily ram through the steel gates and concrete levee abutments to cause a massive breach. Flooding of downtown New Orleans would take more than a week and would likely be less severe than that produced by Hurricane Katrina’s surge. Nonetheless, it would cause damage measured in tens of billions of dollars. There would be relatively few casualties because people living in the area would have time to flee.

Other successful attacks might be performed by ramming large river ships or barges into Mississippi levees near Cairo, Kentucky, near Commerce, Missouri, or near Memphis, Tennessee where miles of earth-fill levees constrain the river’s flow. Finally, Sacramento-San Joaquin River levees would be good targets and the Oswego-Erie Canal network has a series of locks (three within one mile) near Troy, New York. If they were destroyed, local areas would flood and shipping would be stopped from moving into the Hudson River.
7.3 Feasibility of Attack

Although terrorists can easily obtain access to many vulnerable levees and canal locks in the United States, destruction by explosive means would involve very large charges and would not be considered practical. Terrorists could board and capture an ocean-going liner or cargo ship; with good timing, they could ram and destroy canal locks. The ability to breach levees to cause flooding could result in extensive damage but it would take days to be accomplished and casualties would be low. Flooding damage might be prevented by rapid, extraordinary efforts to block or divert water flows.

8. Contamination, Poisoning, and Breaking

8.1 Descriptions of Concepts

This ‘catch-all’ title covers a variety of unique damage mechanisms that do not fit neatly in the above categories. Examples of four effective mechanisms are identified as follows:

- Short-circuiting electric power transmission lines to cause wide area blackouts.
- Destroying oil and gas pipelines to prevent fuel distribution.
- Igniting underground fuel-air explosives to destroy transportation/infrastructure.
- Contaminating aqueducts to destroy potable water supplies.

(These examples were presented first at a workshop on “economic terrorism” organized for the Advanced Systems and Concepts Office and held at Science Applications International Corporation in McLean, VA, on January 5-6, 2006).58

Short-Circuiting Electric Power Elements

Electric power transmission lines and switch stations are particularly vulnerable to short-circuiting attacks. Because electric power is essential to modern industrial societies and cannot be stored, it was a primary target for Allied bombing in Germany and Japan during World War II and a major focus of resistance fighters and insurgent campaigns. Initial air strikes in Desert Storm bombing attacks (January 16, 1991) and in the Persian Gulf War (March 19, 2003) included U.S. and Coalition bombing of Iraqi electrical power plants and distribution substations.

A campaign to black out large regions of the United States by repeatedly attacking power lines and transformer-switchyards has appeal to terrorists because it would be relatively easy to accomplish, immediately visible, effective, and would pose low risk to attacking personnel. Within a few days, food supplies in cities suffer from refrigeration failures, hospitals/ emergency care facilities expend backup generation capabilities, electric-powered transportation fails, and communication networks shut down. To illustrate the vulnerability of power lines, the California Department of Forestry reported that from 2000 to 2005, three percent of forest and wildfires were started by shorted power.60 During early December 2006, several northern states reported local blackouts caused by ice-laden power lines that short-circuited.

Two illustrative concepts for performing power line attacks have been suggested. The first is to fly over the lines in open-country with helicopters or light aircraft and drop copper
or steel cables (like trailing banners) to snag and short adjacent lines. Individual cables about 25 feet long and fitted with crooked tail hooks would snag upper transmission lines to fall across lower lines. They would be let out of the aircraft on nylon ropes to insure that the plane and its operators are not electrocuted and they would be released upon contact with the transmission lines. This permits the aircraft to fly on to another remote target and attack at many different locations in a short period (minutes to hours) in difficult to reach and repair terrains.

A second concept is to employ “Line Throwing Rockets or Mortars,” to fire light nylon lines over the power-lines. Speedline 250 or Mossberg shotgun line throwers weigh about 12.4 pounds and can fire lines to 700 feet. The lines would be used by terrorists on the ground to pull heavier metal cables over the power lines to cause a short. Terrorists could reach their targets on foot or by off-road motorcycles. They would also have the option of placing small explosive charges to topple power-line towers. Either of these concepts could be accomplished by small teams (3-4 terrorists), purchasing cables at local hardware stores, adding tail grappling hooks, and leasing aircraft or motorcycles for conducting the attacks. Several cells of terrorists (about 20 personnel) could perform simultaneous attacks in different regions of the United States to virtually shut down the nation’s power system since there would be few backup supplies available from other regions.

In terms of effectiveness, it is instructive to review results of some accidental power failures. The Northeast region of the United States has suffered four major blackouts during the past 40 years.

- **November 9, 1965**: A series of power failures lasting up to 13.5 hours left 30 million people in seven states and two Canadian provinces (over 80,000 square miles) without electricity. The accident was attributed to minor line disturbances, slow automatic circuit breakers, and weak control against power surges.
- **July 13, 1977**: Four successive lightening strikes in New York hit transmission towers and initiated a shutdown that blacked out five boroughs of New York City at 8:37 p.m. In addition to shutting down all city airports and subway functions, a crime wave broke out by midnight. Power was restored the following morning.
- **September 11, 2001**: Terrorist attacks on the World Trade Center cut transmission lines from substations on lower Manhattan island. It took 700 electrical workers almost a full day to restore power to the lower half of the city, restoring subways, building elevators, and industrial functions.
- **August 15, 2003**: A transmission line outage caused an eight-state blackout that extended from the Great Lakes, south to Ohio, north to Ottawa, west to Michigan, and east to Massachusetts. It lasted two days and shut down many large cities (Cleveland in particular) and trapped 350,000 people in New York’s Metropolitan subway system.

Transmission lines from Niagara Falls, Indian Point (nuclear plant), and ConEdison plants on Long Island crisscross New York. They could be attacked to initiate blackouts over the region. Similar networks exist in southern California where San Onofry (nuclear plant) lines feed power to Los Angeles and San Diego. California Edison and San Diego Gas & Electric plants in El Segundo, Long Beach, and Encinitas supply power to a network extending from...
Los Angeles to San Diego. Lines from Boulder Dam and Four-Corners thermal power plants deliver power to Las Vegas, Los Angeles, San Diego, and most of Arizona. In the Columbia River basin, high-power lines from 18 dams along the Columbia and Snake Rivers deliver power from 55 hydroelectric plants to the states of Washington and Oregon. The industrial region between Chicago and Detroit is powered by lines from Chicago Electric, Detroit Edison, Indiana-Michigan, and First Energy power plants.

The physical damage resulting from any one of these attacks would be limited (i.e., downed power lines, shorted switches, transformers, and generators). Past experience also shows the ability of the public and the economy to bounce back from isolated blackouts. By contrast, a campaign of repeated attacks over a period of months could have a devastating impact on the economy. A campaign of this type has been in progress by insurgents in Iraq from May 2003 through 2006. Attacks against power transmission and substations have destroyed confidence in Iraqi utilities and the government, required expensive repairs, and caused extensive downtimes for generating plants and electricity-dependent industries. The campaign motivated security monitoring including patrolling of lines. It would be extremely expensive for United States power companies or the government to initiate security protection for transmission lines and virtually impossible to prevent attacks.

Destroying Oil and Gas Pipelines

Small explosive charges (e.g., a few sticks of dynamite) placed under a crude oil, gasoline, or natural gas pipeline can cut the distribution system, initiate large secondary explosions, and fuel fires that require shutting down the lines. In Iraq, between May 2003 and mid-2006, insurgents conducted at least 313 attacks against the oil production and refining industry. Of these attacks, 264 (approximately 80 percent) focused on destroying pipelines. Pipelines were chosen as targets because of their easy access and vulnerability to small bombs (used in 89 percent of attacks) or bonfires (used in 6.2 percent of attacks), while only 4.8 percent were interdicted.59

United States Gulf Coast offshore oil and gas platforms produce roughly one-quarter of total crude oil and natural gas consumed in the country. Port Fourchon, Louisiana terminal on Grand Isle handles most of this production and pipes it across a two-lane causeway to mainland refineries.63 Similarly, Long Beach, California is the major oil and gas-shipping terminal serving the West Coast. Its nearby Wilmington and Torrance oil fields plus tankers from Valdez, Alaska unload products at San Pedro Harbor for local refineries. The North Slope to Valdez pipeline is 800 miles long, exposed over remote terrain. Eastport, Maine is the closest entry port for oil and gas from the North Sea and Europe headed for the Canadian pipeline. Texas Eastern Transmission and Transcontinental Corporation operate 24- and 36-inch pipelines in a 4,300-mile network that supplies fuel from the Texas panhandle to New York, New Jersey, Delaware, and North Carolina. National Fuel Gas and Trans-Canada Corporation operate a 215-mile 30-inch pipeline along the shores of Lake Erie to Kirkwall (Ontario). Finally, ConocoPhilips Corporation is building a huge distribution center at Freeport (Texas) to handle 1.5 billion cubic feet of gas per day (3 percent of the United States capacity).58 Consequently, there are several attractive pipeline targets, all of which have exposed sections in rural areas or crossing rivers.
An alternative and more insidious form of attack could be made against gas pipelines. Specifically, terrorists could tap into the lines at remote locations and covertly inject toxic gas under pressure (e.g., hydrogen cyanide, Ricin, sarin, CO, or building fumigants) to contaminate the fuel. Although most contaminants would be destroyed during burning, the presence of poisons would be detected. This could cause casualties among workers and household users, thereby, terrorizing the wider public. Potential impacts would be the need to shut down the pipeline, clean, repair, and monitor its operation. It would mean loss of residential heating, hot water, and cooking (50.3 percent of users) and shut down of electric power plants and industrial facilities (31.8 percent of users). This form of attack would require a team of terrorists (10 or more personnel) with laboratory capability to produce large quantities of toxic gases to be stored in pressure tanks. Because contaminating gas must be fed into a pipeline under pressure over a period of hours, the covert tapping of pipes would require expertise and a hidden work location (perhaps an underground tunnel leading to the line). Infrastructure damage from this concept would be minor and could be repaired in one or two days.

**Underground Fuel-Air Explosives**

Accidents involving methane gas explosions in coal and other underground mines are a common cause of casualties, damage, and loss of production in many countries. A more interesting possibility is the detonation of gases in urban facilities such as sewers, subways, utility tunnels, or parking garages. Three examples illustrate the potential for this type of attack:

- **Guadalajara (Mexico) Sewer Explosion (April 22, 1992):** Five miles of city streets were blown up and cratered (15 to 50 feet deep) by a hexane gas leak into the sewer system. The gas from Aceutera la Central (a cooking oil processor) mixed with thousands of gallons of leaked gasoline from a local Pemex station. The explosion destroyed 20 to 25 city blocks, flattened 1,422 houses, 452 businesses, damaged 600 vehicles, killed 163, and injured 1,470 people. It took three days for firefighters to rescue the injured due to 15 continuing blasts from pockets of gas.

- **Louisville (Kentucky) Sewer Explosion (February 13, 1981):** Hexane gas was accidentally dumped into the sewer system the afternoon before this explosion by a Ralston-Purina plant that used it for processing soybeans. The dumping was reported to the city at 1:30 p.m. and was estimated to be 150-200 gallons. Vapors from a sewer manhole were accidentally ignited at 5:16 a.m. the next morning by a hot automobile muffler. Secondary blasts occurred three hours later and cratered 10 city blocks. Craters were 10 to 13 feet deep and many homes were hit by flying debris. Police and firemen evacuated the people from 15 city blocks.

These accidents show that terrorists could expel relatively small quantities of methane, hexane, acetylene, or other explosive gases into subway or utility tunnels, detonate them as a fuel-air explosive, and cause significant infrastructure damage and casualties. The gases can be obtained commercially for construction and fuel purposes and would not be difficult to deliver into vulnerable facilities. A few-man team could perform attacks of this type with little training and at minimal cost.
Contamination of Potable Water Aqueducts

Water is a critical commodity in many regions of the country where agriculture is the primary industry and in the Southwest, where arid conditions limit population and industrial capabilities. Several important aqueduct systems have been built to deliver water to these regions over long distances from rivers and lakes to city reservoirs and irrigation storage facilities. Although high explosives could be used to crater aqueducts, it would take large quantities (tons) to breach wide concrete-lined channels and canals. Careful surveying and observation would be needed to locate accessible segments of the aqueducts and segments where a breach would leak or drain by gravity. Furthermore, a breach would only stop the flow of water for a short period (a week or two) until earth moving equipment would be brought to expedite damage repairs. During this period, farmers and city users could sustain their operations by drawing on reservoirs and stored supplies.

By contrast, contamination of the aqueduct channel with toxic or poisonous chemicals would require that the channel be closed, cleaned, bulldozed, or rebuilt to clear it for further use. This is a process that might take months to a year, exceeding the times covered by stored water. Water treatment plants that normally filter water before delivery to users would have to clean their equipment (pumps, pipes, valves, and storage) to remove contamination. However, terrorists would need large quantities of poisonous materials to effectively accomplish such an attack. To their advantage, they could steal tons of soluble, lethal, poisonous waste from western and northern mining operations.

Hydrogen Cyanide, which is acutely toxic to humans and in a gaseous form can kill people with exposure levels of 100-300 parts per million, is one example. When consumed in water, cyanide accumulates in the body and kills at low dose levels. The acid is used by gold mining companies to dissolve particles of gold from crushed rock or soil. Usually, mining companies set up large wastewater holding ponds (some of which cover 60 acres) lined with plastic membranes to catch the poisoned debris. Although a few companies have installed expensive cyanide recovery systems to treat the waste, many let the ponds stand for months or years without treatment. Example mines that have developed and use cyanide leach ponds are:

- Victorville and Battle Mountain Gold Mines, Colorado.
- Pegasus Gold Mining of Canada: contaminated Fort Belknap, Little Rocky Mountain, Montana.
- Summitville Gold Mine: killed all aquatic life along 17 miles of the Alamosa River in the San Juan Mountains of southwestern Colorado.

Many different specific attack modes are conceivable, all of which would entail covertly acquiring the liquid waste, transporting it, and then dumping it. Over a period of weeks, terrorists could deliver tens of thousands of gallons of poisonous liquid waste to an aqueduct - all under the cover of being maintenance personnel.
There are a number of aqueducts and canals in the United States that would be vulnerable to this form of attack.58

- **Colorado River Aqueduct:** This channel begins at Parker Dam on the Arizona/California border and carries drinking water 242 miles to Los Angeles.
- **Central Arizona Project Aqueduct:** This system runs 336 miles from Lake Havasu to Tucson, Arizona to irrigate Indian and private agriculture lands.
- **California Aqueduct:** This channel runs from the Sacramento River Delta to Tehapachi Mountain, 444 miles to irrigate the California Central Valley.
- **Los Angeles Aqueduct:** This system delivers 430 million gallons of water per day from Owens River 263 miles to San Fernando Valley and Los Angeles reservoirs.
- **Hetch Hetchy Aqueduct:** This system starts in Yosemite National Park and delivers water 167 miles to San Francisco and bay area reservoirs.
- **All American Canal:** This earth-fill canal runs from the Colorado River along the Mexican border through Yuma and Mexicali to San Diego and Los Angeles.
- Several smaller and older aqueducts exist in New York and other states. None of the waterways appear to be protected by more than fenced sections for safety purposes and there are no reported monitoring systems or patrols on any of them.

As an example attack, consider the Los Angeles Aqueduct, which runs southwest through desert terrain near Tehapachi to Santa Calrita and pumps water over hills on a cascading waterfall into San Fernando Valley. This aqueduct crosses under State Route 138 near Fairmont, an improved road at Lake Hughes, and parallels the road for 13 miles into Santa Calrita. A team of 4 or 5 terrorists could rent a rural farm in the vicinity of Palmdale where they could operate a 6,000-gallon tank truck. Three men could drive to a mine in Colorado, fill the tank with liquid waste, and return to Palmdale over a long weekend. From their safe house, they could deliver the contaminated liquid to the aqueduct in a single night and prepare to repeat the operation the following week. The contamination would affect the drinking water for the San Fernando Valley (population of 1.7 million in 2000) and northern Los Angeles.

### 8.2 Feasibility of Attack

All of these concepts are feasible and could cause considerable economic impacts. However, electric power blackout attacks would be the easiest to implement and repeat. They also would have the most visible impact over large regions of the country. The attack damage would be relatively easy and quick to repair and restore to operation.

In terms of shutting down industry and transportation, attacks to cut oil and gas pipelines would probably have the greatest impact, provided the campaign continues for a few months (beyond the capacity of stored fuels). Similarly, underground gas explosions may cause significant infrastructure damage and casualties, provided that they are focused on large city subway systems (e.g., Metropolitan Transit System in New York City or BART in San Francisco). But terrorists would find it more difficult to implement these attacks since transportation tunnel systems require large quantities of gas and access may be monitored by control center cameras and/or security patrols.
The contamination of potable water supplies would be easy to implement and could cause some casualties, evacuation of vulnerable population centers, and enormous costs for clean up. There are no apparent security precautions (except safety fences) along most waterways or at chemical waste product dumps. This concept might require weeks or months to achieve its impacts and it only applies to selected geographic regions. Stopping such attacks would be relatively straightforward with increased security monitoring and patrols along waterways and at dump sites.

9. **Analysis of Results and Conclusions**

9.1 **Analysis Methodology**

By way of conclusion, this section evaluates the seven generic weapon mechanisms and candidate target options to achieve mass effects by applying the seven measures of effectiveness (a through g) presented in Subsection 1.2. Because several measures require judgment, the analysis that follows illustrates the procedure by assigning scores on a scale of ten points (0 low to 10 high) to each element of the matrix. The judgmental evaluations are repeated for each candidate target option, taking into account the specific damage mechanisms and target vulnerabilities of that form of attack. What follows is not intended to be definitive; it does suggest, however, some broad conclusions about the most threatening pathways that next generation terrorists might pursue in seeking to carry out mass effects attacks.

In doing the evaluation, the perspective taken is that of the terrorist planner - with the assumption that the selected attack mechanisms, methods of delivery, and target damage plus casualties are successfully carried out. In this respect, the terrorist must be optimistic about his plans and expected success. Each matrix element assumes as well a single attack against the candidate target type. Although the evaluation presented below reflects the author’s experience, readers are encouraged to fill out or modify the matrix in accordance with their own judgments. Previous applications of this technique have proven sufficiently accurate to accomplish three objectives:

- Identify the most interesting concepts, including their relative ranking.
- Identify the least likely concepts, including their primary failings.
- Identify concepts that may be interesting provided they can be repeated with confidence during a campaign.

The results of the author’s evaluation are presented in Table 2.5.4. Scores for the individual measures are combined in the far right hand column (Total Score) as though each measure were equally important. In fact, this is rarely the case! Most terrorist organizations are likely to place greater emphasis on one or more of the measures (e.g., fatalities and injured, value destroyed, or functional downtime) in which case, scores of selected columns in the matrix can be multiplied by appropriate weighting factors. However, for this presentation, each measure is treated as equally important. Because there are seven measures, a perfect weapon mechanism and target set can achieve a maximum score of 70 points.
Table 2.5.4: Assessment of Weapons of Mass Effects Matrix

To ensure consistent results, the author has found it useful to evaluate the matrix by working down the measure columns one-at-a-time, making sure that each target type is judged the same except for changes due to weapon mechanisms since some targets are vulnerable to more than one mechanism. Realism of the results can be compared by reviewing the Total Scores at the end of the target rows.

9.2 Analysis Results

Table 2.5.4 above reveals several interesting and expected results. There are 26 different weapon mechanism and target sets. If one focuses on the top third of the cases (scores of 57 down to 41 total points), they are summarized in rank order in Table 2.5.5. These cases are the most likely to qualify as mass effects.
The number one target rank is nuclear power plants, laboratories, and volatile chemical plants. This is because the potential for causing extensive, costly, and long-term damage is highest, particularly if radiation, nitrates, or toxic chemicals are released by secondary explosions. Attacks on these industries are ranked high in terms of spreading terror and public panic. Nuclear power plants instill visions of Three Mile Island and Chernobyl Power Plant disasters. However, because they are difficult to penetrate, they score low in terms of ease of operations.

The second most important observation is that kinetic energy represents a significant mechanism (three of the top eight cases). Large hijacked aircraft used to impact and cause fuel fires on targets represents a major threat for Target Types 2, 3, and 5.

Incendiary attacks such as forest fires and destruction of volatile chemical plants score high as well. This is because of the weapon’s low acquisition cost, easy operations, and high value of targets destroyed.

Finally, contamination of aqueducts scored high for three reasons: their downtime is long compared to the supplies and demands for water; they cover or affect large areas; and they are easy to approach with relatively low risks.

Next, consider the lowest third of the cases evaluated in Table 2.5.4 (scores of 16 up to 25 total points). They are ranked in reverse order (last to higher) in Table 2.5.6 below. In general, these targets and selected attack mechanisms scored low for multiple reasons. A few important conclusions can be reached. Three cases involving use of toxic gas and three involving biological agents were in the bottom eight cases. Typically, terrorists do not like to handle complicated, hazardous, high risk-of-failure mechanisms or ones that take long times to obtain results (e.g., biological). As expected, there is not much difference in attacking large office buildings or cruise ships with biological agents or toxic gases. The concepts of flooding rural areas or setting fires to relatively small lumberyards or sawmills are probably too low in damage and value to be classified as mass effects.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Primary Target Types</th>
<th>Selected Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nuclear power plants, laboratories, volatile chemicals</td>
<td>Explosives</td>
</tr>
<tr>
<td>2</td>
<td>Large sports arenas, stadiums, and convention centers</td>
<td>Kinetic Energy</td>
</tr>
<tr>
<td>3</td>
<td>Large office buildings</td>
<td>Kinetic Energy</td>
</tr>
<tr>
<td>4</td>
<td>Extensive forest fires</td>
<td>Incendiary</td>
</tr>
<tr>
<td>5</td>
<td>Large transportation bridges</td>
<td>Kinetic Energy</td>
</tr>
<tr>
<td>6</td>
<td>Potable water aqueducts</td>
<td>Contamination</td>
</tr>
<tr>
<td>7</td>
<td>Chemical plants (paints, alcohol, ethanol)</td>
<td>Explosives</td>
</tr>
<tr>
<td>8</td>
<td>Chemical plants (paints, alcohol, ethanol)</td>
<td>Incendiary</td>
</tr>
</tbody>
</table>

Table 2.5.5: Top Eight Ranked Weapon Mechanisms and Target Types
<table>
<thead>
<tr>
<th>Rank</th>
<th>Primary Target Types</th>
<th>Selected Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Subway tunnels</td>
<td>Toxic Gases</td>
</tr>
<tr>
<td>25</td>
<td>Cruise ships</td>
<td>Biological</td>
</tr>
<tr>
<td>24</td>
<td>Large office buildings</td>
<td>Biological</td>
</tr>
<tr>
<td>23</td>
<td>Large office buildings</td>
<td>Toxic Gases</td>
</tr>
<tr>
<td>22</td>
<td>Electric power lines</td>
<td>Short Circuiting</td>
</tr>
<tr>
<td>21</td>
<td>Rural farmland areas</td>
<td>Flooding</td>
</tr>
<tr>
<td>20</td>
<td>Fish habitats</td>
<td>Biological</td>
</tr>
<tr>
<td>19</td>
<td>Lumberyards and sawmills</td>
<td>Incendiary</td>
</tr>
</tbody>
</table>

Table 2.5.6: Lowest Ranked Weapon Mechanisms and Target Types (reverse order)

To sum up, the cases of Table 5 represent the most important for further study and analysis of mass effects. The middle ten cases in Table 4 (total scores between 25 and 41 points) were closely grouped and could deserve further study and evaluation. Four target sets (oil/gas pipelines attacked by explosives or fires, poultry farms and crop fields attacked by biological agents, and cutting of electric power lines) become particularly interesting if a campaign of multiple attacks can be sustained. Cutting electric power lines and oil/gas pipelines are easy to destroy, low risk, and can be repeated with a high degree of success. They may be preferred over single, more damaging attacks.

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Section 2:
DYNAMICS OF NEXT GENERATION WMD and WME TERRORISM

PART 6
MASS EFFECTS NETWORK ATTACKS:
A SAFE AND EFFICIENT TERRORIST STRATEGY

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SAIC Consultant

1 Introduction

The current Internet offers what seems to be an endlessly rich assortment of socially and economically useful functionalities. Individual email for personal, business, and professional purposes; a plethora of information as text, images, voice, and video; direct delivery of software goods and of physical goods through overnight delivery networks; and rapid transfer of information, both off-line and in real-time to support collaboration among disparate groups.

Attacks on this information and communication network occur, including information theft, fraud, identity appropriation, spyware, junk mail, denial of service, destruction of files, stalking, and the like. Efforts are underway by hardware and software providers, law enforcement agencies, national security forces, private and organizational managers, and international organizations to limit or eliminate the worst effects of these attacks, though the best one can expect in such a socially and technically dynamic environment is a shifting balance between white hats and black hats.

Although the following paper briefly reviews the current state of network attacks, it is the future network environment, both offensive and defensive that is the focus here. While the future will, in the natural course of events, be “more of the same,” it will, as importantly, be more of what is different. As Niels Bohr noted, “Prediction is very difficult, especially about the future;” or as Yogi Berra commented, “The future ain’t what it used to be.” Despite these warnings, this paper looks fifteen years ahead. While fifteen years is a large number of information technology generations, typically measured in 18 month increments, it is bounded and is less than a human generation. So many of the ideas that will eventually mature are “in the air.” In addition, most of the users in the future period under consideration are alive today learning and doing much of what they will do in the future.

The analysis consists of three steps. The first, and simplest, part is to collect ideas relating to the future state of network technologies and functionalities and to project trends observed among network users to see how new technology may be used and, more to the point, misused. The second step is to identify a small number of possible attacks, enabled under future network environments, which have the potential for producing mass effects. Complementing this perspective of the offense, the third section outlines various kinds of defender responses.
Network vulnerabilities and their consequences have been studied since the first development of network technology by the Department of Defense. In the vastly simpler days of the ARPANET, when links were few and nodes were trusted, the concern was reading or changing packets in transit, and NSA was eventually convinced to apply its talents to link encryption. Perhaps the first public policy discussion of network vulnerabilities was that which led to the formation of the President’s Commission on Critical Infrastructure Protection in 1996. The author’s own work has explored a number of dimensions of the problem, and those papers reference supporting work. In view of the extensive literature bearing on the present subject, there will be no attempt to provide an extensive literature survey.

2. Current Network Technical Environment

The proper starting point for discussing the future is the present, to look at absolute numbers and growth rates. A previous discussion of what “next generation” means in terms of terrorism suggested that fifteen years is a reasonable estimate, a period when the number of terrorist groups can be expected to increase by about a factor of three. Consider first hosts on the Internet. To an attacker these are both targets and weapon launch points.

Figure 2.6.1 shows the number of hosts starting in 1994, when the number of computers on the net was effectively zero (in fact, it was a few million, but so few hosts did not constitute an attractive target set to an attacker. In 1988, the start of public Internet service, the number of computers was even less, 60,000.) By January 2006 the number was about 450 million. To put this number into perspective, the current world population is 6.5 billion, so the number of hosts per capita is about 14. This underestimates the number of computers, however, since each host can have further computers and users behind it.

Note that the number of hosts appears to be increasing exponentially, with an e-folding time of about 3.5 yr. Unless the host count saturates, and later discussion suggests this will not soon be the case, 15 years represents about four such periods, or an increase by about a factor of 30–40.

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4 See www.isc.org.
Another measure of growth is the count of web sites shown in Figure 2.6.2. The number of sites doubled since May 2004 to a total of 100 million, roughly the same growth rate as for hosts. This growth has been driven by the availability of low-cost software and hosting services for creating sites and blogs. It has been estimated that in April 2005 there were 50 million blogs, though this number is quite uncertain. The referenced source of the number estimates that half of them may in fact have been abandoned, and that some people set up multiple blogs.

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Blogs can be viewed as a measure of potential cyber attackers: people who have technical capability, are on the web, and are sufficiently devoted to a cause to take the time to communicate their views. Not all of them will transition to attackers, an issue addressed later. And, of course, attackers are not necessarily bloggers. But by advertising their views, they provide leads for recruiters. Blogs also provide an easy way to communicate with fellow terrorists, either through coded messages or steganography.

Another measure of attackers is to look at the number of attacks. Figure 2.6.3 presents the number of incidents brought to the attention of the CMU CERT Coordination Center from its inception, triggered by the Morris worm, through 2003. Incident reporting was terminated at the end of 2003 because as the site notes, “Given the widespread use of automated attack tools, attacks against Internet-connected systems have become so commonplace that counts of the number of incidents reported provide little information with regard to assessing the scope and impact of attacks. Therefore, as of 2004, we will no longer publish the number of incidents reported. Instead, we will be working with others in the community to develop and report on more meaningful metrics.”

The richness of cyber attacks is illustrated by two taxonomies of attacks. One such taxonomy, used by Endeavor Security, Inc., characterizes attacks in terms of twelve types:

- **Root Level Exploit** - A root level exploit alarm is associated with attacks that have the capability of gaining the highest level access of the system.
- **Exploit Check** - Exploit checks are attacks that check to see if a system has a given exploit potential. These attacks by themselves do not exploit the system but require a follow-on attack.
- **Worms and Viruses** - These communications are associated directly with inserting worms and viruses.

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7 See [www.cert.org](http://www.cert.org).
User Level Exploit - User level exploits allow an attacker to gain minimal level of access (or increased level) to the system. They do not, however, grant complete access to the system.

Backdoor Check - These communications are designed to check for a backdoor. This can be part of an attack, or the attacker could be looking for a well known backdoor that might have been part of someone else's attack.

Policy - Activity is not consistent with good security practices.

Discovery - Communications are used to discover systems, services and applications. These intrusions are a first step in determining how a system can be attacked.

Suspicious - Activity is normally associated with malicious or policy violations, but has a degree of false positives not meeting FirstLight (the Endeavor Security reporting system) standards.

Decoy - Normal activity. Signatures are not to be used for intrusion detection systems, firewalls, or IPS.

Denial of Service - Attacks intended to disable normal service by consuming too much system resource.

Component - This is a part of an attack, but whose purpose has not been established. Most notable of this type is shellcode.

No Data - The attack packet had no data. This likely indicates a negotiation packet. 8

Endeavor Security maintains a worldwide network of roughly 25 sensors located outside client networks. It monitors the flow of packets in real-time and compares it with its library of attack signatures. In those cases where the packet stream is positively identified as an attack, the target computer is able to take appropriate action. The sensor also passes to the Endeavor Security analysis center all attack packets, the knowns for ongoing analysis and the unknowns for reduction to a signature. Attacks directed to a client machine, i.e. they contain the machine's IP address, tend to be unknown and thus are a particularly useful source of material for the discovery of new types of attacks.

The numbers of attacks of the most serious kinds recorded by Endeavor Security on its network of deployed sensors for October 2006 are shown in Table 2.6.1:

<table>
<thead>
<tr>
<th>Type of Attack</th>
<th>Number</th>
<th>Percentage of All Recorded Attacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root level exploit</td>
<td>37</td>
<td>3.3</td>
</tr>
<tr>
<td>Exploit check</td>
<td>45</td>
<td>4.0</td>
</tr>
<tr>
<td>Worms and viruses</td>
<td>80</td>
<td>7.2</td>
</tr>
<tr>
<td>Backdoor check</td>
<td>53</td>
<td>4.8</td>
</tr>
<tr>
<td>Discovery</td>
<td>145</td>
<td>13.0</td>
</tr>
<tr>
<td>Denial of service</td>
<td>28</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Table 2.6.1: Serious Attacks for October 2006

8 This copyright material, going back to the data for Oct 2006, is taken from www.endeavorsecurity.com and is used with permission.
The US-CERT, a partnership between the Department of Homeland Security and the public and private sectors, uses a less informative taxonomy. As shown in Table 2.6.2, for the 3Q06, their center reported the following:

<table>
<thead>
<tr>
<th>Type of Incident</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unauthorized access</td>
<td>3.6</td>
</tr>
<tr>
<td>Denial of service</td>
<td>0.1</td>
</tr>
<tr>
<td>Malicious code</td>
<td>4.1</td>
</tr>
<tr>
<td>Improper usage</td>
<td>2.0</td>
</tr>
<tr>
<td>Scans/probes/attempted access</td>
<td>86.6</td>
</tr>
<tr>
<td>Under investigation</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Table 2.6.2: US-CERT Reporting

Next consider attacker weapons. Computer security organizations develop databases of attack signatures for use in recognizing attacks. For example, Endeavor Security has developed over 6,400 such signatures. These are detailed descriptions of what the attack consists of and what it can accomplish if successful. A summary of one, for example, an attack that exploits a flaw in the Microsoft SQL database query program, is:

- MSSQL.HELLO.OVERFLOW.A.EXPLOIT: The Microsoft SQL Server 2000 login mechanism is vulnerable buffer overflow exploits. Exploits can execute code within the MSSQL service security context.

This attack was first detected and characterized on August 17, 2005. It is seen by their sensor network over 230,000 times per week. Another is:

- SMB.SMBSERVER-WILD.PADDED.POLICY: An SMB wildcard packet is sometimes padded. This packet aids a system in determining the name of the other system without authentication.

First seen on November 23, 2006, it is seen at a weekly rate of over 95,000. While the various data sets differ somewhat since they are based on different sensor networks, the point is that entering computer systems and networks is an active feature of the Internet.

But, one asks, how successful are these attacks. For this consider the US-CERT database of system vulnerabilities. A count of vulnerabilities for all vendors, all products, having high and medium severity, and any type of exploit, whether launched remotely, locally, or required the target to have accessed the attackers resource is shown in Figure 2.6.4[a]. Figure 2.6.4[b] shows the number meeting those conditions as a percent of the total recorded. The difference is the vulnerabilities assessed as low severity.
The geographical distribution of attackers is shown in Figures 2.6.5[a] [b] [c] for the origin of three types of current misuse: viruses, directory attacks on email servers to acquire subscriber data, and spam. The centers for virus production are the U.S., Western Europe, Russia, Iran, India, Thailand, Cambodia, (North) Vietnam, China, North and South Korea, and Japan. Server directory attacks show a similar pattern but now France, Spain, Egypt, Brazil appear. Spam shows the same pattern as directory attacks.

Figure 2.6.5[a]: Geographical Distribution of Sources of Virus Attacks

Figure 2.6.5[b]: Geographical Distribution of Sources of Mail Server Directory Attacks
While the user sees spam as simply an annoyance, it is included in this attack discussion since a common technique of spammers in sending out large numbers of email messages is to penetrate unprotected third-party computers (typically home computers) and use them as distributed points of origin. Such networks of hijacked computers are called zombie networks or botnets, often consisting of 100,000 such machines.

ShadowServer, an informal organization of computer security professionals is currently tracking over 400,000 infected machines. Sensor information collected by Support Intelligence estimates there are over 250,000 new botnet infections daily. It is estimated that 80% of all spam originates from botnets. It is also estimated that 90% of all email is spam, and that 400 is infected with a virus.

An example of the rapid growth of a botworm is illustrated by the case of Big Yellow, detected on December 7, 2006 as an exploitation of a Symantec vulnerability. Its daily rate of appearance on the Endeavor Security sensor network is shown in Figure 2.6.6, along with an earlier, and still active, worm ANS-1/9988.

Thus the data indicate that the current Internet provides abundant targets; that attacks on systems are frequent; that attackers do not lack for weapons; and that their targets have abundant vulnerabilities.

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11 In a conversation with a “white hat” hacker, he indicated that he had, in the course of his career thus far, penetrated roughly a thousand computer systems. When asked in how many cases had he failed, he responded, “Never.” In another discussion with computer security specialists, they noted that under present circumstances, tracking a computer attacker is virtually impossible unless the attacker makes a mistake or the defender has a stroke of luck.
It is prudent to adopt the position that at the current time any computer system connected to the Internet can be penetrated. Whether the efforts of computer security specialists will succeed in rendering networked machines invulnerable is an open question, but in view of the incredible complexity of the large software programs that control computers, it would seem that purely technical solutions cannot be expected within the next generation of terrorism. The widespread nature of such attacks suggests that there is no simple political or cultural characterization of attackers. What is does indicate is that cyber attacks are easy and provide a fruitful area of malicious activity.

Accompanying the growth of the Internet and the attacks on it is the development of networks used exclusively by U.S. (and presumably similar developments in other countries) military and intelligence agencies that contain sensitive national security information. These developments are frequently discussed under such rubrics as the Revolution in Military Affairs and Network-Centric Warfare. For example, in the United States much information relating to targeting, attack planning and execution, order of battle, tactical and strategic warning, situation awareness, etc. is transmitted via a classified Internet, SIPRNET (Secure IP Router Network.)

Such closed networks are, in principle, more secure than the open Internet. Users are vetted, there is heavy use of strong encryption, network discipline is defined and enforced by top-down security standards, there is heavy intrusion detection and auditing, etc. On the other hand, war-fighting inherently puts the people and systems involved in high risk.

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environments, and the networks are subject to intense interest both by theater-level opposing forces and by powerful sovereign states. Furthermore, if coalition warfare is to be possible, there must be some degree of sharing of information and provision for coalition partner access, all of which opens up such networks to a range of possible penetrations.

Thus the vulnerabilities of networks discussed earlier, and the levels of attack sophistication that can be brought to bear against them, apply just as much to the networks of military organizations as it does to non-military networks. The same drivers for networking are present for both: speed of transmission, efficiency, universality of access, sharing of information, coordination of distributed organizations, flexibility of use, and the ability to incorporate new technology. One should not be surprised that they have comparable vulnerabilities because they come from the same technology and vendor base, as that may be modulated by Defense Department management and its procurement processes.

3. Current Cyber Attackers

In light of the preceding discussion, the next step is to consider cyber attackers, their motivations, their training, and their career development. Data on the number of attackers and their characteristics are, by virtue of their stealth and anonymity, difficult to obtain. Nevertheless, there are some generally accepted views about them.

The life cycle of a cyber attacker (commonly called a hacker, although in the history of computer science, the earliest student hackers performed the important role of testing newly-developed university systems to reveal their flaws so they could be eliminated) starts when they are young, typically of high school age. These youngsters, long on enthusiasm and short on a sense of responsibility, attempt, often successfully, to break into computers. They do this for attention, achieving bragging rights among their peers. Intrusion tools available online make the exploits easier and hence more frequent. Not surprisingly, they are almost exclusively males. The break-in is the goal, not theft or pillaging. Data suggests that around age twenty they cease such exploits and go on to college, jobs, and family. The bulk of recorded attacks come from these people. They are not criminals nor are they terrorists.

The trends, in ease of attacking and the sophistication of attackers are illustrated by Figure 2.6.7.13

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13 While the content is self-referenced, the graphic is taken from a presentation by Henry Kluepfel on critical infrastructure protection, national security, and emergency preparedness, SAIC, 23 Jan 07
Thus not only do “harmless” hackers know how to get into systems, they have an attacker mentality if not a criminal intent. Some of them continue their exploits and become part of a small circle of accomplished malicious code writers. Now their exploits are measured not by computers broken into, but by the propagation rate of their malcode and the number of computers caused to malfunction. They are in a competition with commercial software vendors and system administrators to strike swiftly and disastrously before patches can be created, distributed, and installed (so-called “zero-day attacks.”).

So far this activity is, if not good clean fun, still not the stuff of economy-threatening attacks. There are, however, “graduates” of this teen-age hacking that become dedicated to the activity. Estimates are that there are 300–400 such malcode writers in the U.S., 1,000 in China, and a total of perhaps 10,000 worldwide. Some fraction of these people will move into criminal endeavors. Current examples are to break in to copy names, SSNs, and other personal information for resale to other criminals who mark them up for resale; or to break into accounts of massive multiplayer game players to get free play time, either for personal use or resale. The extent to which serious criminal groups have more ambitious aims is unknown.

One need not be a master craftsman to be a successful cyber attacker, any more than all scientists are Nobel Prize winners. Thus the pool of potential attackers is larger than 10,000.

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14 Private communication, Christopher Jordan and Barnaby Page, Endeavor Security, Inc., McLean, VA 21 December, 2006
What is more significant is that with the current emphasis in universities, government, and industry on computer security, we are teaching defenders about intrusion techniques in a catch-up mode. But teaching defense also teaches offense. So the pool of attackers is being rapidly expanded, not only from the young but from mid-career professionals as well.

Attackers are not born, they are trained. Young hackers largely train themselves, but capable students properly motivated will master the most demanding skills. There is a market for cyber attackers, and supply will increase to match demand. The rapid penetration of computer technology into all nations and all economic classes is also increasing the pool. Computer classrooms are commonly found in elementary schools, and efforts such as that led by the MIT Media Laboratory are introducing computers into the poorest nations. More often than not, young people are bright and inquisitive. However well-intended, one must recognize that a downside of such efforts will be to increase the number of young hackers and thus the pool from which eventually criminal and terrorist attackers will be drawn. If to a hammer every problem is a nail, to many of today’s young people every computer and every database is a challenge. Some will become professionals of one inclination or another.

Another factor that causes the pool of cyber attackers to grow is through the synergism of collaborative effort. Young hackers work alone, so they do not have to share credit with others. But criminal, and by extension, terrorist enterprises, encourage working together since the effort is on behalf of a larger cause (however much the individuals may want to differentiate themselves in the eyes of their leaders.)

It may be instructive to size the problem of the growing numbers of attackers by looking at statistics relating to the fraction of people in a group who resort to violent behavior. Two such examples are people who become terrorists and those who commit violent crimes. The table on the following page suggests that the percent of people electing illegal violence is of the order of 0.1%. The terrorist countries are a representative set currently experiencing terrorist activity. The violent crime statistics are for 2000, drawn from an EU report. Yellow shading indicates those countries where there are data for both terrorism and violent crime.

The two sets of data are not directly comparable but they serve to give an idea of the proclivity of people to move outside legal norms and to participate in violence. The terrorism numbers are admittedly uncertain estimates of group size, and not all these individuals will have personally committed, though they will have supported, violent acts. The violent crime numbers vary with individual national definitions of the term and suffer from variations in reporting rates. In the U.S., violent crime is defined as murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. Furthermore, because this data is a count of acts, not people, the numbers do not reflect the number of acts per individual and the number of individuals per act. The predominance of terrorism and crime varies. The terrorism participation rate is higher in Chechnya than it is for crime in Russia overall; in the U.K., Turkey, Japan, and Australia the crime rate is higher than the terrorism rate by an order of magnitude. See Table 2.6.3.

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16 See www.csdp.org/research/hosb1203.pdf.
Mass-Effect Network Attacks: A Safe and Efficient Terrorist Strategy

Table 2.6.3: Predominance of Terrorism and Crime

<table>
<thead>
<tr>
<th>Country</th>
<th>Terrorist Percent</th>
<th>Country</th>
<th>Violent Crime Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ivory Coast</td>
<td>1.23</td>
<td>Bulgaria</td>
<td>0.81</td>
</tr>
<tr>
<td>Liberia</td>
<td>0.73</td>
<td>Norway</td>
<td>0.45</td>
</tr>
<tr>
<td>Iraq (AQ only)</td>
<td>0.41</td>
<td>Hungary</td>
<td>0.29</td>
</tr>
<tr>
<td>Chechnya</td>
<td>0.28</td>
<td>Russia</td>
<td>0.065</td>
</tr>
<tr>
<td>Corsica (France)</td>
<td>0.24</td>
<td>France</td>
<td>0.40</td>
</tr>
<tr>
<td>Palestine</td>
<td>0.16</td>
<td>Denmark</td>
<td>0.28</td>
</tr>
<tr>
<td>U.K./Muslim</td>
<td>0.10</td>
<td>U.K.</td>
<td>1.29</td>
</tr>
<tr>
<td>U.K./Northern Ireland</td>
<td>0.08</td>
<td>U.S.</td>
<td>0.48</td>
</tr>
<tr>
<td>Columbia</td>
<td>0.06</td>
<td>Canada</td>
<td>0.91</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>0.06</td>
<td>Germany</td>
<td>0.23</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.04</td>
<td>Poland</td>
<td>0.22</td>
</tr>
<tr>
<td>Turkey</td>
<td>0.01</td>
<td>Turkey</td>
<td>0.11</td>
</tr>
<tr>
<td>Algeria</td>
<td>0.01</td>
<td>Portugal</td>
<td>0.19</td>
</tr>
<tr>
<td>Pakistan</td>
<td>0.01</td>
<td>Italy</td>
<td>0.18</td>
</tr>
<tr>
<td>Japan</td>
<td>0.004</td>
<td>Japan</td>
<td>0.063</td>
</tr>
<tr>
<td>Peru</td>
<td>0.002</td>
<td>Greece</td>
<td>0.085</td>
</tr>
<tr>
<td>Australia</td>
<td>0.0001</td>
<td>Australia</td>
<td>0.89</td>
</tr>
</tbody>
</table>

Destructive cyber attacks, being less directly violent and considerably safer to the perpetrator, may appeal to a larger fraction of the population. On the other hand, attacks aimed at death and destruction may require the same mindset as more directly violent acts.

The growth of cyber-crime provides further grounds for concern over more destructive cyber acts in the future. The following excerpts are taken from a recent interview with Karel Obluk, Chief Technology Officer of the antivirus security firm Grisoft:17

Cybercrime and the criminals behind malware are getting more and more organized. They can afford to hire professionals, and it is becoming a business for many people.

Signs of the trend are obvious. The number of phishing sites used by online fraudsters jumped more than eight-fold year over year, according to the Antiphishing Working Group. The number of denial-of-service attacks doubled between January and June, according to Symantec, the owner of SecurityFocus. Mail service provider MessageLabs intercepted, on average, one targeted Trojan horse attack every day in 2006, up from one a week in 2005.

The trend is quickly making the de facto term for such code – malicious software or malware – a misnomer. The virus writers and spyware coders are not creating the

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code for malicious reasons but to make money illegally, making the term coined by
antivirus firms – crimeware – more appropriate.

For example, spammers are using botnets – large numbers of compromised
computers controlled by a single person – to help them send a greater volume of
messages. The development has increased the global volume of spam by at least a
third in the last six months, according to Symantec, though other firms put the
increase as high as 450 percent.

“This is their primary form of employment now – it’s a 9-to-5 job,” Oliver Friedrichs,
senior director for Symantec Security Response, said in a recent interview. “They are
not doing it on weekends, and they are not doing it during the summer months.”

Other cybercriminals are taking a more personal approach: Hijacking people's stock
accounts and using the access to drive up the price of certain thinly-traded penny
stocks has also become popular. Details of one scheme appeared in the court papers
filed by the U.S. Securities and Exchange Commission (SEC) in support of a civil
action against one apparent stock scammer. A Russian national allegedly used a
company registered in Belize and based in Estonia to execute trades in stock whose
prices had been manipulated by compromised accounts.

Another disturbing trend for the defenders also highlighted by Karel Obluk, aside from
the above attack statistics, is legal actions being taken against defenders.

The deluge of flaw reports put the topic of responsible disclosure back in the
limelight. Vendors and researchers debated the merits of paying bounties for
vulnerabilities, while some researchers attempted to auction off information about
previously undisclosed flaws. The prosecution of a security researcher that revealed a
flaw in the University of Southern California's online admissions Web database left
many flaw finders feeling uneasy. The researcher, Eric McCarty, eventually agreed to
plead guilty.

The bottom-line is that the number of capable cyber attackers will increase as the result of
several factors: increasing computer penetration into societies, criminal incentives to go after
easy pickings, and better training of defender turned attackers. There will also be many more
targets to attack and these, with their abundant software vulnerabilities, will provide increasing
better opportunities to strike at the heart of advanced societies.

If cyber attacks are such a serious threat, it is reasonable to ask why cyber disaster has not
already struck. Many “incidents,” some of considerable impact, have been noted: viruses and
worms, denial of service attacks, spyware, mass junk email, phishing, and identity theft. But
these are simply indicators of attack technology, not national security attacks on critical
economic functions. Figure 2.6.1 suggests why a “network 9/11” has not happened.

One key change was the development of browser technology, which after 1994 made it
simple to access virtually all computers and information via the Internet. Prior to that
development, there were sufficiently few targets on the Internet whose immobilization or
destruction could cause major economic damage – whether Internet service providers, email
service, e-commerce sites, on-line banking, corporate information and operational control
systems, etc. Since then, attackers of all stripes have been increasing in numbers and attacker tools have been increasing in power and sophistication.

During this same period since the mid-1990s, Jihadi terrorists have been doing quite well with conventional bomb and bullet attacks and have directed their innovation to broader sets of targets such as ships, aircraft, and the 9/11 attacks on signature buildings. Thus, the period of growth and increasing economic dependence on the Internet and the potential exploitation of its software vulnerabilities coincided with a period when al Qaeda, for one, has been quite successfully exploiting tools and personnel from its campaign in Afghanistan a decade earlier.

The post-9/11 terrorist organizational adaptation has resulted in its becoming more distributed, with less central management and more local initiative. In this environment the low cost opportunities that cyber attacks provide Jihadists to deal serious blows to any economy and population are unlikely to go unnoticed.\(^{18}\) While not to deny the continued utility of conventional bomb and bullet technology, in a distributed terrorist network open to local experimentation, cyber technology will be attractive, especially by the next generation of people raised on the Internet and whose activities were enumerated earlier.

We already see extensive use of the Internet among terrorist groups for communication, recruiting, training, and fund-raising. Given the extensive discussion of attack incidents and technology in western counter-terrorism, computer security, and infrastructure protection literature, the adoption of aggressive cyber attack modes is almost certain to be a self-fulfilling prophesy.\(^{19}\)

### 4. Cyber Battle in the Early 21st Century

If the language of targets, weapons, attackers, and defenders is too abstract, it may be instructive to recount the course of a battle waged in cyberspace May 1-20, 2006.\(^{20}\) The aggressor was PharmaMaster, one of the world’s top ten spammers selling generic (and fake) Viagra and other drugs and herbal preparations. PharmMaster operates through illegal botnets of hijacked computers to evade spam filters. Its revenue is proportional to the number of solicitations it sends.

The defender was an Israeli start-up, Blue Security, that provided anti-spam service to 450,000 customers. It operated a service, Blue Frog, consisting of a central database of spam filters used by its customers. Blue Security’s innovation was an automated opt-out feature. The U.S. CAN-SPAM Act of 2003 (Controlling the Assault of Non-Solicited Pornography and Marketing Act) establishes requirements for those who send commercial email, spells out penalties for spammers and companies whose products are advertised in spam if they violate

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\(^{18}\) On 29 Nov 06, the al-Fajr Media Center published the first issue of a new online magazine entitled “The Technical Mujahid.” The first issue contained articles on computer and Internet security, the GPS system, and PGP encryption software. See OSC report in Arabic 18 Dec 06, GMP20061218298002.

\(^{19}\) Rebecca Givner-Forbes in “To Discipline the Savage Cowboys: An Analysis of Weapons of Mass Destruction in Jihadist Primary Documents,” Terrorism Research Center Report, Dec 2006 notes public discussion of U.S. concerns are picked up by jihadists as weaknesses to exploit.

the law, and gives consumers the right to ask emailers to stop spamming them.\textsuperscript{21} Blue Security’s service had been quite successful. By April 2006, six of the top 10 spammers used the firm’s filtering service to remove Blue Security clients from their mailing lists. Since 90\% of email is spam, this meant that Blue Security had cut 25\% of such traffic to its customers. Clearly Blue Security was a strategic threat to PharmaMaster should its technology be widely adopted. A controversial feature of the Blue Security product was that it triggered the opt-out feature automatically. In so doing, it launched, in effect a denial-of-service (DoS) attack on the spammer, inundating the spammer with more opt-out email than its mail server could handle.

On May 1, 2006 PharmaMaster launched a preemptive attack (or counter-attack if one sees Blue Security as already having launched an attack). It targeted the Blue Security website and a subset of Blue Security’s customers with even more spam, a DoS attack. Collateral damage was sustained by Six Apart, a blog hosting service and several Internet service providers.

On May 2nd, public access to the Blue Security service ceased and Blue Security was put out of business temporarily. On the afternoon of May 2nd, Blue Security received a message from PharmaMaster that claimed it could block all Internet service to Blue Security through actions of a top-level ISP. Further, PharmaMaster threatened to widen its DoS attacks on more Blue Security customers. When Blue Security hired Prolexic, a DoS-defense company to bring its sites back online, PharmaMaster then attacked Prolexic also.

Blue Security realized that however much they were legitimately defending themselves, by continuing the battle they were harming their customers. On May 16\textsuperscript{th}, Blue Security formally announced that it was out of the anti-spam business.

This battle represents more than a commercial struggle between two companies. One was legitimate and operating legally. The other was basically a criminal operation. The outcome was that the criminals won hands-down.

Denial-of-service attacks are only one of many possibilities. Another recent development is the targeted Trojan attack.\textsuperscript{22} In one case, emails were sent from Western Australia to two human rights organizations with malicious code intended to take over the groups’ networks. In another, a company found that valuable information had been covertly encrypted and the key held for ransom. In still another, five members of a company’s R&D organization were targeted for computer attack. These cases illustrate that the attacker had taken considerable pains in establishing the precise targets for the attack.

Typically Microsoft Office programs such as Word, PowerPoint, and Excel are used as the vehicle to carry the attack code. These attacks are the work of organized gangs, presumably for hire. Each has their own characteristics. One IP address that targets military computers on a two-week schedule comes from a computer in California, but it may be part of a botnet controlled elsewhere. Another specializes in zero-day attacks. Another IP address targets

\textsuperscript{21} See \url{www.ftc.gov/bcp/conline/pubs/buspubs/canspam.htm}.

\textsuperscript{22} Robert Lemos, “Targeted Trojan attacks on the rise.” \textit{Security Focus}, 13 Oct 06.
Hong Kong companies at roughly three-week intervals. Graham Cluley, a technology consultant, notes that, “No one other than kids wants to infect a million people anymore. You would rather deal with 50 or 100 systems at a time.”

In the current context the attacker can be any company attacking any other company, any state attacking another state, or organizations within the target state, or any sub-state group attacking any public or private entity. The only requirement is the technical ability to collect the intelligence necessary to identify and locate targets in cyberspace, a matter of determining names, organizational positions, IP addresses, email addresses, and the target’s supply chain. This is no different than for any military capability. But here the weapon systems involved are not multi-billion dollar hardware. They are tens of brains and tens of workstations costing a few thousand dollars each.

In November and December 2006 the Endeavor Security network itself came under attack, perhaps the cyber equivalent of the typical defense suppression mission. The attacks come from the U.S., China, Canada, Taiwan, and South Korea (one is a machine at Ft. Belvoir). These attacks come from bot-infected machines. The U.S. has the highest number of infected IPs (3,619) followed by China (987), Canada (723), South Korea (668), and Taiwan (393).

Another example of professional use of the Internet for financial fraud is to manipulate the prices of penny stocks using spam campaigns. The stock of Diamant Art Corporation was trading a 8¢ on 15 Dec 06. Small transactions totaling 11,532,726 shares raised the price to 11¢. After millions of spam messages, the stock went to 25¢. Assuming the spammer sold his shares at the peak, he made $20,000. By 20 Dec the stock price was down the 12¢. Recognizing that this is all very recent history, the concern is for the future viability of commerce over the Internet.

5. The Future Cyberspace Battlefield

To understand the future cyberspace battlefield, it is necessary to consider briefly how the Internet is constantly evolving. The Internet is currently an information resource for email and other forms of personal and organizational expression and accessing information through web browsers. A great deal of socially and economically important activity is built on this functionality. It includes personal, business, and professional communications, the use of attachments to distribute audio, graphics, images, video, and documents, mail lists, access to current and archival information, e-commerce, websites, chat rooms, blogs and other forms of individual publication, webcams, access to commercial and governmental resources, and education and training. The utility of these will grow as more people gain access.

There are, however, new domains that are likely to be networked that will make the Internet an integral part of a gigantic command and control system. Since that which is networked can be attacked, these represent new target sets, new societal vulnerabilities, and new channels through which attackers can damage an economy or hold it at risk. The list includes:
- **Physical objects** – for reasons such as inventory control, transportation tracking, and prevention of theft, physical objects can be tagged with a transmitter/receiver having its own IP address such as with an RFID device. These can communicate with each other to self-organize themselves into micronets to issue an alert in the event of behavior outside specified limits.

- **Buildings** – increasingly buildings are internally networked to integrate occupant communications, HVAC, physical access to areas, energy efficiency, fire protection, etc. Such networks are attractive because they diminish the need for on-site maintenance and security personnel. As such nets become increasingly intelligent, both through pre-programmed limits and learning of occupant activity patterns, they can be made more effective and contribute to environmental protection as well. The target implication is that buildings can be rendered unusable through denial of communication, heat, water, power, and physical access.

- **People** – badges, biometrics, cell phones, and location tracking will enable people to be tracked for normal or emergency communications.

- **Homes** – the same functions that are useful for commercial and industrial buildings will be useful in homes. In addition, chores such as ordering and cooking food, providing entertainment, and controlling the thermal, acoustic and visual environment will add to the quality of life of its occupants. Here the implications are the same as for commercial and institutional buildings. By ordering consumables, distribution channels can be disrupted.

- **Vehicles** – tracking vehicles increases the safety of the vehicle and its occupants, increases the efficiency of commercial uses, and provides for downloading vehicle software updates or uploading mechanical status information for maintenance and diagnostics. GPS already plays this role for some vehicles, and cellular tracking via Bluetooth technology can also be utilized. Control of even a small part of the vehicle fleet will enable attacks on cities by disrupting urban and intercity traffic.

- **Images** – there are a plethora of CCTV networks, typically for tracking vehicles in parking garages, identifying traffic violations, security of public venues, prevention of theft, and protection of private property. These can be networked, although currently they are kept separate for a variety of legal and proprietary reasons. Add to this commercial satellite imagery and other aerial surveillance related to civil engineering, construction planning and environmental monitoring. Manipulation of images will enable attackers to conceal or confuse the databases and systems that can be used to thwart them.

- **Robots** – industrial production now makes heavy use of robotic devices, networked within a facility. Higher levels of manufacturing integration will see these networked. Facilities are currently networked to suppliers and shippers to support just-in-time manufacturing and custom-specified products. Similarly, manufacturing integration will be extended to the retail level for the same reasons. In addition, there is increasing use of robots at the retail/consumer level for such chores as delivery of meals in institutions and home cleaning. When robots can be issued arbitrary instructions, they can come under external control and be turned from helpers to saboteurs.

Once these networked infrastructures are almost universally available, a number of social processes and services will be built upon them. These include:
- **Education and training** – repetitive tasks such as drill and examination can be delivered and administered more easily, improving productivity and the need for central facilities.

- **Health care** – remote monitoring of the ill, disabled, and elderly, remote diagnosis, diagnostic collaboration, central medical histories, and remote physical therapy can be expected. Inventories of pharmaceuticals, blood, and transplant organs can be tracked to meet legal requirements as well as to assure the efficient use of scarce resources in times of emergency.

- **Government** – several years ago the U.K. Government laid the foundations for e-government, where information networks would provide the major interface between clients and service providers. The current crop of terrible automated call response systems and un navigable websites is just the beginning of this process. Despite current problems with electronic voting, networked information is a useful direction for the discussion of issues, analysis of electoral choices, and the exercise of citizens’ responsibilities.

- **Entertainment** – aside from gambling, video-on-demand, massive multiplayer games and immersive virtual reality, new ways will be found to deliver new experiences. Virtual environments, simulations, and combinations of visual and kinesthetic experiences will be provided through networks.

- **Group cognition** – networking enables people of diverse backgrounds and locations to join in group cognition and group problem-solving. Text messaging, blogs, wikis, chat rooms and interactive websites are the beginning of the linking of people for political interaction, innovation, and emergency response.

- **Payments** – credit cards and online banking and bill-paying are the first steps in reducing dependence on cash. Central to this evolution will be the extension to micro-payments.

All the technology to support the above exists and the trends indicated above are clearly underway. This includes GPS, RFID, smart sensors and software, social networks, cell phones, with cameras, location capability, and web access to portable network nodes, collaborative software, image analysis and understanding, speech synthesis and recognition, digital maps, etc.

A particularly important target set is networked infrastructure. Infrastructure, if it is operating properly, is nearly invisible. There is dial-tone when a handset is picked up and lights go on when a wall switch is operated. This is particularly so in developed nations where everyone has long experienced and thus accepted that infrastructure services will be available, and if not, service will be restored in a relatively short time. But infrastructures are a near miracle of technology, business, economics, and government.\(^3\)

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3 An appreciation of the miracle behind infrastructures can be gotten from a set of monographs by Amy Friedlander, commissioned by the Corporation for National Research Initiatives in Reston, VA www.cnri.reston.va.us. The series to date consists of: Emerging Infrastructure: The Growth of Railroads, (1995); Natural Monopoly and Universal Service: Telephones and Telegraphs in the U.S. Communications Infrastructure 1837–1940 (1995); Power and Light: Electricity in the U.S. Energy Infrastructure 1870–1940
The current exploitable vulnerabilities in infrastructures derive from the adoption in the design of such infrastructures of the Internet to provide links to their customers and for operational command and control. The issue facing an attacker, in view of the widespread nature of such networks and their critical role in keeping modern societies running, is what infrastructures to attack. Several cuts have been taken by governments as they seek to understand how to allocate their defensive resources. The U.S. did it as part of the extensive study of the problem of infrastructure vulnerability in 1997. The U.K. went through a similar process in 1998 to prepare for the Y2K problem. Most recently, the European Union undertook to do the same thing as part of its responsibilities. The three separate judgments on the question of criticality are shown in Table 2.6.4 as follows:

<table>
<thead>
<tr>
<th>U.S. PCCIP</th>
<th>U.K. Y2K</th>
<th>EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>Fuel</td>
<td>Energy</td>
</tr>
<tr>
<td>Oil and gas production and storage</td>
<td>Utilities</td>
<td>Information and communication</td>
</tr>
<tr>
<td>Water supply</td>
<td>Transport</td>
<td>Water</td>
</tr>
<tr>
<td>Emergency services</td>
<td>Finance</td>
<td>Food</td>
</tr>
<tr>
<td>Government services</td>
<td>Supply of food and goods</td>
<td>Health</td>
</tr>
<tr>
<td>Banking and finance</td>
<td>Communication</td>
<td>Financial</td>
</tr>
<tr>
<td>Electrical power</td>
<td>Emergency services</td>
<td>Public and legal order and safety</td>
</tr>
<tr>
<td>Information and communication</td>
<td>Social services</td>
<td>Civil administration</td>
</tr>
<tr>
<td>Justice</td>
<td>Transport</td>
<td></td>
</tr>
<tr>
<td>Health services</td>
<td>Chemical and nuclear industry</td>
<td></td>
</tr>
<tr>
<td>Weather forecasting</td>
<td>Space and research</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.6.4: Three Judgments on Criticality

A terrorist, reading through these self-described critical functions, shopping for targets, and keeping in mind his own capabilities, might select the following five: electrical generation, electrical transmission, telecommunication, finance, and railroads. It is suggested here that these merit priority in any nation’s thinking.

A terrorist organization, like any organization, must be concerned with efficiency: achieving the greatest bang-for-the-buck. To an attacker this will mean sparse networks such that the greatest number of nodes can be rendered inoperable for the longest time with the least effort, thus causing the greatest diminution in throughput. To do this the attacker will look for interdependencies, attacks such that not only impact a target infrastructure but do so in a way that will cause the greatest ripple effects in infrastructures depending on it.


24 see footnote 1.
In this regard, the U.K. study offers considerable insight into both attackers and defenders. The U.K. study went deeper than infrastructures. It looked into 59 “processes,” developed flow charts for each, and tabulated the dependence of these lower-level processes on each other. It divided such dependencies into critical, meaning that the process is necessary, and non-critical, meaning that the affected process is forced to operate with less throughput.

Interdependency analyses, such as this one shown in Table 2.6.5, provide insight to both the offense and the defense.

<table>
<thead>
<tr>
<th>Infrastructure Process</th>
<th>Critical Dependencies</th>
<th>Non-Critical Dependencies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide telecommunications</td>
<td>49</td>
<td>9</td>
<td>58</td>
</tr>
<tr>
<td>Provide electric power</td>
<td>56</td>
<td>1</td>
<td>57</td>
</tr>
<tr>
<td>Supply transport fuel</td>
<td>45</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Provide road infrastructure</td>
<td>43</td>
<td>6</td>
<td>49</td>
</tr>
<tr>
<td>Supply clean water</td>
<td>26</td>
<td>3</td>
<td>29</td>
</tr>
<tr>
<td>Transfer funds</td>
<td>17</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Provide postal service</td>
<td>14</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Supply gas</td>
<td>13</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Manage sanitation and waste disposal</td>
<td>11</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Provide fire and rescue service</td>
<td>11</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Provide weather information</td>
<td>9</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>Provide rail transportation</td>
<td>8</td>
<td>11</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 2.6.5: Critical and Non-Critical Dependencies

Though the term “cyberspace” is used to excess, there is justification for the view that the sum of the above amount to a new “space.” Unlike the physical world it has no dimensions, no distances, and it is regulated and controlled through a patchwork of complex sovereignty and domestic legal jurisdictions. The users and devices all have physical locations and this aspect imparts some degree of jurisdiction to the degree they are known. But the diversity of jurisdictions, the distributed nature of events in this space, and the ease with which email accounts, user names, and web sites can be changed enormously complicate recording, tracking, and assignment of responsibility. Zombie nets, spiders, proxy servers and sites, anonymity, the malleability and invisibility of software, the difficulty of maintaining control over software, the creation of digital objects and their manipulation, the ability to create and change IP addresses, email accounts, URLs, and all the other constructs in this space provide considerable scope for individual actions, legitimate and not. As events appear to be unfolding, they will define much of the environment in which next generation terrorism will be practiced.

Against this backdrop, a number of trends stand out in thinking about future attacks as well as in establishing the corresponding indicators and signatures around which to base intelligence collection and to deploy defenses. Specifically:
(a) Because both the productivity of cooperating groups of specialists exceeds that of individuals and there is already evidence of cyber-gangs, one can expect functionally-organized groups rather than individuals to form the basis for executing network attacks;

(b) The trend to wireless networking of mobile terminals such as cell phones, iPods, PDAs, and laptops suggests these soft targets will become attractive as network entry points. They also offer considerable operational benefits for terrorists themselves, although the terrorists also will need to master defensive technology to protect themselves from compromise;

(c) As infrastructure enterprise continues to integrate its information networks for both operational and business efficiency and for differentiating itself in terms of customer service, terrorists will see attractive targets because of their implied vulnerabilities. The public information infrastructure also offers efficient means through which terrorists will operate. Network attacks are low cost and can be executed by well-supported experts operating from secure foreign locations;

(d) Biometrics will be increasingly deployed in an effort to prevent system intrusions. These biometrics are, of course, digital files stored in computers that will accessible to an attacker for copying and used to assist in intrusions or to deny legitimate users access. Thus apparently sure-fire defensives can encourage an overly complacent sense of security;

(e) Physical objects, including people, and their movements are central to economic performance. Their disruption will be an attractive strategy. With a sufficiently high capability to repeat attacks, terrorists can scale up a single attack into a campaign of attacks – constrained only by the ability of the defender to prevent or anticipate such attacks. This will be an aspect of the attacker–defender competition;

(f) The automation and networking of manufacturing facilities is another area where the coupling of networked enterprise functions and outsourced activities to production will open up opportunities for attackers to disrupt critical production both continuously and at times of their convenience.

6. **Future Network Attacks That Can Result in Mass Effects**

When considering future attacks, there are two central points to recognize. First, the “future” covers a very long time period, so that new technology, both offensive and defensive, has plenty of time to be developed and widely adopted. Second, because it is “hot” for both developers and investors, new technology moves very rapidly (meaning over fractions of a decade.) Thus, the future should not be viewed as a defined static state but rather as a dynamic interplay between the application of new technology by attackers and defenders. There are no silver bullet defenses and one hopes, no killer applications for attackers. This dynamic state is illustrated in Figure 2.6.8 below:
Attacker processes refers to such matters as recruiting, training, motivating, funding, and equipping attackers, planning attacks, transporting attackers, and evaluating potential targets. Defender processes refers to collecting intelligence on attackers, tracking them, constructing defensive systems, and taking actions against them. The reason for looking at attack space, and by extension, campaign space, is because this is where attackers meet defenders, either in a real or in a planning sense. It is where both learn, the attacker having to study up-to-date information about vulnerabilities and defenses, and the defender studying attacker order of battle, capabilities, signatures, and effectiveness. Both learn from this process, and this learning is what drives the offense-defense competition.

When thinking about the potential network attacks, it is useful to have a taxonomy in mind. The one used here is based on two broad classes or targets: the physical economy seen as a system, and people, seen either as groups or as individuals. Each is divided into classes of large and small attacks, with their respective attack goal. Some of these attacks will not have “mass effects” but they may be enablers or multipliers of larger network attacks. The latter are leverage attacks.

**Economy-oriented network attacks:**

- Small attacks repeated frequently:
  1. Damage or bankrupt
  2. Defraud or extort

- Large attacks repeated less frequently:
  3. Damage or destroy a single infrastructure
  4. Exploit inter-dependencies among infrastructures

**People-oriented network attacks:**
6.1 Small frequent attacks to damage the economy

The threshold issue of how much damage can be done to an economy and the way such damage can be sustained for long periods has been discussed previously.\textsuperscript{27} That work showed that three elements are important. The immediate impact of the attack should be measured in significant fractions of the GDP. The other two are directed to the recovery process. The target economy is best politically isolated from sources of international support, and the rate of attacks should be sufficiently great that the recovery from a single attack is incomplete and hence damage from repeated attacks is cumulative.

To meet both the GDP as well as the repetition rate conditions there will have to be numerous attacks over large areas, i.e. they will have to be scalable. The repetition rate will put a premium on zero-day attacks to reduce the utility of learning and early warning. If $N$ is the number of attacks/unit time, $\tau$ the 90% recovery time from each, and $f$ the GDP decrement/attack, then the product of the three factors should perhaps be of the order of $N\tau f \geq 0.1$.

In view of the increasing dependence on public digital networks, and as they will be enhanced by greater bandwidth, functionality, and penetration in the future, cyber attacks would appear to be most useful under two conditions: that zero-day attacks are scalable, and that network defenses remain meager.

What attacks will be attractive? Whatever works today, absent tighter defenses, will work tomorrow: viruses, Trojan attacks, denial of service attacks, spyware, spam, phishing, directory attacks, etc. What the future promises, again absent improved defenses, is more networked targets, more attackers, more sophisticated and dedicated attackers, perhaps initially attracted by financial gain but then some recruited or attracted to terrorism.

Of the new targets, homes and vehicles will be particularly attractive because their owners are least able to select, assemble, and maintain a defensive perimeter. Some security services may be available (though not necessarily employed) but with such services there are issues of centralization of information and control and the potential for insider damage. Also, from the

Blue Security case, defender organizations will also become targets in protracted cyber conflict, the equivalent of the air attack mission of defense suppression.

Since the specifics of future functionalities are unknown, one can only guess at possible attacks. Stopping cars on freeways in large cities at rush hours would be useful, as would turning off heating in homes in winter in ways that require complex restart (something like waiting for gas company workers to turn on pilot-lights after earthquake triggers have shut down service.)

Other attacks from the new network targets list are institutions. Here automated production lines look particularly attractive. So also are causing train derailments in tunnels or in ways that destroy bridges. Again, details can not be examined further except to remind that the condition the attacker should satisfy is \( N f \tau \geq 0.1 \).

6.2 Attacks to defraud or extort

Despite the impression that terrorists work for low wages and undertake attacks that are relatively low cost, the fact remains that they do have to raise significant amounts of money for payments to the families of martyrs, supporting teams in the field, bribes, specialist services for false documents, legal fees for front operations, security, public relations, high tech weapons and equipment, and other aspects of their own infrastructure. To the extent that advancing the political cause of a Caliphate is high on their agenda, with even larger sums needed to penetrate elites in Muslim states, this motivation could take on greater importance.

Terrorists have various types of cash sources: investments, state subsidies, charitable contributions, and criminal activities. The latter are most important since the first three can vary subject to political pressures and the ability of defender states to constrict international money flows. At the local level street crime can handle out-of-pocket expenses, but larger enterprises to be sustained over long periods require significant escalation in the level of criminal activity.

Financial crime committed with the aid of computers is especially important because it is so easy. Crime statistics indicate that while the average financial crime committed at gun point yields about $6,000, the average computer-assisted theft is about $600,000.

Financial crimes are not, by themselves, major factors in undermining an economy. Their importance lies in the leverage they imply. One $600,000 financial crime will pay for another 9/11 attack.

6.3 Major attacks on a single infrastructure

The world needs energy to operate at advanced levels. If there is any infrastructure that is high on an attacker’s list it is the world energy infrastructure. There are several attractions for an attacker. Energy prices for oil are worldwide prices. One does not have to attack in country X to impact country X. One can attack anywhere, subject on to the leverage factor that any attack carries with it.

There are, of course constraints. Nations that are energy self-sufficient provide few opportunities unless they are major energy exporters. Nations having a diversity of energy technologies and sources are also relatively protected, at least to the point where their
domestic demand grows due to either population growth or their intensity of energy use per capita.

Over the long term, of the order of fifty years, the world is likely to shift to alternate energy sources as the price of oil increases because high-quality low-cost sources become depleted. But that is not likely over the fifteen year time-span considered here. Note that it is not necessary to impact total energy supply. All that is necessary is to influence energy prices. This can be done through attacks on critical nodes in the transportation system: production fields, pipelines, refineries, loading terminals, tanker transport, and the corresponding facilities at the importing end. Price uncertainties on futures contracts, the threat of stepped up attacks, and exploiting some of the trust attacks discussed below are all that is necessary.

These energy targets are all highly automated, as they must be to meet the world’s growing energy needs. Pipeline and refinery control systems, port operation systems, and tanker operating electronics are all cyber opportunities. Efforts to date have examined the vulnerabilities of the world energy infrastructure to conventional terrorist attacks, and much of this is not directly relevant to cyber attacks. The parts that are relate to picking targets and estimating the impact of downtimes on economies. SCADA systems controlling pipelines, refineries, and transshipment facilities would appear to be the most attractive. But what is important is not simply network penetration but having the necessary intelligence (both intellectual and military) to determine what are the physically most destructive actions with the longest repair time.

6.4 Major attacks to exploit interdependencies among infrastructures

While, in principle, everything is connected to everything else, there are a few infrastructures whose centrality offers substantial leverage to an attacker. However, to achieve significant damage, one must cause such physical damage that the recovery time is long, months rather than days. Simply interrupting the operations of computers and the flow of transactions will not suffice.

The U.S. President’s Commission on Infrastructure Protection (PCCIP), the U.K. as part of its Y2K remediation program, and the EU have all published lists of critical infrastructures. Reading across those lists, one can identify electrical power, telecommunication, finance, and rail as infrastructures most commonly viewed as central. Fundamental to the linking of cyber weapons to physical damage is the fact that, like all parts of modern economies, there has been a deep penetration of network technology into their real-time operations.

An earlier study indicated as high leverage points of attack the high voltage transmission grid, thermal plant generators, crude oil and gas pipelines, telephone switches and packet network routers, central computers handling inter-bank transfers and settlements, and rail shipments, especially those transporting coal for electrical generating plants.

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28 Stephen J. Lukasik, “Innovative Cyber Attacks to Cause Severe Damage to the U.S. Economy: America’s Achilles Heel?” briefing to the DTRA Economic Terrorism/Economic Warfare Workshop, SAIC, McLean VA, 5–6 Jan 06.
The critical steps for attacking these targets were outlined. In some cases the best entry is the SCADA systems controlling operations. Thus by manipulating certain settings on high-voltage transformers, pumping speeds and pipeline pressures, sudden shutdown of thermal plant generators, or rail switches can cause burnout, explosions, or derailments. In other cases, circuit boards can be destroyed by getting into power supplies, and such attacks can be made more effective by conventional attacks against circuit board manufacturing and distribution points. EMP attacks can also be effective if computing facilities are within range of a publicly-accessible point for a portable EWMP generator.

The central issue is how access to system control computers can be accomplished. There are two routes. One is through back-office systems linked to control facilities through a common corporate network. Another is direct entry into the proprietary software systems in the same way operational and field personnel do. Numerous cases of such attacks have been recorded. In one case simply slowing down the rate at which a SCADA system monitored a pipeline system resulted in a fatal explosion.

In another case, SCADA software destined to be “stolen” by the Soviet Union was modified by U.S. intelligence. The result was a major gas pipeline explosion, which helped to dissuade Western Europe from depending on that source of energy.\(^{29}\)

Witting and unwitting insiders can also be effective in gaining access to computers and control system, as such the well-known social engineer Kevin Mitnick has recounted.\(^{30}\) Other cases in the literature report on failures in control systems brought about by testing of powerful radars.\(^{31}\)

6.5 **Destroying trust and confidence in a population**

Individual perceptions such as trust are a mixture of current information leavened by past experience.\(^{32}\) Public perceptions are statistical in nature; they are what substantial numbers of people believe. A news article recounts why a Federal Reserve Board member feels it is important to inspire trust among Americans that inflation will not take off:

> Consumers' and investors’ expectations of future inflation have risen slightly in recent months by several measures, raising concerns at the Fed that such perceptions might become self-fulfilling if they embolden businesses to raise prices, encourage shoppers to pay them and prompt workers to demand higher wages.\(^{33}\)

If virtual realities can be constructed by governments, corporations, and the media, why can’t they be constructed by terrorist group to convince us that our economy is on the skids, thus stimulating actions that turn them into a self-fulfilling prophesy?

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\(^{31}\) This set of ideas has benefited from discussions with Robert Balzer (Teknowledge), Anthony Rutkowski (Verisign), Joseph Weiss (Kema, Inc.), Jeffrey Faye (Terrorism Research Center), Robert Kahn, (CNRI), and Leonard Kleinrock (UCLA).


A broader set of spoofing ideas, not directly related to cyber delivery mechanisms but certainly aided by such technology, was provided earlier by Cooper.\textsuperscript{34} He notes:

Acts of economic terrorism could be carried out through actual damage or disruption to key facilities, to trade and transportation links, or to markets and financial relationships. However, terrorists targeting the U.S. economy could also attempt to achieve many of the same effects through “spoofing.” In this context, spoofing includes activities that simulate actions or attacks in order to induce adverse consequences or provoke damaging reactions that disrupt important economic equities, rather than directly cause the principal damage themselves. These activities could be designed to provoke reactions that adversely affect the U.S. economy directly or to trigger secondary effects that have adverse consequences. Such reactions could be of two fundamentally different types: first, protective responses, such as grounding commercial air traffic for some period of time (as occurred after 9/11), that create large undesirable economic consequences as byproducts, and second, loss of confidence, as might result from a rumor-driven panic over a major financial collapse or default, that could have widespread ripple effects throughout the U.S. economy.

Network attacks of mass effect could consist of projecting the message and demonstrating that current processes for everyday life are unreliable and hence government and institutions are failing. This could be done through penetration of the computers of commercial organizations, changing some fraction of transactional records, perhaps 5% or less, so that chaos ensues as virtually every bill or statement has some error that must be corrected. Central hospital patient databases could be modified such that records are translated into fatal errors in treatment. Records at educational institutions could be modified so that people are denied boarding passes when they arrive at an airport or seat assignments could be randomized. Local tax records could be changed so that bills for increased payments are rendered. The possibilities are endless in a society whose every action is mediated by networked computers. The issue is how much disruptive action is needed to undermine what degree of public confidence in a society.

6.6 \textit{Wearing down a population}

Terrorists have a political agenda. Their attacks are directed to groups, locations, and events that represent the forces opposing that agenda. Thus conservationists block loggers and oil drilling. Bin Laden’s agenda to get the United States out of the Middle East results in targeting military facilities and embassies. The terrorist goal is to cause a change in policy and, in the case of democratic countries that are responsive to the wishes of the electorate, the entire population is the target. The process is to make the population suffer, to know why it is suffering, and to offer relief from that suffering should enough of the population accede to the terrorists’ goals.\textsuperscript{35}

\textsuperscript{34} Jeffrey Cooper, “Economic Terrorism Threats from Spoofing,” presented at the DTRA-sponsored workshop on Economic Terrorism/Economic Warfare, SAIC, McLean VA, 5–6 Jan 06.

\textsuperscript{35} A discussion of the history of strategic bombing as a way to bring a war to civilian populations that support it can be found in Marshall De Bruhl, \textit{Firestorm: Allied Airpower and the Destruction of Dresden}, Random House, New York, 2006.
Terrorists choose targets that are intended to send their message. The hoped for effect is for people to decide, through surveys, elections, media statements, etc. that the cumulative benefit from the policy under attack is not worth the cumulative harm they suffer. There is a minimum rate at which the attacks must be delivered. But instead of a physical recovery time to be circumvented, it is the attention span of the population that is relevant, a function of the rate of attacks, their severity, and the amplification that comes from media attention and public debate. The timing with respect to national elections is important, as well as synergistic effects of other political and natural events.

So this is a classical public relations problem but where the attacks must be especially newsworthy. It is a problem with considerable uncertainty and luck involved on both sides. As 9/11 showed, a “spectacular” ideally is carefully calibrated to be neither too much nor too little.

The attacks will be like the first attack set out above – and “small, frequent attacks to damage the economy” – and they will be large enough to garner enough attention. In this case, casualties will be more important than economic effects, however, since losing money does not get the public’s attention the way blood and bodies do. Cyber attacks on commercial buildings would appear to be attractive if doors can be locked, Halon systems activated, panic induced by sounding fire alarms through gaining cyber control of integrated building protective systems. With the large number of such buildings, it should be possible for terrorists to shop around to find one with weak defenses and inattentive management as well as one well-located with respect to political and media attention.

6.7 Personal cyber attacks on leaders

Like attack #2 – “attacks to defraud or extort” – this is a leverage attack. It may entail use of the Internet to spread false rumors and allegations about a particular leader’s behavior, past record, personal life, and other characteristics. By itself this type of cyber attack does nothing but it can serve to initiate a change that may be more agreeable to the attacker. Personal attacks on individuals are, of course, nothing new. They are called politics. Tear down to build up, not unlike urban renewal. There are also vigorous and capable industries traditionally involved: advertising, public relations, and lobbying. So it is not unreasonable that terrorists will decide to apply these techniques to their cause. To an extent this is what bombs and bullets do, but that delivery technique may be overkill (pun unintended). Perhaps something softer may have utility also, or appeal to different senders and receivers.

The success of personal attacks depends on reaching the desired audience. Mass media gatekeepers pursue their own agendas and are unlikely to lend their influence to terrorist causes willingly. They could sell their services, but the blowback on their other clients will make mass media channels difficult for terrorists to use.

The growth and popularity of the Internet is changing some of that, and replacing highly controlled media channels with the open access, unregulated, do-it-yourself Internet. While newspaper circulation and TV news channels are in decline, email, websites, blogs, chat rooms, and wikis are growing. Spam services are available to all, search engines can be manipulated, phishing and outright theft can acquire email addresses, self-publishing on the
net is very inexpensive, and Internet availability, growing everywhere, is high in the powerful nations terrorists will want to influence.

Rumors spread rapidly, the more outrageous the faster they move, while corrections move slowly and are less interesting. There is a natural tendency for people, largely powerless, to adopt conspiracy theories. This is partly because they are often true (i.e. politics, crime, etc.) and partly because they satisfy the human desire to know “why” and to have a ready-made target on which to heap blame.

A sophisticated cyber campaign against effective western leaders, or in favor of leaders viewed as sympathetic to underlying terrorist causes, would identify constituencies, issues, and positive ways of presenting desired outcomes. Leaders would include central individuals in government, industry, and even the media itself, to discredit negative reporting of terrorist events. There is really nothing new in these techniques. The only thing new is the use of relatively free communication channels, with their admittedly less developed reach, instead of conventional media outlets.

Aside from its openness, the Internet offers another useful feature. The material on it is almost totally un-reviewed. While media channels must labor under the burdens of credibility, professional reputation, and critical analysis, what is on the web is largely junk unless the site can draw upon some organizational reputation. But private input is often carried along with mainline stories, as public comment. The fact that this public comment is self-selected harnesses the broad distribution channel to private agendas.

As with anything else, the Internet is not a silver bullet for any cause, but it is a bullet. And in its favor is its speed. Anyone can say anything. With the right amount of organization and pre-planning, that word (or better yet, image or video) can travel sufficiently rapidly that the tortoise of large media and government organizations will have trouble staying in the race.

6.8 Destroying confidence in elites

This attack on public confidence in elites also is a leverage attack. It is more difficult than attacks on leaders because “elites” are ill-defined. Even when one can narrow the target by identifying most important elites (ignoring for the moment, how to establish “most important”), there is still the problem of discrediting a larger group, many of whose members are likely to have impeccable credentials and credibility.

But the challenge of destroying confidence in an elite may simply entail a bigger job and more time. The textbook for doing so was written by Soviet leaders in their rise to power before WW II and in their extension of communist ideology during the Cold War. An important part of their technique was to have insiders in the elites under attack, in effect, communist “agents of influence.”

There are numerous domestic examples of destroying confidence or attempting to do so. For example, the tobacco industry sought to cast doubt on researchers whose results pointed to the dangers of smoking. Similarly, there are individuals and entities today that are campaigning to discredit global warming research unfavorable to energy interests.
The combination of free speech protections and political and financial resources facilitates any such efforts to destroy confidence in elites. In turn, technology acts to reduce the cost of entry. Slick presentations and the rise in scientific fraud makes it a credible attack mode.

7. Approaches to Defense

As Figure 2.6.7 above indicates, cyber tools and network attacks are not matters of victory or surrender. They are parts of thrust-and-parry combat. What, then, does a defender do to address the cyber attacks and campaigns discussed here? There are three dimensions in which to seek protection: technical, institutional policy, and user self-protection.

Consider first the technical dimension. This is the least complicated to conceive. That said, the practical matter of feasibility may be the most difficult to assess granted the complexity of software and the impossibility of guaranteeing the absence of unforeseen consequences at the virtually uncountable number of interfaces between hardware and software components in a network.

The technologist will look to construct absolutely reliable systems, capable of sensing what is “not right” and immediately fixing it. This is a vision one should not give up, but it is not a vision one should count on maturing in any reasonable period. More feasible, though never completely satisfactory, is to develop technical defenses and to deploy them.

There are, however, architectural approaches to a “solution.” Foremost among these is to control what is connected to what. The premise of networking, from the Licklider vision of the power of connecting every computer, and more to the point, every mind to every other, is what has brought us to our current state, with its plusses and minuses. There are, however, examples of electronically secure systems, primarily in national security and some areas of commercial practice. Machines with critical information are kept in shielded rooms to eliminate effects of signal radiation such as keystrokes, and where their connection to other computers is carefully controlled to the minimum necessary for functionality (but not necessarily for efficiency or convenience). They are separated from other machines by air-gaps; information inside can be moved only on moveable media, in encrypted form, all transfers recorded, and appropriately sanitized (sometimes referred to as the “sneakernet”). This does not solve issues of disloyal insiders or compromise in transit. It may not guarantee the security of information once it is placed in outside machines. But the idea of not connecting computers into networks deserves emulation in the many areas of automation where intrusions of the kinds discussed here can have disastrous consequences. Networks that do not exist cannot be penetrated.

Another technical approach is a reactive defense. Again, technical feasibility has not been established, but such approaches come under the rubric of damage limitation. If a cyber burglary is underway, block further downloading; collect detailed forensic information to reduce future threats; break the connection to the intruder; take the attacked machine off the

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net; seek by whatever means are available to permanently label the intruder or permanently block him from the net, or from accessing the machine in question.

There are more vigorous reactive defense steps. Computer penetration is relatively cost-free. An unsuccessful intruder can continue his efforts until he is successful without having to pay a price per try. Active defense is the cyber equivalent of “shooting back.” There are significant practical technical and policy issues involved that have been examined elsewhere.37

There are defensive approaches that are matters of institutional policy. These depend on policy determinations at local, national, and international levels. They are also technical. But the technical parameters of the defense are set by the legal and organizational agreements through which they are executed.

The lowest organizational level, and hence the easiest at which to work, is the local level, the individual computer administrator, the facility manager, the organization responsible for the system that supports the organizations business. Here is where one finds firewalls, spam filters, passwords, security policy, access tokens, etc. Legal precedents for exercising due diligence, avoiding negligence, demands of insurers, and protecting intellectual property are at this level. To accomplish change requires only internal decision-making. The flip side is that the local level is driven by financial constraints and organizational priorities and often has relatively weak requirements for security.38 For example, in the electrical power system, SCADA information is not encrypted because the process is inconveniently slow, while power companies are forced, by stringent environmental legislation, to give priority to reducing pollution over security.

At the state or national level of government, authorities of various degrees of jurisdiction can force organizations through regulation to adhere to minimum standards. But the exercise of governmental control must follow strictly defined processes if it is to be upheld in court. This also means that the process is political, to assure the sectors that would have to pay for the imposed mandates have an opportunity to negotiate. The process frequently reduces to the lowest-cost solutions that are of lower effectiveness than might be possible or needed. Nevertheless, this level allows national interests to be addressed and decisions made on the basis of what matches U.S. interests.

The last level, that of international agreements, is the most difficult but also the most critical because the cyber protection matters are inherently international. Agreements are needed – agreements that for the most important matters require ratification through the internal processes of the signatory nations. National laws regarding computer crime must be rationalized, provisions made for monitoring and enforcement, procedures for hot pursuit established, privacy of personal information and intellectual property protected, and less capable nations must receive help in training and funding. Nonetheless, some progress has been made in recent years, but only a bare minimum has been completed.

The problem with all these institutional approaches is that they are slow and ill-suited to changing technical requirements that evolve at “Internet speed.”

A final dimension of the protection problem is to use the net recursively, as a means for users to participate in their own defense. The concept is old: volunteer fire departments, self-policing by radio hams, variable star observer report by amateurs, chat room monitoring looking for pedophiles, etc. The point is that if there are so many users and so many input points to the net, the users should share in the watching and set up a system to collect their reports. Virus detection has a number of features of this type.

There are problems, as there always are: varying abilities, non-uniform reporting thresholds, individual liability, absence of checks and balances on activities, varying local laws and numerous jurisdictions, and uncertain motivation of participants. Unauthorized or freelancing actions to defend against or investigate cyber attacks may not be welcomed. For instance, the security investigator who uncovered the Titan Rain attacks was functioning as an (unauthorized) amateur was fired and may be prosecuted. The security researcher who discovered and revealed the flaw in the USC online admissions system was prosecuted and pleaded guilty. Whistle blowers are often poorly treated.

But this does appear to be an area worth developing since the only characteristic of the Internet that scales with its growth is the number of its users. If there are toolkits for the construction of viruses and computer intrusion, why can there not be toolkits for defenders?

It is not within the scope of this paper to explore these approaches. However, note that each of the infrastructures is quite different in its technology, connectivity, geography, ownership, management, and the history of its economic development. Thus, it is important to address infrastructure protection from the level of individual networks. Their vulnerabilities are all quite different and hence the defense must be suited to their details.

8. Concluding Observations

While this paper has outlined problems, possibilities, and approaches, it has not provided analytical models from which one can derive “conclusions.” Nevertheless, there are several parting observations to make:

- Networking technology and its penetration into all aspects of contemporary society over the past thirty years has been astonishing. But much of it is behind the scenes, with functionality provided in ways that are often not appreciated. This has the result that the vulnerabilities it introduces go unrecognized;
- Technical vulnerabilities, even when recognized, are only the visible part of the problem. The hidden part of the problem is the level of maliciousness and malevolence that rides on networked technology. Old-time hacking has been augmented by mature, capable, innovative professionals intent on doing real damage to individuals and to institutions;
- This new environment has been called here the cyberspace battlefield. It consists of entities, functions, people and interconnected systems for the command and control of developed societies;
That Jihadists (but also other terrorist groups if not also individuals) will recognize the potentialities this networking provides and use them to apply pressure on their enemies, as evidenced in the case of Jihadists both by the statistics of the situation as well as their demonstrated use in networked communications to operate their enterprises;

This wide-open domain of concerns, called here “attack space,” can be mapped and charted. The taxonomy presented is a first step, analogous to the Lewis and Clark expedition in 1804 to explore the western frontier. It divides the space into large and small attacks, target types, different rates of attack, and the size of the group or facility attacked;

Defenses are needed for the most important parts of this space, “importance” being a matter for governments and their constituents to decide upon. Some issues of particular relevance are indicated below;

There is a need to deal with zero-day attacks, attacks well-planned such that they accomplish their objectives before defenders can respond;

This means that one must focus on attackers rather than primarily on attacks. Waiting for attacks will be too late. To the extent possible, one must see attackers coming and recognize them immediately on arrival. In particular, this means one must track gangs, not simply their means of attack;

This in turn means that some familiar capabilities from other areas of national defense are needed for operations on the cyber battlefield, e.g. early warning, situation awareness, and order of battle;

The Internet can be viewed as a new capability for force projection, but the asymmetric attacker is more likely to benefit than the large defender who already has significant force-projection abilities;

Architectural thinking about networks must depart from the paradigm that everything is best connected to everything. There is a need for an anti-networking discipline to help clarify the tradeoffs;

International responsibilities for behavior in cyberspace commons must be established that are universally recognized, the cyber equivalent of search and rescue, emergency medical care, and disaster relief;

The driving features of the problems discussed here must be addressed up front: system complexity and rapid changes in both technology and the penetration of technology into markets.

There is ground for optimism in these matters, but only if the right problems are addressed. Humans have considerable experience in fixing the messes they make. Deterrence and arms control contained nuclear weapons, and they may still work despite the growing threat of runaway proliferation. Cyber defense should be possible and cyber offense should be containable.
Section 3:
U.S. responses to next Generation
WMD and WME Terrorism

Introduction
Lewis A. Dunn
SAIC

In an overall context of a continued growth in the numbers and capabilities of terrorist groups, the threat of use of weapons of mass destruction (WMD) by al-Qaeda and its Jihadist affiliates as well as its inspired cells, as described in Section 2 of this report on Next Generation Weapons of Mass Destruction (WMD) and Weapons of Mass Effects (WME) Terrorism, is likely remain a dominant feature of that next generation terrorism threat. However, some other groups also could consider escalation to WMD violence as a means to achieve their goals. This is particularly so if more discriminate uses of chemical and biological agents become more readily accessible. Across the spectrum of future terrorism, it also should be anticipated that some of these groups or even individuals will seek to use conventional means in non-traditional ways to have mass effects. Next generation WMD and WME terrorism may shift as well from isolated incidents to campaigns of destructive attacks over a relatively short period of time.

1 Road Map to the Discussion

This section of the report explores possible U.S. responses to next generation WMD terrorism and to a lesser extent WME terrorism, including steps to strengthen cooperative responses in coordination with other nations and the wider the international community. No attempt is made, however, to set out a fully comprehensive and detailed U.S. response strategy. U.S. official documents – both unclassified and classified – have already carried out that task.1 Instead, this Section’s discussion of U.S. responses to next generation WMD terrorism focuses on actions or initiatives to complement, extend, or supplement the core thrusts of U.S. strategy to counter the threat of WMD and WME terrorism. In so building off of existing strategy, this discussion also reflects the conclusion of Section 2’s analysis that al-Qaeda and the wider Jihadist movement will continue to pose the greatest – if not the only – WMD threat over the next decade.

More specifically, Part 1 of this section begins with a survey of the existing set of U.S. activities to counter WMD terrorism to identify possible gaps in U.S. strategies. In the course of that survey, it identifies and explores areas warranting new, expanded, or complementary response initiatives on the part of the United States – in some cases unilaterally but often in coordination with other countries. Part 2 is a more in-depth examination of one of the most potentially important but as yet still very much under-exploited areas for action - efforts to

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1 Among unclassified documents see inter alia: “The National Strategy for Combating Terrorism” (September, 2006); “The National Security Strategy of the United States of America” (March, 2006); “The National Military Strategic Plan for the War on Terrorism” (February, 2006); and “The National Military Strategy to Combat Weapons of Mass Destruction” (December, 2002).
influence the calculations of terrorist groups and their component entities contemplating the acquisition and use of WMD – including al-Qaeda but also that wide swath of non-al-Qaeda terrorist groups (both Islamic and non-Islamic.) Part 3 then provides a brief discussion of the implications of a set of high-priority possible new counter-WMD terrorism response initiatives for the activities of the Defense Threat Reduction Agency. Part 4 offers a brief conclusion.

2. **The Bottom-Line, Up Front**

A broad spectrum of actions is currently being pursued by the U.S. government to counter the threat of WMD terrorism. Against that backdrop, this section of the report has identified a set of additional, complementary initiatives that the United States, often in coordination and cooperation with other countries, should undertake. Taken from the fuller set of possible initiatives discussed below, this sub-set of top priority initiatives is listed in Table 3.1, following page. This table is derived from the tables at the end of Section 3, Part 1 which include more detailed “rankings” for all of the initiatives discussed.

For reasons set out in the discussion below in Section 3, Part 1, all of these initiatives would have high payoffs in terms of filling gaps in current U.S. activities to counter WMD terrorism. They range across many different “functional areas,” from enhancing intelligence to capacity building. Their pursuit would confront a variety of implementation challenges. They vary, however, in terms of how difficult they would be to implement. At least several of these top priority higher payoff initiatives would pose tough technical, conceptual, or operational challenges, not least efforts to enhance the protection and resiliency of the American population from a terrorist biological or nuclear attack. Further, for many of these top priority initiatives international cooperation would be essential - if not at the start then to achieve the most benefits.
<table>
<thead>
<tr>
<th>Initiative</th>
<th>Functional Area(s) Involved</th>
<th>Payoff</th>
<th>Key Implementation Challenge(s)</th>
<th>International cooperation essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure monitoring of non-al-Qaeda groups WMD motivations, intentions, interest in capabilities</td>
<td>Intelligence</td>
<td>Reduced risk of surprise</td>
<td>Operational access &amp; analytic priorities</td>
<td>Not initially</td>
</tr>
<tr>
<td>Accelerate implementation of UNSCR 1540</td>
<td>Capacity building</td>
<td>Enhanced prevention, disruption, response</td>
<td>Moderate resource demands</td>
<td>Yes</td>
</tr>
<tr>
<td>Influence terrorist WMD acquisition and use calculus</td>
<td>Policy, Doctrine</td>
<td>Reduce risk of WMD attack</td>
<td>Operational – implementing concepts</td>
<td>Not initially</td>
</tr>
<tr>
<td>Develop family of National Response Plans - including to counter terrorist WMD campaigns</td>
<td>Policy, Doctrine</td>
<td>Enhanced effectiveness of consequence management</td>
<td>Concept development</td>
<td>No</td>
</tr>
<tr>
<td>Initiate political-military response planning for a terrorist WMD event</td>
<td>Policy</td>
<td>Enhanced effectiveness of response – immediate, longer-term</td>
<td>Concept development</td>
<td>Not initially</td>
</tr>
<tr>
<td>Build habits of global cooperation - prevention, detection, disruption, attribution, response</td>
<td>Intelligence, Norm Building, Policy, Doctrine and Operations, Capacity Building</td>
<td>Enhanced counter WMD terrorism effectiveness across the board</td>
<td>Multi-year, ongoing effort of many countries required</td>
<td>Yes</td>
</tr>
<tr>
<td>Pursue a multi-nation nuclear emergency response capability</td>
<td>Doctrine, Operations</td>
<td>Enhanced response to overseas nuclear crisis-event</td>
<td>Operational and technical challenge</td>
<td>Yes</td>
</tr>
<tr>
<td>Move ahead to protect the American population from a biological attack</td>
<td>Policy, Operations, Capacity Building</td>
<td>Consequences reduced, supports influencing efforts</td>
<td>Resource demands, political will</td>
<td>Not initially</td>
</tr>
<tr>
<td>Explore concepts to protect nearby publics from a terrorist nuclear attack</td>
<td>Policy, Operations, Capacity Building</td>
<td>As above</td>
<td>Technical, concept development, high resource demands</td>
<td>No</td>
</tr>
<tr>
<td>Enhance public resiliency facing WMD attack</td>
<td>Policy, Capacity Building</td>
<td>As above</td>
<td>As above</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 3.1: Top Priority Complementary Initiatives Identified
Section 3: U.S. responses to next Generation WMD and WME Terrorism

PART 1
Gaps and Initiatives

Lewis A. Dunn
SAIC

1 Introduction

A broad spectrum of U.S. strategies and actions already is being pursued in response to the threat of WMD terrorism. With adaptation, many of these strategies apply as well to efforts to counter WME terrorism. Drawing on existing U.S. documents, these strategies and actions are usefully grouped into the following broad goals which broadly follow the framework set out in National Implementation Plan to Counter WMD Terrorism:

- Determine terrorists’ motivations, intentions, capabilities, and plans;
- Deny terrorists access to materials, components, expertise, and other enabling capabilities;
- Deter and dissuade terrorists from employing WMD or state support for terrorist use of WMD;
- Detect and disrupt terrorists attempted acquisition, movement, and/or use of WMD;
- Prevent and respond to a terrorist WMD attack, including managing the consequences of that attack; and
- Determine the nature and scope of a terrorist WMD attack.

Some of these goals are more readily or fully achievable than others. Success also is more readily measurable in some cases than others. That said, it is not the purpose of this report to set out a new set of U.S. goals for countering the threat of WMD terrorism or to undertake a detailed assessment of all of the uncertainties of pursuing these different goals. Rather, this report takes these established goals as its starting point and then explores complementary initiatives that would strengthen overall U.S. (and international) efforts to deal with the threat of WMD terrorism.

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1 These categories and the examples below of specific actions are derived from the unclassified U.S. policy documents set out in footnote 1. The details of the National Implementation Plan are still classified but its broad goals or categories of actions have been made public.

2 The phrase “motivations” is not explicitly used. However, it clearly is consistent with the emphasis in the first goal of understanding the terrorist adversaries confronting the United States and others countries. Given the importance of understanding those motivations, it is, therefore, included here.
More specifically, using this set of U.S. goals as the framework for further analysis, the SAIC team undertook a four-fold approach to identify possible gaps in U.S. strategies and actions to counter WMD terrorism – and more important, to explore potential complementary response initiatives across that spectrum of U.S. strategies. Specifically:

- First, drawing on published national strategy documents, an illustrative summary of major ongoing U.S. strategies and actions to counter WMD terrorism across all of the above categories was developed.
- Second, the SAIC team then assessed this working list to identify possible gaps and to develop an initial working list of potential complementary response initiatives in each of the above categories.
- Third, building on this initial SAIC list, a small workshop of SAIC personnel and outside experts was convened to brainstorm this issue. Its purpose was to evaluate the proposed set of initiatives as well as to help identify other possible responses. In light of that workshop’s discussion, a revised set of possible complementary response initiatives was developed and is set out in this section of the report. The following Table lists the potential initiatives identified. Each of these responses is briefly explored below.
- Finally, these initiatives were evaluated to highlight the most promising near-term actions. Concluding Section A, that ranking is set out after the specific initiatives are discussed.

Before turning to a discussion of possible new initiatives, three caveats are in order. First, quite a few of the initiatives sketched below are not unique to this study effort. Other recent analytic efforts – studies, working groups, and more ad hoc discussions among experts – have also identified them as areas for actions. Heightened attention to “shaping terrorists’ WMD use calculus” is a good example. In effect, a consensus may be emerging within the research community on some of the most promising, if not always easy to implement, next steps to counter WMD terrorism.

Second, given the workshop process, the purpose of the discussion is not to provide a detailed, in-depth discussion of specific initiatives. Rather it seeks to highlight potentially promising areas for action. Some readers may also identify other proposals for actions, reflecting their own analytic or governmental backgrounds.

Third, for ease of presentation, the following discussion places specific actions in specific categories. However, some of the actions discussed below have potential payoffs in several different categories, e.g., many of the specific consequence management actions identified

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3 Participants in the workshop included a mix of functional specialists, terrorism specialists, and project team members. The workshop will be referred to below as the “SAIC Counter-WMD Terrorism Responses Initiatives Workshop.”

4 In particular, some of the results below also were identified by an ongoing unclassified “Roundtable Series on WMD Terrorism” in which the editor has also been participating, organized by Rita DiCasagrande and Michael Moodie for the National Intelligence Council and bringing together experts, officials and former officials, and individuals from the Intelligence Community. This series is referred to below as the “WMD Terrorism Roundtable.”
below would lessen the perceived payoffs of a WMD attack, helping thereby to shape the perceived costs and benefits of escalation to WMD terrorism. In turn, several of the broad categories of counter-terrorism strategy are themselves closely linked, as is the case with consequence management and deterrence.

### 2. Determine Terrorists’ Motivations, Intentions, Capabilities, and Plans

Efforts to determine terrorists’ motivations, intentions, capabilities, and plans to carry out an attack with chemical, biological, radiological, or nuclear weapons already are a very high U.S. priority. Some of the more prominent of those efforts are highlighted by the accompanying text box. Against that backdrop, two potential gaps or areas for expanded effort stand out:

- Monitoring and assessment of “non-al-Qaeda” WMD threats and
- Early warning of a terrorist WME attack campaign.

Each area is examined briefly.

#### 2.1 Monitoring and Assessment of Non-al-Qaeda WMD Threats

The overwhelming priority of efforts to determine terrorists’ motivations, intentions, capabilities, and plans is al-Qaeda and directly affiliated or inspired Jihadist groups. This emphasis is warranted by the fact that today’s al-Qaeda leadership combines a proven interest in acquiring WMD capabilities, well-developed arguments justifying the use of WMD as well as mass killing, and strategic motivations linking WMD use to the pursuit of al-Qaeda’s goals. What al-Qaeda lacks so far is proven capabilities.

However, the arguments set out in Section 2 of this report make clear that over the next years, other extremist groups could come to consider the use of WMD to serve their goals. That interest could be facilitated, moreover, by possibilities for more discriminate use of chemical or biological weapons. Among the most prominent of such groups could be ethno-

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5 The activities to counter WMD terrorism set out in this text box - and the ones below - were drawn from the unclassified descriptions of U.S. strategies cited above. They were discussed and modified in light of the discussion at the SAIC Counter-WMD Terrorism Responses Initiatives Workshop.
nationalist-separatist groups and right wing extremist groups. In addition, as the capability for extreme violence becomes accessible even to individuals, the possibility that an “evil genius” could carry out a WMD attack also needs to be considered. These other possibilities clearly are less likely than a future WMD attack orchestrated by al-Qaeda or its Jihadist affiliates. But the danger is that U.S. officials and others will underestimate the risk from “non-al-Qaeda” groups - much as many persons in the mid-1990s underestimated the dangers posed to the United States directly of Osama bin Laden and al-Qaeda, contributing directly to the surprise of the 9/11 attack. Further, even if such groups do not seek to attack the United States directly with WMD, there still would be indirect security implications for U.S. interests - from the precedent of WMD use to possible loss of life in an American friend or ally.

At the least, the possibility that other groups could seek to escalate to WMD violence suggests the need to step back to determine if the scope of existing intelligence monitoring and assessment efforts is sufficiently broad - and the procedures in place - to lessen the risk of surprise should such a “non-al-Qaeda” entity consider use of WMD. As needed, the priority assigned to monitoring this “non-al-Qaeda” threat should be increased. Specific attention would be focused on tracking the thinking within such groups about the use of WMD and on detecting any potential shifts in attitude. In that regard, particular attention should also be focused on the conditions, if any, under which the leadership of the two most prominent Islamist non-al-Qaeda terrorist groups - Hamas and Hezbollah - might contemplate acquisition or use of WMD. So expanding the focus of U.S. early warning efforts could permit direct action against that emerging entity.

2.2 Early Warning of a Terrorist Attack Campaign

An attack campaign is now widely acknowledged as a possible feature of future terrorism, whether with bombs and bullets or with certain types of WMD. One definition of a terrorist attack campaign would be a sustained and coordinated series of attacks, with a limited period of time (months not years) between attacks. A successful terrorist attack campaign, as discussed in Section 2, would significantly amplify the effects of either WMD or WME terrorism. The psychological and social impact in terms of public insecurity from exposure to prolonged and repeated violent attacks would be magnified, the risk heightened of potentially damaging official or public overreaction, and the direct effects increased (not least for attacks using weapons of mass effects). By contrast, early warning of a campaign would support efforts to shut it down before the more severe psychological and social impacts of repeated violence had resulted. Earlier warning also would resolve the initial uncertainty about whether an attack was a one-off event or were the harbinger of a series of attacks. More accurate

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6 On the possible motivation for more discriminate use of WMD, see the discussion in DeMarce, Section 2, Part 3 as well, Michael Moodie, “Reflections on the Implications of Terrorist Campaigns,” Appendix VIII.

7 In the aftermath of the 9-11 attack, this author ran a series of workshops on “terrorist surprise.” One point that was made by several official participants was that for quite some time in the 1990s, the danger to the United States of the emerging al-Qaeda movement in Afghanistan was not fully appreciated.

8 In addition to being made in the SAIC Counter-WMD Terrorism Responses Initiatives Workshop, this point also figured in discussion at the “Roundtable Series on WMD Terrorism.”

9 See the discussion in Appendix VIII, Michael Moodie, “Reflections on the Implications of Terrorist Campaigns.”
information about whether an attack campaign was in progress would facilitate making some
of the tough resource allocation and other policy choices that would have to be made, e.g.,
whether to release emergency stockpiles of antibiotics or other items after that initial attack or
to hold back reserves for follow-on attacks.

For a start, existing Interagency plans, procedures, and mechanisms for terrorist attack
warning could be assessed to determine if they would suffice to provide early warning of a
terrorist attack campaign against the American homeland. Warning that an attack campaign
were commencing could well entail coordination among many different governmental entities,
at many levels of government, from local, state, to federal. Particular attention could be
focused on those WME attacks that on a one-time basis could fall within the “noise” of day-
to-day destructive events but which cumulatively could have a major impact on the American
economy, e.g., disruption of a series of power generating capacity, efforts to manipulate the
Internet to create loss of confidence in government or
to disrupt economic activities, or disruption of the
transportation network by repeated “accidents.”
Table-top and other exercises also could be designed
and implemented to enhance U.S. capabilities and
responses to detect possible campaigns. (Other issues
related to U.S. responses to a terrorist WMD
campaign are discussed in Appendix VIII).

3.  Deny Terrorists Access to Materials, Components, Expertise, and Other Enabling Capabilities

Actions to deny terrorists access to material,
components, expertise, and other enabling capabilities
needed to carry out a WMD attack have been a
center-piece of U.S. strategy to counter the threat of
WMD terrorism since the early 1990s. Exemplified by
the Cooperative Threat Reduction (CTR) and the
Material Protection Control and Accounting (MPC &
A) programs, those actions have focused heavily but
not exclusively on the threat of nuclear terrorism
stemming from breakdowns of security and control in
Russia. Great progress has been made in those
efforts, with efforts likely to shift in the years ahead
from putting in place nuclear-related security upgrades
to longer-term sustainment. Still more emphasis will
be placed as well on controlling access to biological
weapons-related inputs, with increased funding for
Department of Defense biological threat reduction in
contrast to reduced funding for the overall CTR
program. In particular, under the CTR program activities are underway in states of the former
Soviet Union to consolidate and secure dangerous pathogens, to improve the safety and

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Deny Terrorists Access to Material, Expertise, and Other Enabling Capabilities - Illustrative On-going Actions

- Implementation of Cooperative Threat Reduction (CTR) and Materials Protection Control and Accounting (MPC & A) Programs
- Strengthened CTR biological weapons-related programs
- Other steps to secure dangerous pathogens, deadly chemicals, radiological/fissile materials
- Pursuit of voluntary codes of conduct in biological research-industry (per BWC)
- Eliminating reliance on highly-enriched uranium (HEU) in research reactors
- Global Initiative to Combat Nuclear Terrorism activities
- G-8 Global Partnership against proliferation
- Proliferation prevention measures of many sorts, across the board
security of biological facilities, increase transparency, and eliminate biological weapons infrastructure.10

More recently, United Nations Security Council Resolution (UNSCR) 1540 (2004) took an important step forward by creating a legal obligation on all countries to put in place controls over WMD materials, components, and other items (and means of delivery) that could be used by a terrorist group. It also created a Security Council subsidiary body – the UNSCR 1540 Committee – to play a coordinating role in helping countries to fully implement their new obligations. As part of the review process for the Biological and Toxin Weapons Convention (BWC) discussions are continuing on codes of conduct that would educate scientists and others about the potential security risks associated with advances in the biotechnology field.

In terms of more traditional “non-proliferation measures” with implications for denying terrorists access especially to nuclear materials, ongoing U.S. and international efforts also are seeking to reduce greatly if not eliminate the use of highly-enriched uranium fuel in research reactors. Still other nuclear-energy related activities are aimed at finding alternative approaches to the nuclear fuel cycle that would avoid the widespread dissemination of enrichment and reprocessing capabilities as part of a possible renewed 21st century utilization of nuclear power. The potential anti-terrorism payoffs of these nuclear initiatives, however, are more distant – and they also have met with some resistance from countries concerned about being denied access to needed technologies. The U.S.-proposed Global Nuclear Energy Partnership (GNEP) also has been criticized for its inclusion of spent-fuel reprocessing and recycling in certain countries as a means ultimately to lessen the availability around the globe of stocks of plutonium. Most broadly, the full set of today’s proliferation prevention actions falls into this basket on the grounds that as the number of nuclear powers increases so does the likelihood of a terrorist group’s gaining access to nuclear weapons materials if not even a nuclear weapon.

Among the possible complementary responses initiatives warranting attention are the following:

- Accelerated implementation of UNSCR 1540;
- Expand the Global Initiative to Combat Nuclear Terrorism; and
- A nuclear weapon state code of conduct for nuclear weapon security.

3.1 *Accelerated Implementation of UNSCR 1540*

Adopted in 2004, United Nations Security Council Resolution 1540 obligates all states to put in place “effective appropriate” controls to prevent access by non-state actors to WMD-related materials, components, know-how, and other items. It also required all states to report to the Security Council on their actions to implement 1540. The resolution also created the

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UNSCR 1540 Committee to help implement the resolution – and extended the life of the
1540 Committee for an additional two years in April 2006.

If fully implemented, UNSCR 1540 would be a major step forward in making it more
difficult for terrorist groups to gain access to WMD as well as in creating a legal framework to
take actions against such groups. Nearly four years after the passage UNSCR 1540, the results
are disappointing. The 1540 Committee has surveyed the status of national controls (based
on the reports that it has received from countries), developed a template to assist countries in
reporting their controls and implementing the resolution, held regional outreach meetings to
focus attention on enhanced controls, and taken steps to facilitate assistance from
international organizations as well as national donors for countries to upgrade their controls.
But upwards of 50 states have not yet reported, while in virtually all states considerable
enhancements of controls remain needed. The lack of implementation partly reflects
ambiguity about what is necessary for “effective appropriate controls” and partly limited
political will given other problems. But for a many countries, a lack of capacity explains their
slow implementation of the resolution.

The United States has initiated programs to cooperate with other countries to assist them
in upgrading their controls, while many other countries ranging from Argentina to the United
Kingdom have stated their readiness to provide assistance of various sorts. U.S. efforts have
also recently begun to seek better coordination among potential state and international
donors. Various non-governmental organizations also have made cooperation to enhance
controls one of their priorities. Nonetheless, a great deal of further work is necessary to
ensure effective global controls to realize UNSCR 1540’s mandate.

With the support of other countries, the United States should work with other countries
to accelerate implementation of UNSCR 1540 as a key measure for countering WMD
terrorism. There are many different specific steps that might be considered. The 1540
Committee’s mandate and capabilities could be expanded to allow it to play a more proactive
role not simply in outreach but in orchestrating assistance to countries and identifying best
practices. International organizations such as the International Atomic Energy Agency (IAEA)
and the Organization for the Prevention of Chemical Weapons (OPCW) should be
couraged to take on still more of an implementing role. Building on prior bilateral
diplomatic contacts with other countries as well as on earlier sessions that brought together
the 1540 Committee with potential donors of assistance, the United States could propose that
potential “donors” and “recipients” come together in an ad hoc “UNSCR1540
Implementation Meeting.” The purpose of this meeting would be to identify possibilities for
cooperation among different pairs of countries to buttress national controls - and to put in
place commitments for that assistance. As discussed below in Section 3, Part 3, consideration
should be given to partly redirecting the existing Cooperative Threat Reduction Program to
support countries’ implementation of UNSCR 1540. The ongoing G-8 Global Partnership
also could be partly redirected to this purpose, providing a source of funding.

3.2 Expand the Global Initiative to Combat Nuclear Terrorism to Include All WMD Terrorism

The U.S.-Russian Global Initiative to Combat Nuclear Terrorism is focused only on the nuclear dimension of the next generation WMD terrorism threat. This choice reflects the potentially catastrophic effects of a nuclear terrorist attack. Nonetheless, most U.S. experts in and outside of government believe that biological weapons use may be the most likely current and next generation WMD terrorist threat. Greater ease of access to the materials, the potential to inflict very large casualties with certain agents as well as conversely the potential utility of less lethal agents as part of a terrorist bio campaign, and past unsuccessful bio attacks by al-Qaeda-inspired cells (e.g., the 2004 Ricin attack in London) all are cited to support that judgment. Similarly, the vulnerability of the United States and other countries to terrorist attacks leveraging industrial chemicals is also well-acknowledged.

Expansion of the mandate of the U.S.-Russian Global Initiative to include biological and chemical weapons terrorism would be consistent with the relative importance of these threats. In particular, a decision to include bio-terrorism could increase the priority attached to this threat on the part of other governments, at least some of which still tend to question it. Indeed, the very process of proposing that the Global Initiative include bio-terrorism and then generating support for that shift first with Russia and then more broadly would help to elevate the attention paid to bio-terrorism. As with the core Global Initiative, any expansion could entail individual countries taking the lead in organizing a specific area of action. Some possible areas could include population protection from bio attacks, factors influencing public resiliency in the face of terrorist attacks, experiences in enhancing regulations of potential targets in chemical industries, issues of managing the global spillovers of a bio-terrorist incident, public-private engagement with respective life sciences communities, political-military responses to terrorist bio-attack, and countering terrorist bio-attack campaigns. Successfully pursued, such an expansion would be another way to build habits of global cooperation across the areas of WMD terrorism.

Expanding the Global Initiative would require that states agree to take on still yet another initiative. Concerns about resources could make it harder to sell. That said, an initial step would be to explore if there is sufficient political will to move ahead.

3.3 Pursue a Nuclear Weapon Security Code of Conduct

The theft or purchase of nuclear weapons materials could allow a terrorist group to attempt to fabricate an improvised nuclear device. Depending on their access to needed technical expertise, the expected level of destruction, however, would likely be limited. By contrast, theft of a full-up nuclear weapon would provide the most straightforward pathway for a terrorist group to acquire the capability to inflict state-like levels of nuclear damage on the United States or other countries.

A major thrust of the CTR and MPC & A programs has been to enhance security and controls at Russian nuclear weapon storage sites. It also is in the interest of each of today’s nuclear weapon states to ensure the tightest possible control over its nuclear weapons.

12 This view was widely shared within the “WMD Terrorism Roundtable” group of experts and officials.
However, as the recent U.S. Air Force incident involving the flight of a B-52 carrying - unknown to its crew and others - 6 nuclear-armed cruise missiles across the United States indicates, failures to follow procedures, other slip-ups, and breakdowns of control cannot be dismissed out of hand.

Pursuit of a nuclear weapon security code of conduct among the nuclear weapon states would be one approach to help ensure that all of these countries, at all times, followed tight nuclear weapons security and control procedures. As such, its pursuit would complement and extend CTR programs with Russia, while breaking new ground with the other nuclear powers. A nuclear security code of conduct could be developed in consultation among some or all of the nuclear weapon state parties to the Treaty on the Nonproliferation of Nuclear Weapons (NPT) and non-NPT nuclear weapon states. In principle, it would be open to adherence to all such states - though not necessarily by some type of formal multi-party “signing ceremony.” Even if agreement proved too difficult, moreover, discussion of the concept could provide a useful means to engage the newer nuclear powers in an ongoing dialogue on control matters.

With regard to substance, this code could set out principles or guidelines for best practices in nuclear weapon security and commit all of the parties to meet those standards. Provision would need to be made for different ways that nuclear powers might implement given principles or guidelines. A commitment could be included to cooperate in responding any breakdowns of security that might occur.

Nonetheless, nuclear weapon matters, including security and control, are among the most sensitive national security areas. That sensitivity would likely make agreement on a code of nuclear weapon surety a difficult undertaking. Even so, the very process of broaching this concept and putting forward preliminary principles and guidelines would be one way to foster a dialogue with other nuclear powers in a very important area.

4. **Deter and Dissuade Terrorists from Employing WMD - and State Support for Terrorist WMD Use**

Possible efforts to deter or dissuade terrorist groups from seeking to acquire or use WMD are probably the most controversial area of U.S. counter-terrorist strategy and action. The very feasibility of doing so is sometimes questioned.

More specifically, there continues to be considerable skepticism within the community about the prospects for success of any efforts aimed at shaping the calculations about WMD use of al-Qaeda and other al-Qaeda affiliated or inspired Jihadist terrorist groups. For many analysts
and officials, the operative assumption continues to be that for such Islamist extremists, "acquisition of WMD will equal its use." Isolated efforts have been made to develop a concept of deterrence, dissuasion, and influence for terrorist groups. Concepts are emerging. But agreement on and implementation of a strategy to shape terrorist WMD calculations is still to come. Virtually all of this debate also focuses on today’s top threat – that of al-Qa’eda and affiliated or inspired Jihadist groups. Even though there are good reasons to believe that the “non-al-Qa’eda” groups are not now attracted to the use of WMD, it still is important to think about how to reinforce their existing beliefs that WMD use would not serve their goals.

In turn, at a general level, the importance of pursuing a mix of public diplomacy, strategic communications, and political outreach activities to undermine Islamic extremism, delegitimize terrorism, and gain the support of moderate Muslims, including those with leadership responsibilities, is recognized. Activities are underway in those areas. Nonetheless, as also is widely acknowledged, those efforts have met with limited results for various reasons – the effectiveness of the Jihadist message, wider alienation of many Muslims within their own societies as well as overseas, the continued failure to create a Palestinian state, and not least, the corrosive impact of the war in Iraq. Moreover, many of the “denial” actions undertaken in other areas of U.S. counter-terrorism strategy to counter possible terrorist WMD attacks – not least, detection, disruption, and interdiction as well as preparations for consequence management – can help shape terrorists’ calculations about perceived risks and payoffs of WMD terrorism in comparison to sticking with more traditional “bombs and bullets” terrorism.

With regard to possible state support for a terrorist WMD attack, the situation is somewhat different. U.S. officials from the President downward have strongly stated that state support for a WMD terrorist attack would be met with a decisive but rightly unspecified response. President Bush, for example, has so warned the North Korean regime of Kim Jong-II. Ongoing programs to buttress U.S. capabilities to attribute the sources of future terrorist WMD attacks provide one means to back up that declaratory posture. Examples include nuclear forensics to track back a detonation to the source of its materials, intelligence fusion activities, and Interagency preparations and exercising.

Against this backdrop, several new complementary response initiatives stand out for further exploration. These initiatives include:

- Develop, formalize, and implement a doctrine to shape the al-Qa’eda-Jihadist WMD use calculus;

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13 This was the view of the Bush Administration in the aftermath of the 9/11 attacks. Beginning toward 2004, however, various government documents, including the National Implementation Plan to Combat WMD Terrorism and later the 2006 Quadrennial Defense Review, acknowledged the legitimacy of efforts to try to deter or influence terrorist thinking about WMD use.

14 This author has been working in this area since publishing a monograph for the National Defense University. Recently, Brad Roberts and his colleagues at the Institute for Defense Analyses have carried out a study on these issues for the U.S. Department of State. Richard Danzig also is leading a small study group on this question. Some concept development also has been done by Greg Weaver for STRATCOM.
Develop, formalize, and implement a parallel doctrine to shape the “non-al-Qaeda” WMD use calculus – from Hamas and Hezbollah among Islamist groups to the Tamil Tigers and other so-called ethno-nationalist separatist groups among the non-Islamists; Pursue additional international actions to strengthen and disseminate norms against the misuse of WMD-related technology; and Build habits of cooperation among countries in attribution of a terrorist chemical, biological, radiological, or nuclear attack.

4.1 Develop, Formalize, and Implement Doctrine to Shape the al-Qaeda-Jihadist WMD Use Calculus

Despite continued debate over ultimate feasibility, there now is a growing readiness within both the government and the outside analytic community to explore seriously what can be done to try to “deter” al-Qaeda and its Jihadist affiliates from acquiring or using WMD. Initial thinking has coalesced around a number of concepts that could provide the basis for any attempt to do so. Explored more fully in Section 3, Part 2, these concepts include: the need to think more broadly in terms of shaping or influencing terrorist calculations rather than in terms of more traditional Cold War deterrence concepts; the importance of disaggregating the al-Qaeda-Jihadist movement into its component entities that would have to cooperate to carry out a successful WMD attack (e.g., the al-Qaeda core leadership, its operatives, its aiders and abettors; al-Qaeda-affiliated or inspired leaders and followers; outside aiders and abettors; and any other individuals); and the need to bring to bear many types of actions to shape the calculus of those different entities. In turn, there is a broad acknowledgement – even among skeptics – that the lack of sustained and tailored efforts in this area is a major gap in U.S. strategies and actions.

Development, formalization, and implementation of a doctrine aimed at shaping the WMD calculus of the different groups and their component entities that make up the al-Qaeda-Jihadist movement, therefore stands out as an especially important complementary initiative. Part 2 of this Section explores many of the more specific issues that would be raised by such an initiative and presents an evaluation of the prospects for success. Suffice it here only to assert that one critical dimension of a serious and sustained effort to shape the WMD acquisition and use calculations of the groups and entities of the al-Qaeda-Jihadist movement would be words and deeds aimed at influencing their perceptions of whether such use would be “smart” – from serving their goals to being an effective use of their energies and resources.

The following discussion as well as the more in-depth treatment in Section 3, Part 2 emphasizes efforts to shape the thinking of different terrorist groups and entities about the relative costs-benefits – or “smartness in many dimensions” of WMD use. The discussion also considers shaping actions aimed at cultural perceptions of the legitimacy of WMD use. Assuming a decision to develop and implement a shaping strategy, it would be important to focus not only on the legitimacy dimension but also the fuller set of cultural, psychological, organizational, and behavior factors that could influence a terrorist decision to use WMD. Thus, this report’s analysis should be viewed as an initial step toward that fuller analysis.

In addition, though the prospects of influence are less, it also would be important to include in such a shaping strategy actions aimed at exploiting the tension between those Islamic extremists that argue the justifiability of mass killings of innocents and the wider Muslim community which may well still remain unconvinced. Such an effort is unlikely to have a great impact on the thinking of the al-Qa’eda core leadership but it could affect the calculations of al-Qa’eda inspired Jihadists (including recruits) as well as others. Not least, heightening perceptions of risk could be especially important to shape the calculations of WMD aiders and abettors.

4.2 Develop, Formalize, and Implement Doctrine to Shape the WMD Calculus of “Non-al-Qa’eda” Entities

Over time, other terrorist groups and their component entities could consider escalation to WMD acquisition and use. The lack of actions to influence or shape their calculations also is a gap in current strategies to counter WMD terrorism. That gap is reflective, as suggested above, of the wider lack of attention paid to these “non-al-Qa’eda” groups – from Hamas and Hezbollah to the Tamil Tigers – as a current or future threat to the United States. It also reflects the belief that such groups would not seek to acquire and use WMD against any country. Section 3, Part 2 below explores possible actions to shape the WMD calculus of these non-al-Qa’eda groups and their component entities. With these “non-al-Qa’eda” groups, moreover, there may be a greater possibility to influence their thinking not only about use but also pursuit and acquisition of WMD in the first place.

Development, formalization, and implementation of a shaping doctrine aimed at the non-al-Qa’eda would differ in some respects from the case of the al-Qa’eda-Jihadist movement. Unlike the latter movement, most but not necessarily all of the other extremist groups have yet to confront the question of whether or not to seek or use WMD. Their ideologists also have not yet put forward a series of tightly constructed arguments for why such use would be both justified in terms of their organization’s basic values and strategically smart. Those few groups that have used chemical weapons appear to have done so out of opportunity rather than careful calculation – and then at least in the case of the Tamil Tigers decided against further use. For all of these reasons, it may be somewhat easier to craft and implement a shaping doctrine for these non-al-Qa’eda entities. At the same time, that effort would be more speculative, in effect, projecting and seeking counters to lines of argument for non-al-Qa’eda WMD use prior to those lines of argument emerging let alone taking hold.

4.3 Encourage International Actions to Strengthen and Disseminate Norms against Misuse of WMD-related Technology

In recent years, the global non-proliferation community has given considerable attention to how to strengthen and disseminate psychological, cultural, and social norms against the misuse of technology and know-how that could contribute – directly or by inadvertence – to the acquisition or use of WMD weaponry by states, terrorist groups, or other entities. Future norm-building efforts could build partly on already established norms, e.g., the centuries’ old

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17 Recent public opinion polling and interviewing lends support to this assertion that killing innocents still is questioned by the wider Ummah. Plus the very need of bin Laden and other to join the debate about mass killing and Islam’s teachings indicates that their audience still questions the religious justification of use of WMD that kills large numbers of civilians.
Hippocratic oath of “do no harm,” the life-sciences commitment to improving human well-being, the taboo against the use of nuclear weapons, and the ban on genocide. Existing international agreements also could be leveraged, e.g., the new International Convention for the Suppression of Acts of Nuclear Terrorism. Still other actions have been proposed to reinforce those more general norms, including especially, seeking to make the use of WMD a crime against humanity.

Norm-building efforts would be aimed principally at individuals that inadvertently could provide technology, know-how, or other inputs to terrorist groups in acquiring WMD.\textsuperscript{18} Their purpose would be two-fold: first, to heighten the awareness of individuals concerning potential efforts by terrorist groups or others to gain access to dual-use technologies or know-how for malevolent purposes; second, to encourage those individuals not only to be alert and prepared to warn the right authorities of any questionable activities but also to be prepared to refuse to participate themselves.

Within the United States, this concept already is well-acknowledged. Various entities, e.g., the National Academy of Sciences as well as NGOs, have been exploring next steps. By contrast, the potential role of norm-building in countering WMD terrorism receives considerably less attention - or action - overseas. The United States could encourage such attention and action - both in words and in deeds. The former could include support and pursuit of the types of Codes of Conduct already discussed; the latter could include moving ahead with ratification of the Nuclear Terrorism Convention.

4.4 Build Habits of International Cooperation in Attribution of a Terrorist WMD Attack

Enhanced U.S. capabilities are being pursued to track a terrorist WMD attack back to its origins. In part, these activities entail R & D investment in technical forensics to determine the characteristics of a terrorist WMD device and to compare those characteristics to data on possible source materials. Other political, legal, law enforcement, and intelligence steps - at home and abroad - also are being explored and pursued to put in place more operational capabilities. A widespread perception that the United States (supported by other countries) ultimately could track an attack back to those individuals, groups, and possibly state entities that made it possible is essential to more traditional deterrence efforts based on a threat of retaliation.

Other countries’ cooperation in successful attribution could entail any or all of the following: sharing of intelligence information, providing access to national territories and citizens, law enforcement cooperation, and access to technical data. Acknowledging the importance of building habits of cooperation in technical forensics, the U.S.-Russia Global Initiative to Combat Nuclear Terrorism includes a working group on “nuclear forensics.” Over time, that working group’s mandate could be expanded to include other areas of attribution cooperation. This working group also could explore the possible role of the International Atomic Energy Agency - with its data base on nuclear materials around the globe - in post-attack attribution. One purpose of engaging other countries on these issues with prior to a terrorist WMD attack would be to build habits of cooperation - informal and

\textsuperscript{18} The pursuit of codes of conduct in the life-sciences is a specific instance of such norm building.
formal ties between individuals and organizations - that would facilitate attribution later. Going a step further, multi-country “attribution exercises” could be undertaken, akin to those interdiction exercises of the Proliferation Security Initiative (PSI). As with PSI, such exercises would help countries to test their own internal procedures and legal authorities for cooperation, in this case in attribution. Again, global habits of cooperation would be strengthened.

Whether as part of the proposed expansion of the Global Initiative to include more than nuclear terrorism or on a more ad hoc basis, comparable international cooperation could be pursued in the areas of chemical and biological forensics and attribution. As in the nuclear field, one purpose would be to find ways for individual nations to buttress their own technical capabilities as well as internal procedures and legal authorities for cooperation. But another purpose would again be to help build habits of working together.

Not least, the types of cooperative activities suggested here would help strengthen the perception that a WMD attack could not be carried out without eventually being tracked back to its origins. Particularly for state authorities that might play a part in such an attack or for outsider individual aiders and abettors, this prospect of eventual attribution and identification would shape their calculations of whether or not to take that risk.

5. **Detect and disrupt terrorist attempted acquisition, movement, or use of WMD**

U.S. counter-terrorist actions, as illustrated by the accompanying text box, have placed a high priority on a wide range of actions to detect and disrupt terrorists attempted acquisition, movement, or use of WMD weapons. International initiatives, military preparations, law enforcement activities, and technology R & D programs all figure prominently among those actions. Across these activities, changes at the margin would enhance their effectiveness, e.g., from bringing new partner countries into some key initiatives to accelerated deployment of next generation nuclear detection systems. Though not necessarily “gap fillers,” several potential response initiatives could be useful complements to this set of ongoing detection and disruption efforts:
Build habits of international cooperation in detection and disruption;

Pursue a multi-nation nuclear emergency support and response capability;

Reiterate and reinforce global norms and obligations to cooperate to detect and disrupt terrorist attempted acquisition, movement, or use of WMD; and

Strengthen public-private cooperation for early warning.

5.1 Build Habits of International Cooperation in Detection and Disruption

As with attribution, international cooperation could prove essential in detecting and disrupting terrorists’ attempted acquisition, movement, or use of WMD. In that regard, the ongoing U.S. actions cited above all are valuable means to build up habits of cooperation that could come into play to stop a terrorist WMD attack. However, there may be some uncertainty among U.S. partners as to whether these initiatives will continue after a change of the U.S. administration in 2009. To the extent possible, it would be useful to find ways to send the signal that those initiatives that have clear bipartisan support will continue – as is the case with the Cooperative Threat Reduction Program and probably most of the recent U.S. partnership initiatives such as PSI, the Global Initiative, and the Container Security Initiative.

Several other complementary steps also might be pursued in order to build up habits of cooperation to detect and disrupt terrorist attack. Periodic exercises focused specifically on detection and disruption of a terrorist seizure and attempted use of a nuclear weapon might be undertaken. Such exercise might be carried out under the Global Initiative or under PSI – or perhaps on a more ad hoc basis to bring in a smaller but more divergent group of countries. Additional bilateral or multilateral exercises also could be pursued, e.g., within NATO and the NATO-Russia Partnership. As with the PSI process, one purpose would be to help nations put in place the needed formal procedures and authorities as well as informal cross-government working relationships to facilitate cooperation if needed. Building on the model of the Egmont Group which shares information on financial transactions, a parallel group of countries could be created to share information and cooperate in disrupting possible terrorist attempts to acquire or use WMD.

5.2 Explore Multi-Nation Nuclear Emergency Support and Response Capability

The U.S. Nuclear Emergency Support Team (NEST) capability was created in the 1970s during an earlier period of heightened concern about the risk of nuclear terrorism. NEST draws on the technical expertise within the U.S. National Nuclear Security Administration, including especially the national laboratories. NEST’s purpose is to provide technical expertise as part of the overall U.S. response to a terrorist nuclear or radiological incident or threat – to make a determination on whether the threat is real or a hoax and to advise senior decision-makers; to help detect and locate a clandestine nuclear device; to assess the characteristics of any such device or nuclear materials; and in the case that the threat is not a hoax, to provide technical expertise in support of rendering safe any such device as well as its transportation for final disposition. On-call personnel and equipment make possible extremely rapid responses to meet the timelines involved in any such terrorist situation. These NEST capabilities are in direct support of other U.S. agencies – the Federal Bureau of Investigation for incidents within the United States; the Department of State for incidents overseas. It can
be presumed that the other nuclear weapon states have some such nuclear emergency response capabilities, if not necessarily comparable to those of the United States.

Going beyond the more general efforts to build habits of cooperation discussed above, a related complementary initiative would be to propose that some nuclear weapon states join together to explore the concept of a multi-nation nuclear emergency support and response capability. The logic of such cooperation would be clear: a nuclear weapon incident could take place anywhere on the globe; might involve material, a design, or even a nuclear weapon from any one of the nuclear weapon states; and could well require nuclear expertise from more than one of the nuclear weapons to be resolved safely and successfully. All of these countries also share a common interest in preventing a successful terrorist nuclear attack. Their ability to leverage common resources to achieve that goal would increase by prior preparations.

Multi-nation cooperation on nuclear emergency support and response could start small. Perhaps initially, there might only be an informal meeting of technical and political experts designed to help ensure that the players are known to each other. As a further step, this type of meeting could discuss the types of legal authorities, internal communications and inter-governmental procedures, national decision-making, personnel requirements and expertise that any one of the governments might need to have thought through in advance to make possible cooperation to respond to a nuclear terrorist incident. Needed adaptations could then be made to those internal elements. In turn, the types of capabilities that any one of these nations could bring to bear in the event of an incident could be discussed as well as possibilities for cooperative responses. Given that there is no reason to assume that any incident would take place only in a nuclear weapon state, attention also might be focused on what types of capabilities could be brought to bear to assist a third, non-nuclear party in resolving a nuclear emergency incident – from assessment to rendering safe and elimination. Over time, more formal mechanisms or agreements for bilateral and multilateral cooperation could be put in place. Those means would facilitate cooperation later. Ultimately, consideration even might be given to creating a formal multi-nation nuclear emergency support team (MNEST) – with designated personnel, on call-equipment, established communications, agreed operating procedures, and periodic exercises.

5.3 Reiterate and Reinforce Global Norms and Obligations of Cooperation to Detect and Disrupt a Terrorist WMD Attack

Norms and obligations dealing with many dimensions of cooperation against a WMD terrorist attack have been established by several different international undertakings. The newly in-force International Convention for the Suppression of Acts of Nuclear Terrorism obligates parties to cooperate in a wide range of areas to deal with this threat: criminalization; prevention of preparations; sharing of information including information related to detection, prevention, suppression, and investigation); detection, protection of radioactive material; taking jurisdiction; investigation, extradition, and prosecution. For its part, United Nations Security Council Resolution 1540, as already noted, also includes key obligations, from criminalizing WMD proliferation by non-state actors to actions to enhance physical protection and border controls to prevent illicit trafficking in WMD materials and components.
To help buttress the legal obligations for cooperation, the United States could encourage widespread adherence to the new International Convention for the Suppression of Acts of Nuclear Terrorism, beginning with steps toward U.S. adherence and ratification. In turn, the cooperative activities discussed above for more rapidly implementing Security Council Resolution 1540's obligations also could be leveraged to strengthen those habits of cooperation in this area. The likely renewal of the mandate of the Security Council 1540 Committee next April, 2008 would provide as well an opportunity to buttress the norm that all countries need to implement needed controls and to cooperate against WMD terrorism. These norms would provide a basis for later U.S. efforts to enlist other countries' support in the event of warning of an attempted or planned terrorist WMD attack.

5.4 Strengthen Public-Private Cooperation for Early Warning

Particularly but not only in the case of biological terrorism, the first signs of a threat could well be detected by individuals noticing some out of the ordinary or suspicious activities. Those activities could point toward anything from an attempt by a terrorist group to gain access to needed components, materials, or agent to an individual preparing to carry out an act of biological, chemical, or radiological terrorism. Moreover, as bio-technology continues to advance rapidly in academia and industry, the individuals involved will be at the cutting edge of knowledge about how those advances could be used to benefit mankind – or possibly used for more malevolent purposes.

Efforts to put in place a network of public-private outreach activities would be an important potential source of early warning of developments of concern – from technical breakthroughs even to attempts by a terrorist cell to gain access to WMD-related inputs. Such outreach activities also could provide wider payoffs in preventing terrorist access to WMD. Specifics of engagement would evolve over time.

For instance, one initial effort would be to encourage discussions on potential security risks within and among the relevant communities – industry, business, science, and government. These discussions would help to create greater awareness on the part of scientists, technicians, and business executives of what types of activities could be a cause for concern. Especially in the area of the life sciences, such public-private engagement would help to sensitize its practitioners to the potential risks that exist. Over time, consideration could be given to creating a more formal mechanism to foster public-private engagement on these issues of WMD terrorism.

In turn, this type of awareness building could then be supplemented by other efforts to legitimize individual action to alert authorities to activities of concern. The types of codes of conduct now being considered as part of the BWC review process could play a role here. Tailored to different segments of the community, such codes could help both to legitimize public-private cooperation to detect and disrupt WMD terrorist activities and to create an expectation that individuals would be prepared to act.

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19 The following discussion draws partly on some inputs from Michael Moodie.
6. Prevent and respond to a terrorist WMD attack, including managing the consequences of that attack

Motivated by fear of a WMD attack on the American homeland by al-Qaeda and its Jihadist affiliates, the United States has pursued a broad array of response activities. (Prevention activities were considered above under the category of “detect and disrupt.”) Illustrated by the accompanying summary, U.S. response activities are heavily focused on the many different dimensions of managing the consequences of a terrorist WMD attack – from developing national capacity to enhancing local response capabilities, shorter-term measures, to longer-term Research and Development (R & D). Across many of these areas, it is widely acknowledged by experts and officials that progress in fielding capabilities has been slower than hoped and results more mixed than anticipated. But the overall path ahead has been set out.

Nonetheless, there also are several possible gaps that warrant either pursuit or at least exploration of complementary response initiatives in this area. These include:

- Develop a full family of WMD-and WME-specific National Response Plans – including responses to terrorist WMD campaigns;
- Population protection;
- Enhancing public resiliency in the face of WMD attack;
- Establish a mechanism for international sharing of consequence management “lessons learned;” and
- Initiate plans and preparations for political-military responses to a terrorist WMD attack.

6.1 Develop a Family of WMD-Specific National Response Plans

The National Response Plan provides an overall framework and sets out basic concepts for responding to a national disaster, including one triggered by a terrorist WMD attack. A more specific National Response Plan for Pandemic Flu also has been developed but as of yet, other specific national response plans have not been developed for WMD terrorism. Within the U.S. government, more ad hoc exercises and response planning take place, illustrated by the playbooks developed by the Defense Threat Reduction Agency (DTRA) for some types of terrorist attacks as well as by the activities of
different Combatant Commands in consequence management. Other efforts are underway at the state and local levels, though not surprisingly the results and preparedness are uneven from community to community.20

Within the homeland security and counter-terrorist communities, it is acknowledged that the next step should be to develop a family of response plans dealing with the more specific and different terrorist WMD threats—chemical, biological, radiological, and nuclear.21 Development of a response plan for a terrorist—whether a group or a lone individual—anthrax attack would be a place to start. Anthrax combines potentially high lethality and relative ease of accessibility. It also would raise some of the more difficult issues, e.g., how to allocate and dispense drugs, access to emergency ad hoc medical facilities and personnel, whether to initiate selective vaccinations, how to communicate with the public, how to facilitate communication among responders, how to coordinate federal, state, and local activities, how to link-up public and private activities, how to balance responding to an initial event with husbanding resources to deal with repeated attacks in a campaign, and what advance stockpiling of antibiotics and vaccines to undertake. In addition, to start with an Anthrax Response Plan would be able to draw on lessons and mis-lessons from U.S. responses to the anthrax letter attacks of 2001.

Development of a National Anthrax Attack Response Plan would then provide a model for additional WMD-specific National Response Plans. Judgments likely will differ on which plans to do next. Again beginning from potential impact (at least psychological) and ease of accessibility, a Radiological Dispersal Device (RDD) Response Plan would be one possible follow-on. This is particularly so since the effectiveness of a U.S. response—in terms of rapid assessment of the extent of radiological contamination, governmental communication strategy to minimize public panic, coordination of multiple political levels, remediation and clean up—all could reduce not only the direct impact of an RDD attack but the perceived attractiveness of RDD terrorism to still other, on-looking terrorist entities.

Alternatively, U.S. consequence management response planning could follow up development of an anthrax plan with a National Response Plan for a Nuclear Terrorist Attack. A successful nuclear terrorist attack clearly could result in major loss of life and destruction even if accessibility to nuclear materials let alone a weapon likely is less than in the case of either an anthrax or radiological attack. More important, as argued next, it may be possible to save lives by immediate population protection steps. A National Response Plan for a Nuclear Terrorist Attack also would address some issues that would not be raised by other more limited terrorist attacks, including avoiding a major economic downturn if not collapse, collaboration with foreign governments to assess the likelihood—and prevent—any follow-on nuclear attack, assessment of after-attack hoaxes of additional attacks, dealing with possible public flight from major cities (or calls for city evacuations) in response to threats of follow-on attacks, and mobilizing and channeling national response resources into the attack site.

20 This assessment reflects the judgments of several of the participants present at the informal SAIC session to identify potential gaps in U.S. responses. It is consistent with views heard from other experts in other contexts.
21 This step was highlighted in the “Roundtable Series on WMD Terrorism” as well as the “SAIC Counter-WMD Terrorism Responses Initiatives Workshop”.

Gaps and Initiatives
Two other specific national response plans warrant brief mention. As already suggested, it is conceivable that an initial terrorist WMD attack could be part of a wider terrorist WMD attack campaign. For that reason, development of an overall National Response Plan to a Terrorist WMD Campaign could be included in this initial set of WMD-WME-specific national response plans. (Appendix VIII focuses on some of the issues related to dealing with an attack campaign, including especially the importance of thinking through the types of trade-offs and choices that might confront U.S. officials.) In turn, as argued in Section 2, Parts 5 and 6 weapons of mass effects terrorist attacks could take on growing importance in the coming years. Several of the most threatening of such attacks would seek to leverage the Internet as a mode of attack against infrastructure, including a possible campaign of attacks against critical, long-lead time components of the electric grid. Specific response plans for these types of WME attacks also could be included in eventual compendium of National Response Plans.

6.2 Population Protection from Terrorist Biological or Nuclear Attack

The challenge of protecting the American population from a WMD attack varies greatly across the different types of WMD. For a radiological dispersion device, the physical damage will be limited to a very small area and loss of life will be the result of the high explosives used to disperse the radiological material. The key consequence management task will be to manage the potential psychological impact on the American public of the fact of an attack. A terrorist attack using chemical agents could result in greater loss of life or at least injury, as suggested by the fact that the flawed Aum Shinrikyo Sarin attack in the Tokyo subway system that killed 12 persons and injured up to several thousands more. Though more difficult than in the case of an RDD attack, managing the consequences of a terrorist chemical attack still would be a relatively more limited challenge in terms of the potential geographic area and population affected. Over the past decade plus since the Aum Shinrikyo attack in Japan, there also has been considerable progress in the United States at many different levels of government in putting in place plans and capabilities to manage the consequences of a chemical terrorist attack. By contrast, the challenge of biological and nuclear terrorism is far more difficult, whether measured in terms of potential loss of life or the status of existing consequence management efforts. For that reason, the following discussion highlights these two areas.22

Turning first to the biological weapons threat, the basic conceptual requirements of protecting the American population from the physical effects of a biological terrorist attack are no longer at issue. Questions persist about the how to implement those concepts in practice as well as about the financial costs. But in principle, it would be possible to very significantly reduce the potential casualties that might be caused even by attacks with highly-lethal biological agents against the American population. One way to move the process forward would be for the President to work with the U.S. Congress to commit the United States to the goal of protecting population from a terrorist biological attack by a specified date, perhaps 2010.

For a discussion of some dimensions, see Appendix VIII, Michael Moodie, “Reflections on the Implications of Terrorist Campaigns”.

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22 For a discussion of some dimensions, see Appendix VIII, Michael Moodie, “Reflections on the Implications of Terrorist Campaigns”.
By contrast, far more questions exist about the feasibility of protecting nearby publics - that is, those outside of the immediate zone of the blast - in the event of a terrorist attack with an improvised nuclear device or even a stolen nuclear weapon. For that reason, virtually all attention has been placed on preventing access in the first place to nuclear materials or a nuclear weapon by al-Qa'eda and its Jihadist affiliates. Excepting occasional analytic think-pieces, both officials and experts have dismissed out of hand the possibility of taking actions to protect population and mitigate the immediate loss of life from a terrorist nuclear weapon detonation. More generally, there is little understanding at all levels of government on how to deal with the consequences of this type of terrorist attack, including how to deal with the psychological impacts on the public. The discrediting politically of Cold War nuclear civil defense efforts, typified by recollections of 1950s classroom exercises in “duck and cover,” have only reinforced this reluctance to think about what might be done to lessen the consequences of a terrorist nuclear incident.

The limitations and difficulties should be acknowledged of any attempt at protecting nearby publics from a nuclear terrorist attack. That said, it is timely for several reasons to reassess the feasibility of actions to reduce the expected loss of life from a terrorist nuclear detonation. To begin, as sometimes suggested, it may be a matter of when not whether a major American city is subject to a terrorist nuclear attack. In principle, outside of the immediate zone of destruction from the nuclear blast, many lives possibly could be saved by actions to protect against the nuclear fallout. Moreover, depending on the specifics of a terrorist nuclear detonation (including the type of device and whether it detonated successfully or partly fizzled), the challenge could be reduced. An effort to explore and assess the feasibility of nuclear population protection - and to develop and test a possible operational concept for saving lives if the initial assessment proved positive - would need to address many issues as suggested by the examples that follow.

More specifically, there is a need to develop more accurate computer-based models to simulate and predict the effects of a terrorist nuclear detonation in an urban environment. Today’s multiple models, for instance, provide very different estimates of the expected fallout plume that would be created by a nuclear blast in an urban area. More precise modeling of the dynamics of possible residual fallout patterns would be a prerequisite to developing a concept for reducing loss of life outside the immediate blast zone. In turn, given that actual fallout patterns will be dominated by local conditions, especially weather, a capability for near-real time modeling and assessment would be needed to predict likely fallout patterns after a terrorist nuclear detonation. The relative merits of a strategy of selective evacuations of downwind population as opposed to sheltering in place would need to be evaluated. How to communicate any near-real time warning and courses of action to the public - and to convince them to act accordingly - would be still other issues. Here, there may be lessons to be drawn from “tornado warning systems” in the western United States. Going beyond the immediate nuclear attack, the full range of actions – medical, police, firefighting, political, social, and economic – to manage the consequences would need to be part of this assessment. Based on

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23 The following discussion draws partly on a presentation by Dr. Keith Bradley of Lawrence Livermore National Laboratory at a U.S.-Russian Workshop on Consequence Management Issues sponsored by the Advanced Systems and Concepts Office in Moscow in June, 2006.
this type of analysis, it then would be possible to make an informed “go, no-go” decision on nuclear population protection.

6.3 Enhancing Public Resiliency in the Face of WMD Attack

As analyzed in Section 2, Parts 3 and 4 of this report, a terrorist WMD attack on the United States could be motivated by a range of different considerations. To take only the al-Qaeda core leadership of Osama bin Laden and Ayman al-Zawahiri, however, a belief that WMD use would strike a decisive blow against the United States, shatter official and public resolve, and lead to dramatic reversals of U.S. policy and posture across the Islamic world almost certainly would be a critical element. For some of those “non-al-Qaeda” groups that are not now contemplating acquisition or use of WMD, perceptions of whether such use would serve their goals would be an important consideration. In either case, enhancing the resilience of the U.S. public in the face of a WMD attack would help to deny terrorists the expected gains from WMD acquisition and use. More broadly, enhancing public resiliency would be valuable in its own right to lessen the psychological, social, political, and behavior impacts of any future terrorist WMD use, whether with large-scale or more limited direct consequences. Steps to enhance public resiliency would take on even greater importance in the event of a terrorist campaign of WMD violence.

The importance of enhancing public resiliency is increasingly recognized to be an important dimension of U.S. counter-terrorism efforts, including against WMD terrorism.\(^{24}\) Many of the actions discussed in this Part would contribute, including especially capabilities to manage the consequences of any such attack. More intangible factors also will play a part, not least public perceptions of the competence of governmental authorities at all levels - local, state, and federal. This fact reinforces the importance of moving ahead with the development of a family of response plans as discussed above.

6.4 Establish a Mechanism for International Sharing of Consequence Management “Lessons Learned”\(^{25}\)

Since the September 11, 2001 attacks, the United States has not been subject to a major terrorist attack. Other countries in Europe, Asia, and the Middle East have experienced quite severe attacks, though with isolated unsuccessful exceptions, and only with traditional explosives. Nonetheless, setting up now a mechanism to facilitate international sharing of consequence management lessons learned could payoff later after a WMD incident.

On the one hand, at least some of the lessons learned from dealing with traditional “bombs and bullets” terrorist attacks could well carry over or be so adapted into the realm of WMD terrorism. Areas in which to look for those lessons include: public information and communication posture, decision-making under intense stress, lessening public psychological stress and improving social resiliency, avoiding over-reaction, health care stresses in caring for the injured, intelligence sharing with local authorities, inter-agency coordination, national-local coordination, and attribution. A mechanism for sharing lessons learned among multiple

\(^{24}\) Dr. Maureen McCarthy of the Department of Homeland Security has made this point to the author. It also arose in the “Roundtable Series of Countering WMD Terrorism.” See also Appendix VIII, Michael Moodie.

\(^{25}\) The desirability of some international “lessons learned” activities was suggested by both Michael Moodie and Seth Carus at the small, internal SAIC session.
countries - and across first responders and different levels of governmental entities - would help to draw out those lessons and help each country to respond more effectively, regardless of the type of terrorist attack.

On the other hand, a successful WMD attack would be virtually a new playing field for the victim. Some of the procedures and approaches carried over from managing the consequences of traditional terrorism might need to be significantly revised. Unexpected problems and surprises could well occur. Moreover, once the precedent is set by an initial attack, the likelihood of still other attacks around the globe could increase - whether by the initial group or in a copy-cat effect. For that reason as well, it would be important to have a means for the country attacked to share its lessons learned with other friendly and allied countries as rapidly as possible. Over time, if more WMD attacks occur, there would be even greater need to facilitate this type of international sharing.

The more specific characteristics of this mechanism could vary, e.g., participants, degree of formality, and periodicity and duration of meetings. Its linkage to existing on-going activities also could be an issue. Tying it to the Global Initiative to Combat Nuclear Terrorism - perhaps as an additional working group - would be one way to jump start the process. But it also would too closely align this lessons learned mechanism with only one dimension of the challenge, assuming that is, that the mandate of the Global Initiative remains nuclear-only. A possible solution could be to link a new mechanism to the Global Initiative but to define its mandate more broadly to encompass all dimensions of consequence management on the grounds that there are as yet no lessons learned from a nuclear terrorist attack.

6.5 Initiate Plans and Preparations for Political-Military Responses to a Terrorist WMD Attack

Planning for consequence management focuses on actions to deal with the loss of life, destruction, disruption, and other local, national, and global ripple effects of a successful WMD terrorist attack. By contrast, political and military responses to such a terrorist attack have received little if any attention, whether as part of consequence management or part of the overall spectrum of U.S. responses discussed here. This lack of plans and preparations for political-military responses to a terrorist WMD attack is an important gap that needs to be addressed to ensure an effective immediate response, to avoid costly missteps, and to leverage the shock of an attack to pursue transformations of global counter-terrorism and non-proliferation activities. That is, in thinking about political-military responses, both narrower and broader, more near-term and more long-term dimensions need to be included. Suffice it here to note some key dimensions that should be pursued as part of such plans and preparations.

Some Examples of Pol-Mil Responses to Leverage the Shock of a WMD Terrorist Attack

- Accelerated implementation of UNSCR 1540
- Multi-nation NEST capability
- Ad hoc “Egmont Group Surrogate” to exchange information for detection, disruption, attribution
- Ratifications of the International Convention for the Suppression of Nuclear Terrorism
- Country-specific anti-terrorist actions - against leaders, supporters, bases
- Date certain for full and complete WMD materials control
At least initially, U.S. goals are likely to be focused on attributing the sources of the attack, determining whether a follow-on attack is to be expected, taking steps to prevent a follow-on attack if needed, and taking action against the terrorist entities and any other individuals or states that might have been directly or indirectly (wittingly or unwittingly) involved. U.S. response planning would need to consider how best to pursue these goals, particularly based on different assumptions about the success of U.S. attribution efforts. In that regard, near-term political-military response planning also should reflect actions to bring other countries’ assistance to bear in both attribution and response. Of possibly special importance, this type of response planning needs to address explicitly the domestic political and public pressures that could arise for prompt, draconian, and possibly counter-productive retaliation (assuming as likely would be the case with an al-Qaeda organized attack, that one purpose would be to provoke a U.S. or international over-reaction.) Not least, in the immediate aftermath of an attack, U.S. responses would need to include actions to deal with the possibility of a “follow-on” attack.

More broadly, U.S. political-military response planning needs to focus also on how best to leverage the shock of a terrorist WMD incident or attack to strengthen national and international efforts to counter WMD terrorism. Past experience in other areas suggests that after such a shock it could well be easier to forge an international consensus not only for proposals that had been on the table previously but for dramatic new initiatives. In turn, it could be particularly important to use that shock to encourage opinion-makers in many countries to speak out against those terrorist ideologies that would justify and legitimize mass deaths in pursuit of a cause. Prior thinking – and contacts with like-minded countries – would increase the likelihood of successfully leveraging a future WMD terrorist shock in one or more of these ways.

7. **Determine the Nature and Scope of a Terrorist WMD Attack**

A final basket of today’s U.S. activities to counter the threat of a terrorist WMD attack entails actions to determine the nature and scope of any such attack. This goal deals with attributing the attack – including the source of the materials, the group that carried it out, the role of any enabling countries or individuals, and other such questions as well as determining whether additional attacks are planned. Several of the ongoing actions as well as some of the proposed complementary initiatives already highlighted would contribute to this goal, including especially in the areas of attribution as well as building habits of international cooperation. One other potentially important complementary initiative stands out: development of plans, procedures, and linkages to determine the likelihood and contain the risks of possible “follow-on” attacks.

<table>
<thead>
<tr>
<th>Determine the Nature and Scope of a Terrorist WMD Attack - Illustrative On-going Actions</th>
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<tbody>
<tr>
<td>Planning and preparations for post-attack assessment</td>
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<tr>
<td>Enhance forensics and attribution – technical-political-legal</td>
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<tr>
<td>International initiatives – Attribution Working Group of Global Initiative, Multi-Nation NEST, Enhanced international norms and legal obligations</td>
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</tbody>
</table>
7.1 Develop Plans, Procedures, and Links to Determine the Likelihood and Contain the Risk of Possible “Follow-On” Attacks

After a terrorist WMD attack, efforts to determine the likelihood of a follow-on attack, where it might take place, and how as well as to prevent any such additional attacks will be a central concern of American officials at all levels of government. Judgments about likelihood would contribute directly to how to manage possible trade-offs in response strategies, what additional prevention actions to initiate as well as how long to maintain any already implemented extraordinary actions, what message to communicate to the public and how to prevent growing public panic fed by speculation on the part of the media as well as by Internet discussion, and other dimensions of the U.S. post-attack reaction and response. Part of this assessment also will impact how to deal with the almost certain hoaxes that will follow the initial attack.

Determination of the likelihood of a follow-on attack will draw on many of the capabilities already touched on in this discussion of gaps and initiatives. Intelligence assessments and cooperation with other intelligence services, law enforcement work and inter-government cooperation, technical forensics, and wider attribution initiatives all will contribute. As with other aspects of responding to the threat of WMD terrorism, prior habits of cooperation with other governments could well again payoff in reducing uncertainties and making a more timely determination about the risk of follow-on attack. One way to foster those habits of cooperation in this particular area would be to put this question of “follow-on attack” on the agenda of ongoing counter-terrorist deliberations, whether bilaterally as well as multilaterally as in the G-8 Summit, the NATO-Russia Partnership or the Global Initiative. Further, as proposed above, the issue of actions to determine the likelihood of a follow-on attack could be made either part of each specific National Response Plan or made a separate plan.

8. New Initiatives – Top Priority Near term actions

Federal, state, and local authorities are pursuing a broad spectrum of actions to respond to prevent and if necessary, respond to a WMD attack by a terrorist group or some other non-state actor. In many areas considerable progress is being made. In some areas, a good deal more work still is needed to implement given actions but the way ahead is well-defined. Against this backdrop of ongoing activity, the preceding discussion has identified and briefly explored a set of additional complementary actions that could be taken to buttress the overall U.S. response to the threat of WMD terrorism – both today and as that threat evolves over the coming years.

8.1 Dimensions of Possible Initiatives

By way of summary, the critical dimensions of these complementary response initiatives are set out in Table 3.1.1 on the following page. For analytic simplicity, closely related initiatives have been combined (e.g., shaping terrorists WMD calculus). A number of points stand out:

- First, these response initiatives entail actions that range across functional areas, from intelligence to domestic and partner capacity-building.
Second, many of these initiatives would refine, extend at the margin, or elaborate pre-existing elements of U.S. policies to counter WMD terrorism, e.g., expanding the Global Initiative to Combat Nuclear Terrorism to encompass all types of WMD.

Third, a number of initiatives would entail development and implementation of new concepts, doctrine, and supporting operational capabilities. Intensified efforts to shape terrorists WMD calculus, to develop a multi-nation nuclear emergency support and response capability, and population protection from WMD attack are examples.

### Table 3.1.1: Possible Initiatives to Enhance Global Activities to Counter WMD Terrorism

<table>
<thead>
<tr>
<th>Initiative/Aspect</th>
<th>Intel</th>
<th>Norm Building</th>
<th>Policy</th>
<th>Doctrine and operations</th>
<th>R&amp;D</th>
<th>Capacity Building</th>
<th>U.S. alone</th>
<th>Multi-country</th>
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<tbody>
<tr>
<td>Monitor non-al-Qaeda WMD interest</td>
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<td>Campaign early warning</td>
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<td>Accelerate UNSCR 1540 implementation</td>
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<td>Expand “Global Initiative” to all WMD</td>
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<tr>
<td>Nuclear weapon state surety code of conduct</td>
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<td>X</td>
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<tr>
<td>Shaping terrorists WMD use calculus – including aiders &amp; abettors</td>
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<td>X</td>
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<tr>
<td>Strengthened norms and obligations against WMD-related technology misuse</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Build habits of global cooperation – prevention, detection, disruption, attribution, response</td>
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<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
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<td>Multi-nation nuclear emergency support &amp; response</td>
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<td>Public-private engagement</td>
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<tr>
<td>Family of national response plans – including vs. campaigns</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>Enhance public resiliency</td>
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<tr>
<td>Population protection – nuclear, biological</td>
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<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Int’l Lessons Learned</td>
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<tr>
<td>Pol-mil responses planning – including v. follow-on attacks &amp; campaigns</td>
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<td>X</td>
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</table>

The initiatives and their possible implementations are shown in the table above. Each initiative is assessed against various aspects such as intelligence, norms building, policy, doctrine, R&D, capacity building, and whether the implementation is U.S. alone or multi-country.
Fourth, building on efforts already underway, capacity building with partners also stands out. Perhaps most important in that regard would be to use a variety of pathways – formal and informal, bilateral and multilateral – to build habits of global cooperation to prevent, detect, disrupt, interdict, attribute, and respond to a WMD terrorist incident.

Fifth, some of these actions could be undertaken or at least initiated by the United States alone. But many of them would require the cooperation of many countries.

8.2 Priorities for Possible New Initiatives

Up until this point in the discussion, one important issue has been set aside: given constraints on U.S. and other countries’ resources, which of these initiatives should be pursued, what is the relative priority among them? As a step to setting out one answer to that question, Table 3.1.2 below ranks these initiatives in terms of relative payoff and relative difficulty of implementation. For the former, the scoring is based on the extent to which a particular complementary initiative would fill a critical gap. For the latter factor of difficulty of implementation, a variety of metrics are explicitly used. These metrics are set out in the table.

The specific numerical scores set out in this table reflect the author’s best judgments drawing on analytic work done for this project; comments from several other individuals at SAIC; and the discussions at the SAIC Counter-WMD Terrorism Responses Initiatives session as well as at the WMD Terrorism Roundtable. Thus, no attempt was made to define and then apply very specific tests for each of the 1-5 scores, in part given the inherent difficulty of precisely measuring either payoffs or relative difficulty in what is an inherently uncertain endeavor. Though subjective, it is highly unlikely that a wider survey of expert opinion would result in a complete reversal of any given initiative’s scoring, that is result in a shift of ranking from high payoff to low payoff or from more difficult to less difficult to implement. Readers may debate the details of one or another score. Nonetheless, the overall rankings in terms of relative payoffs and difficulties of implementation – in effect, a more or less judgment – provide a framework for comparing different initiatives as well as for debating further possible near-term priorities.

26 Thus, no attempt was made to define and then apply very specific tests for each of the 1-5 scores, in part given the inherent difficulty of precisely measuring either payoffs or relative difficulty in what is an inherently uncertain endeavor. Though subjective, it is highly unlikely that a wider survey of expert opinion would result in a complete reversal of any given initiative’s scoring, that is shift from high payoff to low payoff or from more difficult to less difficult to implement.
<table>
<thead>
<tr>
<th>Initiative/Payoff-Difficulty Metrics</th>
<th>Payoff</th>
<th>Difficulty of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor non-al-Qaeda WMD interest</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Campaign early warning</td>
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<td>1</td>
</tr>
<tr>
<td>Accelerate UNSCR 1540 implementation</td>
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<td>1</td>
</tr>
<tr>
<td>Expand “Global Initiative” to all WMD</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Nuclear surety code of conduct</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Shaping terrorists WMD acquisition and use calculus</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Strengthened norms against WMD-related technology misuse</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Build habits of global cooperation</td>
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<td>4</td>
</tr>
<tr>
<td>Public-private engagement</td>
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<tr>
<td>Family of national response plans – including vs. campaigns</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Population protection – bio-terrorism</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Population protection – nuclear terrorism</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Enhance public resiliency</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>International consequence management lessons learned mechanism</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Pol-mil responses planning – including v. follow-on attacks</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

1-5 = lower to higher in terms of potential payoff in filling critical gap and of difficulty of implementation

Table 3.1.2: Possible Initiatives to Enhance Global Activities to Counter WMD Terrorism – Payoffs v. Difficulty
By way of summary, these initiatives can be binned into four baskets in terms of potential payoffs and relative difficulty of implementation. Table 3.1.3 below sets out the results.

<table>
<thead>
<tr>
<th>Higher Payoff/ Less Difficult to Implement (1)</th>
<th>Higher Payoff/ More Difficult to Implement (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring non-al-Qaeda WMD interest</td>
<td>Build habits of global cooperation - prevention, detection, disruption, attribution, response</td>
</tr>
<tr>
<td>Accelerate UNSCR 1540 implementation</td>
<td>Multi-nation nuclear emergency response capability</td>
</tr>
<tr>
<td>Shaping terrorists' WMD calculus</td>
<td>Population protection - bio attack</td>
</tr>
<tr>
<td>Family of National Response Plans - including to counter terrorist campaigns</td>
<td>Population protection - nuclear attack</td>
</tr>
<tr>
<td>Political-military response planning</td>
<td>Increase public resiliency facing WMD attack</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lower Payoff/ Less Difficult to Implement (3)</th>
<th>Lower Payoff/ More Difficult to Implement (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand Global Initiative to all WMD</td>
<td>Campaign early warning</td>
</tr>
<tr>
<td>Strengthened norms and obligations against WMD-related technology misuse</td>
<td>Nuclear weapon state surety code of conduct</td>
</tr>
<tr>
<td>Public-private engagement</td>
<td></td>
</tr>
<tr>
<td>International consequence management lessons learned mechanism</td>
<td></td>
</tr>
</tbody>
</table>

Higher payoff = 4-5; lower payoff = 1-2; Less difficult = 10 or less; more difficult = 11 or more

Table 3.1.3: Possible Initiatives to Enhance Global Activities to Counter WMD Terrorism – Payoffs v. Difficulty of Implementation

Some of these initiatives combine a promise of a relatively high payoff with relatively less difficulty of implementation - “basket 1”. Further exploration if not pursuit of this set of initiatives should be the highest priority. Step to monitor and provide early warning of a non-al-Qaeda WMD threat fall into this basket. Accelerated implementation of UNSCR 1540 is another potentially high-payoff but still relatively less difficult initiative. It would require considerable efforts on the part of many players - the United States, other countries, international organization, and non-governmental organization resources to provide assistance to countries in implementation. But what is needed is well-understood as is the readiness of many players to contribute. In turn, building on recent conceptual thinking about the “how” of shaping terrorists’ WMD calculus, the United States can take steps to implement a shaping strategy that would fill an important overall gap in counter-WMD terrorism. (This is the subject of Part 2 of this Section.) In turn, there would be limited resource demands in initiating political-military planning to respond to a terrorist WMD incident. Developing a family of national response plans also would fall into this category, though with ultimately greater resources demands.

Still other initiatives combine potentially higher payoffs but greater difficulty of implementation - “basket 2”. Technical toughness but also political memories of Cold War civil defense programs, for instance, hinder efforts to lessen the vulnerability of the American population to a terrorist nuclear incident. Somewhat differently, what is needed to increase greatly the level of protection for the American population against bio attack is not difficult to define - the challenge is finding the resources, mechanisms, and political will to move forward. Efforts to enhance public resiliency are very important and there are actions that can be taken which do not have high operational, technical, or resource demands. But ultimately public resiliency also depends on the effectiveness of population protection actions. Building
habits of global cooperation to prevent, detect, disrupt, attribute, and/or respond to a terrorist WMD attack is still a different challenge. The payoffs would be high but success will take time, will be the result of many incremental steps, and will need to be pursued across many different governments with many different priorities. A multi-nation nuclear emergency support and response capability is another higher payoff but difficult initiative. In its case, the difficulty arises from the highly-sensitive nature of some of the information likely to be brought to bear as well as long-engrained ways of doing business on the part of the national nuclear establishments. Thus, in this second basket, most effort will be required here but the results could be dramatic.

There also are possible initiatives that promise somewhat lower payoff but also relative less difficulty in implementation – “basket 3”. In effect, these may be considered the still-remaining “low hanging fruit.” Public-private engagement activities aimed at bringing industry, government, academic, and scientific communities together in confronting the WMD threat does not hold out a major breakthrough in U.S. capabilities or in the level of threat. That said, these activities could help provide early warning of potential emerging WMD threats (especially in the biological terrorism area), while the helping to block non-state access to key WMD-related inputs. Such engagement would blend with other efforts to strengthen global norms against misuse of WMD-related know-how. Creating a mechanism to share lessons learned in consequence management and response to WMD-related incidents would also fall into this category. It could be part of a broadening of the Global Initiative to cover all WMD, an action that would provide another forum for building global cooperation.

The final set of actions has relatively lower payoffs and greater difficulty in pursuit – “basket 4”. Efforts to acquire early warning of a terrorist campaign fall into this category. Campaign early warning would facilitate a U.S. response; but the conceptual foundation for how to ensure such early warning is still to be developed. Somewhat differently, while pursuit of a code of nuclear surety could be one way to ensure best practices in nuclear safety and control among today’s nuclear powers, bilateral approaches offer an alternative means with possibly fewer spillovers in terms of creating a perception of a nuclear weapons state cabal among the NPT’s non-nuclear weapon states.

Across many of these potential initiatives, the Defense Threat Reduction Agency may well have a role to play. Before turning to a discussion of implications for DTRA, however, the next sections address two specific areas in greater detail – shaping terrorists WMD calculus and responding to terrorist WMD campaigns (itself one relatively unexamined dimension of overall national response planning.)
Section 3: U.S. responses to next Generation WMD and WME Terrorism

Part 2 Influencing terrorists' WMD acquisition and use calculus

Lewis A. Dunn
SAIC

The lack of a strategy and supporting actions aimed at influencing terrorists’ calculations of whether or not to seek to acquire or then to escalate to the use of WMD, as already argued Section 3, Part 1, is a major gap in the overall set of U.S. counter-terrorist activities. Within the analytic community, moreover, there is an emerging conceptual consensus on how to address this gap. There also remains considerable skepticism about the ultimate effectiveness of any such efforts.

Against this backdrop, the following discussion first sets out a set of concepts that could guide a U.S. strategy of to influence the WMD acquisition or use calculus of many different terrorist groups and their component entities as well as outside aiders and abettors. The ultimate goal of that strategy is clear: to affect terrorists’ assessment of such things as whether WMD use would be smart (in terms of their own goals), feasible and an effective use of resources (in light of available alternatives), and/or justifiable and legitimate (in terms of their own ideology and vision). What to term this strategy, however, is more uncertain. As argued below, deterrence is too narrow a term. During the course of this study, the term of “influencing” was often used instead, including in a workshop held on this subject. However, influencing may well suggest to great an ability to impact terrorists’ thinking. For that reason, the discussion that follows uses the term influence.

Building on this initial discussion of key concepts, this part then applies that conceptual model to a series of cases, from the al-Qaeda core leadership to outsider aiders and abettors of a possible terrorist acquisition and use of WMD. In so doing, the analysis also provides an assessment of how the prospects for successful influencing efforts likely would vary across the most prominent different cases.

Up front, two prefatory points are in order. First, it bears emphasis that any such influencing strategy should be viewed as only one element of an overall U.S. and global

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1 The following discussion draws on the author’s ongoing work in this area, including an earlier monograph for the National Defense University. It also has benefited from interaction with Dr. Bradley Roberts of the Institute for Defense Analyses, Alexandria, VA, who has been a key figure in these recent efforts to think through the issue of deterring WMD terrorism.

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To influence: to give definite form, influence, organization, or character to; to fashion or form

To influence: to exercise influence on; affect; to move or impel (a person) to some action

— The Random House Dictionary of the English Language (1973)
strategy to counter the threat of terrorist escalation to the use of WMD – but a potentially important and as yet undeveloped element. Second, as discussed more fully below, the following approach assumes that there will be an element of rational calculation, a weighing of costs and benefits in any decision by terrorist groups, their component entities, or their outside aiders and abettors to seek to acquire or eventually escalate to WMD violence. That element of rationality may be more or less, depending on the group and the individual. It also will be influenced by the particular lenses through which a group or its leaders view the world. Other factors also may play a role in any WMD decisions. Nonetheless, past terrorist behavior, including that of the most dangerous threat, al-Qaeda in all of its facets, warrants making this assumption that there often will be an element of rational calculation as the basis for exploring the elements of a influencing strategy.²

1 some analytic concepts

The conceptual model of how to seek to influence terrorists’ WMD acquisition and use calculus can be summarized by a series of propositions.³ These propositions are:

- Think in terms of actions aimed at influencing terrorists' calculus concerning acquisition or use of WMD – rather than in terms of deterrence per se;
- Recognize that there are many different WMD-related choices and decisions made by terrorists as well as by outside aiders and abettors that any such strategy should seek to influence – not simply the final choice of whether or not to escalate to the use of chemical, biological, radiological, or a nuclear weapon;
- Disaggregate the “whom” that is to be influenced, in effect, recognizing that there are many different terrorist groups, that each group is comprised of different types of members or component entities, and that there also are external individuals whose involvement could be essential to facilitate a successful terrorist WMD attack;
- Identify the specific leverage points that could be used in an attempt to influence each of the different groups and their component entities as well as outsider aiders and abettors;
- Disaggregate, as needed, among the types of WMD in crafting any influencing strategy and in evaluating the prospects for success;
- Think broadly in terms of “who” does the influencing – not simply governments;
- Be prepared to use both soft and hard power, words and deeds;
- Seek to identify and begin by implementing potential cross-cutting influencing actions that would impact “terrorist targets” among the full set of groups and their component entities.

Consider each of these concepts in turn.

² See the discussion in Section 2, Part 2 of the “rationale for instrumental violence” of selected terrorist groups.
³ The discussion that follows draws partly on a small session on “Shaping Terrorists WMD Use Calculus” held at SAIC on July 29, 2007. That session included experts with backgrounds in strategic analysis, counter-terrorism, and particular terrorist groups, including al-Qaeda. This discussion also has benefited from the reaction to an initial version by participants in the Roundtable Series on WMD Terrorism.
11 Influencing Terrorists' WMD Calculus

U.S. and global actions should aim at influencing the overall terrorist WMD calculus regarding the perceived costs and benefits of escalating from more traditional “bombs and bullets” terrorism to the use of WMD (including whether or not to seek to acquire WMD in the first place). This emphasis on influencing calculations encompasses the concept of deterrence - whether by threat of punishment that the costs of action would outweigh the gains or by denying terrorists the benefits sought in any number of ways. But the concept of influencing differs in two important respects from these more traditional concepts. On the one hand, the concept of influencing terrorists’ calculus points toward a broader set of actions that might be pursued than simply punishment or denial. On the other hand, the concept of influencing opens up a wider range of terrorist actions that could or should be subject to attempted influence than only a “yes-no, binary” decision whether or not to use WMD. Indeed, to the extent possible, such influencing efforts should seek to influence terrorist choices - and those of outside aiders and abettors - as early as possible in the chain of decisions leading up to a use or not use choice.

12 Focus on Many different terrorist WMD-Related Choices

More specifically, some of the other choices that an influencing strategy could seek to influence are identified in the accompanying text box. They range from an initial choice to seek to acquire WMD up to various choices tied to how to carry out a WMD attack. The two most critical choices would be the initial decision to seek WMD and the decision to use it. But other decisions also would have an important impact on the nature of the specific WMD threat, including the prospects for successful interdiction or consequence management as well as its ultimate magnitude. While the discussion that follows focuses most on the decisions to acquire or use, it returns at times to some of these other dimensions of influencing terrorists’ WMD calculus.

This emphasis on influencing terrorists’ WMD calculus rests on several assumptions that should be made explicit. Consistent with what is known about the goals of today’s terrorists groups, especially al-Qaeda, it assumes that those goals go beyond simply “killing Americans.” Rather, terrorist use of violence - as argued more extensively in Section 2 of this report - is intended to serve certain goals and values. There is a rational calculus at work - if only in terms of the internal logic of the group, its leaders, and its members. Thus, the pursuit or use of WMD is likely to reflect at least in part some view of costs and benefits, of the impact of use on the organization’s goals.

This is not to say that costs-benefits calculations will be the only factor involved or in some instances, the most important one. As also discussed above, group dynamics, external socio-political influences, organizational survival, and individual leadership psychology may be all (or in part) involved in this decision. Escalation to use of WMD also could sometimes be
opportunistic, the result of a capability becoming available or of necessity, vice any weighing of costs and gains. But there are sufficient grounds to believe that there often would be an element of rational calculation in terrorist decisions about WMD use to warrant thinking about influencing that calculus - even if the available leverage points and means of impacting them may or may not be sufficient in specific instances to affect that calculus decisively.

13 Disaggregate the Terrorist “Whom”

There is a wide variety of “whom” that effort to influence terrorists’ WMD calculus could be directed toward. These different potential targets of any such influencing efforts can be disaggregated in terms of: first, the specific group; second, the types of individuals likely to be involved in any terrorist WMD attack - or what is termed here the group’s component entities; and third, the wider set of outsider potential “aiders and abettors” of a WMD attack (including state supporters).

More specifically, as discussed in Section 2 of this report, there is a wide range of terrorists groups and component entities. For ease of reference, these groups are divided most broadly into al-Qaeda and the non-al-Qaeda. As discussed in Section 2, the latter’s motivations are considerably lower to escalate to WMD violence, especially indiscriminate violence. In addition, possible lone-wolf terrorists seeking to use WMD need to be included in this initial typology of “groups.”

In addition, with the exception of lone wolf individuals, it is important to distinguish among the many different component entities that comprise a terrorist group - and whose support and involvement would be needed to carry out a successful WMD attack. Some of these component entities are quite clear-cut, e.g., the leaders that would make the decision to escalate to a WMD attack and the dedicated operatives that would seek to carry it out. Particularly with regard to al-Qaeda, it is useful to distinguish the core leadership represented by Osama bin Laden and Ayman al-Zawahiri from newly emerging leadership associated with the insurgency in Iraq, as well as al-Qaeda inspired individuals in affiliated groups and self-directed cells. In still other groups, e.g., Jemaah Islamiyah in Indonesia, there may also be a distinction between the leadership of more versus
Influencing Terrorists' WMD Acquisition and Use Calculus

less extremist factions. But two other entities need to be considered. There also could well be insider aiders and abettors, that is, ideological supporters or fellow-travelers of the terrorist group who could provide important indirect support to a successful WMD attack. Examples could include financiers, providers of information and technical assistance, and individuals prepared to offer lodging or other logistics aid. Finally, influencing efforts also could be directed at more youthful potential future recruits and supporters to a terrorist organization.

Finally, in thinking about the “who” of whose WMD use calculus to try to influence, there is a wide spectrum of outside “aiders and abettors.” Contrasted with the insider aiders and abettors already discussed, these entities would not be directly affiliated with the terrorist group. An A.Q. Khan-like individual selling technical know-how to al-Qaed would be one example; a disaffected Russian scientist selling access to a nuclear-weapon storage site would be another. A criminal organization helping a terrorist group transport stolen nuclear weapons material out of the former Soviet Union would be still a further example. In all of these instances, the outsider aiders and abettors would not be members of a particular terrorist group or supporters of it but they could cooperate with it.

Among these outsider aiders and abettors, an initial distinction is between state sponsors on the one hand and individual or organization aiders and abettors on the other. The former category of state sponsors also needs to be broken down further into different types of potential state sponsor involvement: authorized and official support to acquisition of WMD by a terrorist group; unauthorized involvement by officials or other nationals, possibly resulting from a lack of effort in putting in place measures to prevent such involvement; and unintentional entanglement, reflecting terrorist access to WMD-related know-how, materials, or personnel despite government best-faith efforts to prevent that access.

Within the set of individual and organization outsider aiders and abettors, it also is useful to distinguish among types of support. Here, a functional approach can be followed. Depending on the person or organization, outsider aiders and abettors can provide support of different types. Technical know-how and art - the often-unwritten knowledge needed to make a particular production process work effectively or to carry out a given operational step in an attack - may be the most important type of support. From Aum Shinrikyo’s failed attempt to aerosolize anthrax to the aborted 2004 ricin plot, lack of access to such technical art has been a repeated source of terrorist attack failure. At the other end of the attack chain,

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4 The importance of including more youthful potential future recruits, including individuals conceivably in their teens, was suggested both by Stephen Lukasik (one of the SAIC team members) and by Dr. Walid Phares (a participant in the Shaping Terrorist WMD Use Calculus session.)
Influencing Leverage Points - perceptions of WMD use

- Justifiability, legitimacy, and consistency with basic values
- Serves organization’s goals
- Feasibility of acquisition and successful attack
- Effective use of resources
- Too risky or imprudent

assistance in acquisition could help a terrorist group to defeat national control measures. Or as discussed in Appendix 5, criminal organizations could help a terrorist group to transport WMD inputs or even a full-up weapon.

14 Identify Potential Leverage Points

Of equal importance to disaggregating the “whom” of the terrorist WMD threat, any effort to influence terrorists WMD calculus needs to be based on an identification of the potential leverage points that might be used in targeting specific groups and their component individuals. The analysis in Part 1 of this report suggests that at least in principle there is a spectrum of such possible leverage points. Is the use of WMD—and quite possibly the killing of innocent civilians—justifiable and legitimate in the terms of whatever religious or moral teachings adhered to by the group and equally so its wider public audience of potential supporters? Most broadly, how smart would be the use of WMD as a means to achieving the goals that animate the group and its members? What is the prospect of technical success whether in acquiring WMD or in carrying out a successful attack—the feasibility issue? Are there other, better ways to use existing technical, organizational, financial, operational, and other resources than seeking to acquire and then use WMD—again related partly to the prospects for a successful attack? And how much risk would be involved in attempting to acquire and use these weapons?

Depending on the group as well as the components within it, the answers to such questions are almost certain to vary. In some instances, as noted below, there may be no high confidence leverage point to influence terrorists’ calculations. For those cases, other counter-terrorist means, including denial measures, will bear the entire burden of protecting the United States and its allies and friends. In other instances, however, there may well be leverage points that can be used in an influencing strategy. Moreover, even if those influencing efforts do not fully succeed in influencing the choices of different individuals, those efforts may still lead individuals to hesitate, to make mistakes, and to increase the likelihood that other prevention to interdiction efforts may block a terrorist WMD attack.

15 Disaggregate among the Types of WMD

The differences among the types of WMD—chemical, biological, radiological, and nuclear weapons—are well acknowledged. Efforts to influence the terrorists WMD use calculus should take those differences into account. In particular, depending on the specific type of WMD, different leverage points could take on greater importance. For example, for nuclear weapons, issues of the justifiability of indiscriminate mass killing would be a key issue as well as the smartness of such killing as a means to the group’s goals. Or, to the extent that access to biological agents in a future of global science and bio-industries could be through the missteps of an individual scientist, an emphasis on creating codes of good scientific conduct could come into play. In turn, the possibility of more discriminate uses of chemical or biological weapons may open up influencing opportunities aimed at using denial efforts to create a presumption that limited use is not an effective use of resources and may be too risky
given potential payoffs. At that same time, there may well be many cross-cutting leverage points across the different WMD types.

16 Think Broadly Regarding “Who” Does the Influencing

Many different entities need to be involved in any such efforts to influence terrorists’ WMD acquisition and use calculus. At one level, governments have a role to play. To the extent possible, the United States should seek the support and involvement of other like-minded governments. This would include not only traditional U.S. friends and allies, but also other governments throughout the Muslim world.

Influencing terrorists’ WMD calculus, however, is not simply a government problem. There also is likely to be a role for international, non-governmental, and community organizations. International organizations include traditional entities, from the United Nations to regional political groupings. Depending on the type of individual to be influenced, traditional and non-traditional non-governmental organizations may be sometimes a means of influencing. Examples would include professional, scientific, and academic organizations in the biological sciences, industry associations across the chemical, biological, and nuclear fields, Islamic but also non-Islamic religious councils and associations, non-violent wings of domestic political-separatist movements across different countries, and prominent groupings of individuals with religious, social action, or other affiliations. Certain types of individuals alone, e.g., a highly-respected clerical authority, also could be sources of influence on at least some of the possible groups and component individuals. Moderate American Muslims also may be able to exert some impact on the thinking of the wider Muslim community around the globe that is the ultimate audience as well as the source of recruits for the Jihadist movement inspired by al-Qaeda.

17 Use Soft and Hard Power, Words and Deeds

Influencing the WMD acquisition and use calculus of different terrorist groups and their component entities will call for a mixture of both soft and hard power or words and deeds. At the core of soft power could be efforts to foster a debate and influence perceptions of the legitimacy and justifiability of WMD use - and the impact of that use on the wider audience’s of different groups. Efforts to encourage moderate Islamic leaders, clerics, and community groupings to speak out against WMD use would be one example. National declaratory policies also could contribute to de-legitimizing WMD use among a wider audience as well as influencing perceptions of the risks of becoming involved in WMD terrorism. From a narrowly American perspective, what officials say can also influence perceptions around the globe of American intentions, policies, and ultimately whether the United States is seen to be a factor of “good or evil” in world affairs.

Hard power also figures into implementation of this overall framework for influencing the terrorist WMD calculus. Perhaps most clearly, such power can influence perceptions of whether involvement in WMD acquisition and use would be smart as well as whether such activities would be imprudent or too risky. Hard power ranges across the spectrum of organizations from law enforcement to covert operations to outright military operations. It includes not only military power but also economic and financial means. In turn, actions not directed at influencing terrorists’ calculations clearly also can have an impact for good or ill, e.g., provision of assistance to victims of natural disasters, support for economic and political
change, efforts to encourage the resolution of internal and regional disputes, and uses of force
to support American interests.

More specifically, the potential blowbacks from the uses of hard power in increasing the
perceived acceptability of WMD use among a terrorist group’s wider audience need to be
carefully considered. One of the goals of terrorist attacks, including not least by al-Qaeda or
al-Qaeda affiliates may well be to provoke an overreaction by the United States that would
strengthen their support among their publics. Somewhat differently, a widespread distrust and
condemnation of the United States within the Islamic world has been one of the adverse
spillovers of the war in Iraq, thereby making it more likely that any al-Qaeda or affiliate use of
WMD against the United States would be tolerated if not applauded. Conversely, American
support for tsunami aid to Indonesia may have had the opposite effect, at least slightly muting
negative perceptions of the United States in that country compared to some other Muslim
countries.5

In the areas of applying both soft and hard power to influence terrorists’ WMD calculus,
however, the United States is playing catch-up. There still has not been an authoritative,
moderate Islamic response to the 2003 Sheikh al-Fahd fatwa justifying mass killing, while U.S.
public diplomacy to influence negative Muslim attitudes toward the United States has made
very little progress in changing those attitudes. As noted, the war in Iraq has generated deep
resentment and fear of the United States in those very audiences of Islamist extremists. In
turn, more than six years after the 9/11 attacks, both Osama bin Laden and Ayman al-
Zawahiri remain at large as does the still unknown “anthrax mailer” of late 2001. Their
escapes cannot but effect perceptions of the risks of being caught and punished for carrying
out or aiding or abetting a WMD attack.

18 **Seek Initial Cross-Cutting Influencing Actions**

Finally, in implementing any such influencing strategy, top priority should be paid to any
cross-cutting actions that might influence more than simply a single group or component
entity. Such cross-cutting actions, as will be argued below, exist. Their pursuit would be a
place to begin to implement this type of influencing strategy even while fine-tuning the
approach to specific groups and entities.

2. **Influencing terrorists WMD Calculus—Illustrating the Concept, Assessing the Prospects**

Turning now to a set of specific groups-component entities, the following section
illustrates how the preceding conceptual framework could be applied in practice. To do so, it
first presents a summary overview assessment of the applicability of the potential leverage
points across different terrorist groups and component entities. With that background, the
discussion then turns to the specific cases. These cases have been selected to cover the
spectrum of potential “influencing challenges,” from the al-Qaeda core leadership (the
toughest case) to individual outsider aiders and abettors (potentially the case most susceptible

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5 On a series of questions, Indonesian public attitudes toward the United States were negative but slightly less
so than in Morocco, Egypt, or Pakistan. See Steven Kull, Principal Investigator, “Muslim Public Opinion on
US Policy, Attacks on Civilians and al Qaeda,” WorldPublicOpinion.ORG, University of Maryland, April 24,
Influencing Terrorist WMD Calculus – An Overview Assessment

Although U.S. counter-terrorism policy and posture now acknowledges the legitimacy of thinking about how to influence the thinking of terrorist groups concerning acquisition or use of WMD, there remains considerable skepticism about successfully influencing terrorists’ WMD acquisition and use calculus. The accompanying summary (Table 3.2.1) on the following page suggests that such skepticism both has merit but that it also should not be overdone. More specifically, some overarching points stand out:

- Depending on the particular group and its component entities, the availability of potential leverage points clearly varies considerably. Not surprisingly, there is a significant difference between the al-Qaeda core leadership and its affiliated groups or inspired cells and the non-al-Qaeda. Within the constellation of al-Qaeda related entities, however, there also are differences in possible susceptibility to influence. There also appear to be more potential leverage points for seeking to influence the calculations of outside aiders and abettors, including individuals, organized criminal groupings, and state-related entities.

- Across the different terrorist groups and component entities, efforts to influence perceptions of the more instrumental aspects or “smartness” of WMD acquisition and use appear the most promising - its role in serving the group’s goals, its feasibility, its effective use of group resources, and its potential risk or backlash. In regard to the latter leverage point, particularly for less committed individuals as well as outsider aiders and abettors influencing perceptions of risk may be very important. Even so, for some entities, efforts to influence perceptions of the justifiability and legitimacy of WMD use should not be dismissed out of hand.

- A number of leverage points to influence the calculations of insider aiders and abettors providing different types of indirect support to an operation also are evident. To a greater degree than more dedicated operatives, such supporters may be subject to influence through raising questions about the feasibility, effectiveness, and risk of their involvement.

- Closely related, multiple, promising leverage points for seeking to influence outsider aiders and abettors are a prominent feature. Indeed, this set of individuals may be the most promising target for such influencing efforts, using multiple approaches. A focus on outsider aiders and abettors also is consistent with efforts to apply an influencing strategy as early as possible in possible pursuit of a usable WMD capability by terrorist groups and their component entities. Multiple leverage points also exist to influence state supporters.

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6 In addition to the small expert session held at SAIC, the results were briefed to an ongoing “terrorism roundtable” organized by Rita DiCasagrande and Michael Moodie.
<table>
<thead>
<tr>
<th>Group-entity/ Potential leverage from perceptions of:</th>
<th>Justifiability and legitimacy</th>
<th>Serves organization's goals</th>
<th>Feasibility</th>
<th>Effective use of organizational resources</th>
<th>Too risky or imprudent</th>
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</thead>
<tbody>
<tr>
<td>Al-Qaeda core leadership</td>
<td>None</td>
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<td>Some</td>
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<td>Al-Qaeda operatives</td>
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<td>Al-Qaeda aiders and abettors - insiders</td>
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<td>Some</td>
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<td>Some-Considerable</td>
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<td>Al-Qaeda affiliated groups &amp; entities</td>
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<td>Some-Considerable</td>
<td>Some-Considerable</td>
<td>Some-Considerable</td>
<td>Some</td>
</tr>
<tr>
<td>Al-Qaeda inspired groups or cells</td>
<td>None-Some</td>
<td>Considerable</td>
<td>Considerable</td>
<td>Considerable</td>
<td>Some</td>
</tr>
<tr>
<td>Non-al-Qaeda (Islamic - Hezbollah, Hamas) - leaders</td>
<td>Some</td>
<td>Considerable</td>
<td>Considerable</td>
<td>Considerable</td>
<td>Considerable</td>
</tr>
<tr>
<td>Non-al-Qaeda and Non-Islamic - (Tamil Tigers, FARC) -- leaders</td>
<td>Some</td>
<td>Considerable</td>
<td>Considerable</td>
<td>Considerable</td>
<td>Some</td>
</tr>
<tr>
<td>Domestic right-wing extremists - leaders</td>
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<td>Considerable</td>
<td>Considerable</td>
<td>Some</td>
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<tr>
<td>Domestic left-wing extremists</td>
<td>Some</td>
<td>Considerable</td>
<td>Some</td>
<td>Some</td>
<td>Considerable</td>
</tr>
<tr>
<td>Anti-globalists - leaders</td>
<td>Some</td>
<td>Considerable</td>
<td>Some</td>
<td>Some</td>
<td>Considerable</td>
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<tr>
<td>Loners</td>
<td>Some</td>
<td>Some</td>
<td>Considerable</td>
<td>Some</td>
<td>Considerable</td>
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<tr>
<td>State supporters - authorized</td>
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<td>Some-Considerable</td>
<td>None</td>
<td>Some</td>
<td>Considerable</td>
</tr>
<tr>
<td>State supporters - unauthorized</td>
<td>None-Some</td>
<td>Considerable</td>
<td>Some-considerable</td>
<td>Some</td>
<td>Some</td>
</tr>
<tr>
<td>Outsider aiders and abettors</td>
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<td>Some-considerable</td>
<td>Considerable</td>
<td>Some-considerable</td>
<td>Considerable</td>
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Table 3.2.1: Influencing Terrorists WMD Use Calculus – Applicability of Potential Leverage Points
Application in practice of any influencing strategy clearly will depend on an ability to tap into detailed knowledge about the thinking and workings of a wide range of terrorist groupings and component entities. For that reason, it will be important to think through possible priorities for influencing actions across the groups and entities as well as to seek to identify potential cross-cutting actions that might be pursued regardless of the specific group or entity. (Nonetheless, as noted below, a number of cross-cutting actions to work these leverage points also stand out and could be pursued regardless of the specific group or entity).

Turning to the specific groups and component entities, the following discussion illustrates these points in a series of specific cases. Particular attention is paid to elements of al-Qaeda, given its immediate threat to the United States and the fact that it stands out from the next generation WMD terrorist threat. Brief consideration also is given to some of the “non-al-Qaeda” groups and entities. For these groups, as discussed in Section 2, there are significant constraints on their pursuit or use of WMD within the next generation terrorist threat. An influencing strategy would seek to reinforce those constraints. Two final cases considered are state-supporters and the broad category of outsider aiders and abettors that could assist any group’s pursuit or use of WMD.

For any one of these illustrative cases, readers may question one judgment or another concerning the potential applicability of different leverage points, what specific actions to take and their potential effects, and overall how best to influence that group-entity’s WMD calculus. Nonetheless, taken together, the set of cases serves to reinforce the initial contention that efforts to influence terrorists WMD calculus should be one part of an overall strategy for countering next generation WMD terrorism.

2.2 The Al-Qaeda Core Leadership

Efforts to influence the WMD calculus of the al-Qaeda core leadership – Osama bin Laden, Ayman al-Zawahiri, and their close associates in al-Qaeda center presumed to be located in the Pakistan-Afghanistan border – are the toughest case. Their writings and statements make clear that for them, even indiscriminate killing using nuclear or biological weapons is seen as fully legitimate and justifiable. Once in possession of WMD, the core leadership would have no moral or religious compunctions concerning use. For them, there is no controversy about the legitimacy or morality of using WMD against all enemies even if it results in loss of life among Muslims.” This leverage point simply does not apply.

Illustrative Cases

- Al-Qaeda core leadership
- Al-Qaeda affiliates and al-Qaeda inspired “cells
- Al-Qaeda aiders and abettors -- individuals
- Non-al-Qaeda – Islamists -- leaders
- Non-al-Qaeda – non-Islamists -- leaders
- State supporters – unauthorized or authorized and official
- Outsider aiders and abettors -- individuals

Smartness of WMD Acquisition and Use

By contrast, the core leadership’s perception of whether WMD use would serve their core goals, be a feasible and effective use of the organization’s now-constrained resources, and be prudent are more promising leverage points. In effect, any influencing strategy aimed at this

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7 See the discussion in Givner-Forbes, op. cit... Also see, Brachman, op. cit.
core leadership would need to look for ways to influence that leadership’s perceptions of whether WMD use would be smart.\(^8\) Consider several dimensions.

Whether or not WMD use would have a decisive impact in changing U.S. policies would be a key element in the al-Qaeda core leadership’s thinking about WMD use.\(^9\) That leadership’s goals are well-known: eliminating U.S. influence from the Middle East and the wider Muslim world, encouraging an Islamic renewal, and ultimately creating a new Caliphate.\(^10\) To the extent that WMD use is seen likely to shatter U.S. political will and resolve, the attraction of WMD acquisition and use would grow. By contrast, effective U.S. and global pursuit of the full suite of denial measures set out in the preceding section would create uncertainties in that leadership about the feasibility and impact of WMD use. From prevention to consequence management, from detection to interdiction, those activities all contribute to this dimension of an influencing strategy. Moreover, even if these measures were not completely effective, they still could have an important influencing impact in two ways. First, these actions could limit the expected potential impact of a WMD attack, which would be important if the core leadership’s wanted to be able to impose a very high level of WMD damage on the United States and not simply to carry out an isolated or limited WMD attack.\(^11\) Second, by adding uncertainties about the prospects for success, these measures could lead the leadership to invest its scarce resources in the more proven “bombs and bullets” modes of attacks that have long been at the core of its operational code.\(^12\)

In this context, the types of population protection initiatives already discussed – as well as efforts to enhance public resilience – take on even greater importance. The potential role of population protection in influencing the al-Qaeda core leadership’s WMD calculus provides yet another argument to step up to the challenge of protecting the American public from terrorist WMD attack. Closely related, plans, procedures, and capabilities to manage successfully the physical, psychological, social, and economic consequences of a radiological weapon attack and promoting resiliency could contribute to influencing the core leadership’s thinking about that mode of attack. To maximize their potential influencing impact, such actions could be packaged into a well-publicized Presidential commitment to the goal of protecting the American population, beginning first with the less difficult challenge of protection against more discriminate uses of biological agents, to be followed by actions to enhance protection against high-lethality biological agents and to protect nearby publics from the secondary effects of a nuclear detonation.

Other U.S. actions also can be used to signal to the al-Qaeda leadership that escalation to WMD will neither break U.S. will nor bring about an al-Qaeda victory. The outcome of the Iraq War is likely to be a key factor in shaping those perceptions of U.S. resolve for better or

\(^8\) The participants in the SAIC session on “Shaping Terrorists' WMD Calculus” as well as those in the “Roundtable Series on WMD Terrorism” concurred that what is termed here an influencing strategy directed at the core leadership should focus on that leadership’s perception of whether WMD use would be smart.

\(^9\) This point was made by several participants in the SAIC session on “Shaping Terrorists' WMD Calculus”.

\(^10\) See the discussion of al-Qaeda’s goals in Section 2, Parts 3 and 4 above.

\(^11\) This possibility that the size of the possible attack could be a factor in the core leadership’s calculus about whether to use or not use WMD was suggested to the author by Dr. Walid Phares.

\(^12\) For one discussion of al-Qaeda’s operational code, see Dunn, “Can al-Qaeda be Deterred from Using WMD?”, op.cit., pp. 8-17.
for worse. At the least, it would be important to signal U.S. intentions to remain engaged in the Middle East even after that war ends. Building habits of global cooperation against WMD terrorism along the lines discussed above also serves to signal the core leadership that WMD use would not defeat the United States and other countries.

**Encouraging Debate within the Muslim Community**

Still another but more controversial influencing action would seek to heighten concerns that WMD use would provoke a backlash among the wider Muslim audience that al-Qaeda seeks to rally to its cause. One way to do so would be to encourage more moderate Muslims at all levels to speak out against WMD use. Across the global Muslim community, as reflected in recent public opinion data, there is widespread rejection of Jihadist attacks on innocent civilians, including American civilians. Islamic religious associations and other groupings should be urged to speak out to this effect. Though it would be difficult and probably counter-productive for U.S. officials to encourage them to do so, the United States could seek to work behind the scenes with friendly Muslim government to achieve that objective. In turn, a wider theological debate on the issues of justifiability and legitimacy should be encouraged. Opinion differs, however, on the impact of such efforts.

On the one hand, some U.S. experts argue that the core leadership ultimately arrogates to itself the right to act on behalf of the right-thinking community. It also believes that a successful use of WMD that forced the United States out of the Muslim world would rally Muslims to al-Qaeda. Thus, the core leadership would not be prepared to temper its actions in response to concerns about Islamic public attitudes.

On the other hand, the fact that the core leadership has invested considerable energies in arguing for the legitimacy of WMD use is but one indication that there has been push-back on this question. Indeed, the most authoritative Jihadist religious discourse on this subject, the May, 2003 fatwa by Nasir bin Hamd al-Fahd, explicitly acknowledges such questions about killing innocent civilians by its references to “specious arguments” against the use of WMD before seeking to counter each of those arguments. In addition, in his October 11, 2005 letter to Musab al-Zarqawi, Ayman al-Zawahiri expressed concern about the excessive violence of al-Qaeda in Iraq and went on to emphasize that:

> If we are in agreement that the victory of Islam and the establishment of a caliphate in the manner of the Prophet will not be achieved except through jihad against the apostate rulers and their removal, then this goal will not be accomplished by the mujahed movement while it is cut off from public support. . . .

Al-Zawahiri continued that “[t]herefore, the mujahed movement must avoid any action that the masses do not understand or approve, if there is no contravention of Sharia in such

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13 See Kull, op. cit. passim.
14 These points were emphasized by Paul Jabber in the SAIC session on “Shaping Terrorists WMD Calculus.”
15 Recall the discussion of this dimension in by DeMarce, Kovner, and Moran and Givner-Forbes and Kovner in Section 2, Parts 3 and 4.
avoidance, as long as there are other options to resort to . . . .”

Most recently, Osama bin Laden spoke out in his October 23, 2007 audiotape against the “fanaticism” of the “mujahadin in Iraq,” stressed that “[t]he strength of the faith is the strength of the bond between Muslims and not that of a tribe or nationalism,” and urged that “. . . the interest of the Umma should be given priority . . . .” Somewhat differently, this message again highlights the extent to which the al-Qaeda core leadership is sensitive to the impact of actions on the wider Muslim community.

Readers can strike their own balance between these two perspectives. At the least, the preceding statements suggest that the argument should not be dismissed out of hand that one part of any influencing strategy should include efforts to encouraging concerns among the core leadership about the impact of WMD use on the wider Ummah. There also would few if any downsides of seeking to do so as part of an overall influencing strategy.

Setting aside efforts to encourage the wider Muslim community to speak out against WMD and attacks on innocent civilians, the message sent by senior-most U.S. officials about how the United States would respond to use of WMD also is a means to influence the al-Qaeda core leadership’s WMD use calculus – influencing its perceptions of whether use would serve its goals, be effective, and be prudent. At first glance, signaling that any attack would provoke an all-out mobilization of American energies to destroy al-Qaeda’s leadership as well as the network could be seen as one way to raise the perceived risks of WMD use. But U.S. and Western signaling that an attack would provoke a completely no-holds-barred effort to destroy the leadership could conceivably backfire. One goal of any WMD use by al-Qaeda’s leaders could well be to provoke an indiscriminate American reaction, striking out widely against potential al-Qaeda sanctuaries in other countries, perceived supporters, and possibly even including intensified police and other actions against American Muslims. Such a response would help in turn to rally support for al-Qaeda’s goals among the wider Muslim community, while radicalizing the more moderate American Muslim community. For that reason, U.S. policymakers would need instead to send the message that any American response would be very costly to the pursuit of al-Qaeda’s goals but also tempered and tailored in such a manner as to make it harder for al-Qaeda to build support within its wider Muslim audience.

One final possibility concerning the use of WMD – especially nuclear weapons – by al-Qaeda’s core leadership warrants brief mention. For bin Laden and al-Zawahiri once in possession of a nuclear weapon, that weapon could be “too valuable to use.” That is, a nuclear weapon or even several nuclear weapons could offer a means to deter attack, coerce adversaries, and claim legitimacy as well as power throughout the Islamic world. This approach would be consistent with bin Laden’s past declarations in which he has offered a truce to those countries that would break with the United States as well as with other actions.

17 “Letter from al-Zawahiri to al-Zarqawi,” October 11, 2205, Released by the Office of the Director of National Intelligence, ODNI New Release No. 2-05, p. 4, p.5
19 This discussion draws on the author’s discussion with a variety of experts at several workshops at which this basic concept of influencing terrorists WMD calculus was set out. These terrorism experts repeatedly stressed the possibility that any al-Qaeda leadership attack would be partly intended to provoke an American extreme overreaction abroad but also at home.
that showed him thinking as a virtual state-in-becoming. Nonetheless, even assuming that the core leadership could choose not to use a nuclear weapon but to hold it in reserve, there appears little if any acceptable room for the United States to influence that particular bin Laden calculation.20

2.3 Al-Qaeda Affiliates and al-Qaeda Inspired Jihadist Cells – Leaders and Operatives

The leaders of al-Qaeda affiliated organizations and of al-Qaeda inspired Jihadist cells comprise two other entities. The former are typified by the leaders of Jemaah Islamiyah in Southeast Asia, the latter by the cells responsible for a series of terrorist attacks or attempted attacks in the United Kingdom in 2005, 2006, and 2007. Contrasted with the al-Qaeda core leadership of bin Laden and al-Zawahiri, as suggested by Table 3.2.1 above, the leaders and operatives that make up these entities may be somewhat more subject to influence.21 There is some evidence, for example, that there have been differences within the leadership of Jemaah Islamiyah about escalation to WMD violence and that off-shoots from the mainstream may be more likely to use WMD.22 Within South Asia, whether or not to go beyond traditional bombs and bullets terrorism also is far from a foregone conclusion. Somewhat differently, more ad hoc al-Qaeda inspired Jihadist cells also face greater resources and operational constraints, thereby affecting their choice of means.

The top priority of influencing efforts aimed at these two sets of entities would be the types of actions already identified aimed at influencing perceptions of the “smartness” of WMD use. As in the case of the al-Qaeda core leadership, the goal would be to create uncertainties within the leaders and operatives about whether WMD use would be serve the group’s goals (or possibly backfire), whether it would be an effective use of the group’s organizational talents and resources compared to other traditional terrorist means, and the risks of seeking to acquire and use WMD.23 Closely related, still other actions could seek to influence perceptions of the feasibility of successful acquisition and use. Specific actions to influence these leverage points could range widely from advances in U.S. and other denial capabilities from interdiction to protection against WMD attack, from preventing access to materials to consequence management of lesser WMD attacks. The specific initiatives discussed in Section 2, Part 1 above would fit in here as well. To have an influencing payoff, however, it would be necessary to use declaratory policy, exercises, and other visible means to demonstrate enhanced capabilities.

In contrast with the al-Qaeda core leadership, the potential impact may be somewhat greater of efforts aimed at influencing the perceptions of the justifiability and legitimacy of WMD use within affiliated or inspired cells, especially of WMD use entailing indiscriminate...
killing. The effort set out above to foster a wider theological and public debate within the Islamic world on this issue would fit in here. One specific target of such influencing actions should be the next generation of possible Jihadists among the youth as well as the wider clerical community that may influence the thinking among the pool of potential next generation Jihadists. These younger individuals are the future of Jihad. Unlike the core leadership, they may yet be open to arguments about the legitimacy and justifiability of WMD use.

As for the prospects for successfully influencing the WMD use calculus of these al-Qaeda affiliates and inspired Jihadist cells or leaders, the prospects for success are difficult to gauge. Those prospects do appear greater in the case of these affiliated and inspired organizations than in that of the al-Qaeda core leadership. Equally so, there would be few if any downsides in seeking to do so.

2.4 Al-Qaeda Aiders and Abettors - Insiders to Fellow-Travelers

Within al-Qaeda itself, there would be aiders and abettors all along the chain from acquisition of WMD through a successful attack. Some of these persons may provide support without any knowledge of its ultimate purpose, for example, in the case of financiers that would simply contribute to the overall efforts of the organization. But other persons might be more directly linked to the WMD effort. Among these aiders and abettors, their direct level of involvement in the organization could vary, from relatively committed insiders to fellow-travelers and sympathizers. Closely related, there are likely to be differences among individuals in terms of their readiness to run risks – up to putting their well-being and life in jeopardy. (Outsider aiders and abettors are discussed separately below).

A influencing strategy aimed at influencing aiders and abettors within the al-Qaeda-Jihadist movement could seek to make use of several potential leverage points: questions about the feasibility of acquiring and then carrying out a WMD attack, uncertainties about whether providing support to such an effort was the most effective way to support the goal of global jihad, and not least, perceptions of the potential risks of involvement. More so than with the al-Qaeda core leadership, questions about the justifiability and legitimacy of use of WMD if it entailed mass killing of innocent civilians cannot be simply set aside as a potential factor in the thinking of some of these individuals. Again, one purpose of these influencing efforts would be create second thoughts on the part of these insider aiders and abettors with the possibility that such hesitation could lead to mistakes, delays, and in other ways make a successful attack less likely.

Many of the influencing actions already identified would apply, as well, in the case of al-Qaeda aiders and abettors. Particular emphasis could be placed, however, on actions aimed at influencing perceptions of the perceived risk to individuals of indirectly or directly becoming involved in efforts to acquire the means for a WMD attack or to carry out such an attack. One place to start would be explicit declaratory policy statements by the United States and as many like-minded countries that they would join together to hold individuals accountable for

24 At the SAIC “Shaping Terrorists’ WMD Calculus” session, there was a general consensus that an influencing strategy might have greater effect among these al-Qaeda affiliated and inspired groups-entities.

25 Several participants in the SAIC session highlighted efforts to influence the pool of younger future Jihadists, not only on this issue of WMD use but more generally.
such WMD-related activities. These statements could be couched partly in terms of support for universal adherence to and implementation of the International Convention to Suppress Acts of Nuclear Terrorism which obligates all of its parties to cooperate against nuclear terrorism. Reference could also be made to United Nations Security Council Resolution 1540 which in its case obligates all states to put in place controls against non-state actors efforts to acquire WMD. Highly publicized support for efforts by all states to put in place needed legal authorities and other mechanisms to allow cooperation to apprehend and/ or extradite or prosecute WMD aiders and abettors also would signal heightened risks.

Going a step further, states could cooperate to make examples of publicly known figures detected involved in helping non-state actors gain access to WMD materials or know-how. Well-publicized prosecutions could be one means to do so; more direct covert action is another. Again the purpose would be to cause still other on-looking individuals to reassess their own risks and the desirability of becoming a party to WMD-related terrorism.

2.5 Non-al-Qaeda - Leadership of Islamist Groups

For the foreseeable future, as argued in Section 2, the leadership of the most prominent other Islamist groups such as Hamas and Hezbollah is likely to believe that there are good reasons not to escalate to WMD violence. The challenge for influencing efforts, therefore, is to reinforce those reasons. Several specific leverage points exist.

Perhaps the most important leverage point would be uncertainties about whether WMD violence would serve the organization's goals. For Hamas and Hezbollah, these uncertainties likely include whether such use would make it harder to achieve respectively the creation of a Palestinian State or a radical Islamist-dominated Lebanon. WMD use could well alienate their internal audiences as well as friendly states and groupings (e.g., the European Union), provoke Israel, and undermine their claims to legitimate authority. Questions about the feasibility of acquiring and using WMD effectively as well as comparisons with the relative effectiveness of more traditional means also would be leverage points. Not least, for the leaderships of both Hamas and Hezbollah, the risks of escalation to WMD violence could be considerable. Both entities court European official opinion, depend on outsider financial and political support, and control territory and constitute political entities subject to retaliation. Nor is the justifiability and legitimacy of WMD use by these Islamist groups taken as a given. Indeed, more indiscriminate WMD use also could harm key constituents due to spillover effects, eroding in turn the legitimacy of the groups' claim to leadership.

Continued efforts to strengthen the international consensus against WMD terrorism would be a starting point to reinforce these existing reasons not to escalate to WMD violence. Visible cooperation on the part of the United States and its European allies, for instance, would help to signal that WMD use would undermine needed external support. Conversely, at least in the case of Hamas, progress toward an eventual Palestinian State would undercut any arguments about the need for even more extreme violence. The many types of actions already discussed to make it harder for any type of non-state actor to acquire WMD also could contribute by influencing perceptions of the feasibility and relative effectiveness of that course of action. Still other efforts to encourage moderate Islamic clerics and leaders to speak out against the justifiability and legitimacy of WMD use could reinforce the perception that such
use would not be welcomed by the core constituencies of either Hamas or Hezbollah but would weaken the legitimacy of both groups’ leaderships.

2.6 Non-al-Qaeda – Leadership of Non-Islamist Groups

Taken as a whole, as discussed in Section 2, the next generation non-al-Qaeda terrorist groups also are unlikely to be attracted to the acquisition and use of WMD violence of any type or level. In particular, indiscriminate killing would be at odds with the more political-instrumental use of violence that they have pursued in the past. For these groups, use of more traditional means holds out greater potential to influence rather than alienate their domestic and international audiences - and to advance their agendas. However, the possibility cannot be dismissed that over time at least some of these groups and their component entities time could be attracted to more discriminate uses of WMD violence. Further, two of the most prominent past uses of WMD involved non-Islamic extremists - the use of both anthrax and sarin by Aum Shinrikyo and the use of hydrogen cyanide by the Tamil Tigers (LTTE).

However, in the former case, the leadership kept its plans secret from the members who would have found such use at odds with the organization’s overall moral code; in the latter case, use was highly opportunistic, reflecting a mixture of an available means and a military necessity.

In thinking about influencing the thinking about WMD acquisition and use of the leadership of this set of non-Islamist, non-al-Qaeda groups, four points are in order. First, even more so than in other cases, influencing actions should be focused not only on use but also on acquisition as well as the other prior steps leading up to use. This relative focus would be justified by these groups’ more limited motivations to acquire WMD in the first place.

Second, virtually all of the leverage points and related actions already discussed apply. Influencing actions can seek to influence leaders’ perceptions of whether WMD use would serve the group’s goals, be feasible, be a diversion of resources from potentially more effective strategies, and be too risky. Different ways of seeking to influence perceptions across these leverage points have already been highlighted, not least that wide range of denial steps aimed at making it harder for terrorists to acquire the materials for and to carry out successfully a WMD attack. Highly visible international cooperation against individual WMD terrorists also could heighten the perceived risks of taking this step beyond traditional “bombs and bullets” terrorism.

Third, for the leaders of these non-al-Qaeda groups, the justifiability and legitimacy of WMD use (including indiscriminate WMD use) is not taken as a given. In principle, therefore, the payoffs could be greater of influencing actions aimed at reinforcing the illegitimacy of WMD use and the perception that such use would erode the leadership’s position among the group’s own followers. In practice, it may be difficult to influence directly those perceptions, given the lack of any ongoing debate as appears to exist within the Islamic community. Instead, influencing actions should be aimed at influencing the overall social, cultural, religious, and behavioral milieu in which leadership decisions would be made. By way of example, leaders of non-Islamic religious, political, and social organizations in countries suffering from terrorist violence could be urged to speak out against WMD use. Efforts

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26 Comment to the author by Dr. Marc Sageman, based on his study of the Aum Shinrikyo incident.
might also be made to identify and counter any emergent advocates of such use among the non-al-Qaeda entities, perhaps evidenced initially by discussions within Internet chat rooms. More general efforts aimed at de-legitimizing WMD also could play a part in influencing the overall global milieu, e.g., reaffirmation by the NPT parties of the goal of the elimination of nuclear weapons, well-publicized cooperation by many states to implement UNSCR 1540 to prevent non-state actors from gaining access to WMD, and declarations by the Security Council as well as regional political groupings. Whether or not the United States and other countries condemn more limited WMD use also could be a factor. This is especially so because some of these non-al-Qaeda groups, as discussed in Section 2, could be attracted to more discriminate WMD use. (For this reason, the lack of global condemnation of the use of an explosives-chlorine mixture in Iraq is lamentable).

Fourth, to the extent possible, progress in meeting the underlying political agendas of the leaders of these non-al-Qaeda terrorist groups could contribute to influencing their perceptions of whether to escalate to WMD violence. Unlike al-Qaeda, the leaders of these groups—typified by ethno-nationalist and separatist movements like the Tamil Tigers and the Chechnyan insurgents today and the Irish Republican Army at its peak—are a narrower political agenda. They also ultimately require some degree of cooperation from a government to achieve some or all of that agenda. As such, this provides another potential pathway to influence their choices.

2.7 State Supporters of WMD Terrorism – Authorized, Official, By Neglect

Access to state “resources” figures prominently in many pathways to acquisition of WMD by terrorist groups. In particular, direct state involvement would be one way that a terrorist group could acquire access to the needed “art” that could make the difference between a technically flawed WMD attack and a technically successful WMD attack. Such “art” is the often-unwritten or not easily obtained technical know-how about how to make or deliver different types of WMD. The importance of such “art” has been repeatedly demonstrated by past unsuccessful terrorism WMD attacks—from the failed Aum Shinrikyo attempt to use anthrax through Aum’s crude means of delivering Sarin to the more recent attempted al-Qaeda attack in London with ricin. Or, captured evidence indicates that there were serious technical flaws in the biological weapons research and development efforts of both al-Qaeda (prior to 9/11) and Jemaah Islamiyah. More indirect state involvement by key technical personnel without clear-cut authorization but due to the neglect of state authorities to take preventive measures also could provide access to such know-how.

As part of an overall influencing strategy, the United States and other like-minded countries can take steps to influence the calculations of other states in two closely related dimensions. On the one hand, an influencing strategy should seek to encourage actions by states to prevent unauthorized involvement or unintended support to a terrorist WMD attack by individuals within that state. On the other hand, an influencing strategy should seek to

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27 On these groups and the constraints on WMD violence set by their political agendas, see the discussion in DeMarce, op. cit.

28 This point was emphasized by the experts in the small SAIC session on “Shaping Terrorists’ WMD Use Calculus” and has also been highlighted in other forums dealing with this subject.

29 See Gunaratna, op. cit., p. 8, 12.
dissuade official, authorized, and intentional support by a state’s leadership to a terrorist WMD attack. Consider first the potential leverage points that exist, then some specific influencing actions aimed at influencing state leaders’ calculations. Finally, one important caveat to be borne in mind is in order.30

Leaders’ perceptions that direct support for terrorist acquisition of WMD (or indirect support by not acting to put in place effective controls against diversion) would not serve their personal or national goals comprise one important potential leverage point. Equally so, concern about the possible risks of such support is another leverage point. This judgment is supported by the extent to which potential state supporters of WMD terrorism, from North Korea to Iran, appear to have carefully weighed the benefits and risks of supporting more traditional terrorist actions.31 A belief that assistance to WMD terrorism is neither justifiable nor legitimate state behavior also could conceivably have some effect in influencing the leaders of still other “mainstream” states to take actions to prevent indirect or unauthorized support.

Given the preceding leverage points, the enunciation of a clear declaratory policy by the United States and other countries that they would cooperate to hold accountable the leaders of states providing direct or indirect assistance to an act of WMD terrorism would be a key possible influencing action. They also could make clear that how that policy would be implemented in practice would be left to be determined in the specific situation. By leaving the response to be adapted to the circumstances, this type of declaratory policy would provide needed flexibility to take into account different degrees of state leadership involvement, the relative certainty with which a particular terrorist WMD attack or attempted attack could be tracked back to those leaders, and other unique situational dimensions. Whether or not the United States and others would be prepared to seek international legitimation for that response by going to the United Nations Security Council would need to be determined. There are both pluses and minuses of agreeing to seek such authorization - including on the one hand, possibly greater ease in advance in gaining widespread support for a ‘holding accountable’ posture and on the other hand, possibly greater complexities in following-through with that warning should the need arise.32

Still another influencing action would be to continue building up habits, institutions, and mechanisms of international cooperation against WMD terrorism. The International Convention for the Suppression of Acts of Nuclear Terrorism and United Nations Security Council Resolution 1540 – as well as for the Global Initiative to Combat Nuclear Terrorism – are three such examples. Building these habits of cooperation would help to create a

30 The possibility also has been suggested by Dr. Walid Phares that a state could penetrate a branch of a terrorist group such as al-Qaeda, resulting in a situation in which a terrorist WMD attack actually could be a state attack in disguise. This possibility reinforces the importance of influencing the calculus of state leaders.
31 This point was made by a long-standing observer of terrorism who participated in both of the SAIC workshops. This participant made this point in the context of arguing that though certain states had become considerably more cautious since the 1980s in supporting terrorism, that caution needed to be reinforced by U.S. and other countries’ policies.
32 A variant on this declaratory policy would state that the United States and others would hold states accountable for “knowingly assisting.” In the above formulation, the flexibility of response would make it possible to tailor the response to the degree of certainty. It also would allow for responses in the case that a state’s benign neglect – vice knowing assistance – had been at issue.
presumption of response in the minds of possible state supporters. It also would make it easier for all states to take needed actions to prevent unintentional assistance.

The relative effectiveness of these types of efforts to influence state leaders' calculations clearly would depend on the perceived ability of the United States in collaboration with other countries and possibly international organizations to track a terrorist WMD attack back to the source. Unless the perpetrator can be known, it will not be possible to hold that state accountable. Attribution will depend partly on technical forensics. It also would entail cooperation among intelligence and law enforcement authorities both in the United States and abroad. Attribution already is being emphasized as part of U.S. counter-terrorism actions. In support of an influencing strategy, it would be desirable to publicize advances in U.S. capabilities to the extent possible without compromising sensitive technical information. In turn, international cooperation could be highlighted not only through official statements and efforts to universalize the International Convention but also through attribution exercises designed to build habit of cooperation in this area. Again, the purpose would be to send a signal to any leaders that might be weighing the payoffs and risks of direct support to WMD terrorism as well as how much of an effort to make in ensuring needed controls on the activities of their subordinates and other nationals.

2.8 Aiders and Abettors – Outsiders

Outsider aiders and abettors of a terrorist WMD attack would not be ideologically committed to or members of a terrorist group. Instead, as perhaps typified by A.Q. Khan, their main motivation would be personal gain. But fear and blackmail also cannot be precluded as motivating forces. In turn, some individuals could well provide assistance unknowingly, whether due to the disregard of established procedures to control sensitive information, through unguarded conversations, or in other ways.

With regard to today's top threat of an al-Qaeda WMD attack, efforts to influence the calculus of this group of outsider aiders and abettors take on particular importance in any influencing strategy for two reasons. First, as already noted for state support, it is widely agreed that access to outside assistance is likely to be an important factor in successful acquisition and use of WMD by a terrorist group. By way of example, outside aiders and abettors could provide any of the following types of critical support: insider knowledge to facilitate diversion of WMD-related materials, agents, or weapons; insider knowledge to defeat detection and interdiction actions; direct supply of needed inputs; know-how and art to produce and deliver WMD; technical information to defeat control mechanisms; and many other types of support. Second, outside aiders and abettors appear likely to be much more subject to influence when compared to other potential "targets" of influence, including al-Qaeda’s leadership as well as al-Qaeda-affiliated or inspired groups or cells. This difference reflects the motivations and risk-taking propensities of the individuals involved.

Several potential leverage points are applicable. Particularly for those aiders and abettors that might become unintentionally involved -- or involved only for financial gain -- appeal to a desire not to have innocent blood on their hands could be the surrogate of uncertainty about the justifiability and legitimacy of WMD use. Feasibility also could provide leverage, e.g., in

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33 The experts that commented on the influencing strategy put forth herein also emphasized the importance of influencing the actions of these outside aiders and abettors.
terms of perceptions of the prospects for successfully trading WMD-related materials, know-how, or access for financial or other personal gain. That said, given the motivations at work, influencing actions aimed at influencing perceptions of risk may have the highest payoff for these individuals. (By contrast, considerations of organizational goals as well as the use of organizational resources would not come into play for most of these aiders and abettors, possibly with the exception of criminal groups).

Many of the influencing actions already identified also would apply here. For instance, efforts of many sorts to deny terrorists access to WMD-related inputs would help to impact perceived feasibility. In turn, U.S. and others declaratory policies, well-publicized efforts to enhance international habits of cooperation, to buttress international legal and political mechanisms to counter non-state actors, and to put in place enhanced national controls all would help to influence that perception. Still other actions to encourage different technical communities, especially in the biological sciences area, to develop their own codes of conduct and other internal norms of behavior would be one approach to enhance individual responsibility. Possibly even more than in the case of those aiders and abettors more directly linked to al-Qaeda, actions could be taken to bring to justice any individuals providing support to terrorist pursuit of WMD. This could be done legally, using existing national laws and international mechanisms. But the option for taking direct action in a particularly egregious case should be kept on the table. Well-publicized, its purpose would be to send a signal concerning risks both to other known aiders and abettors as well as to other individuals whose identities might not yet be known.

3. **Some Implications for Next Steps in influencing terrorists WMD calculus**

Many different U.S. and international actions to counter the threat of WMD terrorism are now underway. These actions provide the core, as well, of U.S. and global responses to next generation WMD terrorism. Within this set of responses, particular attention is rightly being paid to those actions that would could have a direct and immediate impact: actions to enhance controls over WMD-related materials and weapons as well as other inputs to terrorist acquisition of one or another type of WMD; enhanced national and international efforts at detection, protection, and interdiction; and the overall ongoing effort to counter terrorist groups from using whatever type of violence. Though limited, the preceding discussion of actions to influence terrorists thinking about whether to pursue or use WMD demonstrates that such influencing actions should be considered a potentially valuable adjunct to the overall set of actions to counter WMD terrorism. Influencing actions are not the answer but they are part of the answer.

With that in mind, there are a number of next steps that the United States and like-minded countries could take to begin to implement an influencing strategy to influence the thinking of different terrorist groups and their component entities about escalation to WMD violence. These include the following:
3.1 Identify and Analyze Highest Priority Influence “Targets”

An initial step would be to identify the highest priority influencing targets from among the groups and component entities that comprise the next generation WMD terrorism threat. In part, priority would be based on the immediacy of the threat; in part on the prospects for successful influencing efforts. So viewed, the list of top priority influencing efforts would include the al-Qaeda core leadership, al-Qaeda aiders and abettors, the leaders of al-Qaeda affiliated groups as well as al-Qaeda-inspired cells, the leaders of non-al-Qaeda Islamic groups such as Hamas and Hezbollah, and the wider set of outsider aiders and abettors. (The al-Qaeda core leadership is included not because prospects for successful influencing are high, but because it is too dangerous to exclude completely). In turn, the influencing strategy discussed here clearly depends on intelligence and information on the thinking and calculus of these different groups and entities. Thus, existing guidance for intelligence analysis as well as efforts to tap outsider expertise could be modified, as needed, to include an explicit emphasis on assessing possible leverage points and identifying related actions to influence those leverage points for the groups and component entities highlighted.

3.2 Also Think in Terms of Cross-cutting Influencing Actions

Based on the case-by-case discussion above, as summarized by Table 3.2.2 on the following page, many of the actions to influence terrorists’ WMD calculus would apply across different groups and entities. This determination is important because it suggests that implementation of a influencing strategy could prove considerably more manageable than might be thought - or even as implied by the emphasis in the conceptual discussion at the start of this Part on the need to think in terms of influencing the calculations of particular groups and their component entities. Instead, there do appear to be a number of cross-cutting actions that would form the core of an influencing strategy. Equally important, many of these actions would not entail a major commitment of additional resources and would be consistent with the overall thrust of U.S. counter-terrorist activities.
<table>
<thead>
<tr>
<th>Group-entity/Leverage:</th>
<th>Justifiability and legitimacy</th>
<th>Serves goals</th>
<th>Feasibility</th>
<th>Effective use of resources</th>
<th>Too risky or imprudent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Qaeda core leadership</td>
<td>• Not applicable – taken as a given by core leadership</td>
<td>• Encourage Islamic WMD use debate</td>
<td>• Suite of denial of benefits actions</td>
<td>• Suite of denial of benefits actions</td>
<td>• Signal tailored, tempered, but costly U.S. response – vice striking out</td>
</tr>
<tr>
<td>Al-Qaeda affiliated groups &amp; inspired cells</td>
<td>• Encourage Islamic WMD use debate</td>
<td>• As above</td>
<td>• Suite of denial of benefits actions</td>
<td>• Suite of denial of benefits actions</td>
<td>• As above</td>
</tr>
<tr>
<td>Al-Qaeda aiders and abettors – insiders</td>
<td>• Encourage Islamic debate on legitimacy &amp; justifiability of WMD use</td>
<td>• As above</td>
<td>• Suite of denial of benefits actions</td>
<td>• Suite of denial of benefits actions</td>
<td>• Declaratory policy – U.S.-others will hold accountable</td>
</tr>
<tr>
<td>Non-al-Qaeda (Islamic – Hezbollah, Hamas) – leaders</td>
<td>• Deal with underlying causes of terrorism</td>
<td>• Suite of denial of benefits actions</td>
<td>• Suite of denial of benefits actions</td>
<td>• Enhance global consensus, means, &amp; habits of cooperation against WMD terrorism</td>
<td></td>
</tr>
<tr>
<td>Non-al-Qaeda and Non-Islamic – (LTTE, FARC) -- leaders</td>
<td>• Deal with underlying causes</td>
<td>• Suite of denial of benefits actions</td>
<td>• Suite of denial of benefits actions</td>
<td>• Enhance global consensus, means, &amp; habits of cooperation</td>
<td></td>
</tr>
<tr>
<td>State supporters – unauthorized or authorized and official</td>
<td>• Encourage debate on justifiability &amp; legitimacy</td>
<td>• Declaratory policy – U.S.-others will hold accountable</td>
<td>• Suite of denial of benefits actions</td>
<td>• Declaratory policy – U.S.-others will hold accountable</td>
<td>• Enhance global consensus, means, &amp; habits of cooperation</td>
</tr>
<tr>
<td>Outsider aiders and abettors – individuals and organizations</td>
<td>• Reinforce individual responsibility &amp; norms of behavior</td>
<td>• Declaratory policy hold accountable</td>
<td>• Punish aiders and abettors</td>
<td>• Punish aiders and abettors</td>
<td>• Enhance global consensus, means, &amp; habits of cooperation</td>
</tr>
</tbody>
</table>

Table 3.2.2: Influencing Terrorists WMD Use Calculus – Influencing Actions vs. Groups-Component Entities
3.3 Priority Cross-cutting Influencing Actions

Based on the preceding discussion - from concepts to practice - a set of priority actions for influencing the WMD acquisition and use calculus of different terrorist groups and their component entities is evident. Implementation of these actions all could be initiated on a generic basis, while over time fine-tuning their application with a view to specific groups and entities. Their sustained pursuit would give substance to the injunction to take steps “to deter and dissuade terrorist WMD use” of the U.S. National Implementation Plan for combating WMD terrorism. In so doing, such influencing actions would fill an important gap in overall U.S. actions to counter today’s and the next generation al-Qa’eda-Jihadist terrorist threat. Not least, such actions could contribute to countering the potential next generation WMD terrorist threat from non-al-Qa’eda groups and entities as well as from their individual aiders and abettors or state-supporters.

3.4 Prospects for Success

Within the U.S. official community, there is a greater readiness to consider the role of deterrence in combating WMD terrorism. Within the analytic community, there now is an emerging consensus on how to approach this task, with an emphasis on a broader set of actions to influence the WMD calculus of different terrorist groups and component entities. The challenge now is to move ahead to implement that emerging consensus. This discussion has put forward one way to do so via a set of influencing actions derived from the potential leverage points across the different this generation and next generation terrorist groups. These influencing actions should be viewed as one part of the overall U.S. and global approach to deal with the threat of WMD terrorism. They are not and do not purport to be a sufficient answer. In conjunction with the other types of responses already underway and discussed herein, influencing actions can increase the prospects for successfully preventing or at least containing next generation WMD terrorism.
Section 3: U.S. responses to next Generation WMD and WME Terrorism

PART 3
Some Implications for the Defense Threat Reduction Agency

Lewis A. Dunn
SAIC

By way of concluding this discussion of responses to the WMD terrorist threat, this final Part briefly considers some implications of this responses discussion for the Defense Threat Reduction Agency. DTRA already is actively involved in many if not most of the ongoing U.S. efforts in this area, as reflected in the different DTRA “campaigns.” As summarized by the Tables 3.3.1 and 3.3.2 on the following pages, DTRA could contribute in varying ways to the pursuit of many of the possible additional WMD terrorism response initiatives set out above. In that regard:

- First, each of the possible new responses falls under the purview of one or more of the DTRA “campaigns;”
- Second, in virtually all instances, there is sufficient bureaucratic white space to allow for additional activity on the part of DTRA – or put otherwise, though other U.S. government agencies sometimes are involved in a given response area, they have not preempted – and could well welcome – involvement by other organizations;
- Third, in quite a few of these possible response areas, DTRA would bring to the table a unique comparative advantage in their pursuit – based on already existing DTRA programs, mission areas, and core competencies; and
- Finally, across these responses, a number of more specific potential implications for DTRA activities, planning, and actions can be put forward – and are summarized next.

1 Some Implications for the Defense Threat Reduction Agency - Possible DTRA Actions

Turning to more specific implications for DTRA activities, three types of implications stand out: changes at the margin of existing DTRA activities; exploratory analysis, assessment, and concept development; and new program thrusts. Drawing on the two tables below, consider each aspect in turn. (Both higher-payoff and lower-payoff initiatives are included in

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1 The Defense Threat Reduction Agency activities to counter Weapons of Mass Destruction are partly structured in terms of a series of Agency-wide campaigns. These are listed above in the accompanying text box.
the discussion that follows. This is so because at least several of the lower payoff but lower difficulty response initiatives could readily be implemented by DTRA.)

<table>
<thead>
<tr>
<th>Responses to Lessen the Threat of Next Generation WMD Terrorism</th>
<th>Payoff-Difficulty to Implement (taken from Table above*)</th>
<th>DTRA Campaign Area</th>
<th>Bureaucratic White Space</th>
<th>Unique DTRA Comparative Advantage</th>
<th>Possible DTRA Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor non-al-Qaeda WMD interest</td>
<td>H-L</td>
<td>Situational Awareness</td>
<td>Considerable</td>
<td>Low</td>
<td>Watching brief</td>
</tr>
<tr>
<td>Accelerate UNSCR 1540 implementation</td>
<td>H-L</td>
<td>Control WMD materials &amp; systems worldwide</td>
<td>Moderate</td>
<td>High</td>
<td>Expand CTR to include UNSCR 1540 assistance</td>
</tr>
<tr>
<td>Shaping terrorists WMD use calculus - including aiders &amp; abettors</td>
<td>H-L</td>
<td>Protect Homeland from WMD; Transform determent</td>
<td>Considerable</td>
<td>Moderate</td>
<td>Enhance pursuit of next generation denial - attribution technologies, systems, architectures</td>
</tr>
<tr>
<td>Family of National Response Plans - including to counter terrorist WMD campaigns</td>
<td>H-L</td>
<td>Protect Homeland from WMD</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Propose taking lead on RDD, nuclear; explore campaigns</td>
</tr>
<tr>
<td>Pol-mil responses planning - including to counter follow-on attacks</td>
<td>H-L</td>
<td>Control WMD materials &amp; systems worldwide; Protect Homeland from WMD</td>
<td>Considerable</td>
<td>Low-moderate</td>
<td>Concept development, exploration of options, &amp; focusing heightened attention</td>
</tr>
<tr>
<td>Build habits of global cooperation -- prevention, detection, disruption, attribution, response</td>
<td>H-H</td>
<td>Defeat threat of lost or stolen nuclear weapons; Protect Homeland from WMD</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Build into exercises &amp; Global Initiative Work Plan</td>
</tr>
<tr>
<td>Multi-nation nuclear emergency support &amp; response capability</td>
<td>H-H</td>
<td>Defeat threat of lost or stolen nuclear weapons</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Build into exercises; propose joint DOE-DTRA study</td>
</tr>
<tr>
<td>Population protection - bioterrorism</td>
<td>H-H</td>
<td>Protect Homeland from WMD</td>
<td>Some</td>
<td>Low</td>
<td>Supporting analyses</td>
</tr>
<tr>
<td>Population protection - nuclear terrorism</td>
<td>H-H</td>
<td>Protect Homeland from WMD</td>
<td>Considerable</td>
<td>High</td>
<td>Plan into modeling; do feasibility study</td>
</tr>
<tr>
<td>Enhancing public resiliency facing WMD attack</td>
<td>H-H</td>
<td>Protect Homeland from WMD</td>
<td>Considerable</td>
<td>Low-moderate</td>
<td>Build into exercises &amp; population protection initiatives</td>
</tr>
</tbody>
</table>

*The rankings are taken directly from Table 3.1.2 in Section 3, Part 1 above which summarized the assessments of the different response initiatives in terms of four quadrants: higher payoff/less difficult to implement; higher payoff/more difficult to implement; lower payoff/less difficult to implement; lower payoff/more difficult to implement.

Table 3.3.1: Implications for DTRA of Responses to Next Generation WMD Terrorism - Higher Payoff Initiatives
### Responses to Lessen the Threat of Next Generation WMD Terrorism

<table>
<thead>
<tr>
<th>Response</th>
<th>Difficulty to Implement (taken from Table above*)</th>
<th>DTRA Campaign Area</th>
<th>White Space</th>
<th>DTRA Comparative Advantage</th>
<th>Possible DTRA Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand “Global Initiative” to all WMD</td>
<td>L-L</td>
<td>Control WMD &amp; systems worldwide; Protect Homeland from WMD</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Propose expanding Global Initiative; develop illustrative Work Plan</td>
</tr>
<tr>
<td>Strengthened norms against WMD-related technology misuse</td>
<td>L-L</td>
<td>Control WMD &amp; systems worldwide</td>
<td>Moderate</td>
<td>Low</td>
<td>Build into expanded CTR efforts outside of Russia and FSU</td>
</tr>
<tr>
<td>Public-private engagement</td>
<td>L-L</td>
<td>Control WMD materials &amp; systems worldwide</td>
<td>Some</td>
<td>Low</td>
<td>None</td>
</tr>
<tr>
<td>International consequence management lessons learned mechanism</td>
<td>L-L</td>
<td>Protect Homeland from WMD</td>
<td>Considerable</td>
<td>Moderate</td>
<td>Build into Global Initiative; ongoing exercises</td>
</tr>
<tr>
<td>Campaign early warning</td>
<td>L-H</td>
<td>Situational awareness</td>
<td>Considerable</td>
<td>Low</td>
<td>Build into exercises</td>
</tr>
<tr>
<td>Nuclear weapon state surety code of conduct</td>
<td>L-H</td>
<td>Defeat threat of lost or stolen nuclear weapons</td>
<td>Considerable</td>
<td>Moderate</td>
<td>Explore options for nuclear surety cooperation – bilateral, multilateral</td>
</tr>
</tbody>
</table>

*The rankings are taken directly from Table 3.1.2 in Section 3, Part 1 above which summarized the assessments of the different response initiatives in terms of four quadrants: higher payoff/less difficult to implement; higher payoff/more difficult to implement; lower payoff/less difficult to implement; lower payoff/more difficult to implement.

### Table 3.3.2: Implications for DTRA of Responses to Next Generation WMD Terrorism – Lower Payoff Actions

#### Changes at the Margin of Existing DTRA Activities – Exercises, Research and Development Programs, and Other Activities

Several of the implications highlighted would suggest changes at the margin of existing DTRA activities. Exercises, planning, R & D priorities, and DTRA’s role as the co-chairman of the Global Initiatives to Combat Nuclear Terrorism all are cases in point.

For instance, DTRA’s ongoing program of WMD-related exercises offers an important means to build habits of global cooperation against WMD terrorism across the spectrum from prevention to attribution and responses. With that objective in mind, specific exercises might be developed to work tough global cooperation challenges, e.g., in attribution of the source of a terrorist attack, in interdiction, or in crafting responses in such a manner as to strengthen overall counter-WMD terrorism efforts. In turn, with this goal of building wider habits of cooperation, the partners chosen for some exercises could be broadened, with particular emphasis on finding ways to work not only with traditional friends and allies but also with Russia and China. On a more specific point, with the involvement of other nuclear weapon states, exercises could be crafted to test mechanisms and procedures for providing nuclear emergency assistance to a third non-nuclear country in the midst of a nuclear terrorist incident. Such cooperation could be especially important, for instance, given the lack of direct...
knowledge and experience with the technical requirements for rendering safe a terrorist nuclear weapon on the part of such non-nuclear weapon states. The preceding discussion also suggests implications for DTRA’s WMD-related R & D priorities. Implementation of a strategy for shaping terrorists’ WMD acquisition and use calculus yet again underlines the importance of DTRA’s ongoing programs aimed at enhancing U.S. and global technical capabilities for attribution. Similarly, more sophisticated and reliable capabilities for modeling the dissemination of nuclear fallout in an urban environment as well as the dispersion of biological agents would take on still greater importance were intensified efforts to be pursued to protect the American population from a terrorism biological if not also nuclear attack.

Somewhat different, DTRA serves as the co-chair of the U.S. side in the Global Initiative to Combat Nuclear Terrorism. In that capacity, DTRA’s leadership can again look for ways to use the Global Initiative’s framework to build habits of cooperation in specific areas, from emergency response to political-military response planning. It also could take the lead in proposing that the issue of the Global Initiative’s mandate be revisited to expand it to include at least bio terrorism if not also chemical terrorism. Or as part of the Situational Awareness activities, DTRA personnel could be tasked to keep a watching brief to monitor any possible signals of heightened interest in WMD by non-al-Qaeda terrorist groups.

12 Ex pl o ra tory A n a l y s i s, A s s e s s m e n t, a n d C o n c e p t D e v e l o p m e n t

DTRA could take the lead in several of the possible new response areas in undertaking exploratory analysis, assessment, or concept development. These activities could be relatively informal analytic efforts - or they could entail a more formal DTRA lead role on behalf of the overall U.S. government interagency process.

More specifically, more informal concept development and analysis could be pursued to identify the types of options and issues that would need to be addressed in more formal planning of political-military responses to a terrorist WMD attack against the American homeland. Or as part of DTRA’s biological threat reduction activities, the possibility could be explored of including efforts to encourage other countries’ scientific communities to develop biological codes of conduct. Most far-reaching, DTRA could undertake a feasibility study of protecting the American population from a
terrorist nuclear incident and improving resiliency. Such a study could draw on DTRA’s core expertise in the nuclear weapons effects and modeling areas. Its purpose would be to design and then assess a possible architecture to achieve that goal.

More formal concept development and planning also could be undertaken by DTRA (possibly in conjunction with the Department of Energy (DOE)) to provide draft inputs into the Inter-Agency process. To speed the process of developing a family of National Response Plans, DTRA could propose to work with the DOE to develop draft plans in response to either a terrorist RDD or WMD attack. To do so would draw again on DTRA core expertise as well as lessons learned from ongoing exercises. Drawing on that exercise experience as well as ongoing work in consequence management, DTRA could offer to take the lead in exploring in greater detail responses to a terrorist WMD campaign. Similarly, again in coordination with DOE, DTRA could draw on its experience in planning for overseas incidents involving U.S. nuclear deployments to develop a draft plan for possible U.S. nuclear emergency assistance and support to a non-nuclear country responding to a terrorist nuclear incident – from interdiction through rendering safe to consequence management. As part of this latter effort, possibilities could be explored for the more difficult but also high payoff task of creating a multi-nation stand-by nuclear emergency support capability.

1.3 New Program Thrusts – Leveraging Cooperative Threat Reduction for UNSCR 1540 Assistance

With regard to new program thrusts, one possibility warranting careful scrutiny would be to expand the Cooperative Threat Reduction (CTR) Program to include providing assistance to other countries in implementing their obligations under United Nations Security Council Resolution 1540 to put in place effective controls against access to WMD and means of delivery by non-state actors. Such an extension of DTRA’s CTR efforts would bring new resources to bear in achieving high-priority U.S. and international objective. Though somewhat different from the main thrust of the nuclear CTR efforts (which was helping the Russians destroy items), it would be consistent with other CTR efforts that have entailed assistance to former Soviet countries in putting in place customs and border controls as well as in writing regulations to deal with potential biological threats. This step also would be meet Congressional interest – and readiness to provide funding – for extending the CTR program to meet proliferation challenges outside of the former Soviet Union.

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2 Both NNSA and the State Department already are involved in providing assistance to other countries. But their resources are limited. It also is widely acknowledged that lack of resources is the most critical impediment to implementing fully and in a timely manner the controls mandated by UNSCR 1540.
Section 3:
U.S. responses to next Generation WMD and WME Terrorism

PART 4
Conclusion
Lewis A. Dunn
SAIC

In many respects, the responses to counter the threat of next generation WMD and WME terrorism will continue and build on the actions now being pursued by the United States and likeminded countries around the globe. At the same time, across today’s responses - as reflected in the elements of the U.S. Implementation Plan for Combating WMD Terrorism - there are important gaps. Consequently, one top priority should be to pursue those measures that promise a high payoff in filling a critical gap with relatively less difficulty of implementation. In addition, there are other high payoff initiatives that whose pursuit would be more difficult but which should not necessarily be set aside.

With two exceptions, virtually all of these priority responses are incremental extensions of today’s counter-terrorist activities - whether in terms of specific U.S. actions or in terms of building habits of global cooperation. The two exceptions are: development and implementation of a strategy to shape terrorists’ WMD calculus and efforts to protect the American population from a biological or a nuclear terrorist incident. These two response areas raise very different challenges.

With regard to the former, an emerging conceptual consensus increasingly exists on the elements of a strategy to shape the WMD calculus of the different terrorist groups and their component entities that confront or could confront the United States. What is needed is to begin to act in accordance with that strategy. As a start, there are a set of cross-cutting actions that could provide the foundation for more tailored efforts over time.

With regard to population protection, the broad outline of what actions would be needed to protect the American population from a terrorist biological weapon attack is known. Questions do persist on some issues, including how to implement those actions. But resources have not been found to implement those actions. What is needed is the political will to get on with the job - prior to an actual and possibly devastating terrorist bio attack. By contrast, the
very feasibility of efforts to protect nearby population from the secondary effects of a nuclear
detonation remains subject to question. The challenge
is to set aside memories of Cold War civil defense to
address what can and cannot be done in a practical,
analytic manner.

Some dimensions of the next generation WMD
terrorist threat, however, will not simply be extensions
of the past. Non-Al Qaeda terrorist groups could
emerge as serious threat along with the continued
threat from the Al Qaeda-Jihadist movement. Though
most attention has focused on the threat of
catastrophic WMD terrorism, more discriminating
WMD use could occur. Indeed, the possibility of
discriminating use could help to push some of the non-
Al Qaeda groups to escalate to WMD violence. In
addition, campaigns of WMD terrorism could become
a feature of the next generation, possibly foreshadowed
by the use of high-explosive with chlorine in Iraq.
These possible added dimensions of next generation
WMD terrorism highlight the importance of ensuring
adequate intelligence monitoring of the non-Al Qaeda
WMD threat. They also underline the importance of
that full suite of measures already being pursued to deny terrorists the benefits of WMD use,
including discriminate WMD use. In turn, political-military response planning needs to
include actions, some of which have been discussed above, to deal with possible terrorist
campaigns.

Across the many areas of U.S. activities to counter next generation WMD terrorism, the
Defense Threat Reduction Agency is already actively engaged. From Situational Awareness to
Protecting the Homeland, DTRA’s campaigns are partly focused on this dimension of the
WMD threat. But in other ways suggested above, there also are opportunities for DTRA to
play an important role in helping to extend, enhance, and strengthen future U.S. activities to
counter WMD terrorism. By way of summary, Table 3.4.1 below highlights some potential
DTRA actions across the DTRA campaigns. In some instances, this would entail changes at
the margin of on-going DTRA activities; in others, a readiness on the part of DTRA to
undertake exploratory analysis and concept development, perhaps in conjunction with other
U.S. government agencies. Not least, the payoffs could be very high of extending DTRA’s
flagship Cooperative Threat Reduction Program into a new realm aimed at providing needed
assistance to other countries in fully implementing the WMD-related controls mandated by
UNSCR 1540.
<table>
<thead>
<tr>
<th>Campaign/Activity</th>
<th>Exercises, R &amp; D, Ongoing Activities - Changes at the Margin</th>
<th>Exploratory Analysis, Assessment, Concept Development</th>
<th>New Program Thrusts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situational Awareness</td>
<td>Monitoring non-al-Qaeda WMD threat</td>
<td>No initiatives proposed</td>
<td>No initiatives proposed</td>
</tr>
<tr>
<td>Control WMD Materials and Systems Worldwide</td>
<td>Building habits of global cooperation - prevention</td>
<td>Codes of conduct - nuclear surety</td>
<td>Accelerated implementation of UNSCR 1540 - use of CTR Program Strenthened global norms and obligations - build into CTR efforts outside FSU</td>
</tr>
<tr>
<td>Defeat the Threat of Lost or Stolen Nuclear Weapons</td>
<td>Building habits of cooperation - interdiction Nuclear emergency support and assistance</td>
<td>No initiatives proposed</td>
<td>No initiatives proposed</td>
</tr>
<tr>
<td>Protect Homeland From WMD</td>
<td>Building habits of cooperation - interdiction Modeling and simulation - bio, nuclear weapon effects Detection and interdiction, technologies Expand Global Initiative to all WMD International consequence management lessons learned Enhancing public resiliency facing WMD attack</td>
<td>Political-military responses to WMD use Population protection - nuclear incident RDD National Response Plan Nuclear Response Plan Counter WMD Campaigns Plan</td>
<td>No initiatives proposed</td>
</tr>
<tr>
<td>Transform Deterrent</td>
<td>Building habits of cooperation - attribution Attribution technologies</td>
<td>No initiatives proposed</td>
<td>No initiatives proposed</td>
</tr>
</tbody>
</table>

Table 3.4.1: Implications for the DTRA Campaigns - Additional Activities
Appendices

Note:

As part of the overall SAIC project on Next Generation WMD and WME Terrorism, a series of outside experts were commissioned to do “think pieces” on various topics. These papers helped to stimulate thinking of the project team and in many cases were presented at a workshop that was part of the overall project. They also have been used by the editor in preparing the preceding project report. With minimal editing, these papers are included as appendices to this report. They provide additional insights and perspectives on the question of the dynamics and implications of next generation WMD terrorism.
Despite today’s growing concern about the threat of WMD terrorism, only a handful of attempted or successful terrorist attacks using chemical, biological, or radiological weapons have been occurred in recent decades. After briefly examining some of these past cases, this paper reviews the main lines of argument within the literature concerning the motivations and capabilities of terrorist groups to carry out attacks using WMD. It touches as well on arguments about how those motivations and capabilities might change. The answers provided within this literature survey provide a backdrop for thinking further about next generation WMD terrorism.

1. **some past cases of “WMD” terrorism**

Turning to past cases of actual terrorism with a so-called weapon of mass destruction, the use of biological or chemical weapons stands out. Despite the widespread availability of radioactive sources, radiological weapons (RDD) have not been used. Similarly, despite great official and public concern about nuclear terrorism, neither an attack on a nuclear power plant nor attempted or successful detonation of an improvised nuclear explosive device has yet to occur. Some of the more prominent attacks are summarized below.

1.1 **The Rajneeshees - Salmonella Contamination**

In 1984, the Rajneeshees, a religious cult in Oregon with origins in India, contaminated several restaurant salad bars with salmonella, sickening 751 people but causing no fatalities. The attack was designed to suppress voter turnout and influence the outcome of county elections in the group’s favor. The ensuing investigation determined that the group obtained the salmonella from a Seattle medical supply company and considered using other biological agents, including hepatitis and typhoid, in the attack. The group even contemplated contaminating the water supply with dead rodents to cause illness. As this was an isolated incident, it is difficult to determine whether their rejection of a more lethal attack agent was based on the principles of their “peaceful” ideology, which speaks of love, meditation, and laughter as being life’s greatest values, or on the fact that they were limited by what sort of agent they could easily acquire.

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1 The Chechen rebels in 1996 did threaten possible use and did plant radiological materials in a Moscow park. Plots to use a RDD also have been uncovered.
12 The Tamil Tigers – Chlorine Gas Attack

The Liberation Tigers of Tamil Eelam (LTTE), also known as the Tamil Tigers, is a politico-military organization that has been waging a secessionist campaign against the Sri Lankan government since the 1970s to secure a separate state for the Tamil majority regions in the north and east of Sri Lanka. In 1990, the group used chlorine gas against Sri Lankan soldiers to seize a Sri Lankan Army fort. A shortage of small arms apparently led to the use of chlorine gas in the attack, which injured over 60 but caused no fatalities. The attack, while successful from a military standpoint, alienated a segment of the group’s core constituency when some of the chlorine drifted back into Tamil territory. The group has not used WMD again.

The Tamil Tigers’ use of chlorine gas to compensate for a small arms shortage is another example of the use of WMD being used to serve a pragmatic goal – in this case, a clearly defined military objective. Unlike the Rajneeshees, who were likely limited in their choice of attack options, the Tamil Tigers’ extensive financial resources and international connections make it likely that other chemicals (or biological agents) could have been acquired for use in subsequent attacks if so desired. The chlorine gas attack in 1990 appears to have represented what could be called “window of opportunity” WMD use in that it was used as a replacement weapon when small arms were not available and not as part of a desire to escalate to WMD use in general.

13 Aum Shinrikyo – Sarin Gas Attacks on 1) the Tokyo Underground and 2) Judges

In 1995, ten members of Aum Shinrikyo, a millenarian religious cult working to facilitate the end of the world by overthrowing the Japanese government, released sarin gas on the Tokyo Underground. The homemade gas was placed in plastic bags wrapped in newspapers, which cult members punctured with umbrellas to initiate the attack. Twelve people were killed and over 1,000 were hospitalized, 40 of whom were seriously injured. In a less publicized 1994 attack, Aum Shinrikyo operatives attempted to kill three judges using a sarin-vaporizing device. The sarin that was dispersed did not reach the judges, but did kill seven other individuals and injured 144. While the attack on the Tokyo Underground was an example of indiscriminate use of violence, which is consistent with the group’s apocalyptic ideology, the unsuccessful targeting of three judges represents another example of WMD use with a pragmatic goal.

Aum Shinrikyo had substantial financial resources at its disposal, estimated by some to be in the range of $300 million. The group was able to recruit bright university graduates to its cause, particularly microbiologists, doctors and nurses. The group is believed to have begun work on biological and chemical weapons programs in the 1980s. Aum Shinrikyo had a $10 million research laboratory at its Mt. Fuji compound, equipped with sophisticated holding tanks, computer control centers, state-of-the-art reactors, a distillation column and industrial packaging machine. While it appears the group’s chemical weapons program was more successful than its biological weapons program, each was plagued with technical difficulties, which leads many observers to conclude that the technical challenges associated with successful WMD use are very difficult to overcome, even given significant resources.
14 Anthrax Letters Sent in the United States

In September 2001, five letters containing anthrax were mailed to several U.S. news media offices and two U.S. Senators, killing five people and sickening 17 others. To date, the perpetrator(s), as well as the specific objectives of the attacks, are still unknown. There has been speculation that the perpetrator(s) sought to exploit perceived vulnerabilities in the U.S. following the 9/11 attacks, exacerbate fear, and trigger costly countermeasures. The successful aerosolization of the anthrax led authorities to believe that the attacker(s) likely had a scientific background, which may or may not have included work with anthrax specifically. Some have speculated that the attacker(s) may have underestimated the potency of aerosolized anthrax and questioned whether the intent of the attacks was to cause deaths.

2. Foiled, Aborted, or Unsuccessful WMD Attacks

The preceding examples of actual attacks, however, only provide part of the background picture. Still other examples exist of known foiled, aborted, or unsuccessful WMD attacks by terrorists or individuals. An illustrative but not fully comprehensive list of these other cases includes:

- **1993** - Aum Shinrikyo operatives released a liquid suspension of anthrax from the roof of an eight-story building in Kameido, Tokyo. The attack failed because the strain used was a vaccine strain, not a lethal strain.

- **1993/1994** - Aum Shinrikyo staged its first sarin attack when it used a van-mounted spray mechanism to target a rival religious leader. The sprayer malfunctioned.

- **1995** - Larry Wayne Harris was convicted of fraudulently obtaining bubonic plague toxins, which he may have intended to use on the New York subway system.

- **1995** - A group of Chechen rebels alerted the Russian press that they had buried a cache of radiological materials in Moscow's Ismailovsky Park. Authorities found a partially buried container of cesium where the rebels indicated it would be. Neither the Chechens who planted it there nor the original source of the cesium was ever identified.

- **2002** - Jose Padilla was arrested for involvement in an RDD plot against the U.S.

- **2003** - Six Algerian men are arrested in London for manufacturing ricin as part of a plot for an attack in London. British authorities found castor beans and the equipment to derive ricin from the beans. However, it later was called into question whether the men were planning a ricin attack.

- **2003** - An al Qaeda-linked cell entered the U.S. and planned an attack on the New York City subway system with homemade cyanide gas, according to authorities. Officials say that the plot was called off by Zawahiri.

- **2005** - A six-man terrorist cell planned to attack American tourists in Jordan using cyanide. They changed their plans when they learned that purchases of cyanide were subject to controls, deciding to use machine guns instead.
3. **The Analytic Consensus on Motivations and Capabilities**

As the previous section illustrates, it is difficult to draw definitive conclusions from the limited cases to explain the relative lack to date of WMD terrorism. Because each group has its own WMD use calculus, uncertainty pervades this area of inquiry. Turning to the analytic literature, two factors were emphasized to explain why so far there had been so few successful instances of WMD terrorism: motivations and technical capabilities.

### 3.1 Motivations

Within the analytic terrorism literature, one line of argument emphasized that there has been relatively little successful WMD terrorism to date because conventional terrorism works. As terrorists become more proficient at using conventional means to wreak physical destruction and death to convey their message, conventional terrorism becomes more cost effective. For that reason, the desire to employ more deadly terrorist attacks does not necessarily lead a group to consider or pursue WMD use. Conventional terrorism is also safer from an operational standpoint, as well as from the position of avoiding detection, and it has relatively predictable consequences, making it more reliable from an employment and effects perspective.

A second reason to explain why so little WMD terrorism has occurred to date is the fact that WMD use may not necessarily be compatible with a terrorist group’s goals, message, or ideology. How use of WMD would impact a group’s core audiences – from supporters to government officials that a group may be seeking to influence – is a key unpredictable variable, especially if members of that audience sustain “collateral damage” in a WMD attack. For many groups, it may also be challenging to frame WMD use so that it is consistent with political or military (e.g., pragmatic) or religious/ideological (e.g., otherworldly) goals. Again, the fear of alienating supporters with a mixed message may be enough to cause some groups to stick with attacks that are more predictable and justified via conventional means.

### 3.2 Technical Capabilities

It is a generally accepted conclusion that material acquisition is still a challenge for terrorist groups. This is especially true for nuclear materials. While it is true that the proliferation of technology and expertise that may be available to terrorists by virtue of globalization may make some groups more capable of acquiring and executing WMD attacks, access to materials and/or knowledge does not necessarily mean all terrorist groups will be naturally attracted to them, as a result of the influence of a group’s motivations (as described above) in addition to their capabilities. Even if possession of a material needed to make a WMD were a given, significant hurdles exist to weaponize and/or disperse such materials. As described in the previous section, Aum Shinrikyo is an example of a group that had very limited success with chemical and biological weapons despite robust research facilities and substantial financial resources.

### 3.3 How Might Motivations Change to Make WMD Use More Likely?

Based on the literature surveyed, the motivational factors described above could begin to change in such a way that they no longer serve as impediments to potential WMD use. For instance, a terrorist group may be more likely to pursue a WMD capability if conventional terrorism is no longer viewed as effective in causing fear or some other desired response in
the targeted population, effectively weakening the group’s bargaining position vis-à-vis a given society. A group that finds itself in such a position may feel it needs to “up the ante” to be effective in communicating its message to the target population, and by extension, the government or ruling class whose policies it seeks to influence.

Another reason why a group may come to view WMD use as a viable option is if the group’s ideology comes to view communication with a religious deity as more important than with a human audience, e.g., its core constituency. If a group feels it no longer needs to justify its actions to its supporters but instead comes to value the opinion of a higher power more, it may choose to pursue WMD use. This may also occur if the popular support for a group has already been lost due to another cause. In this case, the group may feel it has nothing more to lose by using WMD. Similarly, if a group were to begin to experience excessive government retaliation or law enforcement crackdown inhibiting its ability to operate effectively or to continue to exist at all, a group may choose to employ WMD in a “use it or lose it” mentality; again, the group may feel like it has nothing to lose if its very existence is being made difficult or impossible.

WMD use might become more likely if a group is successful at providing ideological justification for use that increasingly becomes more widely accepted by its core constituents. It could gain greater support for use either by eroding or refuting former arguments against use or by developing a new rationale that resonates with a new generation of followers. As certain groups become more decentralized and “splinter groups” emerge that are less governed or influenced by the teachings of a leader or group of leaders, the likelihood of WMD use also might increase. These splinter groups may have more narrow goals and be less concerned with the impact of WMD use on the core group’s audience.

Finally, a group may choose to employ or threaten use of WMD if it believes its standing in the world will be elevated as a result. This “prestige factor” may work in conjunction with any of the factors above. In particular, if the taboo against use nuclear weapons is broken by a state or other non-state actor, additional use may become more likely. That is, terrorist groups may be more inclined to use nuclear weapons if they are following suit and are not responsible for breaking the taboo themselves.

3.4 How Might Technical Capabilities Change to Make WMD Use More Likely?

Likewise, the technical hurdles that to date have formed barriers to terrorist WMD use may become more easily surmountable for a number of reasons. First, if a group were to collaborate with a state sponsor, or, at a minimum, be able to operate in a permissive environment within a state, it may be able to make strides in developing a WMD capability that it could not if it were operating within a state whose laws were enforced and counterproliferation programs robust.

Secondly, as state programs continue to mature, especially in places around the world that may be sympathetic to terrorist causes, acquisition of WMD materials, especially nuclear, may become easier as the security afforded such materials in these countries may be substandard. In addition, concerns continue to exist regarding the security of nuclear materials in the former Soviet Union and the black market and the resurgence of organized criminal elements
in that region of the world. Links between terrorist groups and organized crime may be the key to helping some groups overcome technological barriers to achieving a WMD capability. But, as technological advances continue to make conventional terrorism less costly and more effective, pursuit of WMD capability may continue to be viewed by some terrorist groups as unnecessarily costly or risky.

4. **Lack of WMD Use: Technology Barrier or Incentive Gap?**

   In summary, the principal point of debate found in the literature surveyed is whether the relative lack of WMD terrorism to date reflects more of a technology barrier or an incentive gap. One side contends that technology barriers are the single most important explanation. These technological hurdles, however, are seen as eroding by many experts because of globalization and other factors. For some analysts, this erosion makes WMD use by a terrorist group inevitable in the future. (By contrast, a minority of analysts surveyed believe that technology barriers to WMD use remain, and will continue to remain, insurmountable by terrorist groups into the foreseeable future.)

   The other side of the debate contends that motivations (or lack thereof) play a more important role in explaining non-use than technical capability. These analysts argue that the technological hurdles to developing a WMD capability have already been reduced by virtue of globalization and the information age. Thus, it is likely that a terrorist group would have already been able to pull off a successful WMD attack if it so desired.
There should be little doubt that the Jihadi Movement continues seeking to deploy chemical, biological, radiological, and nuclear (CBRN) weapons against Israel, the United States, the United Kingdom, and Arab governments.

Not only does its track-record suggest that the al-Qa’ida High-Command would authorize the use of such weapons should they be acquired, but followers of the Jihadi Movement have been found to be actively discussing and plotting attacks with CBRN weapons in the post-9/11 environment.

Much of al-Qa’ida’s attempt to acquire these types of weapons in the 1990s has already been examined by Western analysts in open-source reporting. For brevity’s sake, it is sufficient to say that the al-Qa’ida organization prioritized the acquisition of both the raw material and the finished weapons for offensive desires and defensive needs.

The three most concerning WMD cases unearthed since 9/11 include, al-Qa’ida’s aborted 2003 plot to deploy a mubtakkar hydrogen cyanide dispersal device in the New York subway system; Abu Musab al-Zarqawi’s thwarted 2004 plot to use 20 tons of explosives and highly lethal chemicals against government targets in Jordan; and the thwarted 2005 plot by the British Jihadi, Dhiren Barot, to detonate a dirty bomb in concert with other simultaneous attacks against infrastructure and transportation systems in the U.S., U.K., and Yemen.

In addition to the aforementioned cases, the Jihadi military machine has proliferated information about a wide range of topics related to CBRN devices through online manuals, another topic that has been exhaustively covered in open-source reporting. These manuals and websites, most of which have been available on the Internet for years, do provide instructions and information about a wide range of topics, including information directly related to the construction, and deployment of CBRN devices. Some of this information has proven accurate when tested, some has not.

Western analysts who emphasize the ideological dimension of the Jihadi Movement’s interest in WMD tend to cite main written sources to support their assessments. The first is

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1 Professor Jarret Brachman is the Director of Research in the Combating Terrorism Center at West Point and an Assistant Professor in the Department of Social Sciences.”

the 2003 fatwa issued by Saudi cleric, Nasr Bin al-Fahd. The second document is the open letter written by Jihadi strategist Abu Mus`ab al-Suri in response to the announcement of a $5 million bounty for his arrest. Finally, analysts point to the calls made by leaders of al-Qa`ida in Iraq for nuclear scientists to join the insurgent campaign against the Americans.

Since America’s campaign against al-Qa`ida began in earnest in 2001, however, there has been little open-source evidence to show that the senior Jihadi thinking community consider acquiring WMD specifically a top strategic priority. Instead, the U.S. government has missed a related, yet distinct strategic development that has been percolating over the past decade: the de-emphasis of certain weapons and the renewed emphasis on mass destruction.

To be clear, Jihadi theorists have been actively discussing the necessity of inflicting high amounts of casualties against the West. Movement leaders have come to realize that, when leveraged correctly, almost any type of technology can yield mass destruction. Such findings do not often appear in contemporary discussions of the threat posed by the nexus between terrorism and WMD because the West approaches the topic of WMD from a narrow perspective that is not shared by its enemy.

In Jihadi thinking, the contemporary precedent for inflicting high casualties against non-combatant populations was established by the United States itself. These writers are merely reciprocating the treatment that they believe Muslims have been suffering under for decades at the hands of the West.

According to the Jihadi intelligentsia, the West has used conventional weapons so extensively that they have caused mass destruction across the world, particularly against Muslims. The West has also instrumentally employed environmental pollution, trade sanctions, communicable disease and famine, according to Jihadi writings, as weapons of mass destruction against the Islamic world. The results have been so devastating, they argue, that they have caused millions of deaths among Muslims.

It is upon the narrative of Islamic victimization, a narrative widely accepted among Islamists of all stripes that Jihadi scholars have sought to build their case for the need to respond with commensurate violence; what they refer to as, “equal retaliation.” Jihadi religious scholars provide carefully researched and well-argued justifications regarding the religious duty and legitimacy to kill Americans and expounding on the methods by which they can be killed, including the use of WMD. For instance, Yusuf al-Uyayri, a top al-Qaeda strategist killed by Saudi security forces in 2003 has justified the need to kill up to four million Americans based on this theory of ‘equal retaliation.’

Taken as a whole, these Jihadi strongly suggest, moreover, that it is the mass killing that is the goal of extreme Jihadis not the use of WMD. With or without CBRN, any weapon can potentially serve the Jihadis as a weapon of mass destruction. Therefore, discussions of whether or not Jihadis specifically advocate the use of WMD are less relevant than discussions about whether, how, and why the Jihadi Movement advocates mass killing against the West. The following essay explores briefly this latter set of issues.
1 **Jihadi First Premises: Victimization**

Jihadi thinkers consider themselves as being the vanguard of over a billion Muslims worldwide, most of whom they see as being victimized, oppressed, and humiliated. These tragedies have been inflicted, they argue, by the ruling regimes of Arab states who claim to be devout Muslims but have failed to enact Sharia law, and by their supporters, which include the United States, United Kingdom and their Jewish affiliates.

It is only through following the call to violent resistance, these thinkers argue, that the few who recognize the need to defend Islam and are willing to put their lives at risk in doing so will emerge. This dimension of the Jihadi movement has been closely detailed by Western analysts.

What has been less studied, though, are the ways in which Jihadi thinkers translate this feeling of Islamic victimization into the foundation for propelling a homicidal movement.

Usama Bin Laden perhaps most cogently articulates the Jihadi feelings of victimization in his oft-covered 1998 Declaration of War:

> It should not be hidden from you that the people of Islam had suffered from aggression, iniquity and injustice imposed on them by the Zionist-Crusaders alliance and their collaborators; to the extent that the Muslims blood became the cheapest and their wealth as loot in the hands of the enemies. Their blood was spilled in Palestine and Iraq. The horrifying pictures of the massacre of Qana, in Lebanon are still fresh in our memory. Massacres in Tajakestan, Burma, Cashmere, Assam, Philippine, Fatani, Ogadin, Somalia, Erithria, Chechnia, and in Bosnia-Herzegovina took place, massacres that send shivers in the body and shake the conscience.3

A former Saudi al-Qa’ida commander, Faris Zahrani echoes this logic,

> What do you have to say about the honour that is violated, the women that are raped, the children that are murdered, and the men that are put to train & humiliated? What about all the Muslims from East to West who are killed, crucified, have their arms & legs amputated and are exiled from their lands?4

In a series of posthumously published essays, Yusuf al-Ayiri, a key al-Qaeda ideologue and media coordinator, killed by Saudi forces in 2003, argues that:

> This jihad is in a collision course with the Jews, their agents in Egypt, and those who defend the Jews in Egypt. By this I mean the ruling military and secular regime in Egypt. History has proved that the only power capable of stopping this regime and resisting the Zionist tide in Egypt is the Islamic power. With the killing of Al-Sadat and the events in Upper Egypt, the issue of resisting the Jews in Egypt exploded and

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4 Al-Abas Abd Al-Aziz Al-Umary Zahrany. "A Message to the Scholars" (Ulema).
it was clear that the regime, as an agent of the Jews and Americans, is on one side and that the Islamic movement is on the other side.5

One of the more influential living Jihadi clerics, Sheikh Abu Basir al-Tartusi, further elaborates the nature of the challenges facing Muslims around the world:

The Hindus have been slaughtering the Muslims in India and Kashmir for years... yet along with that, the Saudi regime maintains perfect diplomatic and non-diplomatic ties with India!

The Muslims in Chechnya have been slaughtered at the hands of the Russian crusaders for years... yet along with that, the Saudi regime maintains perfect diplomatic ties with Russia!

The Muslims in the Philippines have been slaughtered for years at the hands of the Philippine crusaders... yet along with that, the Saudi regime maintains perfect diplomatic ties with the Philippines! And it seeks a helping hand from them, as if there was nothing wrong!6

Given this first premise that Islam is under attack from external forces (the global conspiracy among Zionists, Crusaders, apostate regimes, Hindus and Buddhists) and from within (the Shi’a, the Muslim Brotherhood, moderate Salafis and secularist-nationalists), the next question concerns how these forces have sought to destroy Muslims.

2. The Case for War I: Zionist-Crusaders Atrocities Against Islam

The belief that there has been an ongoing global conspiracy to destroy Islam is a first-premise adopted by many hard-line Muslims around the world, Jihadis and non-Jihadis. However, Jihadis have been particularly interested in achieving a more granular understanding of just how this Crusade has manifested itself globally and in Muslim lands over the past several decades, particularly with regard to the use of weapons that cause mass destruction.

Consider the writings of British firebrand cleric, Abu Hamza al-Masri, who provides a useful first cut at the progression of Jihadi arguments with regard to WMD. In his book The Need for Shari’a, Abu Hamza begins by painting a picture of America’s irresponsible disregard for the global environment. For instance, he writes:

For far too long, the earth has been made to be a testing ground for nuclear weapons, a graveyard for soldiers who died in unnecessary wars and a place of pollution for those to unload the poisonous chemicals from industrial sites.7

In another of his books, The Way to Get Sharia, al-Masri explains,
Military strongmen use their land as a testing ground for chemical, biological and nuclear weapons in preparation to fight their neighbours over the most childish and mundane issues, all the while the issue of planet Earth stays looming on the horizon, unanswered by the elite and lower class alike.\footnote{Way to Get Shàña. Abu Hamza al-Masri. Page 3.}

This notion that the West tests weapons of mass destruction on its own lands is itself an indicator for Jihadis of the small value that Western governments place on human life and the Earth itself. The West’s disregard for implications of their actions is an important step in the larger proof being asserted by the Jihadi intelligentsia.

Beyond using the West’s own territory for nuclear testing, Jihadi thinkers argue that United States military has polluted most of the Middle East with munitions containing spent radioactive material, another indicator of the West’s moral and ethical bankruptcy. An author, allegedly well-connected to Bin Laden’s organization in Afghanistan during the 1990s, wrote in a book published by al-Sharq al-Awsat,

> It was apparent until now that the United States had attacked the Iraqi people with more than 30 tons of bombs containing depleted uranium. This is a low radiation substance, which increases the power of ordinary bombs, and spreads over large areas, causing serious damage to humans and the environment. The question raised in the al-Qa'ida meetings was what would prevent the United States from using its uranium-contaminated bombs against an Islamic people at any time it wants.\footnote{London Al-Sharq al-Awsat in Arabic 08 Dec 04 p1. [Part 1 of Al-Sharq al-Awsat review of a draft copy of a book by an unidentified author entitled "The Story of the Arab Afghans from the Time of Arrival in Afghanistan until their Departure with the Taliban."}

To encapsulate the argument of this essay thus far, these Jihadis see the West as having no regard for their own citizens, the global environment, or other human communities around the world. Actions taken by the West with regard to nuclear testing and adding nuclear components to their conventional weaponry are seen to have had a devastating effect on the aforementioned constituencies. But the argument does not stop there.

Other Perceived Attacks. Jihadi authors focus on a broad number of other perceived attacks against them that have not been waged through CBRN devices but through conventional weaponry used in such a way that it causes mass destruction. These activities, taken in concert with the previously mentioned WMD offenses, provide the necessary precedent for the reciprocal mass slaughter.

In 2002, the Jihadi propaganda outlet, Azzam Publications, released an article under the name of Muadh bin Abdullah al-Madani (an individual identified as writing from Afghanistan) arguing that:

> What these people fail to appreciate is that the 'battlefield' has changed. When the disbelievers attacked our innocent families, creating 'frontlines' in Muslim schools, homes and hospitals, they changed the 'battlefield' arena. By Allah, whilst the
disbelievers continue to rain down bombs on our homes with our families sleeping in them, they should expect no less from the Mujahideen. The 'Modern' Muslims have no problem with American B-52 bombers dropping cluster bombs from 30,000ft on densely civilian populated Afghan villages. That is merely collateral damage, but when it comes to killing Americans, suddenly they are up in arms. Should these Muslims not be concerned that their loyalties lie somewhere other than with Allah and the Muslims?¹⁰

Whilst the disbelieving nations have nuclear weapons, chemical weapons, biological weapons, 15,000lb 'Daisy Cutter' bombs, cruise missiles, B-52 bombers, Stealth bombers, fighter jets, Apache Gunships, naval warships…what do the Mujahideen have to fight back with? 'Modern' Muslims love to use the excuse of necessity when it comes to getting a mortgage to buy a house, or an interest-based loan when it comes to purchasing a new car, but when the principle of necessity is correctly applied in the case of life and death, as in Martyrdom Operations, 'Modern' Muslims call these ‘forbidden acts of evil.’¹¹

In the same vein, one of the most influential Saudi scholars of the twentieth-century, Sheikh Hammoud bin Uqla al-Shuaybi (known also as a strong supporter of the Taliban until his death in 2002) argues that:

The question is: When America attacked a Pharmaceutical firm in Sudan, using its planes and bombs, destroying it and killing everybody in it, staff and laborers, what was this called? Shouldn't the action of America in the Sudanese firm be considered as an act of terrorism?¹²

In short, according to this line of argument, America’s liberal use of weapons to cause mass destruction is seen to have established enough precedent for Jihadis to advocate the reciprocal killing of Americans. As will be discussed further below, the means by which they accomplish this task – be it through WMD or conventional weapons – is less important than the need to make right with God by retaliating in-kind.

3. The Case for War II: Islamic Precedents for the Use of WMD

There has been an active and ongoing debate among Jihadi thinkers regarding the religious legitimacy of using indiscriminate weaponry. Jihadi scholars fully appreciate the negative implications, in terms of the loss of popular support that is associated with, conducting attacks that kill large numbers of women and children. The argument that the use of weaponry to maximize lethality inadvertently kills non-combatants is taken seriously by the Jihadi scholars. As the next section will show, they have gone through great lengths to justify as consistent with Islamic religious teaching their call for mass killings.

Specifically, Salafi Hammoud bin Uqla al-Shuaybi also wrote on the historical precedents within Islam that would justify the use of weapons of mass destruction:

¹¹ Ibid.
¹² Uqla – The Two Scholars Who Dared to Speak.
Muslim commanders have always used Catapult when fighting the Kuffar (a kind of weapon that was used in the past when trying to break into an enemy camp which is fully fortressed - it destroys whatever it meets by its weight, i.e. something like a catapult - translator), and it is obvious that a Catapult when applied in a war does not differentiate between a fighter and others, hence it may afflict some those so-called 'innocent souls', but that notwithstanding this is an established practice among Muslims in their wars.13

In this often-cited passage, Sheikh Shuaybi implicitly legitimizes the use of weapons that “may afflict some of those so-called 'innocent souls'” in the history of Muslims themselves. If these types of weapons have been historically used by Muslims against other Muslims, then surely they should and ought to be used against non-believers – particularly when that enemy camp is situated in the land of Islam.

To emphasize further the Islamic legitimacy of using such weaponry, Shuaybi points to a variety of Hadith related to the subject. He looks to Ibn Qudamah:

Ibn Qudamah may Allah have mercy on him, said: “And it is permissible to use Catapult because the Prophet may the Salaat and Salaam be with him used Catapult on the people of Ta’if; and Amr bin al-As did the same to the people of Alexandria” (Al-Mughniy, vol. 10, p503).14

Shuaybi then looks to Ibn al-Qasim:

And Ibn al-Qasim said “it is permissible to use Catapult against Kuffar even if children, women and old men and monks are killed inadvertently, because 'Nikayah' (doing what will weaken the enemy) is allowed according to the consensus of Ulama.” Ibn Rushd said: “'Nikayah' is permissible according to Ijama' and on any type of polytheists” (Al-Hashiyah ala’ Ar-Raudh, vol. 4, p 271).15

The most influential living Jihadi thinker today, Abu Muhammad al-Maqdisi, addresses the issue of indiscriminate killing in the name of Jihad as well. He is most focused on the unintentional killing of Muslims in the course of these attacks. Maqdisi parses this complex argument down to multiple levels in his works, particularly in, The Fruits of Jihad.

First, Maqdisi provides religious and ideological cover to those conducting attacks using weapons that kill indiscriminately when they are used against Western facilities in Muslim lands. Maqdisi argues:

We fully understand the evidence of the Mujāhidīn for such matter when they attack military sites or housing compounds that are specific to the polytheists, even if there are among them a few who attribute themselves to Islām - these are not the places of the Muslims. The presence of a few people who claim Islām but ally with the

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13 Uqla – The Two Scholars Who Dared to Speak.
14 Uqla – The Two Scholars Who Dared to Speak.
15 Uqla – The Two Scholars Who Dared to Speak.
polytheists and assist them or increase their number, does not protect the polytheists from the attacks of the Mujāhidīn.

This argument reflects Maqdisi’s disdain for Muslims who work in conjunction with non-believers who are present in Islamic lands without the proper invitation or welcome. For him, the West’s attempt to use these people as a sort of human shield, or deterrent against the mujahidin from attacking because they would be killing their own, holds no sway over his argument.

Maqdisi returns to the medieval Islamic scholar, Muhammad ibn Ismail al-Bukhari as he continues to discuss indiscriminate killing. There is, Maqdisi argues, a clear religious precedent that allows for indiscriminate killing on night raids, where it is difficult for the mujahidin to identify the difference between combatant and non-combatant. He says:

Al-Bukhārī and Muslim narrated from the hadīth of al-Sa‘b ibn Jaththāmah that, “The Messenger of Allāh was asked about whether it was permissible for some people to attack the disbelievers at night, at the risk of injuring their women and children?” He replied, “They are from them.” I also heard him say, “There is no protection except for Allāh and His Messenger.” This hadīth indicates the permissibility of attacking the disbelievers and polytheists by night, even if the result of this is that some of their women and children - who we have been prohibited from intentionally killing - are also killed alongside them. The hadīth says that if they are killed unintentionally in circumstances wherein it is difficult for the Mujāhidīn to keep away from the non-combatants, then there is no blame. The scholars also included in this the use of catapults (the modern equivalents of which are explosives) against the forts of the disbelievers, wherein it is impossible to take precautions ensuring the safety of non-combatants.

But Maqdisi is particularly concerned about the young mujahidin, who he argues carelessly conduct attacks using indiscriminate weaponry trying to ground them in these Hadith. Maqdisi writes:

So these youths come and cite this hadīth as evidence for the permissibility to perform martyrdom operations in Muslim streets and markets, even though he said, “They are from them, there is no protection except for Allāh and His Messenger.” This is evidence against them not for them, because it indicates that the Muslim should be protected, and that he has a sanctuary the borders of which cannot be transgressed - those who have no protection are the polytheists and their children, not the Muslims and their children. In addition to this, no protection was stated for the women and children of the polytheists in this hadīth, but this only applies to the night attacks wherein the Mujāhidīn are unable to ensure their safety. The hadīth does not generalize other evidences that forbid intentionally killing the women and children.

Al-Hāfidh Ibn Hajar said in al-Fat‘h regarding the phrase, ‘They are from them’, “This refers to a situation where the fathers cannot only be reached through the children; if the children are killed because they are mixed together, then it is permissible.”

Al-Nawawī said in Sharḥ Muslim, “The meaning of night-raids is that they be attacked at night, such that a man cannot be distinguished from a woman or a child.”
4. Killing-in-Kind: 4-10 Million Americans

In 2002, al-Qa`ida spokesman Suleiman Abu Gheith was quoted on the al-Qa`ida website, al-Neda, that, “we have the right to kill 4 million Americans, 2 million of them children… and cripple them in the hundreds of thousands. Furthermore, it is our obligation to fight them with chemical and biological weapons, to afflict them with the fatal woes that have afflicted Muslims because of their chemical and biological weapons.” Although his thinking may not have had much causal impact, it reflected a growing sense in the movement that there was a reciprocal war to be waged against the United States for its actions in Muslim lands, the attacks of 9/11 being just an opening shot.

In 2003, Nasr bin al-Fahd followed Gheith’s lead by issuing a fatwa heard ‘round the world on the permissibility of deploying WMD in the course of jihad operations. As a highly regarded religious cleric, his statement clearly carried causal weight in justifying the use of such attacks in the minds of many Jihadis. Since the United States had ravaged Muslim lands and killed upwards of 10 million Muslims in the course of their military campaigns, Jihadis, he argued had earned the reciprocal right to retaliate in kind.

In the same vein, Saudi Jihadi thinker and propagandist, Yusuf al-Uayyri, began outlining deeper justification for reciprocal actions against the United States. He looks to this Qur`anic verse for justification,

And if you punish (your enemy, O you believers in the Oneness of Allāh), then punish them with the like of that with which you were afflicted. But if you endure patiently, verily, it is better for the patient ones.16

Al-Uayyri also points to Imam an-Nawawi, an early 13th century authority on matters of Islamic jurisprudence,

If the transgressor kills using a sword, then Qisās should not be applied to him with anything other than a sword, because Allāh (Most High) says, “Then whoever transgresses the prohibition against you, you transgress likewise against him.”17

But if the transgressor burned his victim (till death), or drowned him, or threw stones at him (till death), or threw him off a cliff, or struck him with a piece of wood (till death), or confined him (till death), or refused to give him water and food till the victim died.18

Yusuf al-Uayyri looks to the 18th century Yemeni scholar Imām Ash-Shawkānī, who highlighted the following Qur`anic verses,

“The recompense for an evil is an evil like thereof.”19

16  An-Nahl: 126
17  Al-Baqarah: 194
18  “Al-Muhathab” (2/186)
19  Ash-Shūrā: 40
“And if you punish (your enemy, O you believers in the Oneness of Allāh), then punish them with the like of that with which you were afflicted.”\(^\text{20}\)

“Then whoever transgresses the prohibition against you, you transgress likewise against him.”\(^\text{21}\)

Essentially, the decisive evidences which generally prohibit the wealth, blood, and honor of a human are restricted by these three Verses.”\(^\text{22}\)

Al-Uayri is among the most cogent Jihadi thinkers arguing for the religious acceptability of “equal retaliation” in matters of life, honor, and wealth. He writes,

And all the jurists have clearly stated that if the kuffār burn our crops and cut down our trees, then it becomes permissible to do the same to their crops and trees. And this is the exact same issue! And Allāh had indeed accepted the action of the Companions when they cut down the date trees of the Jews- because the action (of cutting down those trees) disgraced the Jews; and this shows that He (Most High) loves disgracing the oppressive transgressor- and this is a legislated action.\(^\text{23}\)

But there is one condition- It is not permissible for the Muslims to kill more than 4 million non-combatant American civilians, nor is it permissible to banish more than 10 million Americans!! And this is so that we do not surpass the equality of our retaliation. And Allāh knows best.\(^\text{24}\)

And after mentioning these and explaining that the “Equal Retaliation” which is mentioned in the Quran is not restricted to mutilation, Uayri goes on to argue that Muslims have an equal retaliation claim to make against the United States. The following excerpts show Uayri meticulously tracking and tallying up the different Muslim deaths in order to establish the foundations for reciprocal mass attacks against the West:

So here they are- they have put economic sanctions on ‘Irāq for a long period of time- and they have killed none but the Muslim population. And in their bombardment of ‘Irāq, they did not even damage the ‘Irāqi Government significantly- rather, they only harmed the Muslims, killing hundreds of thousands of them.

So if the Muslims equally dealt with America [in a similar fashion], it would be perfectly permissible for them to kill around 10 million American civilians.

\(^{20}\) An-Nahl: 126
\(^{21}\) Al-Baqarah: 194
\(^{22}\) Refer to “Nayl Al-Awtār” (6/39)
\(^{23}\) Chapter Five: The Verdicts of Contemporary Scholars Regarding Killing Women and Children as Equal Retaliation. The Verdict of Shaykh Al-Mujāhidīn, Yusuf Al-‘Umayrī in At-Tibyan Fi Istīhabf An-Nisā’i Was-Sibyān, The Clarification Regarding Intentionally Targetting Women and Children. At-Tibyan Publications. Ramadhān, 1425 H.
\(^{24}\) Chapter Five: The Verdicts of Contemporary Scholars Regarding Killing Women and Children as Equal Retaliation. The Verdict of Shaykh Al-Mujāhidīn, Yusuf Al-‘Umayrī in At-Tibyan Fi Istīhabf An-Nisā’i Was-Sibyān, The Clarification Regarding Intentionally Targetting Women and Children. At-Tibyan Publications. Ramadhān, 1425 H.
With a single missile, Americans killed more than 5 thousand Muslims in the Baghdad Social Refugee [Center] during the (first) Gulf War.

And if indeed the people behind the operations which took place in America [The Raids of New York and Washington] were Muslims- then this was nothing more than a payment of the debt that the Muslims owed to America on behalf of the Baghdad Social Refugee [Center] in which Muslims were murdered. This statistic is not including the economic sanction, which has killed more than one million and one hundred thousand (1,100,000) Muslims in ‘Irāq.

And let us not forget that the American transgression against ‘Irāq has not ceased to continue upon the innocents. Indeed the effects of America’s murderous weapons, with which they have satanically attacked the Lands of the Muslims, have ruined hundreds of thousands of innocent souls with strange illnesses, the most well-known of which is leukemia, and these strange illnesses are still apparent to the eyes. And these are all due to the depleted uranium [which is inside the bombs used by the Americans]. And the deaths of the infants in ‘Irāq alone has reached, in these last few years, due to the attacks of America, along with economic sanctions- more than 750,000 babies- meaning three quarters of a million.

Indeed the cruelty of America against ‘Irāq is hundreds of times more than the number which was inflicted on the Blessed Tuesday.

And if you look to America’s economic sanction upon Afghānistān- then you shall indeed see shocking oddities. The victims of the embargo have amounted to 70 thousand Muslims; as for the internal displaced, illness, and poverty- these things have increased to a percentage of 95 % of the population. And all this is due to America and it’s imposed economic sanctions. And this Muslim Land was showered with seventy American missiles25- yet we did not find anyone who would condemn this “terrorism” and “murder of innocents”.

And then turn your glance towards Filastīn- verily you see that for more than 50 years, America has crusaded against the Muslims through the hands of the Jews… And the scores? 5 million refugees, 262,000 martyrs, with the Permission of Allāh, 186,000 injured, and 161,000 permanently handicapped. And the Zionist-American siege against our brothers in Filastīn has not ceased to continue…

And in Somalia, the Americans infiltrated it with excuses of “humanitarian aid” to continue its satanic cruelty upon its land; killing 13 thousand Muslims, and burned the children of Muslims, and perpetrated satanic deeds with the Muslimāt. And America buried its nuclear waste in the Muslim Land of Somalia, which has continued to make the Muslims suffer.

These are just a few of the Muslims’ affairs in which America has involved itself in overtly and directly in the murder of innocents, and spreading cruelty in the Lands of the Muslims… We have not mentioned the affairs in which America covertly is

25 Trans Note: As was mentioned before, this was written 9 days after the Blessed Raids- so the Shaykh, may Allāh have mercy upon him, is referring to the missile attacks on Afghanistān during the regime of the Tāḥfūt Bill Clinton. After the official launch of this New Crusade, thousands- if not millions- of American missiles have been showered on this Muslim Land.
behind- as in the Filibbīn, Indonesia, Kashmīr, Macedonia, Bosnia, and many other Muslim Lands. And it is indeed correct for a Muslim to say that every calamity which has befallen the Muslims- America has had a long hand behind it, either directly, or indirectly.

And from amongst the “equal treatment” that we will apply to America- we will apply its own law upon itself…  

Each of these incidents cited is seen to provide one more set of Muslim deaths to be added to the overall toll inflicted by the United States and the West – and justifying “equal retaliation.”

5. Jihadī Community Responses to WMD

Thanks to the Internet chatrooms and email groups, a new demographic of Jihadī online pundits have emerged, commenting and blogging on affairs of the day. The status of these individuals likely ranges from potential recruits for extreme violence to disaffected individuals setting out their frustration and alienation on the Internet. Their discourse and thinking reflects the argument made above, that Jihadis are less concerned with the acquisition of a specific category of weaponry but more concerned with the effect of their attacks in causing mayhem and destruction for the enemies.

At the same time, these online Jihadis have discussed a number of other issues related to the Movement’s acquisition of nuclear weapons. A Jihadī poster under the name, “Abu Talha the Salafi” in the Muslim.net website recently wrote:

The possession of nuclear weapons would be a great addition. It would alter the balance of power in the world. But do we need uranium and plutonium to win? I do not think so, because we are living in a victorious age. The great Mujahidin were able to defeat the Russians in [Afghanistan]. And we are defeating America in Iraq with primitive weapons.  

In late September 2006, Abu Hamza al-Muhajir, then the leader of al-Qa‘ida in Iraq, announced,

The field of jihad can satisfy your scientific ambitions, and the large American bases are good places to test your unconventional weapons, whether biological or dirty, as they call them.

In response, a number of Jihadī Internet participants revisited the idea of acquiring nuclear weapons, a subject not often brought up on Jihad chat forums.


Curiously, a growing number of postings have appeared in the chatrooms and by email after natural disasters occur in the United States, that spin these acts of God as a God-issued deployment of mass destruction. These natural disasters, including hurricanes, tornados and earthquakes, not only serve to kill many people and damage property, but they serve as a form of God-delivered terrorism, keeping people in a constant state of fear.

On 11 September 2005, Abu Musab al-Zarqawi, for instance, commented on the impact that Hurricane Katrina had on the United States, saying,

I believe the devastating hurricane that hit the United States occurred because people in Iraq or Afghanistan – maybe a mother who had lost her son or a son whose parents were killed or a woman who was raped – were praying for God and God accepted their prayers.

Or consider this email from a Jihadi email group that was received by the author,

The first shower was Katrina. We can not fail to recall that America expects a major earthquake as California is prone to earthquakes and disasters. The population living under the obsession of the massive earthquake which is expected by geologists to hit Los Angeles in the future will result in thousands of deaths. Some scientists believe that a series of small earthquakes in California is a warning before the strong earthquake occurs, which may lead the destruction of entire cities. Where are those earthquakes that terrorizes the population of California?

There have been some self-imposed restrictions on the application of violence against targets. Jihadi ideologue, Abu Muhammad al-Maqdisi, has been highly vocal about the need for Jihadis to use discrimination when possible in the waging of attacks where Muslims may be present.

So let us be clear - this is another matter that we are not censuring or speaking against, but rather we are defending the Mujahidin, and we are adding to their evidence on its permissibility. No, what we are criticizing is for some aspects of it to be reversed, such that the passages, gatherings, means of transports and streets crowded with Muslim women, men and children, turn into targets for blind

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29 Email communication originally in Arabic. Sender: Tanthem-alqa3edah@yahooogroups.com; sent to author on 15 September 2005.
bombings, under the pretext that there is a shop, car or embassy owned by a disbeliever in the same vicinity. The explosion will then kill tens of Muslims, along with innocent women and children, and may not even harm the enemy in a manner that could have been achieved without such explosions.

O our brothers, we remind you of the hadīth of al-Mustafā reported by Muslim on the authority of Abū Hurayrah, “and whoever from my Ummah attacks others, killing [both] the righteous and the wicked, sparing not the believers and not being faithful to his covenants, then he is not from me,” and in one narration, “then I am not from him.”

What will the Mujāhid benefit from his Jihād if included in the threat and sphere of this hadīth is that the Messenger of Allāh declared himself free from him and his Jihād - how amazing is the condition of the Muslims, their sanctity and their blood, and how amazing is the Jihād and its benefits!

6. Conclusion

The main argument of this article has been that the Jihadi emphasis on acquiring and deploying weapons of mass destruction has certainly been important. It is an instance, though, of a more important and broader based trend that has been occurring for several decades in the movement; namely, that Jihadis have made mass killing and destruction of the United States their priority.

In order to make this argument, one that is highly problematic for most Muslims, Jihadi authors have sought to overlay it on existing social grievances held by Muslims around the world, particularly with regard to actions by the United States military abroad. Beyond that, Jihadi authors have sought legitimation of the need to conduct indiscriminate attacks and mass killings from the Quran, Hadith, and chief clerical experts.

Focus on the nexus between the Jihadi Movement and WMD is clearly not misplaced. The argument of this article, however, is that such questions and analysis ought to be situated in its broader context. The Jihadis have been marketing a compelling and logical set of arguments that encourages Muslims everywhere to kill Americans using any weapon they have accessible.
The subtitle of this panel, “The WMD Terrorist Threat: Some Givens, Some Changes, and Some Uncertainties,” is an excellent description of the current state of knowledge concerning weapon of mass destruction (WMD) terrorism. The “uncertainties” aspect, particularly, gets to the heart of the issue of terrorists and weapons of mass destruction. More so than any other aspect of terrorism, the WMD terrorist threat is primarily based on speculation. We have far more uncertainties regarding this threat than we have givens or changes. When I first wrote about WMD terrorism in the late 1980s at RAND, I titled my paper “Terrorists and the Potential Use of Biological Weapons.” It was ready to be distributed when a colleague suggested that since we had not yet had any bioterrorist attacks, I should add the subtitle “A discussion of possibilities,” which I did. If we look at the situation today, we really are still only talking about “possibilities.”

Despite all the money and attention that is being devoted to the WMD terrorist threat, there is still no consensus as to how an incident is actually going to unfold or what measures should be taken to mitigate the consequences of such an attack. This uncertainty is due to the fact that with the exception of the 1995 Sarin nerve gas attack in the Tokyo subway system in 1995 (a botched attempt by a religious cult, Aum Shinrikyo, to kill tens of thousands of people) and the wave of anthrax letters in the U.S. in 2001 (which killed five people but which cannot really be considered a large-scale attack), there has never been a major terrorist attack with a WMD.

In this regard, we are today with respect to WMD terrorism where we were almost 40 years ago with respect to “conventional” terrorism. A new international threat was emerging then, but it was unclear as to the direction it would take. It took several years after the first major international hijacking in 1968 – the Popular Front for the Liberation of Palestine hijacked an Israeli El Al flight bound for Rome and diverted it to Algiers – for the diverse
nature of conventional terrorism to become clear. Hijackings ultimately proved to be only one small part of the terrorists’ repertoire of tactics, which eventually included midair plane bombings, prolonged hostage crises, suicide truck bombings, car bombings, massacres, and other violent acts. As each new dimension of conventional terrorism emerged, lessons were learned and governments took measures to try to thwart the threat. This has not happened yet with respect to WMD terrorism.

We still do not know if the first major successful WMD attack is more likely to be a chemical, biological, radiological, or nuclear attack, or even a combination of the four basic types of WMDs. And within each category of WMD, we do not know the specific tactics or weapons that terrorists and other extremists are likely to use. For example, with respect to bioterrorism, tactics and weapons can range from aerial dispersal of anthrax spores and the release of ricin in the ventilation system of buildings or arenas to the deliberate spread of smallpox by an infected suicide terrorist. With respect to chemical terrorism, we can have anything from a repeat of the Aum Shinryko use of Sarin in a subway system to the sabotage of a vehicle carrying chlorine gas. Radiological and nuclear terrorism can include the use of a Radiological Dispersal Device, also known as a “dirty bomb” (a conventional explosive combined with radioactive material) or the use of a suitcase nuclear bomb.

We also have now what appears to be the first known case of radiation poisoning as an assassination weapon, the death of former Russian agent Alexander Litvinenko. Litvinenko is suspected to have been poisoned in a London hotel with polonium-210 in November 2006 and died a few weeks later. Coincidentally, it was in London in September 1978 that the first known case of deliberate ricin poisoning took place. Bulgarian dissident Georgi Markov was attacked by a Bulgarian agent who used an umbrella-type weapon that fired microscopic pellets containing the toxin ricin into Markov’s leg, resulting in Markov’s death a few days later.

We also do not know if after the first major successful WMD attack (from the terrorists’ perspective in terms of casualties and effect on the target nation) we will see a “new age of terrorism” emerge with WMD attacks occurring more frequently or whether it might be just a “one-incident wonder” not followed up with any subsequent major attacks. Unlike many other countries around the world, the United States has never experienced at home a major terrorism campaign of any type. We have not had the daily or weekly bombings and other types of major attacks that many other countries have experienced. Our experience with terrorism at home has been sporadic major attacks separated by many years, not days, weeks, or months. That means that there has always been time for the initial shock of the first major attack to gradually wear off. This allows the public to regain some of its confidence in the ability of the government to deal with the terrorist threat as well as for emergency workers and other first-responders to recover from the stress of dealing with the incident.

In the American experience, therefore, a sense of normalcy in the country has been restored before the next attack occurs. This took approximately a year after the first World Trade Center bombing in 1993 and occurred within a year after the Oklahoma City bombing in 1995. We have already seen this sense of normalcy occur with respect to the 9/11 attacks. Therefore, the public and emergency service personnel could well prove unprepared psychologically for any type of major terrorism campaign on U.S. soil. Should that first campaign
involves WMD, the many practical difficulties that will arise during the crisis will be compounded by the added problem of an American public witnessing for the first time ever its government unable to prevent a continual series of major attacks and the emergency services dealing for the first time with a continual series of major incidents. The danger is that the result will be a loss of public confidence in the government while a major terrorism campaign with weapons of mass destruction unfolds. This will make it much more difficult for federal, state, and local authorities to deal with the crisis.

Another uncertainty is the question of how ready we are today for a major WMD attack. I would probably move this uncertainty to a “given.” That is, it should be assumed that we are not ready for the likely disorganization, confusion, and panic that will follow a major WMD attack. Hospitals are not prepared for the flood of patients that will seek treatment after a major attack and may have to close their doors to people in need during the crisis. Furthermore, the most likely target of a major WMD attack, namely the general public, has basically been left in the dark regarding contingency planning for WMD terrorism. More than a decade after WMD terrorism started to receive high-level attention in the United States after the Tokyo subway attack, the public still does not know what to do or where to go in the aftermath of a major attack. We have not yet had a systematic and comprehensive WMD pre-incident preparation program for the general public.

In addition to these uncertainties regarding WMD terrorism, we also have some “givens” that are important for understanding and dealing with the threat. The most obvious one is the killing potential of weapons of mass destruction. Under optimal weather conditions and proper dispersal techniques, the release of biological warfare agents such as anthrax would likely kill extraordinarily large numbers of unvaccinated individuals. In one of the more cited assessments of potential casualties, the former Office of Technology Assessment of the U.S. Congress estimated in 1993 that the dispersal of 100 kilograms of anthrax spores from an airplane over Washington, D.C. on a clear, calm night would kill between one and three million people. The use of chemical and nuclear weapons by terrorists will also result in large numbers of casualties.

Another given about WMD terrorism is the type of extremists that are likely candidates to use chemical, biological, radiological, or nuclear weapons. In my view, there are three basic characteristics that any terrorist or terrorist group considering using WMD would have to exhibit (along with having the technical and organization skills needed to acquire or develop WMD). These are the following:

- A constituency whose possible reaction to a WMD attack does not concern the terrorist group.
- A perception that conventional terrorist attacks are no longer effective and that a higher form of violence or a new technique is needed.
- A willingness to take risks by experimenting with and using unfamiliar weapons.

Among the terrorist groups that could be described as meeting these criteria would be doomsday religious cults, global religious revolutionary groups, and Neo-Nazi and white supremacist groups. State-sponsored terrorist groups also are potential users of WMDs,
provided that the state-sponsor feels confident that the WMD attack would not be traced back to them and that the group they are sponsoring would not one day use the knowledge, training, and WMDs in an attack against the state-sponsor itself.

Another type of terrorist that is a candidate for using WMDs is the lone operator. We tend to overlook the lone operator in assessing the terrorist threat since many definitions of terrorism require that an act of violence be committed by two or more people with a political, social, or religious objective. Yet in terms of the effect that a violent act committed by a single individual can have upon society and government, there is sometimes little difference between the actions of the lone operator and those of organized terrorist groups.

We have seen this phenomenon in the case of Theodore Kaczynski, the infamous "Unabomber," whose violence and threats of violence caused changes in the way packages are sent through the U.S. postal service, led to heightened security measures at airports, and generated fear among the public. We have also seen this in the case of the 1982 Tylenol poisoning in the U.S., a case still not solved but which authorities suspect was the work of a mentally ill individual who laced Tylenol capsules with cyanide, causing the deaths of seven people. That single act of product tampering (and the wave of copy-cat extortion threats that followed) created concern throughout the country about the safety of pharmaceutical products and led to new legislation and government regulations requiring tamper-resistant packaging on many different products.

Suspected to have been the work of a lone operator, the 2001 anthrax letter attacks also demonstrated the impact that a single individual can have upon government and society. For several weeks there was heightened fear throughout the country concerning opening letters and a legitimate concern that a new form of bioterrorism had been introduced, namely sending anthrax spores through the postal system. The innovative nature of lone operators is not surprising. The lone operator has been among the most innovative in terms of terrorist tactics, introducing new forms of violence which the more established terrorist groups eventually mimic. For example, the first midair plane bombing and wave of hijackings in the United States were the work of lone operators.

When it comes to the issue of WMD, there are several reasons why lone operators are a threat to use such weapons. First, one of the constraints that inhibit many terrorist groups from venturing into this type of terrorism, namely concern about alienating the group's supporters or constituency, is not present in the case of lone operators. Lone operators do not rely upon any segment of the population for financial, logistical or political support and thus do not have to worry about any potential negative reactions to an incident.

Second, lone operators are not burdened by any group decision-making processes or inter-group dynamics that can sometimes stifle creativity in formulating plans and operations. They are therefore free to think up any type of scenario they want and then try to act upon it since they are accountable only to themselves. Related to this is the fact that because they are not part of a group, lone operators will not be concerned, as would be some but not necessarily all groups, about a potential government and law enforcement crackdown following an incident that could lead to the virtual elimination of the group through arrests. And if a lone operator
A third reason why lone operators are a threat to use WMD is that they are unlikely to be discovered by law enforcement or intelligence agencies prior to an attack. Since they work alone, there will be no communications between members of a group to intercept, nor will there be any members of a group to arrest and interrogate to gain further information.

Chemical and biological agents, in particular, provide the lone operator with a weapon which he could feel confident would not be discovered prior to an attack and which could be easily transported to the target area without needing any help from others. In this regard, a WMD, particularly a chemical or biological weapon, is actually easier for a lone operator to deal with in terms of logistics than would be an attack involving a large bomb or other large conventional weapon. Such WMDs can be very small and not even appear to be a weapon.

The revolutionary information age in which we are living can also be effectively exploited by the lone operator planning a WMD attack. Individuals working alone today can gain access through the Internet to information on WMDs, some of which can be used to assist them in acquiring or producing such weapons. The information age also makes logistics easier for lone operators in terms of pinpointing targets. Maps of airports, diagrams and blueprints of buildings, and other information about possible targets can be obtained from the Internet and other sources.

Some of the more innovative schemes involving chemical and biological agents have involved individual criminals and lone operators. In one case, a man calling himself Commander Nemo tried to extort $15 million from the Cypriot government in 1987 in exchange for not releasing dioxin, a toxic chemical, over the Troodos Mountains south of the capital Nicosia. The blackmail letter was extremely detailed, including scientific data on the ingredients Commander Nemo claimed he used to make the dioxin. The threat was taken seriously by the Cypriot government, which decided to consult with British scientists. It was not until British scientists assessed the data presented in the extortion demand that they were able to dismiss the incident as a hoax. Fearing public panic, the government of Cyprus kept the threat secret until Commander Nemo, who turned out to be a 36-year-old British citizen of Cypriot origin, Panos Koupparis, was arrested in London a few months after he had sent the letter. Also arrested in London were his wife and two brothers, one of whom was a chemistry student at London’s Polytechnic Institute. Police stated that they found weapons and documents in Koupparis’s Cyprus apartment – he had an offshore company in Cyprus – that indicated he had planned a series of bombings on the island to convince the government that his dioxin threat was real.

In another case, a mentally-ill Yugoslav immigrant, Muharem Kurbegovic, who claimed to be the leader of a fictitious group called “Aliens of America,” set off a bomb at Los Angeles International Airport in 1974 that killed three people and injured several others. In tape recordings that he sent to the media, Kurbegovic stated that the first bomb was marked with the letter “A”, which stood for “airport,” a second bomb would be associated with the letter “L”, a third with the letter “I”, and so forth, “until our name has been written on the face of this nation in blood.” He therefore became known in the media as the Alphabet Bomber.
Kurbegovic threatened to release Sarin nerve gas over Washington, D.C. unless all immigration and naturalization and sex laws were declared unconstitutional. In one tape regarding the release of Sarin, Kurbegovic said, "Imagine what will happen if we are lucky and the wind blows from Supreme Court to Capitol Hill to White House to Pentagon." When police searched the Alphabet Bomber’s apartment after his arrest, they found pipe bombs, explosive materials, books and manuals on germ and chemical warfare, gas masks, catalogues for purchasing chemicals and laboratory equipment, and maps of Washington, D.C. and Heathrow Airport in London. In subsequent searches of his apartment, police found twenty-five pounds of sodium cyanide, which is a precursor chemical for the manufacture of the nerve agent tabun and can also be used to generate toxic hydrogen cyanide gas.

The Commander Nemo and Alphabet Bomber cases illustrate the creativity of lone operators. If the 2001 anthrax letter attacks in the U.S. turns out to be the work of a lone operator as is suspected, then we have another example of how innovative and dangerous the lone operators can be. Nobody had previously thought it was possible to effectively spread anthrax by sending it through the postal delivery system.

Finally, in terms of some of the changes that have occurred in the world of WMD terrorism over the past several decades, I would put at the top of the list the amount of publicity, information, funding, and resources that have been devoted to dealing with this threat. This shift of resources all started in the period leading up to the first Gulf War in 1991 and accelerated after the 1995 Aum Shinrikyo attack in the Tokyo subway system. However, it has been in the post-9/11 period (including the 2001 anthrax letter attacks) that we have seen billions of dollars being poured into research for early warning of a WMD terrorist attack. This includes the effort to design, develop, and deploy early warning sensors across the country. Yet we really do not know how reliable these sensors and other detection device ultimately will be. They also warn only after a biological warfare agent has been released, not before. So early warning of a biological terrorist attack does not refer to indicators that it is about to happen, but rather that it has already happened and that we will hopefully have enough time to reduce casualties with speedy response and treatment. That is why the emergency services and medical community will continue to play the most significant role in combating WMD terrorism, particularly bioterrorism.

I also see in the years ahead continual skepticism in many circles concerning the likelihood of a major terrorist attack with a WMD. This is understandable, since if there is so much attention and discussion and focus on a threat that has never happened, it is human nature to question whether it ever will occur. But the history of terrorism teaches us that it is very dangerous to underestimate the intentions and capabilities of terrorist groups and other extremists to commit a violent act. The world was shocked by the 9/11 attacks. Yet that operation was the logical extension of terrorists always seeking new and innovative ways to commit violence. We had suicide attacks on the ground and a suicide attack at sea, so it was only a matter of time before we would have a successful suicide attack from the air. The same is true for WMD terrorism. While we cannot predict whether it will be a chemical, biological, radiological, or nuclear attack, there are simply too many smart, creative, and technologically savvy terrorists around the world to believe that we will forever remain free of major WMD terrorism. Therefore, we need to continue to prepare for the day when it will happen and be ready to deal with the aftermath of the attack.
**APPENDIX IV**

**Terrorist use of WMD – A Network Approach**

Justin Magouirk, Darcy Noricks, and Dominick’ Wright

1. **Introduction**

   Terrorist acquisition and use of weapons of mass destruction (WMD) is acknowledged to be today’s most dangerous threat. As reflected in the different parts of this report, many different analytic approaches can offer insights into that threat. This paper draws on social network analysis to explore how the type of social network of a particular terrorist group can facilitate the spread of radical ideological motivations and decision making to acquire and use WMD.

   More specifically, the discussion that follows begins by positing a set of conditions that would be most likely to lead a terrorist group to seek to acquire and use WMD. In light of that theoretical discussion, the results of two case studies are then set out. One case study examines a centralized, hierarchical network – Aum Shinrikyō, a Japanese terrorist cult responsible for the 1995 Sarin attacks in the Tokyo subway. The second case study considers a decentralized, fluid network – the Global Salafi network – which includes the recently decentralized al Qaeda sub-network. The emphasis in these case studies is on how the characteristics of each group’s social network shaped its justification for, decisions about, and strategic approach to the acquisition and use WMD.

2. **Theory**

   Terrorist organizations confront at least two issues when considering the acquisition and use of WMD as a means for achieving their goals: 1) psychological justification for the use of unconventional weapons and 2) overcoming organizational/network constraints that might prevent their development or acquisition. According to the theory set out here, a terrorist network that acquires and uses WMD would satisfy these two necessary conditions – while also being robust enough to withstand either accidental or intentional disruption.

   2.1 Basic Description of the Conceptual Model

   From the perspective of terrorist groups, we posit the following as key psychological and organizational conditions for supporting the acquisition and use of WMD. The conceptual model also sets out some initial propositions about the impact of social networks on these conditions.

   Terrorist groups are most likely to consider acquisition and use of WMD under the following two conditions:

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1 The authors’ names are listed in alphabetical order.
1. **Strategic Failure - or “Need”**
   The expectation of diminishing expected utility drawn from a current course of action (e.g., conventional weapon use or even non-violent strategies of negotiation) “triggers” a cognitive incentive to “search” for more viable alternatives. “Current strategy failure” does not imply that the terrorist group is never successful in its pursuits. Rather, it implies that on some level the terrorist group’s leaders and followers view its existing strategies as unable to meet the requisite demands of its overall organizational goals.

2. **Diminishing Costs - Tangible but also Intangible**
   Assuming that the damage produced by WMD is at least equal to that of conventional weaponry, then a significant decrease in the costs broadly defined (monetary, transaction development, acquisition and access, perceived adverse impact on key audiences, lack of perceived justification, etc) associated with WMD should increase terrorist group willingness to use WMD. The theorized diminishing costs include intrinsic losses associated with conducting an immoral act.²

Terrorist leaders are most likely to be able to persuade individuals within the wider terrorist group population to support the acquisition and use of WMD under two, jointly determined conditions.

1. **Credibility - and Consensus Formation**
   Members of these groups perceive their leaders as sufficiently sharing common interests with them and consider their leaders to be effective agents for actively pursuing or otherwise articulating those interests;

2. **Strategy and Diminishing Costs Satisfied**
   Current circumstances satisfy at least the failed strategy or diminishing costs conditions outlined above at the local organizational level.

Collectively, convergence in support for acquisition and use of WMD across all categories of terrorist movements (i.e. Islamic terrorism, right-wing Christian terrorism, etc) is most likely to occur under the following jointly determined conditions:

1. **Consensus Formation Within the Opinion Leading Elite**
   This condition requires a sufficient degree of consensus to form between terrorist leaders, irrespective of ideological faction, in support of WMD deployment.

2. **Global (across groups and or sub-groups) Satisfaction of the Strategic Failure and Diminishing Costs Conditions.**

   Terrorist groups’ success in acquiring WMD will require:

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² Some terrorist leaders and followers are likely attracted to some types of WMD, especially nuclear weapons, because of their considerably greater damage potential than conventional weapons. Diminishing costs still would play a role in facilitating acquisition by making pursuit of WMD relatively more attractive compared to other traditional means.
1. Access to internal technical resources or
2. Access to such weapons through outside social networks.

Social network analysis suggests that certain network structures are more likely to meet the above conditions and to facilitate the justification, acquisition, and use of WMD on an ongoing basis. The type of social network may also affect relative robustness of the group, thereby facilitating in a different way pursuit of a decision once made to acquire or use WMD. For our purposes here, two different networks are considered: a centralized, hierarchical and a decentralized and diffuse network.

In particular, highly centralized, isolated networks are likely to be the most effective structures for making and then transmitting a justification or need for WMD acquisition and use. They are also highly effective at centralizing and consolidating financial resources and achieving unity of purpose for the pursuit of non-conventional weapons. This is so because the leaders presumably already possess a high level of credibility (since they created and nurtured the organization and can use the hierarchy to build their reputation) and can allocate all available resources in the organization to the justification and acquisition/deployment of WMD. However, a centralized network is likely to be less robust in the face of external threats.

By contrast, within a decentralized network, there are numerous aligned groups that operate independently across multiple countries and regions. Within a decentralized network, it is harder to reach a consensus among leader and followers about whether the present strategy has failed and about the credibility of leaders. Decentralized networks also may require a longer time to transmit justification and consolidate organizational resources in pursuit of WMD. However, the very decentralization may facilitate efforts by individual leaders to set out ideological justifications for WMD use – and to have those justifications accepted. Decentralized networks may facilitate efforts to acquire WMD by connections with other groups in the network. More decentralized networks also are certainly more robust to both internal and external attacks such as counter-terrorism activities.

As a final note, it is interesting that statements about WMD made by terrorist organizations such as Al Qaeda and Aum Shinrikyo minimize the distinction between WMD and conventional weapons. They often primarily emphasize a change in the magnitude of casualties rather than something uniquely terrifying about the type of weapon used. If that is the case (and if it is applicable to other groups), then justification of WMD use seems to be inextricably linked to access and availability (included as part of “diminishing costs” above but otherwise not addressed significantly in this paper). As such, greater access and availability could lead to increased ideological and organizational justification for WMD use.³

³ In the case of Aum, Asahara’s interest in WMD did seem to peak at around the same time that scientists with research backgrounds and a certain skill set became high-level members of the organization. This is not the only reason for Asahara’s interest of course – he was also obsessed with the US use of the Atomic bomb on Hiroshima – but it was likely a relevant factor. In the case of Al Qaeda, both Osama bin Laden and Sheikh al-Fahd, seem to evaluate WMD differently than conventional weapons only in terms of the desired increase in the magnitude of casualties generated from using unconventional weapons. Admittedly, Al-Fahd also argues that US use of WMD erases whatever non-use norms might have existed.
2.2 Need and Credibility – An elaboration of the basic model

Per the model above, need and credibility are the two most essential psychological factors shaping decisions by leaders to seek WMD and the reception by a group’s followers of WMD-supporting messages. This section briefly elaborates the issue of need; the next section turns to leadership credibility.

The Establishment of Need

Consider a scenario in which terrorist groups are devoted to changing the policies of governments by inciting terror and governments are devoted to stopping them through counter-terror activities. The interaction between the two is basically a series of trial and error events that accumulate over time. The ongoing interaction between the two competitors fosters parallel evolution and adaptation of each side’s behavior. Focusing on terrorist groups, when the government successfully inhibits the use of certain strategies (for instance hijacking airplanes), the group invariably tries another strategy (substitution). To the extent that governments have not been able to stop existing terrorist strategies (traditional bombings, kidnappings, etc), there is not an existing need to allocate all resources to other strategies such as WMD, even if these strategies would be more effective in many ways. However, as traditional strategies become less effective over time, we would expect terrorist groups to allocate more resources to WMD. Nonetheless, we will not see a “blitzkrieg” effort until conventional strategies fail completely. To the extent that the development of WMD requires the expenditure of limited resources, however, the financial, opportunity, and other costs associated with developing and deploying WMD could lessen its attractiveness as a preferred method of action.4

Leadership Credibility and Local and Global Networks

Turning to the issue of credibility, leaders must overcome a number of limiting conditions in order to appear credible and therefore legitimate to their followers. Sometimes the endeavor requires that the leader has exhibited behavior commensurate with the realization of the group’s expressed interest. For example, Noordin Top’s (a Jemaah Islamiyah commander) successful attacks against Western targets in Indonesia fostered his rise to power among JI radicals. This is a case of behavior-based reputation.

Another important means for engendering leadership status is the demonstration of a thorough knowledge of the group’s ideology and the ability to place it into context with contemporary reality. Rabei Osman Ahmed el Sayed, “Mohamed the Egyptian,” provides an example of a predominantly ideological exposition-based ascent to leadership within a terrorist group. According to the surveillance records and eye-witness accounts collected by Spanish authorities, Rabei was bolstered his training in explosives with the Egyptian military with eloquent statements about the realization of jihad outside of Iraq to develop support within the cell responsible for the 3-11 atrocities in Madrid.5

4 In the case of al Qaeda and the Global Salafi movement, this point is particularly interesting because it potentially explains the lack of mass appeal (in terms of observable, significant changes in terrorist group behavior) despite the proclamations made by bin Laden and al-Farukh in support of using WMD. 
5 In addition to his past experience in both Egypt and in fighting the Soviets in Afghanistan, Al Qaeda’s Ayman al-Zawahiri also draws some of his current from the eloquence of his ideological conveyance.
The consonance of the leader’s actions (behavioral or expressive) with the existing interests and goals of the group is a further source of a leader’s credibility. In the abstract, ascent to a leadership position means that a particular individual has successfully conveyed to others in the group that he shares with them an affinity for the core values of the group and that he has demonstrated behavioral competence by producing desired outcomes or demonstrated ideological competence by eloquently expressing the group’s principled intentions. More concretely, a leader’s ability to communicate a shared understanding of desires and motivations with his audience critically affects their acceptance of him as a leader.

An important feature of group leadership is that credibility within one group does not automatically extend to credible leadership across all groups. Without a perception of shared interests, a leader’s ability will be limited to persuade members of other groups to accept his ideas. Another limit on a given leader’s ability to persuade members of other groups is the diversity of terrorist groups and of socio-political circumstances throughout the world. This leads us to the proposition that a global convergence to support acquisition and use of WMD will most likely arise under the condition that the multiple elites themselves have formed a consensus.

3. Two Case Studies – Aum Shinrikyo and the Salafist Movement

Turning then to the cases studies, this section highlights the impacts of social networks on the acquisition and use of WMD by two very different terrorist entities – Aum Shinrikyo and the global Salafist movement. It is useful to set out up front some of the major findings from those case studies.

On the one hand, Aum Shinrikyo is a perfect example of a highly centralized, hierarchical social network. Aum had an extensive set of recruiters and members across Japanese society. However, this entire network was subject to the leadership of one person. As such, by joining, the members accepted the leader and, henceforth, his credibility. The leader defined whether or not a need existed to pursue WMD as an alternative course of action. Given the centralized structure of Aum Shinrikyo, the leader was able to pursue that decision with little if any need to forge a wider consensus. In turn, the hierarchical network also allowed the leader to mobilize in-house technical skills in pursuit of WMD. Aum on the other hand has been largely decimated as a terrorist organization after Japanese authorities ceased to tolerate its activities. Given Aum’s hierarchical organizational structure, once the Japanese authorities “cut off its head,” they effectively killed the organization as an effective terrorist threat.

On the other hand, the global Salafi movement typifies a decentralized network. Within this movement there are signs of significant disagreement among radical Islamist groups about the success of existing “resistance”/terrorism strategies. Perhaps even more important, the decentralized network – along with the discrediting of traditional Islamic religious authorities – has facilitated Osama bin Laden’s effort to justify the need for the acquisition and use of WMD as a religious duty. Network ties between al Qaeda and Jemaah Islamiyah – at the group and the individual level – helped to provide access to skills or materials in its pursuit of.

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WMD. Again reflecting the impact of its decentralized network, the global Salafi movement—contrasted with Aum Shinrikyo—is still alive and well even though the United States has been waging a war against it for the past half decade.

3.1 Aum Shinrikyo Case Study

On March 20, 1995, five members of Aum Shinrikyo, a remarkably large new religious movement (NRM) in Japan founded by Asahara Shōkō, boarded five subway trains during the morning rush hour. Using sharpened umbrella tips, they punctured holes in plastic bags full of diluted sarin, releasing the poison gas into the enclosed environment of the subway. The five trains were scheduled to converge around Kasumigaseki station—the station closest to Japan’s Parliament—the Diet—as well as the National Police headquarters and a number of government ministries. By the end of the day, 12 people were dead, and more than 4,000 injured.

Although Aum began as a small yoga group in the mid-1980s, it grew over the subsequent decade into a popular new religious movement with some 10,000 adherents eager to rid themselves of their accumulated karmic debt acquired by living in a materialist society, through devotion to Asahara and his teachings. Of that number, around 1,200 members had become nuns or monks within the movement in a process of renouncing their families and society as well as turning all of their possessions and wealth over to Aum. Aum’s structure was based on its religious belief in various planes of existence borrowed from Hinduism. Below Asahara were the five ‘sacred grand teachers’ (seitaishi), who also held ministerial positions, along with 17 others, in the kanbu or Aum’s executive committee, which implemented Asahara’s dictums and helped to run the organization.

A Hierarchical Network

Aum is, in some ways, more hierarchic than the Catholic Church. In contrast to the decentralized radical Salafi Islam movement discussed in the next case study, in Aum’s network, all organizational decisions were ultimately made by Asahara Shōkō and carried out by a small executive committee of devoted ascetics. Asahara had the unique responsibility of ideological and religious interpretation, although those who had achieved the highest levels of enlightenment beneath Asahara could also perform some of the spiritual rituals and become teachers to the new generation of disciples. This hierarchy provided an optimal network structure in which to influence individual and group calculations about whether to use WMD. Complete devotion to the guru was a foundational tenet; enlightenment was to be achieved in large part by “cloning the guru” (guru no kuronka o suru). This latter practice involved meditation, ascetic practices, and endlessly listening to Asahara’s sermons and prayers in an effort to replace one’s own thought patterns with those of Asahara. It goes without saying that Asahara maintained “credibility” (a necessary condition per the earlier model) within his terrorist cult.

Thus, anything that Asahara approved, including the development and eventual use of chemical weapons, was conceptually part and parcel of what Aum members were agreeing to, whether they explicitly understood the details or not. At the same time, however, the

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7 “New religious movement” or NRM is the contemporary academic term that has replaced the use of the term “cult”.
8 Juergensmeyer: 114.
hierarchy of the organization ensured that there was no need to keep members lower down in the organization informed of either Asahara’s or the executive committee’s plans or intentions for implementation. In practical terms, this organizational structure made it possible for all resources to be focused on whatever projects that Asahara gave priority at any given time. Hence, all of Aum’s scientific and technical expertise was combined with Aum’s considerable resource base in the effort to develop WMD. Still, like many groups based around a charismatic leader, the rise and fall in prominence of the various members of the core group surrounding Asahara may have played a role in Aum’s emphasis on advanced weapons research and an increasingly technological version of the apocalypse.9

**Research and Development – WMD**

Aum began trying to produce both biological (anthrax and botulism) and chemical (sarin) weapons beginning in early 1990. Aum was able to gain access to the technical knowledge necessary for the creation of WMD through its vast network of recruits from university and scientific communities in Japan. Aum scholar Ian Reader notes that the rise of Murai Hideo and Endo Seiichi to the highest ranks, both of whom had scientific educations, coincided with the evolution of Aum’s interest in “advanced and destructive forms of weaponry.” Murai and Endo were responsible for the practical implementation and elaboration of Aum’s WMD research and development program, but the impetus and justification were still Asahara’s.10 Aum had become a millenarian group that believed Armageddon was imminent, and as part of that narrative, Asahara’s April 1993 sermon outlined his initial belief that the Japanese government should acquire sarin in order to thwart the United States’ plan for world domination and the military conquest of Japan. Asahara soon realized that his pleas would go unheeded and turned his focus to Aum’s role in saving those that it could from the coming apocalypse. The hierarchical nature of Aum allowed Asahara to define the “need” for WMD and immediately orient the organization to address it.

**Defining the Need for WMD**

Ideologically, it was Asahara’s adoption and transformation of the Tibetan Buddhist concept of \(\text{phoa}\) (or \(\text{poa}\)), in which enlightened individuals can help the dead gain access to a higher spiritual realm, that provided the primary justification for both internally- and externally-directed violence. For Aum, \(\text{phoa}\) came to include not just intercession after death, but also bringing about someone’s early death in order to prevent them from occurring additional karmic debt while erasing the negative karma they had already accrued. Anyone outside of the movement was, by definition, either a sinner, or not spiritually aware enough to achieve enlightenment on their own. While this explanation provides a justification for the sarin attack, there have been different interpretations of its purpose. It may have been a preemptive effort on Aum’s part after learning about a planned police raid on the organization, or it may have been Asahara’s attempt to bring about an early Armageddon, or a combination of both.

**Concluding Thoughts – Aum**

Unlike in the case of al Qaeda (in which justification was provided, but the limiting factors were access/feasibility), Aum had both justification and access —although fortunately for the

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10 Reader, 187.
Japanese public the sarin that Aum had managed to develop was still of a diluted nature. Focusing on the necessary conditions for justification from the model, the hierarchical nature of Aum Shinrikyo meant that the conditions of leadership credibility and need were met. Once Asahara made the decision to move forward with WMD development, there were few if any networks roadblocks. In this case, once Asahara made the decision in 1993 that there was a need for sarin development, it was accepted among the adherents that he chose to bring into his small group of leaders.

Stepping back from the model, Asahara filled a widespread desire within Japanese culture for spiritual fulfillment and an emphasis on rejection of hyper-materialism. Much of Aum’s constituency was young, university educated, and often successful in their chosen career endeavors, but reported in interviews that they suffered from feelings of alienation and a lack of self-fulfillment. Once individuals became members of Aum, they became part of the hierarchy. In contrast to a decentralized network, in which a diffusion of information ensures that everyone knows and understands where the organization is going and how it is going to get there, centralized networks require diffusion only at the very highest level; the rest of the network is only required to follow where they are led.

Although there has not historically been any real demand for the justification of violence in the Buddhist tradition, it is interesting to note the use of such a justification in active conflict regions like Sri Lanka. Mark Juergensmeyer explains that the Buddhist rule of nonviolence may be broken in the case of an armed response to an attack, as long as there is no intent to kill. In addition, some Buddhist monks in Sri Lanka have argued that violence cannot necessarily be avoided in a time of *dukkha*: an age of suffering that is a part of human history. Overall however, it was both a lack of demand for justification among the sect’s followers as well as the lack of resiliency of the network that ensured that Asahara’s religious justification for violence did not inspire further violence in other parts of Japan or in any other Buddhist sects.

### Global Salafi Movement/Al Qaeda Case Study

In a 1999 interview, Osama bin Laden responded to a question about whether he was trying to acquire chemical and nuclear weapons with the following statement:

> Acquiring weapons for the defense of Muslims is a religious duty. If I have indeed acquired these weapons, then I thank God for enabling me to do so. And if I seek to acquire these weapons, I am carrying out a duty. It would be a sin for Muslims not to try to possess the weapons that would prevent the infidels from inflicting harm on Muslims.

The authority of bin Laden’s statement that acquiring WMD is a religious duty is grounded in today’s decentralized radical Salafi Islam movement. Increasingly, traditional Islamic centers of Islamic law in Sunni Islam have decreased legitimacy. Instead, what is

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12. The Salafi movement strives to restore Islam to the practices of Prophet Mohammed and his companions. It tends to advocate violent jihad. According to Marc Sageman, the global Salafi movement “advocates the defeat of the Western powers that prevent the establishment of a true Islamist state.” See Sageman 2004, 1.
emerging is a system in which Islamic “thought leaders,” irrespective of religious training, may invoke the acceptability of violence and expect to have radicals across the globe cite their statements as justifications for violence. In this system, creating consensus to justify WMD use differs considerably from the situation in a more hierarchical movement. In turn, two of the potential “costs” of using WMD – intrinsic losses associated with what once would have been held to be an immoral act as well possible lack of support among the wider audience – are considerably reduced in this decentralized network. Consequently, although the radical Salafi movement has so far been unsuccessful in using WMD, it may actually be able to translate justification into access and use in the near future.

**Decentralization**

Sunni Islam, the branch of Islam to which radical Salafis subscribe, differs from religious organizations like the Catholic Church in that there is no hierarchical structure and no central authority. Hence, the power of ideological and religious interpretation and justification is diffused across the four “classical” Sunni schools of jurisprudence, as well as other non-classical schools such as Sufian bin O’ayyna. This decentralized structure ineluctably creates a situation where there are multiple centers of power, with different groups within Islam following different schools of jurisprudence. This situation has been exacerbated by the fact that the traditional schools of jurisprudence have lost significant legitimacy, as they have been subjugated to state (most often secular) authority. As such they are often seen as extensions of the government regime. Taken to its logical extreme, this decentralization has led to a situation in which even unqualified individuals like Osama bin Laden are recognized in small circles as legitimate religious authorities of Islamic law. The legitimacy of such actors is enhanced by their perceived independence from the secular state.

**Manufacturing Chemical Weapons**

In 2001, al-Qaeda became interested in formalizing a program to create chemical weapons. As noted before, bin Laden had already provided *fatwas* justifying attacks on American citizens and had noted in various statements that it was a duty of Muslims to acquire chemical and nuclear weapons. Mohammed Atif, the military chief of al Qaeda, tapped Hambali, the leader of Jemaah Islamiyah, to find a director for this project. Hambali chose Yazid Sufaat, a JI associate who had received his degree in chemistry and laboratory science from the University of California in Sacramento. Motivated by the ideological justification provided by bin Laden’s *fatwas* and statements and by the approval from his own organization, Sufaat met and interviewed with the al Qaeda leadership. He then moved to Afghanistan and set up a lab to create anthrax near the Kandahar airport.13 His plans were ultimately thwarted by a combination of problems shipping lab materials into Afghanistan, the American attack of Afghanistan after 9/11, and his own arrest in Malaysia in December of 2001.14 Nonetheless, the fact that al Qaeda set up a lab to manufacture Anthrax is important in and of itself. It marked a defining moment in Salafi terrorism, as al-Qaeda utilized its network connections to JI to access the technical skills it lacked to proceed with chemical weapons manufacturing. Interestingly, it did this based on the religious justification and leadership of one individual, Osama bin Laden.

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**The Fatwa**

While bin Laden’s fatwas on violence were regarded as legitimate by many radicals, bin Laden himself technically did not have the religious training to issue these religious edicts. As such, there was still not a religious edict from a leader with the traditional jurisprudence training to be accepted among the larger pool of Muslims. However, this changed in 2003 when Nassir bin Hamad al-Fahd, a prominent and extremely radical Saudi religious leader, issued a fatwa authorizing the use of WMD in the service of jihad.

In a detailed legal justification, al-Fahd argued that that Islamic law trumped international law, and hence international standards on the acquisition and use of WMD were not applicable to Muslims. He argued that the very countries such as the United States that argued against the spread of WMD had used them in the past. Thirdly, he argued that since America had ravaged Muslim lands and killed up to 10 million Muslims, it would be permissible for Muslims to respond with equal magnitude, killing up to 10 million Americans with WMD. Finally, he argued based on the sayings and traditions of the Prophet Mohammad that Muslims must strive to do everything perfectly. Hence if the use of WMD was the only way to defeat the United States, it was permissible. This statement provided support for previous al Qaeda assertions concerning the right to utilize violence in extreme forms against the United States and its allies, although not everyone within the radical Salafi movement concurred.15

**Supply, Demand, and Inspiration**

There is clearly a demand for religious and/or ideological justifications for violence against the United States. This demand trickles up from the most radical fringes of terrorist organizations like al Qaeda that want to destroy American influence in the Islamic world. Viewed through the lens of our theory, individuals are engaged in a “justifications” search. Because the Salafi movement is large, global, and decentralized, the response to provide such justification for extreme violence is slower than in an isolated, hierarchical organization. Nonetheless, radical religious leaders like al-Fahd, Ali Al-Khudair, and Ahmad Al-Khaledi in Saudi Arabia (three religious scholars arrested after the 2003 Riyadh bombings in Saudi Arabia) are ready and willing to supply religious edicts justifying violence to fulfill the search of other radicals.

In turn, these types of rulings promote a desire for violence beyond the initial demanding groups. For example, bin Laden’s 1998 fatwa justifying attacks on American civilians was later used by Hambali not only as justification for the creation of a chemical weapons lab, but also as justification for the series of JI attacks against Western interests in Indonesia from 2000-2005, including the Bali attacks in 2002 on a nightclub and discothèque. Prior to 2000, JI had not participated in any terrorist attacks and was focused almost entirely on overthrowing the secular Indonesian government. Hambali himself, as well as other JI radicals such as Mukhlas, the director of the 2002 Bali bombing, cited bin Laden’s fatwa not only as justification for their violence, which we would expect, but also as inspiration. As such, the decentralized radical Islamic movement provides an open market for religious edicts that not only justify this violence, but also inspire further violence, creating a downward spiral. The Internet has expedited this process as radicals across the globe have access to religious edicts on the web.

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Just as anyone can offer their own running commentary or news service on the Internet, irrespective of qualification, anyone can provide religious justifications for violence on the Internet. Perhaps paradoxically, this decentralizing phenomenon exists alongside the continuing influence certain more radical individuals such as al-Fahd who originated in traditional but not state-controlled jurisprudence.

**Concluding Remarks - Radical Salafi Networks**

To recap, the highly decentralized structure of the radical Salafi social network both 1) facilitates the spread of ideological motivations that justify the acquisition of WMD and 2) facilitates acquisition via connections to other organizations with complementary skill sets. Viewed through the lens of our theory, the radical Salafi network potentially provides a very fertile ground for both the "justifications" and the "information/feasibility" searches outlined earlier. Perhaps most important, the decentralized nature of the movement allows prominent religious leaders to rise up and provide the justifications for violence that other individuals are seeking or that are needed to maintain support among the movement's wider Muslim audience. Nonetheless, because the global Salafi network is so decentralized, it is likely to take considerably longer for "justifications of need" be accepted across the diverse movement than in a hierarchical network structure such as Aum. Additionally, because resources are scattered across groups led by different thought leaders, it is harder to marshal resources and allocate them towards the goal of WMD, something Aum was also able to do quite efficiently.

4. **Conclusion**

In this paper we began by proposing a set of conditions that would make it more likely that a terrorist group (leaders and followers) would seek to acquire and use WMD. To reiterate, these conditions were: perceived strategic failure or need for a shift to an alternative course of action; diminishing tangible and intangible costs of acquiring and using WMD; and leadership credibility to create a wider group consensus for the need to acquire and use WMD. In so doing, we also proposed a conceptual model that helps to explain how the social network/organizational structure of a terrorist group – hierarchical or decentralized – influences the generation and transmission of ideas and beliefs associated with its acquisition and use of WMD.

To reiterate, the characteristics of the group's social network affect both the leadership's ability to define a need/justify a new (WMD) strategy to meet its organizational goals as well as the nature of leadership credibility. In hierarchical groups, the leader alone may be able to conclude that a need exists because of a perceived strategic failure. Credibility of the leader may be taken as a given, justification once declared never questioned, and consensus established almost by definition. Or, as in the case of Aum Shinrikyo, an extremely hierarchical network may allow a leader to act without the knowledge of most of a group's members and only a consensus among a very few participants. By contrast, in a more decentralized network, there may be many different views of whether or not strategic failure necessitates a shift of posture. But paradoxically, within a decentralized network, it may be easier for an established leader to take on the mantle of religious authority in providing a justification for WMD use, as has occurred with Osama bin Laden in the Salafist movement. Whether hierarchical or decentralized, the social network structure also was seen to impact the group's capabilities and strategy for acquiring WMD. More hierarchical networks can draw on
internal resources more readily, while decentralized networks may be able to leverage linkages within the overall network to other groups.

The most likely groups to acquire and use WMD would combine an ability to provide psychological justification for the use of unconventional weapons and to overcome organizational/network internal and external constraints that might prevent their development or acquisition – while being robust to disruption from government counter-terrorist activities. From the perspective of likelihood to acquire and use WMD, we would term this combination a WMD “perfect network.” It will be very rare for a network to evolve that will meet all of the “perfect network” requirements. Aum was successful in the first two areas, but was not robust. The global Salafi network is moderately successful in the first area (justification), very successful in the third area (robustness), but at least so far has not successful in overcoming constraints to development and acquisition.
APPENDIX V

**Trafficking in Nuclear Materials and Other WMD**

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Trafficking in nuclear materials and other WMD by crime and terrorist groups is not a hypothetical problem. By comparing data contained in the databank of the IAEA with research conducted by the author and others, it is apparent that there is much more movement than is evident from official sources. Most of this trafficking is of low level materials and small quantities of highly-enriched uranium (HEU). But the cumulative effect of the transport of these materials may be much greater than is presently recognized. Furthermore, the possibility of a dirty bomb being used in Western Europe or the Middle East in the coming years is probably significant, as law enforcement sources in Western Europe report detection of radioactive materials. Some of this material moves along with other illicit commodities such as drugs.

Many persons fail to recognize the diffusion of nuclear materials for a variety of reasons. First, on some occasions the movement of the material is facilitated by high-level corruption that government officials deny or cannot acknowledge. In other cases, knowledge of the transport remains the domain of law enforcement personnel who retain this information for their investigations and do not communicate the knowledge of the WMD movement beyond their law enforcement circles. Investigators failing to do the network analysis of the movers of the detected materials do not see the full dimensions of the problem.

The possibility of bio-terrorism is also a reality. The routes and patterns of dissemination of this material would probably entail different scenarios. The increasing involvement of both criminals and terrorists in the lucrative pharmaceutical industry also suggests that shadow networks may assume an important role in the distribution of potentially dangerous biological materials. The involvement of the corporate world in government-sponsored working groups on countering bio-terrorism makes these possibilities more known to government analysts, although the discussion of possible scenarios is not well known to the general public.

The range of actors involved in the illicit movement of WMD is much broader than many persons think and the relationships that exist among these diverse actors are much more complex than many anticipate. The legitimate status of some of the perpetrators helps them elude detection. In contrast, a significant share of this illicit movement occurs within a murky world that is difficult to investigate and in which the networks involved may never be thoroughly unraveled.\(^1\) As the investigation of the radiation death of Putin critic Alexander Litvinenko reveals, even a police force as sophisticated as the British cannot fully uncover all

the international networks involved in the movement of the polonium because of the failure of Russian law enforcement to cooperate. The presence of an immediate and active disinformation campaign intended to derail the investigation also undermines the investigative process.²

There is presently much focus on the role of illicit power structures, failed states and non-state actors in WMD trafficking. This has been the topic of recent conferences and academic research.³ But these attempts to understand the phenomenon of WMD smuggling outside the context of Western developed countries may be misleading. Some of the smuggling appears to be linked to legitimate or state structures. Furthermore, some of the materials are flowing into strong states such as Britain, as the recent polonium case illustrates. This smuggling occurs even in countries where there is minimal corruption of law enforcement and more enforceable borders. Therefore, it is important to realize that this problem also affects and involves the affluent and developed countries and is not just a problem of failed and weak states.

This paper sets out and examines different scenarios for the possible dissemination of WMD, focusing in particular on the nuclear aspect of the problem. The key role that crime groups assume in the trafficking of nuclear materials will be analyzed. Attention will also be paid to the direct involvement of terror groups that use crime techniques or retain the services of criminals to disseminate WMD. The role also is examined of the legitimate corporate world in deliberately or inadvertently facilitating this illicit movement.

The scenarios that follow are not entirely hypothetical. To the contrary, they have been informed by interviews with individuals in the corporate, law enforcement and security communities who have encountered the phenomenon and are able to provide insights into how segments of transnational WMD networks operate. The scenarios focus on the movement of materials in North Africa, Western Europe, Eurasia, and include Turkey and the Middle East. These regions are the subject of particular focus because evidence of the movement of materials is strongest in these regions. Also, the presence of Islamic fundamentalists with pronounced intentions to acquire WMD provides a market in these regions. Rogue states exist, as well, with the expressed desire to acquire nuclear materials but the acquisition by these states is not necessarily linked to illegitimate actors or illicit power structures.⁴

More specifically, to depict the variety of routes for moving WMD, the analysis focuses on a variety of scenarios that highlight the geographical reach of the problem, the variety of actors who can be involved in WMD movement, and the gaps in the existing system of controls that can allow this smuggling to occur. The scenarios will help explain how states and non-state actors can use a variety of means to acquire WMD.

1 SCENARIOS

1.1 Role of Corporations

The involvement of legitimate actors in the movement of illicit materials is much more acute than is commonly realized. Corporate actors may not be involved merely as front companies but as active participants in the illicit movement of radiological materials. The possibility of violating brand integrity to disseminate WMD is also a distinct possibility.

Scenario One

A company called “Cesium Strategies” is formed by an apparently legitimate businessman. The alleged function of this company is to provide cesium based equipment for industrial uses. The equipment provided by Cesium Strategies can be used for road construction and technical uses in desert areas. This well financed business has airplanes that fly the needed equipment to clients in developing countries. One of the clients of this business is the government of Libya in the 1990s, which retains the services of Cesium Strategies to supply numerous machines for its “public work projects.”

The provision of industrial equipment that contains cesium is a pretext to provide the radioactive material sought by the Libyan government. The owner of Cesium Strategies appears to be a legitimate businessman who retains high-priced and high-status lawyers to help advise on the management of his company. The law firm that provides consultancy services beyond the provision of tax advice is unaware that the cesium provided under this guise is “dual use.” All they see are leasing and contractual relationships for equipment that contains cesium. They are not aware that during the process of leasing the equipment, the cesium is removed from the equipment and is retained by the government of Libya. In this way the status of the law firm provides an excellent cover for the WMD distribution strategies of Cesium Strategies. Enough legitimate business is carried on in other parts of the world and in other developing countries that the fraction of the business that is involved in WMD distribution is not apparent even to those involved as legal counsel to the firm. The generous fees paid by Cesium Strategies does not make the law firm probe deeply into all aspects of this particular commercial venture in the pre 9/11 world.

Comment: This case of smuggling was hard to detect because the illegitimate activity was hidden within a large legitimate business. The cover provided by high status professionals also adds an air of legitimacy. This scenario closely resembles an actual situation that was never completely unraveled by law enforcement, the intelligence community, or most of the professional service providers.

Scenario Two

A pharmaceutical faculty is set up by criminals/terrorists in an area with very limited effective law enforcement. Two possible locales for the location of this factory are Paraguay, which presently houses 50 counterfeit cigarette factories, or in a Balkan state such as Kosovo. The capital to establish this factory that produces counterfeit pharmaceuticals comes from a variety of sources, including criminal activity and diverse sources of terrorist financing. The factory manages to survive because of pay-offs to local law enforcement and government officials.
The factories make money by producing and selling counterfeit pharmaceuticals through its distribution system. A small part of the commodities produced in these factories are deliberately defective or harmful pharmaceuticals. Illustrative of this scenario would be the tampered Tylenol that was distributed in standard Tylenol packaging through the manufacturer’s normal distribution system. The quality of the bogus packaging in these factories is so good that it often takes a very fine specialist to detect the difference between the authentic and the bogus product. Therefore, the terrorist-controlled company can produce not merely “knock-offs” of the pharmaceuticals but deliberately harmful pharmaceuticals. In this way they are not only profiting by counterfeit production but are also simultaneously engaging in bio-terrorism.

Even though these pharmaceuticals may be produced in remote places such as Paraguay or Kosovo, they may be distributed in areas that terrorists seek to target. For example, the bombings against the Jewish community center in Buenos Aires, Argentina were planned in the tri-border area and Kosovo has served as a training center for terrorists from other regions. Therefore, these places that have been used as incubators for terrorism in the past can be used for the production of bio-terrorist products.

Comment: This second scenario is one that is of concern to employees of the pharmaceutical industry that seek to prevent the counterfeiting of their products. The failure of the pharmaceutical industry and law enforcement ever to solve the “Tylenol case” makes members of the pharmaceutical industry believe that they are vulnerable to this bio-terrorist threat.

12 Role of Criminal and Terrorist Actors

Scenarios of the Polonium Case

Much of the focus on the smuggling of nuclear materials has been concerned with the production of so-called dirty bombs and the construction of nuclear devices. There has been little attention to the situation revealed by the killing of Litvinenko in London which a single individual was targeted for murder using a radioactive source, polonium. The possibility that polonium could also be used effectively as a substance in a dirty bomb raises further concerns.

In the aftermath of Litvinenko’s death, the Russian official news agency disseminated several scenarios to explain this killing. Each of these scenarios is interesting because they reveal much about the Russian mindset as well as the Russian propaganda apparatus that sought to turn Western attention away from any state complicity in Litvinenko’s murder.

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5 NY Times op ed piece
Russian Scenario One

Litvinenko was trading in nuclear isotopes and wanted to profit from this trade. There are several assumptions behind this Russian model. 1) Former members of the Russian security apparatus are trading in nuclear materials. 2) These former security personnel still have access through their connections to materials that are supposed to be housed in tightly controlled facilities. 3) Controls at Russian airports and on commercial transport such as airplanes are not sufficient to detect the movement of nuclear material such as polonium. 4) There is a market for such substances in Western Europe.

Commentary: All these assumptions at the heart of this scenario concerning Litvinenko have been shown to be valid in other cases of nuclear smuggling. Furthermore, there seems to be evidence that Litvinenko had international links with Mario Scaramella who has been identified by the Italian authorities as someone involved in arms trafficking. The Chechens who were closely linked to Litvinenko (Litvinenko was the chauffeur-bodyguard of the son of the exiled Chechen leader Akhmad Zakhayev and converted to Islam at his death) have expressed interest in acquiring nuclear materials.

Russian Scenario Two

According to a version aired by NTV on Russian television, Litvinenko was connected with an underground London laboratory where a dirty nuclear bomb was being prepared by Chechen terrorists. Boris Berezovsky commented two years ago that the Chechens had acquired a portable nuclear bomb and lacked only one detail to make it viable. There was a possibility that polonium 210 could be used to detonate such a device. Therefore, Litvinenko was killed in the process of participating in the production of a WMD device. Therefore, he was a victim of his own misconduct.

There are several assumptions behind this scenario. 1) Berezovsky has knowledge of Chechen illicit activities. 2) Serious planning of terrorism is underway in Great Britain despite the presence of a strong intelligence and law enforcement community. 3) This scenario may also suggest that Berezovsky’s private intelligence is helping the Chechens as he is privy to the planning for this use of WMD.

Comment: French anti-terrorism authorities have also commented on their concern that Chechens have sought and may have acquired small quantities of nuclear materials. Therefore, while this scenario may not explain the events in Great Britain, it is not without precedent in Western Europe. Secondly, other law enforcement investigations reveal the presence of Berezovsky’s intelligence service in the service of Chechens.

Russian Scenario Three (posited by official Russian news agency but expanded with further insights)

According to Russian sources, the polonium was used against Litvinenko as a form of punishment for trafficking in nuclear materials. This would be the application to WMD of the adage “Those who live by the sword die by the sword.” The official Russian reports did not suggest the following chain of events, which follows logically. High-level Russian officials authorize the release of small quantities of polonium to Britain in order to eliminate this political enemy or to send a warning to Zakhayev or Berezovsky. They intentionally organize the transport and delivery of this material through a combined delivery system of criminals.
who serve as couriers and security agents who serve as the individuals who will deliver the fatal dose to Litvinenko. The assumption of this scenario is that highly placed individuals have access to enough material to actually punish someone known to be engaged in WMD activity and whose behavior was seen as counter to the interests of the Russian government. Therefore, it was in the interest of the Russian government to eliminate this person. A fundamental assumption is that there was knowledge of Litvinenko’s trafficking in nuclear materials by individuals who were powerful enough to punish him in this way.

Comment: The dose that killed Litvinenko was estimated by some experts to have cost tens of millions of dollars on the black market. Considering that only individuals with access to significant amounts of these materials would have had the option to use so much of this commodity to kill just a single individual, its use in this manner was not very efficient.

Non-Russian Scenario

The officially planted version of Litvinenko’s death leaves out some equally feasible scenarios that would not be in the interest of Russian authorities to propose. This scenario would have either security officials presently employed by the Russian government or past security officials engage criminals to transport the polonium from Russia to Great Britain. The criminals would have the risky task of moving the material through airport security in Russia and transporting it on the flight for subsequent delivery to those who would target the victim. Since the criminals functioning as couriers did not know what they were carrying, they chose to examine the commodity that they were transporting. This explains the small deposits found on the aircraft in which they moved the materials. The criminals were affected by their curiosity but they were disposable and hence were not of concern to the strategists behind the trafficking scheme. If the couriers were eliminated, it would remove any possible threat they could become material witnesses of the crime.

Comment: This scenario suggests that there is deliberate collaboration of state authorities with criminals in order to traffic nuclear materials. It also suggests that officials in the Russian government believe that their status as an energy supplier to Great Britain and their key role in diverse international bodies would overcome any desire of the British government to engage in official reprisals against them. Furthermore, the retention of shady actors to carry out the operation and the deliberate stonewalling of any international investigation by law enforcement bodies in Russia would preclude a definitive determination that the murder by WMD on British soil was orchestrated by the Russian government or actors closely associated with it.

There are several important conclusions that can be drawn from these scenarios of the Litvinenko case. Several of these conclusions, moreover, have implications for understanding the problems of investigating and combating trafficking of WMD.

1. Individuals responsible for trafficking nuclear materials in the Litvinenko case were able to find and move a commodity that has not been on the radar screen of those following nuclear smuggling.

2. The polonium remained undetected in British bars, restaurants and airplanes until Litvinenko’s death. This suggests that some types of harmful nuclear and comparable materials can remain in public places without
detection. The material was also moved on to airplanes bound for Britain without detection, suggesting that security schemes to protect against the illicit movement of WMD are inadequate,

3. The murky world in which Litvinenko existed, including an exiled billionaire oligarch, Chechens, as well as former members of the Russian security apparatus, suggests that establishing clear patterns of responsibility for this particular incident may never be possible.

4. The failure of investigations to be carried out jointly in both Britain and Russia with full cooperation of the Russian authorities means that all aspects of the criminal activity that resulted in Litvinenko’s death will never be unraveled.

5. Immediately after Litvinenko’s death, there were public statements made by individuals known to engage in disinformation. This suggests that a public disinformation campaign was possibly organized with the complicity of the Russian state. A dissemination campaign could be organized so rapidly by individuals with backgrounds in the security apparatus only if they had some prior knowledge of a possible murder.

**Georgian-Russian Scenarios**

The Georgian experience with nuclear smuggling, in which authorities have confiscated small quantities of HEU, contrasts with the polonium case in several important ways. First, in the British case no movement of polonium was detected until the death of Litvinenko. Second, the threats posed by the trafficking of polonium were not recognized until the death of Litvinenko and the illnesses of others who were exposed to this WMD. Third, there was a deliberate victim in this case rather than the transit of nuclear materials for an unknown use.

For the past several years, there has been the transit of small amounts of HEU through the conflict regions of Abkhazia and Ossetia into Georgia. This material has been detected consistently in the hands of criminals who do not reveal the larger organization that may be behind this movement. The smuggling of this material has been detected through operative police work rather than the use of nuclear detection equipment. In the investigation of the recent well-publicized 2006 case (as in past cases), the couriers of the material were not able to shed light on the larger criminal networks that may be moving the material.

Two contrasting scenarios need to be posited to explain the trafficking of this nuclear material that originates in nuclear facilities within Russia and then traverses thousands of miles before exiting the porous border areas marked by the conflict zones.

**Scenario 1**

Low-level insiders within a secure nuclear facility establish contacts with a criminal organization. This can be done because the officials seek to make money or because the criminals, through the introduction of drugs or other illicit activity, have the capacity to force the nuclear officials to cooperate with them. These crime groups are not insignificant actors within their home communities but have links to local politicians and have penetrated the law.

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7 Shelley, Global Crime.
enforcement apparatus. Through the legitimate construction and service businesses that these crime groups control, they have longstanding relations with officials in the nuclear facility. They also can expect to carry out their activities without interference by local law enforcement officials, who are on their payroll or part of their criminal organization.

These criminals also have contacts with the significant ethnic groups within their communities. These ethnic groups are retained by the crime group to transport the materials from Siberia through the Caucasus and beyond the territory of the former Soviet Union. This transport will occur through the standard means that are used to move other forms of contraband such as trucks, cars, boats and trains. This differs from the British case in that the material is not moved by airplane.

The material is moved across the border into Turkey, often with other forms of contraband such as drugs and with rugs that can enter either legally or illegally. The problem of nuclear smuggling into Turkey has been a long-term reality. Eighteen trafficking incidents were identified between 1993 and 1999. The problem has continued since then. Currently, there is great concern on the part of Turkish authorities that with the on-going conflict in Iraq and with the conflict in Lebanon, there is increasing incentive for terrorists in the region to obtain nuclear materials through Turkey. Further, with their need to escalate violence for ever greater effect, terrorists are seen as more likely to seek nuclear materials than in the past.

The long borders, absence of legal protections, and lack of cooperation among law enforcement and intelligence in the Caucasus, Turkey and neighboring countries means that criminals and terrorists enjoy a strategic advantage. They can cooperate undetected by the agencies responsible for their control.

Once this material exits the former Soviet Union, it can be moved further along with other illicit commodities such as drugs or can be moved by truck along with consumer goods to Syria and beyond in the Middle East.

Comment: The smuggling scenario is feasible because the crime groups have internationalized their activities and established important links with corrupt or corruptible officials. These networks can facilitate the movement of WMD because there are few effective border controls, either as a result of inadequate protections, poorly trained or corrupted law enforcement, or deliberate policies to reduce border controls. Therefore, WMD can be moved across significant territory within Russia and other successor states without fear of interception.

The crime networks that cross the borders of the Soviet successor states survived the break up of the USSR. The criminals' bonds, often formed in the labor camps of the Soviet era, endured beyond the state that sought to control them. In this way, the criminal networks mirror those of members of the security apparatus who have globalized and often cooperate to achieve their objectives, as evidenced by the polonium case.

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The illicit networks of the Soviet era have adapted to the global economy. As post-Soviet crime groups and former security personnel have globalized their networks, they have expanded beyond not only the former USSR and Eastern Europe, but also to émigré communities overseas and to prisons in Western Europe. Increased international transport, communications, and mobility have given smaller groups increased access to international markets and the possibility of being the transporters of nuclear materials.

Scenario 2

A policy is developed by high-level Russian officials to deliberately move small quantities of nuclear materials on to international markets through illicit networks. This scenario parallels one of the possible scenarios in the polonium case. In that case there was possibly a deliberate decision to move materials from a state-controlled facility housing polonium to punish a defector from the Russian security service. In contrast, the movement of HEU is done with a larger political objective - to ensure that Western states are financially and psychologically weakened by their need to fight terrorism. This view fails to acknowledge that the illicit circulation of this material may have unintended consequences, such as its falling into the hands of terrorists within Russia like the Chechens or into the hands of groups in the Middle East, with still other unintended political consequences.

The deliberate release of small quantities over time that bear the signature of the facility from which the material is released allows Russian officials to track the movement of the material across Russia and beyond. As in the past, members of the security apparatus who have responsibility for this illicit movement retain contact with different criminal groups. The criminals are able to contract with buyers in the West through contacts made by criminals and terrorists in prisons. Therefore, just as the prisons in the Soviet era played a central role in connecting diverse actors from across the USSR, prisons in Western Europe are assuming this role today.

The authorities responsible for this smuggling believe that this deliberate dissemination of nuclear material will not be easily detected because most analyses of nuclear smuggling examine the problem only at a particular locale - the facility that might be the source of the material, the border crossing at which the material is detected, or the country in which loose material has been found. Therefore, by examining these separate data points, it is very difficult if not impossible to understand how the whole smuggling network operates. Furthermore, because the amounts smuggled are broken up into small, discrete quantities, the probability of detection of each shipment is very low. Therefore, it is unlikely that those detecting the transport of illicit materials will have access to enough samples to understand that multiple shipments are being sent from the same nuclear facility.

Comment: The scenario is based on the survival of the KGB mentality that sees the country’s nuclear arsenal as a key to Russian power and a means of maintaining Russian influence in the world. The use of criminals to transport the materials is a continuation of a long Soviet tradition in which Soviet officials used the criminal underworld to carry out their bidding. The disproportionate importance of the individuals from the Caucasus in the criminal world of Russia explains the use of the Caucasus as an important transit route for

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these materials. Furthermore, the likely exit of these materials from the borders of the former Soviet Union to Turkey would allow the HEU to reach both Western Europe and the Middle East, thereby increasing the risk factor of harm being done through the spread of these materials. This scenario presumes a Russian failure to understand the internal risks within Russia and presumes that Western analysts will not be able to unravel the fact that there are multiple smuggling incidents related to the same source. This is the same presumption that the materials would not be detected most probably led to the choice of polonium to kill Litvinenko.

2. Discussion

There is not one pattern of nuclear smuggling. The scenarios outlined above are not mutually exclusive. Several of them may operate simultaneously, thereby explaining the diversity of smuggled materials, the diverse locales in which the materials have been detected and the range of criminal actors who have been found transporting them. The focus on investigations of individual cases rather than the whole network that is responsible for the smuggling means that analysts fail to grasp the extent of the problem and its links to crime and terrorism.

Some of the individuals who move nuclear materials consciously do so, even at risk to themselves, because they believe that something this dangerous must have worth. These opportunists move materials that are often of little potential danger to the larger society because the material in question has low levels of radiation content and could not be used for making a dirty bomb let alone a full scale bomb. Of much greater concern is the HEU that is properly encased, the plutonium that can be transported without detection, or even the cesium that can be moved under the guise of moving an industrial use commodity.

The individual smugglers may unknowingly carry this dangerous cargo. As a recruited mule (or low level transporter), such as exists in a drug trafficking organization, the actual transporter of the materials is isolated from the larger organization and lacks knowledge of the full operations of its network. This has been the case of individuals moving HEU through the Caucasus into Turkey. It also is probably the case of the individuals who possibly transported the polonium on the airplanes between Moscow and Britain. Because the courier does not know what he is transporting and therefore does not take protections to safeguard his person, both transporters and law enforcers have been known to suffer the severe consequences of exposure to radiation.

The smuggling can be carried out by a diverse group of actors who establish trust amongst themselves. Some of the crime groups of the Soviet successor states fit the model of the newer transnational criminals who possess neither large resources nor loyalty to the state.

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10 Based on interviews by the TraCCC team in Georgia concerning individuals who have been caught transporting radiation sources.
Their services are merely available to the highest bidder. The risk calculations of these newer crime groups are entirely different from those of the crime groups of more established societies where law enforcement functions better and association with terrorists enhances risk.

Therefore, while the criminals and terrorists manage to establish trust across ethnic groups and borders, the law enforcement and intelligence community that seeks to apprehend them is fragmented. The mistrust and inability to share information among government ministries within countries and among different countries is easily exploited by the smugglers of these potentially deadly materials. The imbalance between the trust established among criminals and terrorists and the mistrust that exists among those who seek to control them creates ample opportunities for the smuggling networks to continue. All of these problems are compounded by the secrecy of data collection and analysis precluding open discussion and assessment of emerging trends.

The newer crime groups may not share the ideological motivations of the terrorists but they, too, do not want a secure state. Therefore, they are willing to smuggle for terrorists, state entities, or any individual who will pay their fee. These crime groups may promote grievances, because it is through the prolongation of conflict that they enhance their profits.\textsuperscript{13}

Nuclear smuggling is not confined to one single crime group. Rather, smuggling networks are comprised of different post-Soviet crime groups as well as other criminal and terrorist actors that interact to move goods across borders. As the scenarios suggest, they may include high level officials and lower level insiders as well as current and rogue members of the state security apparatus. Nuclear materials are just one of many illicit commodities that the smugglers move both wittingly and unwittingly across the largely unpoliced and unmonitored borders of former Soviet territory and beyond.

\section{Conclusion}

The scenarios described above are based on actual known smuggling. They reveal the following:

1. Crime groups and terrorists interact.
2. Individuals from the corporate world sometimes are willing to engage with actors from rogue states.
3. Past and present members of state security apparati will engage with criminals to achieve their objectives.
4. The use of corporate brands can be an effective means of disguising the movement of both nuclear material and biological agents. This can be done with the deliberate participation of corporate actors who act like organized crime.
5. The successful smuggling of polonium into Great Britain without detection reveals the failure of technical solutions alone. The movement of HEU in the Caucasus also confirms the limits of technical efforts to safeguard against nuclear smuggling.

The existence of a crime-terror link in nuclear smuggling enhances the threat posed by the dispersion of nuclear materials. Thankfully, it does not guarantee the effective utilization of these materials either to create a dirty bomb or a nuclear weapon. Yet the threat of their effective deployment increases with the continuing departure of the materials from the former Soviet Union and the enhanced motivation of terrorists to obtain these materials.

Technological solutions to safeguard against the diversion and transport of nuclear materials provide only part of the answer. Much more attention needs to be paid to the human component of nuclear smuggling, especially the role assumed by criminals and terrorists.
APPENDIX VI

Violent Extremism in South Asia: Implications for Future WMD Terrorism

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Policy Architects International

1 Introduction

The prospect of acquisition and use of weapons of mass destruction (WMD) by terrorist groups in South Asia - India, Pakistan, insurgent-affected areas of Kashmir, and Sri Lanka - must be considered a pressing concern. Even if the probability today of successful, large-scale WMD use by extremist groups based in South Asia seems low, the possibility cannot be ruled out and the probability may well grow over time. Despite the attrition Al Qaeda and the Taliban have suffered from the War on Terrorism, both survive and continue to operate, with the help of allied extremist groups native to the region. South Asia has a large variety of organizations that employ terrorism or guerrilla war methods for political ends. Technical proficiency in understanding and obtaining WMD capability can be expected to grow with social and economic modernization and the diffusion of technical knowledge. Globalization also increases potential terrorist access to targets locally and abroad and may enlarge the geography of violent ambitions.

This paper does not address cyber-terrorism or any related class of weapons of mass effects (WME). While cyber attacks are certainly a serious area of policy concern, cyber-terrorism is a specialized subject that requires entirely different kinds of analysis than WMD. Similarly, while the circulation on websites of recipes and manuals for producing dangerous materials and devices has proliferated, and content analysis of such web sites is certainly a legitimate area of research, the analysis of such web sites does not seem at this time to provide direct insight into what we need to know about extremist groups and their WMD intent or capabilities in South Asia. We can presume today, to be sure, that any extremist groups that are computer literate and interested in WMD have members who are familiar with those website materials. Instead, the main purpose of this paper is to provide background analysis on the characteristics of violent extremism in South Asia. By way of conclusion, it considers the implications for future WMD terrorism in the region.

2. Scope of Violent Extremist Groups in South Asia

South Asia's violent extremist groups today fall into five main categories: (1) armed Islamic extremists, or jihadis, who fight to impose, reimpose, or extend and defend Muslim rule against non-Muslim rule or foreign encroachment; (2) armed Sunni and Shi’a extremist groups fighting for sectarian dominance; (3) Hindu extremist organizations, such as the Hindu Vishwa Parishad and the Rashtriya Swayam Sevak Sangh, which seek to move India from secularism to statehood based on Hindu culture, and who use confrontational methods but are not necessarily sponsors of armed militias; (4) separatist ethno-linguistic groups that use guerrilla war and terrorist methods to win territorial independence from a bigger power (e.g., the Tamil Tigers in Sri Lanka); and (5) leftist revolutionaries, such as the Maoists in Nepal and...
the Naxalites in India, who use force or guerrilla war in an attempt to win state power and transform society in stages according to certain ideological goals.

Further assessment may show additional categories to be relevant to extremist group capabilities or operations. For instance, registered charitable organizations or their members may provide financial or technical support to extremist groups, wittingly or unwittingly, and individuals or networks in government agencies or chartered NGOs may sympathize with and be drawn into support of extremist groups in various ways. In addition, the criminal underworld is a substantial phenomenon in the larger South Asian countries and certain extremist groups undoubtedly have underworld links, as do some elected politicians and even bureaucratic agencies. These factors will be touched on in this paper, but plumbing them in a serious way would be the subject of future research.

Virtually all of South Asia’s violent extremist groups engage, at least episodically, in what outsiders would consider “terrorism.” But the concept of “terrorism” is controversial and without an agreed international legal definition. It is interpreted, for example, in opposite ways by Indian and Pakistani authorities, particularly over militancy in Kashmir. Most armed extremist groups that see themselves as fighting for some kind of “freedom” or “self rule,” whether on religious or secular grounds, deny that they are terrorists and instead describe themselves as freedom-fighters. Most of those who fight in jihadi causes see their aims as legitimate in the eyes of God (Allah) and either reject the term terrorism or justify their use of violence as necessary given what they claim to be the evil nature of the obstacles they aim to overcome.

Sikh separatism (the Khalistani movement) was once a serious threat to North India and considered by Indian authorities to be terrorist in its methods. It has largely subsided or been extinguished. Hindu extremists regard their activities as something akin to Manifest Destiny. For them, propagating an “Indian” consciousness of the great religious epics and an affinity for Hindu culture of the sons of the soil is natural and could hardly be considered “terrorist.” Tamil separatists in Sri Lanka see themselves as a nation in their own right, notwithstanding their kinship with Tamil Nadu state in India. Various separatist ethno-linguistic and tribal groups in Eastern India regard themselves, similarly, as distinct peoples or nations. The Maoists and Naxalites operating within India and Nepal are not separatists, but rather revolutionaries who adhere to versions of Leninist and Maoist theory and think of themselves as freedom fighters for the liberation of the proletariat.

Of all the violent extremist groups in South Asia today, however, it is mainly the religious extremists who tend to be hostile to the West in deeply seated or primordial ways. Separatist groups within South Asian countries, including Hindu extremists, all use transnational channels (especially their overseas diasporas) to obtain outside resources. But in South Asia today, it is primarily a subset of the Islamic extremist groups, usually those intimately allied with Al Qaeda, that launch violent projects both into neighboring countries and overseas against Western countries. Thus, while one cannot rule out potential interest among South Asian separatist and revolutionary groups in WMD for local use, it is the religious extremists that would seem to be those most likely to be inclined to entertain WMD use as part of a tool kit for cross-border objectives, including transnationally, against the West.
3. Parsing Types of WMD and Related Activities in South Asia

To assess the prospects of WMD use by extremist groups from this region realistically, we may consider known, as well as potential, WMD acquisitions and actions, but should focus on those types of WMD and those groups that could mount credible capabilities to threaten or actually inflict acts of mass destruction. The various classes of WMD pose substantially different issues of feasibility and consequentiality. By way of background, consider briefly those differences.

Success in buying or stealing actual nuclear weapons or getting significant quantities of fissile material as well as retaining technicians to assemble material into workable fission explosive devices, for example, would threaten catastrophic destruction. Fashioning radiological dispersal devices would come far lower on that scale, though still significant in potential impact — psychologically, politically, and economically. As a practical matter, the feasibility and probability of terrorists getting and using “dirty bombs” would seem much higher than their obtaining or constructing and using true nuclear explosives. Sabotage of nuclear reactors to cause core meltdown or releases of radioactive byproducts is a related issue, but difficult for terrorists to take on successfully because the danger is well known and most states have respectable physical security barriers and countermeasures. As a rule of thumb, feasible activities and consequential acts would appear, as a matter of probability, to be inversely related.

The recent radiation poisoning of Alexander Litvinenko, a former KGB agent who had sought refuge in London, by unwitting ingestion of Polonium-210, forces us to consider whether use of this type of radioactive poison could be a future form of nuclear terrorism. Unlike many radioactive byproducts, Polonium is relatively easy to handle. It emits alpha particles and this radiation is dangerous only if it enters the body. Nonetheless, only a tiny quantity dispersed in the body is lethal. Polonium-210 is produced in very small quantities, usually a few grams, under state supervision, in very few locations (the majority in Russia). Polonium-210 has a half life of only 138 days.

Now that Litvinenko case has been publicized, it might be foolish to say Polonium-210 would never be produced in Indian or Pakistani nuclear facilities nor that the substance could never fall into terrorist hands. Nevertheless, terrorist acquisition of Polonium-210 seems highly unlikely. Furthermore, Polonium-210 seems an unlikely “WMD of choice” for any terrorists who really do want to kill a lot of people, partly because of its short half life (poor shelf life) and partly because dispersing it lethally for mass destruction or mass effects would not be easy, quite apart from how difficult it may be to obtain from the short list of producers. It is not difficult to imagine, however, that Al Qaeda leaders or their more technically ambitious allies groups might be very interested in convincing the media and public that they might get their hands on this material for the intimidating effects this perception could generate.

In the chemical arena, production, handling, weaponization and successful employment of chemical agents are difficult even for state military organizations. Even if we assume theft from a state’s stored chemical weapons, these tasks would be truly formidable for non-state actors. More feasible and perhaps more likely are sabotage scenarios of chemical plants to
cause civilian injury and stress on the authorities, as occurred in the 1983 Union Carbide explosion in Bhopal, India - an incident, albeit accidental, with huge collateral effects. Poisoning urban water reservoirs seems simple in concept but is not easy in practice. Other chemical options, such as releasing poison gas in confined spaces but have occurred elsewhere but are rare and generally fall far lower on the scale of consequentiality.

A survey of reported incidents of threatened chemical use by terrorists in South Asia (mainly in insurgent-affected Kashmir and Sri Lanka) will show several incidents of threatened or attempted use of ordinary poisons (e.g., cyanide) to injure, or contaminate the food of, military or security personnel. But these incidents do not appear to be indicative of chemical weapons threats in the usual sense and insofar as recorded cases do not contain evidence of the intent or the potential for “mass destruction,” they are not included in this analysis.

Watching for future biological threats is a serious matter because dangerous quantities of agent may be quite small and transportable without detection in ordinary travel. To date, however, what has been learned even about Al Qaeda efforts in this field – where intent has been demonstrated – suggests that the technical hurdles for non-state actors of acquiring and producing high quality pathogens and biological toxins, let alone the challenges of disseminating them efficiently, are quite high.

4. Do Extremist Groups in South Asia Debate Use of WMD?

Debate among extremist groups concerning the utility of one or another type of WMD could be an important point of departure for assessing the likelihood of intent, though not by itself an indicator of actual capability. Very little evidence of debate of WMD among South Asian extremist groups turns up in a canvas of the English language media - which is still prevalent in India, Pakistan, Bangladesh and Sri Lanka. It can be expected that if there were any such sustained debate reflected in extremist group pamphleteering, on indigenous websites, or in local language press reporting, it would be picked up and reported in the English-language media and on the policy-oriented or anti-terrorist websites, especially in India. One can surmise that literate leaders of extremist groups are well aware of the international discourse on this subject and it would be surprising if they did not discuss the subject privately among themselves. But with few exceptions, South Asian extremist groups do not seem to leap into the public limelight with pronouncements about WMD.

We do have a small number of data points in which Islamic extremist group leaders have gone public with views on the subject by making statements invoking the legitimacy of using WMD against the enemies of Islam. These have been declarative assertions rather than debate per se. The most explicit of these have been by Al Qaeda - usually circulated by Middle East

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1 The 1988 crash of Pakistani President Zia ul-Haq’s C-130 aircraft killing himself along with other senior Army officers and the American Ambassador who were aboard has been investigated but never satisfactorily explained. One plausible theory was the timed release of a sophisticated knock-out gas from a container brought onto the aircraft with food supplies shortly before departure. This incident has the earmarks of an act of terrorism and surely was highly consequential, albeit not in terms of mass destruction. But its technical proficiency (no smoking gun) and penetration of military security suggests it was a more sophisticated source than the typical Islamic extremist or other terrorist organizations extant in South Asia at the time.

2 These may, however, have been in response to criticism or debate in Islamic leadership circles, seeking to end that debate.
media or websites - are now well known, needing no extensive discussion here.³ To this author's knowledge, however, there is just one such statement by a South Asian extremist group leader, in this case a Pakistani, Maulana Fazlur Rahman Khalil. He reportedly publicly invoked the legitimacy of using WMD, as indicated in passages below.

Khalil had linked his group closely to Al Qaeda in the mid-1990s. He also was said to be associated with Osama bin Laden's first fatwa to declare war on the United States, issued in 1996.⁴ Khalil, as Amir (chief) of the Harkat-ul-Mujahiddin (HUM), was also believed to be a founding member of Osama bin Laden's "Islamic International Front (IIF) for Jihad against the Jews and Crusaders," announced on February 23, 1998. The HUM, Khalil's Deobandi organization, was one of the original five Pakistani extremist organizations to join the IIF.⁵ This was also the occasion for Osama bin Laden to issue a second fatwa declaring "global jihad" against the United States and its citizens.⁶

Khalil's Harkat-ul-Mujahiddin (HUM) was a renamed version of the Harkat-ul-Ansar (HUA), which had been implicated in killing Westerners in Kashmir in the mid-1990s and was banned by the United States in 1997. Instructors and trainees from HUM were present in jihadi training camps in Afghanistan and actually suffered heavily from the U.S. cruise missile attack of August 20, 1998 on those camps. B. Raman, a former senior Indian intelligence officer, who follows South Asian terrorist organizational activities closely, has described the HUM in the following terms:

³ Perhaps the most graphic was Osama bin Laden's eliciting of a religious edict (fatwa) justifying the use of nuclear or WMD against Americans, including civilians. This edict was published in May 2003 by its author, a radical Saudi cleric, Shaikh Nasir bin Hamid al Fahd, on his website under the title "A Treatise on the Legal Status of Using Weapons of Mass Destruction Against Infidels." See Michael Scheuer, "Al-Qaeda's Completed Warning Cycle - Ready to Attack?", March 3, 2005, posted by Jamestown, www.jamestown.org/news_details.php?news_id=96#: text of the treatise at FBIS, May 23, 2003; and CBS, 60 Minutes, Bin Laden Expert Steps Forward, Ex-CIA Agent Assesses Terror War In 60 Minutes Interview, Nov. 14, 2004. This was in addition to a series of reports that Al Qaeda had sought, albeit unsuccessfully, to purchase nuclear weapons and also weapons-grade uranium from Russian sources in the 1990s, and the discoveries from documents found by US soldiers in Al Qaeda safe houses in Afghanistan in late 2001, Al Qaeda laptop computers later seized from captured Al Qaeda operatives in Pakistan, and US interrogation of captured Al Qaeda leaders at Guantanamo that Al Qaeda had collected information and made crude diagrams of nuclear and radiological weapons, and had a few members attempting in Afghanistan to produce chemical and biological weapons, though subsequent analysis suggests that these efforts did not come to fruition. Osama bin Laden also expressed his view in several interviews between 2001 and 2004 that Muslims would be justified in using nuclear weapons against America.

⁴ Osama bin Laden's August 23, 1996 fatwa was entitled "Declaration of War against the Americans Occupying the Land of the Two Holy Places," accessed at www.mideastweb.org/osamabinladen1.htm. Also see Steven Emerson, "Inside the Osama Bin Laden Investigation," available at: www.jacsp.com/jtojhi.html. However, this author was unable to find independent information naming any co-signers of this 1996 fatwa.

⁵ Four were from the Deobandi movement, including the Harkat-ul-Mujahiddin (HUM), the Harkat-ul-Jihad-al-Islami (HUJI), the Jaesh-e-Mohammad (JEM), and the Lashkar-e-Jhangvi (LEJ). The fifth was the Lashkar-e-Ta'iba (LET), which was an outgrowth of the "Indian Wahhabi" movement's secretive Jama'at-e-Ahl-e-Hadith.

⁶ Entitled "Declaration of the World Islamic Front for Jihad against the Jews and the Crusaders," the fatwa appeared on February 23, 1998 in Al-Quds al-Arabi, an Arabic newspaper published in London. The five primary co-signers were Osama bin Laden himself, along with Ayman al-Zawahiri, Amir of the Jihad Group in Egypt; Abu-Yasir Rifa'i Ahmad Taha, of the Egyptian Islamic Group; Shaykh Mir Hamzah, secretary of the Jamiat-ul-Ulema-e-Pakistan; and Fazlul Rahman, Amir of the Jihad Movement in Bangladesh. See for instance: www.mideastweb.org/osamabinladen2.htm and www.mideastweb.org/osamabinladen1.htm.
Of [the five Pakistani extremist organizations that joined the IIF], the HUM is the most virulent[ly] anti-US organisation, [with] sleeper cells in the black Muslim and Pakistani communities in the US since the early 1990s. It had been calling for attacks on US nationals and interests all over the world even before bin Laden moved to Afghanistan from the Sudan in 1996. The HUM has not only been involved in acts of jihadi terrorism in India’s Jammu & Kashmir, but has also been assisting for many years the jihadi terrorist groups of southern Philippines, particularly the Abu Sayyaf, Myanmar (the Rohingyas), Tajikistan and Chechnya. Its cadres had infiltrated into Iraq before the US-led invasion of that country in 2003.

The concept of a global jihad against the US and Israel was first enunciated by it and then borrowed from it by bin Laden. [The HUM] has always been projecting Pakistan’s atomic bomb as an Islamic bomb, which should be available for use by any Muslim country. It was the first[Pakistani extremist group] to talk of the right and the obligation of the Muslims to acquire and use weapons of mass destruction (WMD), in order to protect their religion, if left with no other alternative. (Italics added)7

On a quite different level, a public debate erupted between January and March, 2000, in the Pakistani media over leaks that some officials in the Musharraf-led government reportedly, were reportedly seriously considering signature of the Comprehensive Test Ban Treaty (CTBT). Islamic political parties in this debate expressed strong support for Pakistan’s nuclear arsenal in terms that implied those assets were in the proprietary interest of the worldwide Muslim community. A few excerpts give the flavor:8

- Maulana Qazi Husain Ahmad, chief of the Jama’at-i-Islami party, reportedly told a religious congregation in Peshawar on January 11, 2000 that there would be dangerous consequences if the military rulers decided under U.S. pressures to sign the CTBT and sabotage Pakistan’s nuclear program. He said: “The whole nation would rise against the rulers. The courageous and brave people of Pakistan cannot let the rulers compromise over our hard-earned nuclear capability. Pakistan’s nuclear program is not only ours [Pakistan’s], but is that of the whole Muslim Ummah. A ruler who compromises over the nuclear programme would betray the whole Ummah.” He urged the government “to refrain from taking a decision that would anger Allah and the nation.” [Italics added.] Suggesting that former Prime Minister Nawaz Sharif had been ousted because he let the nation down in the Kargil crisis, Ahmad warned the present government could suffer the same fate.

- Three days later, Maulana Fazlur Rahman Khalil, then chief of the extremist HUM, warned the Musharraf government in a statement from Islamabad that signing the CTBT would amount to “a rebellion against Allah Almighty’s injunctions.” [Italics added.]

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7 B. Raman, “Jihad in US: From Pakistan with Love,” South Asia Analysis Group, Paper No. 1420, June 14, 2005, www.saag.org/papers15/paper1420.html. Raman cites no sources, and the author has been able to find original newspaper reports or texts quoting Khalil’s endorsement alleged here of Pakistani nuclear weapons as assets that could properly be used by any Muslim country, or his concept of the justifiability of WMD use to protect the Muslim religion. In the same article, Raman quotes Khalil as saying, in reaction to the August 1998 US cruise missile strikes on HUM training camps in Afghanistan, “You had come and attacked us in our territory with your Cruise missiles. We will come and attack you in your territory with our Cruise missiles.” Ibid.

8 B. Raman, compilation on “Pakistani CTBT Debate,” August 14, 2000, provided in correspondence. The archives of the Pakistani press of that period are, unfortunately, no longer readily available on line.
Khalil claimed that Allah's will recorded in the Holy Quran was for Muslims to have strong defense capability. “Freezing the nuclear programme or signing the CTBT would be an un-Islamic act and betray the nation.” He alleged the United States was hatching a conspiracy against the Islamic world’s first nuclear program and called on the government to conduct more nuclear tests.

This debate sheds no direct light on whether particular Pakistani extremist groups have their own particular interests – i.e., as non-state actors – in acquiring and using WMD for their own aims. It does suggest, however, at least implicitly, that Pakistan's Islamic political parties and affiliated extremist groups generally share a perception that Pakistani nuclear weapons (atomi hattiya) are vital not only for the national defense of a Muslim country but also are to be held in trust and, if necessary, used by that country for the defense of Islam and Muslims worldwide. It should be added, of course, that the mainstream political and military establishment in Pakistan subscribes to the national defense proposition of protecting the country but has not taken a position on whether Pakistan’s nuclear weapons could be used to defend Muslims elsewhere.

As indicated earlier, few extremist groups in South Asia have any “reputation” for debating WMD as a potential capability for their purposes. Beyond what has been discussed above about Pakistan and touched on with respect to reported efforts by Al Qaeda to develop WMD in Afghanistan, elsewhere in South Asia only the Tamil Tigers in Sri Lanka are known to have displayed an interest in anything resembling CW. Their attempted use in 1995 of industrial chlorine gas against Sri Lankan military personnel involved opening the taps of chlorine tanks that were conveniently located, causing a small number of casualties to soldiers encamped nearby. It was not accompanied by any indications of debate within the Tamil Tigers organization. It was not a military use of WMD acquired for purposes of deploying CW. In the twelve years since, there have been no other attempts by the Tamil Tigers to use stored chlorine gas against either the military or civilians, nor any other instances of attempted use of chemical or biological weapons in the classical sense. To the best of our knowledge, no other extremist groups showed interest in emulating that instance of Tamil Tiger activity. Other than intermittent reported instances of interest in the use of poisons, the attempted acquisition or use of real WMD by extremist groups in the other countries than Pakistan of South Asia – India, Bangladesh and Nepal – remains undetected and presumably has not occurred.

5. Characteristics of Violent Extremism in South Asia

Most forms of violent extremism in South Asia in recent decades have consisted of the employment of conventional arms or the use of conventional explosives to destroy opponents (as in guerrilla warfare against state security forces and infrastructure) or organized attacks on selected targets among civilian communities to intimidate those communities and thereby bring pressure on political authorities to negotiate in one or another issue area. Assassination of officials, actual and attempted, has been a common pattern in virtually every country of the region. Attacks on civilian transportation nodes, as well as trains and buses, have been notable in Kashmir, western India, and Sri Lanka. Destruction of civilian aircraft in flight within this region has, thus far, not been in vogue (although an India-bound international flight from Canada crashed in the Atlantic in 1985, presumably at the hands of Sikh Khalistanis). We have
just one celebrated hijacking of an Indian aircraft to extort the release of prisoners connected with the insurgency in Kashmir. Kidnapping local influential to raise money or to coerce political concessions has been known in Kashmir, Afghanistan, and Nepal. Attacks on foreign installations and foreigners was a sine qua non against Russians in the anti-Soviet Afghan war and have been a theme of Pakistani extremist groups against Westerners in Karachi and Islamabad as early as 1979. These attacks have occurred with more frequency in recent years, with some instances of violence against Iranian and Iraqi embassies in Pakistan in the 1980s.

What is notable about these past patterns is the absence of any indications (apart from Al Qaeda) by non-state actors of attempted WMD production or deployment for use: No cases have materialized of anthrax (or other pathogens) dispersed in confined spaces, no attempted poisoning of water reservoirs, no evidence of attempted penetration of industrial or nuclear facilities for sabotage or other malicious purposes, no real laboratories of chemical or biological experimentation uncovered in non-state actor or unauthorized hands. Such ideas may have existed here and there in certain minds, but if so the practical hurdles to implementing them may have been, or seemed, insurmountable. Extremist group leaders, who might have weighed the possibility of getting a bigger bang for the buck from exploiting WMD would also face questions as to whether the retaliation or stepped-up response it would generate would overwhelm their current or prospective operational opportunities with conventional weapons.

Readily available small arms and explosives for conventional violence seem thus far to have satisfied the motives and impulses of most extremist groups in South Asia. Suicide bombing has been a technique of the Tamil Tigers for decades, but only recently has become a part of the tool kit of Islamic extremists in South Asia, with incidents increasing in number in Afghanistan and Pakistan since late 2005. Headline-grabbing publicity has been amply provided by these conventional forms of violence – whether for the Tamil Tigers, jihadi participants in Afghanistan’s civil wars or the insurgency in Kashmir, Islamist groups attempting to force Islamization of politics in Bangladesh, or for the Maoists and Naxalites struggling for secular power in north and central India, or tribal insurgents in India’s northeast.

Nevertheless, in the future, new geopolitical conditions may form. New technical opportunities may materialize. Would changing conditions make WMD more available to extremist groups, or increase their incentives to break into this field and exploit WMD for their political aims? Which extremist groups might have the propensity to move down this path? Are there causes, beliefs, or ideological traits among South Asian extremist groups that would make them more prone to WMD use if they could assemble the resources? How might the dynamics of terrorist violence operating in, or from, South Asia change in the coming years?

6. **Extremist Political Aims and Beliefs: Implications for Future WMD Potential**

Of all the current streams of extremist violence in South Asia associated with non-state actors, only three would seem to be plausible for the acquisition and deployment of WMD capability. Only one of the three would seem to have the foreseeable motivation and potential capacity to use WMD in offensive or strategic terms far beyond the region, as, for instance,
over long distance against the West. Each of the three, however, could conceivably operate offensively within the region, including against foreigners and Western interests. The first of these streams consists of the universe of Islamic jihadi extremist groups, and it is this stream that is most likely to find international as well as local targets for any WMD capability, should such capability be mastered. The second stream is that of Hindu extremist groups, whose potential for enlistment of WMD today almost certainly is entirely latent and whose prospective terrorist applications would seem, under current geopolitical conditions, the most speculative. The third stream is the Tamil Tigers, who may come to believe that their aims for independence may not be feasible without a major leap in capability.

A case can be made in each of the three cases that there are no insurmountable normative or ideological obstacles to contemplating WMD acquisition or use, although there may still be ethical soul-searching as well as significant pragmatic inhibitions. In other cases, such as those of the Maoists, Naxalites and tribal insurgencies in India, or, Baluch insurrectionist tendencies in Pakistan, there are no grounds to believe that interest in or pursuit of the classical forms of WMD would be credible, at least under realistically foreseeable conditions.

To be sure, one learns in foreign policy and international politics never to say “never.” But it is hard to see how the localist revolutionary aims of the Maoists and Naxalites, or the autonomy aims of the smaller ethno-linguistic movements (e.g., in Assam, Nagaland, Mizoram, or Arunachal Pradesh, in north-eastern India) could be successfully advanced by diverting their energies to radiological, chemical, or biological weapons. Stealing let alone producing nuclear weapons would be highly unlikely.

7. **The Roots and Present Aspects of Islamic Extremist Political Aims and Belief Systems in South Asia**

Turning to the Islamist stream of extremist violence in South Asia, it is now widely understood that political Islam has many doctrinal and ritualistic strands and is far from monolithic. Even the armed jihadi groups, which usually have been on the fringes of national politics in Muslim countries of the modern era, are far from uniform in their belief systems and are prone to compete with each other – and by no means only along Sunni-Shi'a or other sectarian lines. Within South Asia, however, almost all jihadi activity historically has been Sunni-based, and contemporary Shi'a activism in Pakistan has been primarily defensive. Islam in South Asia absorbed a number of local spiritual practices and became more eclectic than its Islamic antecedents in the Arab world. Through invasions and conversions, Muslims had become a large fraction of the population of the Indian subcontinent long before British encroachment began and the Mughal Empire finally collapsed. The successor countries of the British Raj in South Asia, taken together, contain the largest geographical concentrations of Muslims anywhere in the world, approaching half a billion. India’s Muslim minority is almost equal to Pakistan’s population and roughly on a par with Bangladesh’s.

During the colonial era, several Islamic revivalist movements and numerous associations and networks formed in the Indian subcontinent. Some of these movements attempted to reform or purify Islamic thought and practice and take it back to what those clerical thinkers and activists regarded as its roots in Medina and Mecca. The majority of the Muslims in the region as a whole were not intensely involved in or deeply touched by these purification
movements or their jihadi projects and remained moderate in their outlook when the British transferred independence. Muslim nationalism became a stronger popular rallying force, giving rise to the partition of India and the creation of Pakistan in the final stages of British departure, and the spin-off of Bangladesh later. At the same time, it should be emphasized that the center of gravity in the Islamic communities of the successor countries – India, Pakistan and Bangladesh – still leans to moderate versions of Islam identified with the more relaxed Barelvi School of Islam and the mystical appeal of the Sufi spiritual networks scattered throughout the region.

At the same time, the more severe of the Islamic revivalist and purification movements of the colonial era provide the roots for today’s militant jihadi enterprises. The modern-day activist Islamic political parties and their armed militias or affiliated extremist groups are the lineal descendants of these groups. As a result, the moderate traditions have been under increasing challenge in Pakistan and Bangladesh, however, from the repercussions of the Islamic revolution in Iran, the Afghan War against the Soviets, and the current global War on Terrorism.

Jihadi lineages today in South Asia trace back to three distinct Sunni revivalist movements of ulama (Islamic scholars) in India, the earliest of which also gave some inspiration to the founders of the other two.9

1. The “Indian Wahhabi” movement, beginning with Shah Wali-ullah, the leading Islamic revivalist in India in the mid-18th century, and culminating in the Jamiat-i-Ahl-i-Hadith and several radical, sister organizations in Pakistan today;

2. The orthodox Deobandi movement, beginning in 1867, and politically centered in Pakistan today in the Jamiat-ul-Ulama-i-Islam (JUI) political party, which is now the dominant political force in the Pashtun (Afghan) borderland; and

3. The Jama’at-i-Islami movement of Sayyid Abul a’la Maudoodi, an influential scholar-writer and activist against British rule as early as the 1920s, who founded his political party in the Punjab region in 1941, and moved to Pakistan in 1952. Separately led offshoots of the Jama’at-i-Islami also exist in Indian-held Kashmir, Bangladesh, and Afghanistan.

For a schematic of these Islamic movements and their descendants in Pakistan today, see Figure V1.1, the “Map of Islamic Militant Groups in South Asia” on page 20.

For outsiders, it may be difficult to fathom the intensity of the armed jihadi impulses that explains the willingness of some adherents to sacrifice their own lives in what they see as serving God’s will. Equally so, those impulses make it credible that some extremist groups would use WMD in the same cause. That intensity stems from two related beliefs: the belief

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that it is God’s will that Muslims follow his precepts as recited by the Prophet Muhammad and set forth in the Quran; and the belief that this condition can only reach complete form when it is Muslims who rule over fellow Muslims and they are free to propagate their faith. This form of governance is exemplified in the Caliphate model, where rule over Muslim society is based holistically on Islam. These concepts are at the core of the Islamic revivalist movements. They took particular forms in the Indian subcontinent— in reaction to the breakup of the Mughal state and the encroachment of the British— but had their parallels elsewhere, as in the dismantling of the Ottoman Empire and in the reactions of Muslims in India, and worldwide, to those events.

The Islamic revivalist motives for Sunnis in India seemed to have two eventual applications. One was to teach and preach to Muslims who had fallen away from the straight path outlined by Muhammad and to convince them to purify their own lives and conduct, as fundamental to restoring moral order, rectitude, justice and economic well-being on a day to day basis in a Muslim community. Spreading Muslim schools and graduating scholars to act as Muslim leaders and adjudicators in far-flung communities, or to open more Islamic schools (maktab and madrassas), was the vehicle for this moral influence. Establishing this influence had a populist edge, of building local power in every Muslim community. The other application was to remove non-Muslim governing power and influence over Muslims that the reformists believed distracted from and subverted the elements of the faith. It was the latter that would require, and justify, the use of force in the struggle (jihad) to achieve its objectives. Some of the Muslim scholars would also become commanders and warriors in the combat arena, when necessary. When their goals were achieved, the scholars would return to their other roles of teaching, and advising the state in the application of Muslim law.

7.1 Purposes of Jihad: The Ahl-i-Hadith Viewpoint

What motivates the jihadi? A Markaz al-Dawa tract contains a concise list of eight religious purposes of armed jihad, a catechism based on Quranic verses that most contemporary jihadi groups probably would subscribe to. It all revolves around establishing Islam as the basis of Muslim rule over Muslims, and defending that Islamic sphere of governance:

1. To end fitnah (rebellion, or sedition) among Muslims, i.e., to bring all Muslims back to the true path of Islam and to end doctrinal confusion and un-Islamic practices. This purpose goes to the purification of Islam among Muslims. (Quran, 2:193);

2. To gain global mastery or victory (ghalaba) for Islam, that is, until the whole world is under the mastery of Islam (Islami riyasit, Islamic state) and in every place the law of Allah is enforced, it is the duty of Muslims to fight the non-believers. (Quran, 8:39);

3. To force the non-believers to pay the tax (jizya), that is, to reverse the current flow of resources in the world from Muslim nations to the West and end the

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dependence of Muslim countries on the World Bank, IMF, etc., and make non-
Muslim states and entities pay tax to the Muslims. (Quran, 9:29);

4. To help the weak (kamzoron ki madad), that is, to help the poor, those suffering
under tyranny or oppression, whether man, woman or child. Once an Islamic state
is formed, then Muslims and non-Muslims will experience the fairness of Muslim
rule. (Quran, 4:75);

5. To take revenge, or retaliation (badlah), for the martyrdom of Muslims, that is, for
the killing of Muslims by non-believers. (Quran, 2:78);

6. To make war against those nations that have broken treaties or covenants
(mu‘ahadah) with Muslims, that is, to fight against those who have broken alliances
with Muslims, even broken faith with Muslims or turned against them. (Quran,
9:12);

7. To defend against (difa‘) those who attack Muslims, that is, to attack any non-
Muslim state, authority, and tribe or group that attacks Muslims. (Quran, 2:190); and

8. To recover for Islam any land or place once ruled by Muslims, but which may now
have fallen into the hands of non-Muslims or non-Muslim rulers. This is
interpreted as a duty to re-conquer countries like Spain, the Balkans, and India –
all countries once under Muslim rule. (Quran, 2:191).

This catechism does not speak to how jihad will be conducted, e.g., whether to spare or
execute non-Muslim prisoners, or how much effort should be applied to avoid collateral
damage among non-combatant civilians, and women and children. It does not speak to limits
on the use of force, nor does it speak of diplomacy as a means of reducing the cost of jihad,
or allow for compromise. Neither does it hint at any specific constraints on mass destruction.
It merely states the ends (purposes) that justify jihad, and the use of force. It does hint at
proportionality in its tit for tat notions of exchange (reference to broken treaties, and revenge),
but not by spelling it out. Does this also imply that retaliation with nuclear weapons, or other
forms of WMD, is justified for offenses against Islam, or Muslim communities, on a similar
scale?

7.2 Post-independence Islamic extremist groups – successors to the
Indian wahhabi movement

The “Indian Wahhabi” movement most clearly distilled the jihadi dimensions of Islamic
revivalist outreach in the era of British encroachment, as the Mughal administration descended
into anarchy in the mid-18th century. After the British crushed the Great Mutiny of 1858 and
took over power in Delhi, the Patna Jama‘at petitioned the British successfully for the excision
from the public record of its common appellation as the “Indian Wahhabis” in favor of being
thereafter called the Jama‘at-i-Ahl-i-Hadith (literally, Society of the People of the Hadith). The
movement is so named in Pakistan today, although usually referred to by the abbreviation,
“Ahl-i-Hadith.”

In Pakistan after independence, the Ahl-i-Hadith remained a shadowy and secretive
association, much smaller in numbers of followers than its Deobandi competitors. It has
spawned modern offshoots, such as the publicly registered Markaz al-Dawa wal-Arshad
(Center for Invitation to Righteous Guidance) founded in 1987 and then its covert jihadi arm, the Lashkar-e-Ta’iba (LET, Army of the Pure). The Markaz al-Dawa had open contacts with Al-Qa'eda in the 1990s in both Afghanistan and Pakistan, bringing together the two historic strains of Wahhabism – the Arab and South Asian. The Lashkar-e-Ta’iba became one of the most aggressive guerrilla organizations in the Kashmir insurgency in the early 1990s. Later, the Indian authorities accused it (and, by implication, Pakistan) of launching the armed attack on India’s Parliament building in December 2001. They also suspected the Lashkar may have had a behind-the-scenes role in the July 11, 2006 bombings of Mumbai commuter trains.

With its reputation for violence well established in Indian-held Kashmir, the U.S. Department of State branded the Lashkar-e-Ta’iba as a “foreign terrorist organization” in December 2001. President Musharraf followed by banning the Lashkar in January 2002, legally prohibiting it from raising funds. When faced with public bans, extremist organizations typically rename themselves or morph into others. The Markaz re-registered as the Jama’at-ud-Dawa (Society for Charitable Work). The U.S. State Department banned the Jama’at-ud-Dawa as a terrorist organization in April 2006, but the Pakistan government has refused to follow suit. As for the Lashkar, after the bans in 2001 and 2002, its original Pakistani leadership ostensibly stepped down in favor of Kashmiri leaders and claimed thereafter that it is an indigenous Kashmiri organization.

In thinking about potential access to the kinds of technical knowledge that would be useful for the acquisition of CBRN, links with technical universities, their faculty, and graduates must be considered relevant to enlisting technically proficient individuals for any knowledge or tasks that require scientific or engineering skills. A founder and spokesman of the Markaz-ud-Dawa, and presumed top Pakistani leader also of the original Lashkar-e-Ta’iba, is Hafeez Muhammad Saeed. Saeed was formerly an Islamic Studies professor at the University of Engineering and Technology (UET), a private institution, in Lahore. Saeed visited Saudi Arabia for further studies in the 1980s and reportedly was induced by Saudi supporters of the action against the Soviets to team up with one or two other professors at UET to assist the mujahiddin in Afghanistan. To the best of this author’s knowledge, however, no evidence has surfaced in the public eye so far that UET has any connection with WMD activities of any kind.

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11 In the late 1990s and in 2000, Al-Qa’eda sent representatives to the Markaz’s annual conventions at the Markaz’s main campus at Muridke, about 10 miles north of Lahore on the Grand Trunk Road. This suggested to some analysts that the Lashkar-e-Ta’iba might be collaborating with Al Qaeda as part of its global network. Formerly, the Lashkar is believed to have focused almost exclusively on Afghanistan and Kashmir.

12 The Mumbai police briefing of September 30, 2006 on the findings of the investigation indicated that several of the perpetrators were members of the Students Islamic Movement of India (SIMI), believed to be a Deobandi-inspired Indian organization, who had traveled to a training camp in Bahawalpur, Pakistan, to be trained by an Azam Cheema, a Lashkar-e-Ta’iba operative, in the use of explosives. These SIMI members reportedly were joined by eleven Pakistanis who covertly entered India for the operation. After the bombing, ten of the Pakistanis fled the country, while the eleventh had died in the bombing. A.N. Roy, the police chief stated that the operation had “the stamp of” Pakistan’s Inter-Services Intelligence (ISI) agency. See Prafulla Marpakwar and Somit Sen, “Probe confirms Pak hand in 7/11 blasts,” Times of India, Sept. 22, 2006; and IST Times News Network, “LeT [Lashkar-e-Tayyaba], JeM [Jaesh-e-Muhammad], SIMI helped execute terror plan,” Oct. 1, 2006, accessed at: www.timesofindia.indiatimes.com/articleshow/2055360.cms.
7.3 Post-independence Islamic extremist groups – successors to the Deobandi Movement

When the British descended on Delhi and shut down the Mughal, a portion of the Sunni ulama retreated to the hinterland and established in 1867 a new seminary, the Dar-ul-Uloom Madrassa in the small town of Deoband, about 185 miles north and slightly east of Delhi. When Pakistan was formed in 1947, the Deobandi movement was firmly entrenched in the Pashtun regions and Pakistan’s North-West Frontier Province (NWFP).

By the time Zia-ul-Haq took power in Pakistan in 1977, the Deobandi movement had established the largest constellation of Islamic political networks in the country. Two years later, when the Soviets intervened in Afghanistan, the leaders of the Deobandi movement in the NWFP, in Baluchistan, and in the federally administered tribal agencies (FATA) in between the two provinces organized religious education and jihadi training for Afghan refugees and also for Pakistani Pashtun youth in the tribal areas. The Deobandi networks were not the only avenues but they were the primary platform for the jihad in the 1980s against Soviet occupation of Afghanistan. Over the next decade, the Deobandi networks grew rapidly. They were also the primary source of religious inspiration and political activism that sponsored the Taliban movement, following Soviet withdrawal, in the 1990s. The Deobandi movement also established important centers of strength in Karachi and other urban centers of Pakistan.

Today, the leading Deobandi sectarian extremist groups, active in attacks on Shi’a and other religious minorities, include the Sipah-e-Sahaba-e-Pakistan (SSP, “Soldiers of the Prophet”), led by Maulana Asfandyar in the early 1980s from the radically anti-Shi’a madrassa, Jamia Farooqia, in Karachi. The SSP’s covertly armed affiliate has been the Lashkar-e-Jhangvi (JEM). The SSP was banned in December 2001, but was revived under other names, one being the Millat-e-Islamia (Way of Islam) in 2002 until it was also banned in 2003, and another, the Jundallah (Army of God).

The principal Deobandi jihadi groups based in Pakistan and active in Afghanistan and Kashmir are the Harkat-ul-Mujahideen (HUM) under Fazlur Rahman Khalil (a firebrand discussed earlier, see page 5 in the paper), the Harkat-ul-Jihad-al-Islami (HUJI) and the Jaish-e-Mohammad (JEM). Each of these organizations joined Osama bin Laden’s International Islamic Front in global jihad against Israel and the United States in February 1998 (as mentioned earlier, see pages 5-6 and note 5 earlier in this paper).

The JEM was created by Maulana Masood Azhar of Bahawalpur, in a split from the HUM. Nizamuddin Shamzai was a key patron of the JEM and its successors, and sat on the councils (shura) of Al Qaeda, the Taliban, and the JUI-F. The JEM was banned in December 2001, split, and reemerged as two successor organizations, the Jama’at[or Tehrik]-ul-Furqan under Masood Azhar, and the Khuddam-ul-Islam under Abdul Jabbar. These two organizations

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13 This name may also have been adopted by a Palestinian extremist organization in Gaza, connected with Hamas, but the Pakistani and Gaza groups are not the same.
14 The HUM, formerly the Harkat-ul-Ansar, calls itself a “purely jihadi organization” formed in 1985 during the Afghan jihad and now focused in Kashmir. It has its own website: www.harkatulmujahideen.org/.
15 Loosely translated, Harkat-ul-Jihad-i-Islami would be “Movement of Islamic Holy War”.
16 Al-Furqan refers to the Quran as the true criterion or standard.
17 Khuddam means servant, and the group, “Servants of Islam”.

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in turn were officially banned by the Musharraf government in November 2003. Shamzai is also believed to have organized a clandestine umbrella terrorist group for combined operations against Western facilities and interests, and Christians, present in Pakistan.

The Deobandi movement also appears to be connected with and part of the support network of the Students Islamic Movement of India (SIMI), which has a program for the overthrow of secular government in India and has been involved in several violent incidents beginning in December 1992 after the demolition of the Babri Masjid in Ayodhya by Hindu extremists. More recently, SIMI was implicated in the commuter train bombings in Mumbai on July 11, 2006, which caused 209 deaths and over 700 injuries. SIMI was founded in Aligarh in 1977, originally as an offshoot, ideologically, of the Jama’at-i-Islami movement (the Indian branch), gained impetus as a result of the insurgency in Kashmir, and is now linked also to Bangladeshi Islamic extremist organizations. SIMI was banned by the Indian government in 2001 under domestic anti-terrorism statutes adopted in 1987 to cope with the Khalistani unrest in Punjab, and now operates clandestinely.

7.4 The Jama’at-i-Islami Movement

A much more recent development than the Indian Wahhabi and Deobandi jihadi movements, Maulana Maudoodi’s Jama’at-i-Islami (Society of Islam) was founded in 1941 in Lahore less than a decade before Pakistan was formed. Over time, the Jama’at-i-Islami party and its affiliates have moved increasingly in an extremist direction, partly resulting from the surge of interest in the Afghan jihad and later the Kashmir insurgency. Extremist groups affiliated with JI have been active in Kashmir in the insurgency, through al Badr, a shadowy terrorist group of the early 1990s that may have dissolved, and through the Hizb-ul-Mujahiddin. Inside Pakistan, the main agitational force of the Jama’at-i-Islami between elections has traditionally been felt through its student wing, the Islami Jamiat-e-Tuleba (IJT, Islamic Students Society). This student wing has clashed with other student groups and with the police since the 1950s as well as intimidated college and university establishments, gradually forcing many of them to purge secular faculty and curricular subjects.

Since the launch of Operation Enduring Freedom in Afghanistan in October 2001 and the pursuit of dispersing al-Qaeda leaders, there is scattered evidence that members of the Jama’at-i-Islami and its affiliates have provided shelter for al Qaeda fugitives. For example, Khalid Sheikh Mohammad reportedly was captured in Rawalpindi on March 1, 2003 in a residence inhabited by a retired microbiologist’s family with JI associations. It may well be
the case that recently JI has undergone a quantum shift in radicalization - drifting into, or even deliberately forging, closer relationships with the anti-Western terrorist organizations. If so, this would be of potentially greater concern in WMD-related terrorist issues, because the JI membership is so widely diffused in the urban sectors, including government and even military service.

In particular, JI is especially well-positioned to infiltrate security agencies and sensitive facilities and subordinate them to terrorist agendas. Like the presence of the Islamic Brotherhood in the urban Middle East and within Muslim diasporas in Western countries, JI members are a minority but a pervasive presence in Pakistan’s modern institutions and a barrier of resistance to their secular accountability and transparency. Ideologically, not even the Deobandis are as adamant as the better-indoctrinated members of the JI that Pakistan’s assets ultimately belong to the Muslim ummah as a whole. No other major political organization in Pakistan (or its counterparts in India and Bangladesh) has as long a history or as implacable an ideological antipathy to the West as the JI, in spite of the relatively high levels of educational achievement of its members. No other major political organization in Pakistan has as highly developed a motivation as the JI to turn the instruments of modernity to Islamic purposes at the expense of the West, if that seems appropriate. And no other major political party organization in Pakistan is so practiced in stealth.

8. Islamic Extremist Groups in India and Bangladesh

Islamic extremism has not flowered on the national scene in India since independence as it did in Pakistan after 1979, fanned by the Iranian revolution and the anti-Soviet jihad. The main concentration of Islamic extremism in India has been in contested Kashmir. But it gained intensity there only after 1989, following Soviet withdrawal from Afghanistan. Extremists also focused mainly on Kashmiri freedom, not so much on a pan-Islamic agenda. Indeed, it is remarkable that Al-Qaeda did not make deep inroads among Indian Muslims in the heart of India, as it did in other Muslim communities from the Philippines to Morocco. In the Islamic terrorist attacks and known plots in North America, Western Europe, the Middle East, and Indonesia, Indian Muslims have been almost non-existent. Al Qaeda elected not to include India as an enemy in its fatwas until recently, although it now does so. Islamic extremists in Pakistan have devoted most of their energy to Kashmir. India was bypassed in the rousing of jihadi Islam against the Soviet intervention in Afghanistan, and even by the overthrow of the Taliban.

This pattern may be changing. There has been a slow ramping up of Islamic activism and extremism in India since the early 1990s. This ramping up is partly due to rippling effects from the troubles in Kashmir and partly from the reaction to Hindu extremism at Ayodhya as well as the ascendancy in 1998 of the Bharatiya Janata Party (BJP). But there also is a growing intensity to the anger felt in Muslim communities against the U.S. and UK-led war launched against Saddam Hussain’s regime. Indian Muslims are not immune to this sentiment. Indian strategists also believe that Pakistan through its ISI has been stoking and supporting Islamic extremism in India through Nepal and even Bangladesh. Despite the ban on its activities,
SIMI appears to be growing in members and ambition as the main agent of Islamic terrorism in India.

In Bangladesh, Islamic extremism is not new. The Jama’at-i-Islami was active in 1970-71 in resisting the anti-Pakistan movement there. Islamist parties have been drawn into politics by the effects of the intense competition between the two main parties, the Awami League and the Bangladesh National Party (BNP) in their efforts to win or maintain power – although it is the BNP that welcomes Islamic forces in forming governments. The impulses of Bangladesh’s Islamist parties are rooted at least as much in Bengali politics as in the Indian Muslim reform movements covered earlier, but ties between Islamist parties in South Asia are not unnatural and those with Pakistan’s deepened in the 1980s and 1990s. A military coup in March 1982 brought in Gen. Husain Mohammad Ershad, who set a course toward the Islamization of Bangladeshi society and the state. In 1988 he amended the constitution and declared Islam the state religion. Islamic political violence has risen in Bangladesh ever since 2000 and even more sharply since 2003. Successful and attempted assassinations of top political leaders took place in 2004 and 2005, there have been scattered bombings in urban areas, and the first suicide bombings in attacks on the judiciary occurred in late 2005.22

9. Future Prospects of WMD in South Asia’s Extremist Groups

The first point to be made about the terrorist capabilities that exist in South Asia is that the preponderance of threat to the West – and to the regional states as well with the exception of Sri Lanka – is from the Islamic extremist groups. This is likely to continue to be the case for the indefinite future. It is hard to conceive of how the Hindu extremists, the Tamil Tigers, the Maoists and Naxalites, or the tribal insurgencies of northeastern India could bloom into sustained terrorism against the West. It is not difficult to imagine that religious cults could arise with dangerous tendencies – as with the Rajneeshes in the United States in the past or Aum Shinrikyo in Japan – but it seems improbable that such cults would pose major threats to the West that cannot be readily overcome by methodical countermeasures.

The second point to emphasize with respect to the Islamic extremist groups, even al Qaeda, is that their current modus operandi has quite a large impact already even without use of WMD. Their use of cell phones, computers and Internet communications, air travel, conventional explosives, automatic weapons, exploitation of the media, and the like inflicts destruction against soft targets on a scale that is highly satisfactory from the standpoint of the groups concerned and much easier to organize and sustain than WMD projects. Their aims of rallying Muslims for jihadi objectives as well as the intimidation of status quo governments and societies may not ultimately succeed. But the signs of progress to true believers are substantial enough to motivate leaders and recruits. Countering these organizations and their conventional strategies of violence is a task that requires detailed and sustained efforts that must not be allowed to falter by fear of the unknown.

The third point to ponder is how certain niche players in the Islamic extremist networks might still be motivated and able to assemble the resources to muster serious WMD capabilities – and deploy them as serious operational threats. The vast majority of the

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manpower in the types of extremist groups surveyed here are unlikely to be enlisted in such ventures since they have conventional outlets of violence. Planning those operations clandestinely will absorb most of their human energy and capital. It is the niche players that are a source of concern. Who are they and how would they take advantage of the structure of their society as well as ongoing social and technological change?

In this survey, the Islamic extremist groups that should be monitored most closely for niche technologies and projects are not the madrassa and mujahiddin networks so much as the activist Islamist strands of the educated middle class. The latter includes individuals that may be at one and the same time religiously devout, ideologically motivated and technically able or well-informed. As ideologues, activists and risk takers, these elements are always likely to be on the fringe rather than in the mainstream, but they could be a substantial force. It is the extremist groups that recruit in and aim to be embedded in the technical educational institutions, of science, engineering and medicine with which we need be most concerned if we are looking for privatization of, or freelancing with, particularly chemical or biological capabilities.

Framed in this light, the two current Islamic organizations that stand out for close scrutiny are the Jama’at-i-Islami and the Jama’at-i-Ahl-i-Hadith in Pakistan as well as their counterparts or analogues in Bangladesh and India. The recruits to these organizations naturally tend to apply for and infiltrate professional and white collar positions in the government services, commissioned officer ranks in the military, professional positions in business, banking and trade, and technical positions in public sector and private sector research and development, manufacturing, electric power production, oil and gas exploration, engineering, medicine and pharmaceuticals. These areas of activity and employment are expanding rapidly in the larger South Asian countries with trade and globalization. Clandestine acquisition and experimentation with sensitive capabilities is most plausible in these domains, as is insider-outsider collusion in the field of state-controlled nuclear weapons and components in either Pakistan or India.

That said, we cannot exclude the possibility that extremist groups might attempt to breach state security over nuclear weapons and delivery systems by the use of force, take advantage of political crises that could divide or disrupt the military chain of command, or hijack systems in transit. Today this is relevant only in nuclear-armed India and Pakistan. Here the extremist groups that would be most likely to have the requisite motivations and relevant skills are the urban-based Sunni sectarian and jihadi groups, especially those spawned by the Deobandi movement as covert armed organizations, including those that cooperate directly with al-Qaeda. These include the Harkats, the Jaish-i-Mohammed, the Lashkar-i-Ta’iba and their offshoots. While these groups acting together may pose a threat of armed assault on their own governments, they are also the most plausible actors for the purchase of WMD capabilities on the black market or from rogue states. In turn, they also are the most plausible adversaries for use of those capabilities against Western interests in the region or against homelands in the West.

New extremist organizations also may form up as networks of opportunity. They may or may not be dependent on, or be part and parcel, of al-Qaeda or the existing Islamic extremist organizations. It is difficult, however, to forecast the emergence of organizations with WMD ambitions that have new ideologies or ambitions that have never been witnessed before. More
likely, new extremist organizations in South Asia will resemble, at least in ideological
coloration, those we are familiar with today. But the means they may have access to may be
more diverse over time. Multi-national networks for profit arising in the South Asian
Diasporas in the West may someday connect not only their new wealth with their countries of
origin, but connect sensitive technology transfers from to the underworld that exists in each
South Asian country.23 In addition, if CBW capabilities are deployed in private hands for
terrorist objectives in the future, in this region linkages with the criminal world may determine
how they are produced, transported and employed.

See Figure VI.1 “Map of Islamic Militant Groups in South Asia” on the following page.

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23 Although fiction, Vikram Chandra’s new 900-page novel, Sacred Games, Harper-Collins, 2007, is considered indicative of the nature and style of the underworld in Mumbai, India. One episode in this novel is devoted to attempts by a Hindu extremist group to set off a nuclear explosive device in Mumbai.
I. Islamist Sunni “modern” – from 1940s

Jama'at-i-Islami (JI) Pakistan

Al Badr (defunct)

Hizb-ul-Mujahiddin (HUM)

Students Islamic Movement in India (SIMI)

Ikhwān (Muslim Brotherhood in Middle East)

JI founder (India/Pakistan) Maulana Maudoodi
JI-P Amir today: Maulana Qazi Hussain Ahmad

II. “Indian Wahhabi”(Suawi puritans) - from 17th Century

Jama'at-i-Ahl-i-Hadith – from 19th Century

Markaz al-Dawa wal-Ilm (Lahore), 1987


Jama'at-ud-Dawa (JUD), 2002 (US ban 2004, legal in Pak)

Chief of LET/JUD: Prof. Hafeez Mohammad Sayeed
University of Engineering & Technology (UET), Lahore

III. Deobandi (Sunni orthodox) – from 1867

Jamiat-e-Ulama-e-Islam (JUI) – from 1947

Maulana Fazlur Rahman faction (JUI-F)
Maulana Sami-ul-Haq faction (JUI-S)

Sipah-e-Sahaba Pakistan (SSP)
Lashkar-e-Jhangvi (LEJ)

Afghan Taliban

Pakistan Taliban

Harkat-ul-Ansar (Al Faran) (US ban 10/1997)

Harkat-ul-Mujahiddin (HUM)

Harkat-ul-Jihad-al-Islami (HJU)
J中铁-e-Mohammed (JEM) (ban 01)

Harkat-ul-Mujahiddin al-Almi

Jama'at-ul-Fujana (ban 01)
Khuddam ul-Islam (ban 03)


IV. Barevi (Sunni, softer, Islamic mainstream)

Jamiat-i-Ulama-i-Pakistan (JUP) – headed by Maulana Shah Ahmad Noorani; a component of Mutahida Majilis-e-Amal (MMA).

V. Shi'a (second branch of Islam) – extremism is sectarian rather than jihadi; Tehrik-e-Nifaz-e-Fiqh-e-Jaafriya (TNFJ), armed wing is Sipah-i-Muhammad (Soldiers of the Prophet); Pak ban 01/02.

Policy Architects International – 11/24/2002; updated 01/20/07

Figure VI.1: Map of Islamic Militant Groups in South Asia
APPENDIX VII

The Evolution of the Unconventional Threat: 
Al Qaeda and Jemaah Islamiyah Operations in Southeast Asia

Rohan Gunaratna

“Acquiring weapons for the defense of Muslims is a religious duty. If I have indeed acquired these weapons, then I thank God for enabling me to do so.” – Osama bin Laden, December 24, 1998.

1 Introduction

The single biggest terrorist threat to international security in recent years has stemmed from the Al Qaeda jihadist network. During its formative years, the group led by Osama bin Laden realized the importance of unconventional weapons. Parallel to building its conventional capabilities, Al Qaeda has also been seeking to build a chemical, biological, radiological or nuclear (CBRN) capability. In fact, the Al Qaeda organizational structure that was formalized in the early 1990s included a dedicated WMD Committee as a sub-committee of its Military Committee. As early as 1993, Osama bin Laden instructed his personal pilot, Essam al Ridi al Masri, to learn crop dusting, which may have indicated al Qaeda's interest in delivery vehicles for chemical or biological weapons. At the time of U.S.-led intervention in Afghanistan in October 2001, Al Qaeda had established links with Pakistani scientists, including nuclear weapons specialists and biochemists. While the WMD Committee led by Abdul Aziz al Masri was dedicated to developing or acquiring a nuclear capability, separate chemical and biological programs also existed. Al Qaeda planned to manufacture Sarin in the Tanarak farm in Kabul, Afghanistan, as well as anthrax in Kandahar and hydrogen cyanide in Darunta.

Al Qaeda's chemical program is led by Abu Khebab al Masri, an Egyptian, while the biological program to manufacture anthrax was previously led by Dr. Rauf Ahmed, a Pakistani government scientist and subsequently by Yazid Sufaat, a U.S.-trained Malaysian scientist/technician who also served in the Malaysian Army Medical Corps. The overall supervisor of the biological program was Ayman al Zawahiri, deputy leader of Al Qaeda and designated successor to Osama bin Laden and the principal architect of the Global Jihad Movement. Following the U.S.-led intervention in Afghanistan in 2001, and a Predator drone killed Abu Hafs, alias Mohamed Atef, the head of Al Qaeda's Military Committee in Kandahar in November 2001. Following his death, Al Qaeda's chemical and biological programs fell into disarray. While Zawahiri remained in charge of the CBRN development projects throughout Al Qaeda, Khalid Sheikh Mohamed, the new head of the Military Committee,
assumed direct responsibility for both the conventional and unconventional weapons programs.

The key question to be examined in this essay is the potential for Southeast Asian groups to seek or build CBRN capabilities either through research, development, and production or by the transfer of expertise and resources from Al Qaeda or any other sympathetic group. In particular, will Jemaah Islamiyah (JI) conduct a CBRN attack in the foreseeable future? This question will be addressed through an historical analysis of past attempts by JI to develop a program to manufacture poisons and toxins in the Southern Philippines as well as JI’s support to Al Qaeda’s anthrax program.4

Traditionally, terrorism has been a largely Middle East phenomenon. The Soviet withdrawal from Afghanistan in February 1989 created the conditions for Al Qaeda and several other Middle Eastern groups to develop their conventional and unconventional capabilities in Afghanistan. The dedicated operatives and scientists recruited by Al Qaeda built separate programs. With multiple groups receiving training in Afghanistan, the capabilities developed by Al Qaeda and other groups spread to different theatres.

The core strength of Al Qaeda includes not only the capabilities seeded within the organization itself, but also across the wider Al Qaeda network and movement. In the same manner that Al Qaeda used its alliance with Jemaah Islamiyah to recruit a scientist to head its anthrax program, the group has been able to enlist the support of the Islamist community from hardcore jihadists to mere Islamist sympathizers. In the Muslim world and in the migrant communities, Al Qaeda’s worldview of working collectively to defeat the United States and its allies has translated into the intentions and capabilities of the Global Jihad Movement. Al Qaeda has successfully proliferated its own intentions and capabilities to these 30 to 40 like-minded groups to conduct mass fatality attacks.

Al Qaeda’s earnest call to these affiliates resonates throughout the Islamist and jihadist environment. In order to win its global struggle, Al Qaeda must constantly highlight the inadequacy of Islamic movements to wage local jihads but also the grave need to wage the “Global Jihad.”5 A multi-national (predominantly Arab) group led by Osama bin Laden has emerged and continues to influence the ideological reference and the operational code of Islamist groups worldwide.6 Today some two-dozen groups are interested in developing CBRN weapons. Al Qaeda, Tawhid Wal Jihad (Al Qaeda in Iraq), Jemaah Islamiyah and a few other groups have invested in the actual development of chem-bio weapons.

In the past five years, a conglomerate of groups has surpassed the singular threat posed by Al Qaeda prior to 9/11. Most of these groups received weapons, financing, training, and ideology from Al Qaeda, the Taliban, and their entities in Afghanistan. Created in Afghanistan in 1988, Al Qaeda has maintained a steadfast presence in Afghanistan since the

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4 Global Pathfinder, the database of Singapore’s International Centre for Political Violence and Terrorism Research host copies of the original documents recovered in the Philippines and in Afghanistan.

5 This is the clarion call of Ayman al Zawahiri in Knights Under the Prophets Banner, (2001) n.p, n.d.

Soviets left the country in February 1989, until the U.S.-led coalition intervened in Afghanistan in October 2001. The Al Qaeda agenda is increasingly finding resonance among regional and local Central Asian, South Asian, Southeast Asian and Northeast Asian groups. Exposed to the ideology of Global Jihad, more groups in Asia are driven by Al Qaeda's ideology. Tactically, organizationally and ideologically, the Southeast Asian groups are strategizing, structuring and behaving like Al Qaeda. For instance, Al Qaeda's regional counterpart in Southeast Asia, Jemaah Islamiyah (JI), has emerged as the most dangerous terrorist group in the region. As the chief proponent of the Global Jihad ideology in Southeast Asia, JI has provided ideological and operational support to like-minded groups in the region and beyond even before 9/11. Without exception, all JI attacks since 2001 have been against targets of the Global Jihad. The Bali I (2002), JW Marriott (2003), Australian Embassy (2004) and Bali II (2005) bombings all aimed to kill non-Muslim Westerners or destroy Western property. JI is concentrating attacks on Western and other foreign targets and avoiding Muslim or Indonesian fatalities and casualties. The danger is that Al Qaeda has successfully transmitted its operational code to JI. In due course, JI is likely to do so to other groups in the region.

JI has steadfastly influenced multiple political and militant groups to wage holy war. Like Al Qaeda, JI considers itself the region’s operational, organizational, and ideological vanguard. In addition to working closely with Al Qaeda, beginning in 2000, JI has built relationships with two-dozen groups in the region. After establishing Rabitat-ul Mujahidin (Legion of the Mujahidin), a regional military platform for collaboration, JI provided training, finance, and other forms of assistance to create a regional Islamic caliphate. After establishing Majlis Mujahidin Indonesia (Mujahidin Council of Indonesia), an Indonesian platform for collaboration, the JI supreme leader Abu Bakar Bashir influenced Islamic parties and militias to campaign for an Islamic state.

2. The CBRN Threat in Asia

Since the beginning of the contemporary wave of terrorism in 1968, only 52 of the 8,000-plus incidents of international terrorism have involved threats or actual use of chemical and biological weapons. The use of chem-bio weapons is a low-probability, high-to-medium consequence threat. Since 9/11, Southeast Asian threat groups—both terrorist and extremist groups—have seriously considered conducting chem-bio attacks. Until recently, publications on WMD or CBRN hardly refer to the threat of unconventional agents in Southeast Asia.

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8 For Al Qaeda, the idea of a vanguard was articulated by Abdullah Azzam, the ideological father of Al Qaeda. “Al Qaeda Al Sulbah, Al Jihad,” 1988, pp.
Although Southeast Asian groups have not expressed a serious interest in developing, acquiring or using radiological or nuclear material, JI has invested time and resources in developing chemical and biological agents.

In addition to assisting Al Qaeda in its anthrax program, JI has played an important role in the development of two distinct chemical and biological programs of its own. JI provided assistance to Al Qaeda to source scientist Yazid Sufaat as the second head of Al Qaeda’s anthrax program in 2000. JI established its own chem-bio program in the Philippines in early 2001 and wrote a chemical and biological manual and tested toxins on animals. JI compartmentalized its assistance to Al Qaeda to develop its second anthrax program beginning in mid-2001 and research into JI’s chem-bio program about the same period.

The predominant terrorist threat in Southeast Asia is the widespread use of explosives. While the radiological and nuclear threat is virtually non-existent, the chem-bio threat is a low probability. Nevertheless, despite its low probability, the unconventional threat in Southeast Asia should be considered medium-to-high consequence. Because it is a threat of concern, it must be properly assessed and managed.

There is an overall expression of interest in conducting mass-casualty attacks among threat groups and increased manifestation of this phenomenon. With JI mainstream splintering, the JI off-shoot is most likely to go down the path of using chem-bio weapons. Influenced by Global Jihadist groups in the Middle East and, to a lesser extent in South Asia, there are several new groups on the horizon with intentions to conduct mass-casualty attacks.

2.1 Origins of the Al Qaeda Anthrax Program

In 1997, then U.S. Defense Secretary William Cohen held a five-pound bag of sugar and said on television that a similar amount of anthrax released in the air above the nation’s capital would kill about 300,000 people. The following is an excerpt from an episode of “This Week with Sam Donaldson and Cokie Roberts” entitled “The Iraq Situation,” which aired on November 16, 1997:

William Cohen: It’s important when we talk about weapons of mass destruction that we translate into something that the American people, and hopefully, the world community can understand. For example, when we talk about anthrax – anthrax. If you took a five-pound bag of sugar and accept—call this anthrax. This amount of anthrax could be spread over a city—Let’s say the size of Washington. It would destroy at least half the population of that city. If you had even more amounts...

Sam Donaldson: Am I correct...

William Cohen: If you had more amounts of anthrax... Let me just get to this point...
One of the things we found with anthrax is that one breath and you are likely to face death within five days. One small particle of anthrax would produce death within five...
days. VX is a nerve agent. One drop from this particular thimble as such... One single drop will kill you within few minutes.\textsuperscript{12}

Cohen later elaborated that, “If you take a five-pound bag of sugar and you say, assuming this were filled with, let’s say anthrax, instead of sugar and you spread that with the right kind of temperatures and right kind of wind over a city of the size of Washington, D.C., you would wipe out almost 70% of the population just with five pounds. There are tons of anthrax in existence.”\textsuperscript{13} A few months later, Cohen reiterated, “This is not some science fiction that we are simply concocting in order to scare people. And you may recall, I have tried to raise the level of consciousness about this threat. I did so years ago in dealing with Saddam Hussein.”\textsuperscript{14}

Although Al Qaeda knew of radiological and nuclear weapons before 1997, Ayman al-Zawahiri claims that Al Qaeda had no knowledge of chemical or biological weapons until “the enemy drew our attention to them by repeatedly expressing concerns that they can be produced simply with easily available materials.”\textsuperscript{15,16} After dedicating US $2,000 to $4,000, Al Qaeda launched an ambitious chem-bio program by studying foreign medical journals and providing summaries in Arabic to Atef, the Head of the Military Committee of Al Qaeda.\textsuperscript{17} Zawahiri wrote to Atef on April 15, 1999:

I have read the majority of the book [an unnamed volume, probably on biological and chemical weapons]... [It] is undoubtedly useful. It emphasizes a number of important facts, such as:

a) The enemy started thinking about these weapons before WWI. Despite their extreme danger, we only became aware of them when the enemy drew our attention to them by repeatedly expressing concerns that they can be produced simply with easily available materials...
b) The destructive power of these weapons is no less than that of nuclear weapons.
c) A germ attack is often detected days after it occurs, which raises the number of victims.
d) Defense against such weapons is very difficult, particularly if large quantities are used...

I would like to emphasize what we previously discussed— that looking for a specialist is the fastest, safest, and cheapest way [to embark on a biological- and chemical-weapons program]. Simultaneously, we should conduct a search on our own ...

\textsuperscript{15} Al Qaeda’s early attempts to build radiological and nuclear capabilities were led by Mamdouth Salim alias Abu Hajir al Iraqi as far back as 1993. Procurement attempts in Sudan (uranium canister), Germany (red mercury), and FSU were unsuccessful. Al Qaeda’s own experience forced it to develop separate chemical and biological warfare programs.
\textsuperscript{17} Ibid.
Along these lines, the book guided me to a number of references that I am attaching. Perhaps you can find someone to obtain them ... 18

The letter cited journals such as Science, The Journal of Immunology, and The New England Journal of Medicine and listed the names of such books as Tomorrow’s Weapons (1964), Peace or Pestilence (1949), and Chemical Warfare (1921). 19 After U.S. forces invaded Afghanistan in 2001, some of these titles were recovered by U.S. Special Forces personnel who raided Al Qaeda’s safe houses in Afghanistan. Because gaining access to chemical agents or manufacturing them outright was judged easier than obtaining biological weapons, Zawahiri and Atef “settled on the development of a chemical weapon as the most feasible option available to them.” 20 The recovery of correspondence on the Al Qaeda computer indicates that Al Qaeda hired “Medhat Mursi al-Sayed, an expert to whom they refer as Abu Khabab” to assist Al Qaeda. 21 They also outlined vague plans for establishing a laboratory facility, as well as created a charitable “front” for the program. 22 In Afghanistan CNN recovered a tape showing the debriefing of Ahmed Ressam, the so-called Millennium bomber, discussing chemical experiments on animals, in addition to an individual named Abu Khabab testing hydrogen cyanide on three dogs. 23

Titled the “Yoghurt Project,” Al Qaeda also embarked on an ambitious biological program. The project to develop anthrax was made operational in 1998. In 1999, Al Qaeda recruited Rauf Ahmed, a scientist working for PCISISR, Lahore. Rauf, at the request of Zawahiri, conceptualized and equipped the Al Qaeda lab. Rauf visited a Level 3 advanced security lab in the United Kingdom and was about to gain access to the most dangerous pathogens; however, he was unwilling to work in Afghanistan. As he was not ideologically committed and financially unstable, Rauf constantly relied on Al Qaeda for funding. Zawahiri found him to be unreliable and enlisted the support of Khalid Sheikh Mohamed (KSM) to recruit another scientist. 24 KSM asked Isamuddin Ridduan, alias Hambali, the operational leader of JI and an Indonesian cleric. Known among the terrorist fraternity as Mokhtar, the mastermind of 9/11, KSM sourced from Hambali a scientist cum businessman already serving within the ranks of JI and Kumpulan Militan Malaysia (KMM)

In the first week of January 2000, Kuala Lampur had been the venue for the first operational meeting in the planning of 9/11. 25 The apartment of Yazid Sufaat, a U.S.-trained Malaysian scientist and a businessman in medical equipment and products, hosted both the deputy leader of the 9/11 attack, Nawaz al Hazmi, and one of the four suicide pilots, Khalid al

18 Ibid
19 Ibid
20 Ibid
21 Ibid
22 Ibid
23 CNN collection, Global Pathfinder, the database of Singapore’s International Centre for Political Violence and Terrorism Research
24 KSM led the media committee of Al Qaeda until his capture in Rawalpindi, Pakistan in 2003. KSM was also head of a subcommittee under Abu Hafs alias Mohamed Atef, the head of the military committee of Al Qaeda until he was killed in a US predator strike in Kandahar in November 2001.
25 George Tenet with Bill Harlow. At the Center of the Storm: My Years at the CIA. (New York, HarperCollins, 2007) p. 204.
A retired Army Medical Corps Captain, Sufaat was acting on the orders of Hambali. When the Al Qaeda leadership requested Hambali, also a member of the Al Qaeda Media Committee, to recruit a scientist to head its anthrax program, Hambali asked Sufaat, who agreed. After topping his class in the Royal Military College in Malaysia, Sufaat joined the Medical Corps of the Malaysian Army. After graduating in Biology with a minor in clinical laboratory technologies from the University of California in Sacramento, Sufaat was introduced to radicalism by his wife and mother-in-law. In addition to providing his apartment to two of the 9/11 hijackers and facilitating a planning meeting, Sufaat provided protection, funding and facilitated the entry of Zacarias Moussaou, an Al Qaeda suicide pilot, into the U.S.

The U.S. intelligence community knew about Sufaat before 9/11 but not as a biochemist working for Al Qaeda. Sufaat came to their attention immediately after the January 2000 meeting and immediately before 9/11 in connection with the arrest of Moussaou. Based on a phone number that was under surveillance in the Middle East, the CIA informed the Malaysian Special Branch (MSB) in December 1999 to watch for Nawaz al Hazmi and Khalid al Mihdar immediately before they arrived in Kuala Lumpur. In January 2000, MSB informed that the meeting was held in the condominium of Yazid Sufaat, but his link to terrorism was not known at that time.

Sufaat participated in Project Natal, the operation to bomb multiple churches in Indonesia on December 24, 2000. The owner of Green Laboratory Medicine, established on October 6, 1993, Sufaat provided a letter from Infocus Technology, established on July 13, 1995, to Moussaou, who visited him in Kuala Lumpur. Although arrested on suspicion in the U.S. on August 16, 2001, Moussaou’s belongings were not searched until after 9/11. Then Director of the CIA, George Tenet, wrote: “On September 18, 2001, a week after the attacks on the World Trade Center and the Pentagon, we were informed that a trunk belonging to Moussaou contained letters indicating that he was the U.S. marketing consultant for a Malaysian company called In Focus Tech. The next day, our officers told us that the general manager of In Focus Tech was Yazid Sufaat...”

In Afghanistan, Hambali introduced Sufaat to Zawahiri as the “man who was capable of leading al-Qa’ida’s biological weapons program.” After relocating to Kandahar, Sufaat continued the work of Dr. Abdul Rauf, the Pakistani scientist from PCISIR. Al Qaeda’s project to manufacture anthrax fell within the rubric of its WMD Committee, a subcommittee of Al Qaeda’s Military Committee led by Abdul Aziz al Masri. Currently in Iranian detention, al Masri reported to Mohomed Atef. The anthrax program was initiated by Zawahiri, an eye surgeon, and supported by Atef, a police officer. Zawahiri, Atef and Abdul Aziz, the principals of Al Qaeda’s WMD program were all Egyptian.

When Sufaat arrived in Kandahar, Al Qaeda had a ready-made lab for him. In addition to rooms for an office, fermentation, incubation and a washing room, the lab had an autoclave.

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26 9/11 Commission Report
28 Ibid, p. 204
29 Ibid, p. 278
culture media, air-contamination detector, and a respirator. Located within the Haji Habash Hospital in Kandahar, Sufaat trained Omar Wadhan, who was close to KSM. However, Sufaat’s stay in Kandahar was limited. Following the U.S. invasion of Afghanistan in October 2001, Al Qaeda was forced to abandon its anthrax lab in Kandahar. Al Qaeda’s leadership, organizing the fight against Northern Alliance and coalition forces, requested Sufaat to leave for Pakistan.

When Al Qaeda was dislodged from Afghanistan, the program fell into temporary disarray. However, KSM immediately took over the program with the intention of reviving it. KSM assumed direct responsibility for both conventional and unconventional programs, but he became too busy with more immediate concerns. First among these concerns was the important task of organizing the exodus of Al Qaeda members from Afghanistan to Pakistan and their travel and relocation from Pakistan to other countries for the purpose of mounting attacks. KSM, who had operated previously in Pakistan, had to hide several Al Qaeda members and associates in that country. Second, KSM was constantly on the move in Pakistan, organizing several attacks both in Pakistan and overseas. Both Sufaat and Omar fled Afghanistan in October and November 2001 for Pakistan. While Omar tried to get in touch with KSM, Sufaat boarded a flight to Indonesia. Sufaat’s intention was two-fold. First, he wished to get more money for the “Yoghurt Project” and second, he wanted to relocate the project to a safe venue. As Al Qaeda members were being hunted in Pakistan, Al Qaeda and JI planned to relocate the anthrax program to Institute Pertanian Bogor. Anthrax had become Al Qaeda’s most favored weapon. However, an Indonesian scientist who initially cooperated with Al Qaeda took their money and then refused to cooperate.

Meanwhile in Pakistan, the ISI arrested Omar and handed him over to the CIA in December 2001. Denial of its sanctuary in Afghanistan and the Malaysian Special Branch arrest of Sufaat on a visit to see his wife in Malaysia effectively ended Al Qaeda’s second anthrax program. Detained in December 2001, Dr. Rauf began to cooperate with the ISI and the CIA. With the major players of the program in custody, the CIA was relieved that it had disrupted the most dangerous component of Al Qaeda’s biological program. In his debriefing, Sufaat said that he isolated anthrax and described the buildings used in Kandahar. The U.S. Special Forces recovered equipment and over 100 journal papers, including an Al Qaeda Biological Weapons Manual. Furthermore, U.S. personnel took swabs of the laboratory and found the virulent strain of anthrax. As anthrax is endemic to Afghanistan, the U.S. tests remained inconclusive. Analysis of the documents recovered from the facility showed that Sufaat made many mistakes but had probably isolated anthrax. Immediately after detention, Sufaat did not cooperate with the Malaysian Special Branch. U.S. authorities were frustrated that the Malaysians did not share the Sufaat debriefings. However, for several months Sufaat resisted all questions that would expose the program. Only after his wife was arrested did Sufaat begin to cooperate. His wife has been released but Sufaat remains in custody.

Although known within the intelligence community as the Al Qaeda anthrax program, the program led by Sufaat had features of a joint Al Qaeda-JI operation. First, Hambali sourced JI and KMM member Yazid Sufaat as the lead scientist. Second, Al Qaeda-JI attempted to revive the program by relocating the program to Indonesia, a JI territory.
2.2 Parallel Programs

Other like-minded groups have developed similar programs for the production of chem-bio agents. They included clandestine programs in northern Iraq under Abu Musab al Zarqawi, in the Pankishi Valley in Georgia under Ibn Omar al Khattab, and in the Southern Philippines under Hashim Salamat and Khaddhafi Janjalani. Since the late 1990s, the interest of Al Qaeda and other groups in unconventional weapons has grown. For instance, in the al Mattar camp in Herat led by Zarqawi, Abu Attiya experimented with toxins in 2001. Abu Attiya relocated his program to the Pankishi Valley in Georgia on the border with Chechnya in 2002. In Northern Iraq, Zarqawi used the Khurmal camp, a facility linked to Ansar Al Islam to conduct research on toxins.30 Because Al Qaeda had invested significantly to train members of its associated groups in the use of chemical and biological agents at camps in Afghanistan, both the jihadist intention and capability to use unconventional agents proliferated.31

The earliest reference to Southeast Asia occurred during the trial of Arabs operating out of Albania who were brought to trial in Egypt. Their confessions revealed that those loyal to Osama bin Laden and Ayman al Zawahiri had “obtained germ and biological weapons by post in return for a small sum.”32 They further revealed that “One of the organization’s members secured an offer to supply samples of anthrax gas and other toxic gases from a factory in a Southeast Asian country. The germs have been made available at a price equivalent to $3,695 plus freight charges.”33 The report added: “A laboratory in Indonesia exported serums to the Islamic Moro Front, which has close ties with pro-Bin-Ladin groups and with Arab Afghans and Balkans. It is believed that the Moro Front has large quantities of toxic gases.”34 The initiative of the cell in Albania demonstrated intent but not capability. Referring to the description of bio-weapons, a specialist on biological weapons, Philip Henika, commented that they are “not correct” as “E coli, Salmonella, and Bacillus anthracis are bacteria not viruses.”35,36 Henika added: “The toxin produced by Bacillus anthracis is anthrax lethal factor which is a protein and not a gas. The ‘anthrax gas’ is probably aerosolized Bacillus anthracis spores. The production of these spores for aerosol is called weaponization and is a whole process unto itself.”37

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30 Ansar al Islam, a breakaway group of the Islamic Movement of Kurdistan, later evolved into Jayash Ansar al Sunnah. Renamed as Jamaat Ansar al Sunnah, this is one of the most active groups in Iraq.
31 Although Al Qaeda was interested in detonating a radiological dispersal device (RDD) in the U.S., there was no training conducted in Afghanistan on RDDs. Al Qaeda members in Pakistan studied what could be found on the Internet but instead decided to use explosives or a gas explosion to bring down an apartment complex in the U.S. Eventually, the U.S. government charged Jose Padilla for planning to use a RDD.
33 Ibid.
34 Ibid.
36 Henika, P.R., email communication, December 24, 2006
37 Ibid.
2.3 JI Chemical and Biological Program

Al Qaeda members dispersed globally from the core of Pakistan and Afghanistan after their sanctuary was dismantled in October 2001. In much the same way, JI members scattered regionally when the JI sanctuary was disturbed after the October 2002 Bali bombing. With the arrest of JI leader Abu Bakar Bashir, the group temporarily lost its centralized command and control structure. Like Al Qaeda, JI survived, and its dispersed leaders and members have come together to form a number of factions, both in Indonesia and in the Philippines.

After recovering, JI is infecting both the Indonesian groups and Filipino groups with the ideology of Global Jihad, the doctrine of Al Qaeda preached by Osama bin Laden. They include a JI-structured faction led by Abu Bakar Bashir. Also known as the JI mainstream, the JI-structured faction is the largest. Through the Indonesian Mujahidin Council (MMI), JI members who swear allegiance to Bashir continue to work with an array of political parties and religious groups throughout Indonesia. Since his release, Bashir has increased his influence throughout Indonesia through the function of an umbrella group, the MMI, whose constituent members cover a range of political, religious and militia groups. In addition to its robust presence in Indonesia, Bashir has his own representation in Mount Kararawo, Philippines. Known as Mantiqi III or region III, JI maintains a presence in Eastern Indonesia, Eastern Malaysia and Southern Philippines. Moro Islamic Liberation Front (MILF) leaders opposed to Haji Murad, the MILF chairman, protect the JI faction led by Usman. The JI faction led by Usman focuses on preaching and training in tactics, both of JI and MILF. Under Usman’s control, JI’s program to manufacture chemical and biological weapons was established in the Philippines in early 2001.

In early 2001, Usman, Mustaqim and Sulaiman, Indonesian members of JI embarked on a chemical and biological program. Initially they worked under the supervision of Fathur Rohman Al-Ghozi. An Indonesian JI member, Al Ghozi was trained in Afghanistan and was operationally close to Al Qaeda. Operating together with Al Qaeda Canadian-Kuwaiti Mohamed Mansour Jabarah, he was the lead surveillance specialist to bomb the U.S., British, Israeli, and Australian targets in Southeast Asia. The JI program was rudimentary in comparison to Al Qaeda’s reasonably well-resourced yet basic program in Kandahar. The JI chem-bio program was an initiative parallel to the Al Qaeda’s CBRN programs.

Under Abu Bakar Bashir, the JI Amir, there are four Councils for Governance (Majelis Qiyadah), Judiciary (Fatwa), Religious (Majelis Syuro or Shura) and Discipline (Majelis Hisbah). Supporting the regional Shura are five divisions or cells called Iqtisod (Economic), A-l-E hsan (Front Organizations), Dakwah (Missionary), Hubungan A ntarabangsa (International Affairs) and Iddat (Military). The Governing Council is headed by a Central Command (Qiyadah Markaziyyah) and has authority over the leaders of JI’s four territorial organizations called Mantiqs. Under Mantiqi are the Wakalahs. The Southern Philippines (Wakalah Hudeibiah: Wahud), a part of Mantiqi III, is led by Qoid Wahoo by Usman alias Rizal. Usman replaced Ibrahim Ali alias Hudaifah and he replaced Ahmad Faisal Sin Imam Sarjan alias Zulkifli alias Arijan alias D onnie Ofrasio. Wakalah Hudeibiah has five functional units, namely: Bendahara (Finance); Staff U mm (General or Common Staff); T abrid (Training); Tajnid (Military); and, Litbang (Research). The leaders of Bendahara and Tajnid were Taufiq Refqi and Mustaqim, alias Delfiro, the JI biologist, who were arrested in Sukoharjo, Indonesia on June 30, 2004.
To sustain Wahud, JI maintains a network connecting three countries. JI has been able to build a virtual superhighway from Eastern Indonesia into Eastern Malaysia and the Southern Philippines and from Eastern Indonesia to the Southern Philippines. Traditionally, both terrorists and criminals used these two routes to move between Indonesia and the Philippines and from Indonesia and the Philippines to Malaysia. To the JI members in Eastern Indonesia, moving through Sabah in Malaysia and the Sulu archipelago in the Philippines is the most popular route. Starting in Nunukan and Tawau, through Sandakan and Tawi Tawi, they travel by trading boat, speedboat and ferry before reaching Cotabato City. This route through Sabah in Eastern Malaysia has been the most important transit point for JI members moving back and forth between Indonesia and the Philippines. Despite attempts to disrupt the JI superhighway, both JI and other groups continued to use the route. The other route is from Manado, Eastern Indonesia, to Sangir, a transit point, and then to General Santos City and Cotabato City in the Southern Philippines. Other than JI and other terrorists, criminals generally and smugglers in particular use these two routes. JI madaris (Tahuna), JI safe houses (Sabah), and JI frequented hotels (Hotel Losmen, Nunukan) have been monitored and disrupted, but the group has been able to rebuild their support network to sustain the lifeline.

Like Al Qaeda in Afghanistan, JI was a foreign group that established a presence in the Southern Philippines. Since 1994, after JI established Camp Hudaibiyah in the periphery of the main MILF camp Abu Bakar, JI has worked with the MILF.38 To conceal the relationship from the larger MILF organization, JI worked with MILF Special Operations Group (SOG) and intermittently with the Abu Sayaf Group (ASG: Al Harkatul Al Islamiyah). In addition to establishing a camp in the MILF territory, JI conducted training for MILF recruits and members, and operations with MILF SOG. In addition to JI’s ideological influence on Muslims in the Philippines, JI trainers gave an added military capability to Filipino groups. JI trained members of the Rajah Soliman Revolutionary Group (RSRM) and ASG to conduct bombings in Manila.39 After the Valentine’s Day bombing, the MILF expelled JI and ASG. After relocating to Jolo, JI operationally merged with ASG. It is this faction of JI led by Umar Patek and Dul Matin that took over the JI chem-bio program initiated by Usman in early 2001.

At “Post Pawas,” JI aimed to develop a toxic chemical that could be used as “bio-chemical weapon.” To manufacture a chemical agent, the JI chem-bio group “just relied on the little knowledge” of Mustaqim, a biologist. Although the details are not available, they also had access to reference materials on chemical warfare. The JI chem-bio work continued even after Al Ghozi was arrested in Quiapo, Manila, in January 2002. Sentenced to 12 years in prison for possession of tons of explosives, Al Ghozi escaped from detention in Camp Crame on July 14, 2003, and was killed by government forces in Pigkawayan, North Cotabato on October 12, 2003. Even after Sulaiman had left for Indonesia, Usman and Mustaqim continued the research. According to Zulkifli, the research to produce a toxic agent was “completed with good results” sometime in July 2003. According to Zulkifli, the product of the research was “tested on rats, cats and frogs.” Though the chemical was not tested on

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38 The decision to establish a JI presence in Mindanao was by agreement between Hashim Salamat, the then head of MILF and Abdullah Sungkar, the then head of JI. The Afghan trained JI trainers were highly priced and as such MILF - and subsequently other groups such as ASG - welcomed them.

39 A faction of the Balik Islam Movement (converts to Islam), RSRM has suffered but has a significant actual and potential support base in Luzon including in Manila.
human beings, Usman and Mustaqim told Zulkifli that its expected immediate effect would be severe itching. As the poison spread on the body, the victim would eventually die. Zulkifli said that he had no information if Mustaqim and Usman had stored substantial amounts of the toxic chemical they developed.

Our understanding of JI’s chem-bio program comes largely from the arrest of JI members both in the Philippines and Indonesia, in addition to recoveries of documents. None of the arrests and interrogations or raids aimed at eliciting information pertaining to the CBRN threat. Although the author of the manual is not known, a Bahasa Indonesia copy of a chemical and biological manual was recovered from the safe house of Taufiq Rifqi, the deputy leader of JI, Wakhala Hudaibiyah, Mantiqi III.40 Taufiq Rifqi [Taufik/ Taufek/ Aufek Rifqi/ Rafik] alias Izza Kusuman alias Omaeroh Kanacan alias Abu O baida alias Amy Erza was the treasurer. Only 29 years old at the time of his capture by the Philippines Military Intelligence on October 2, 2003, Rifqi’s safe house was located in Barangay (village) Taviran in Datu Ordin Sinsuat, Cotabato City, Maguindanao.41 As the trainer of Filipino and foreign recruits in explosives and combat tactics in former Camp Abu Bakar, Rifqi was JI finance and logistics liaison officer in the Philippines. He arrived in the Philippines in August 1998 and trained in Camp Abu Bakar from 1999 to 2000. Trained by Fathur Rahman al Ghozi, the architect of JI’s chemical and biological program, Taufiq Rifqi revealed that JI was planning to bomb several targets.

The JI manual demonstrated intent, not capability. The manual was compiled from formulae available on the Internet, especially the Mujahidin Poisonous Handbook. However, the manual had many mistakes, demonstrating that its authors lacked knowledge of the discipline. As safety measures and precautions are not stipulated, if the manual is used, it is likely to kill the manufacturer. The International Center for Political Violence and Terrorism Research (ICPVTR) in Singapore translated the manual. Singapore’s ICPVTR specialists assessed the manual but its assessment was not publicized immediately after recovery. ICPVTR was concerned that JI will actively look for a better manual or a better scientist. Since then, JI had progressed, and it has become necessary to publicize the sustained interest of JI in seeking to develop a capability in unconventional agents.

There is only one instance of the MILF interest in CBRN: when the Philippine military overran the Buliok Complex in Central Mindanao in 2003 and recovered a biological manual focusing on toxins. The military informed the Department of Agriculture to regulate the toxins referred to in the manual that were commonly used by farmers. In 2004, the Department of Agriculture of the Philippines issued a directive regulating the use of toxins referred to in the manual.

2.4 JI’s Impact in the Philippines and Beyond

JI, having originated in 1993, evolved from Darul Islam (DI), an Indonesian extremist group. Some factions of DI remained sympathetic to and supportive of JI. The threat is spreading beyond Indonesia, the Southern Philippines and Eastern Malaysia. To facilitate

40 www.inq7.net/globalnation/sec_new/2003/oct/20-03.htm
41 Profile of Taufiq Rifqi, JI Personality/ Suspects Profile, Global Pathfinder, ICPVTR Database, accessed on December 24, 2006.
international travel, the transfer of arms, and access to goods, DI leadership in Sabah, Malaysia works with JI and occasionally with ASG. In addition to several DI members, Nur Hadi, the head of DI in Sabah, is currently under Malaysian detention. Another DI Sabah detainee Binsali Bin Omar, alias Kiram Hadji Harun, was born in the Philippines and was arrested on March 16, 2006. He was in direct contact with Dul Matin, deputy leader of JI faction in the Philippines, and served under Zulkifli, alias Doni Ofrasio, JI leader in Mantiqi III. In addition to working as a courier of funds for JI, Harun engaged in the procurement and transfer of firearms and other equipment from the Philippines to Indonesia. Furthermore, Harun served as a guide to JI, ASG and other members.

There is new evidence that DI, JI and ASG are involved in the recruitment, indoctrination, training and dispatch of Malaysian jihadists to Naratiwat, Thailand. According to Mohammad Nazri Dollah, alias Ustaz Nazri, a DI member arrested by the Malaysian Special Branch, ASG agreed to train Malaysian jihadists in Mindanao as instructors in order to help the jihadist groups in Thailand in late 2005. Ustaz Nazri, also serving as a religious advisor in Tawau, Malaysia, dispatched Jeknal Adil, a Filipino who grew up in Malaysia, and Adzmi Pindatun, a Malaysian, to be trained in combat and explosives instruction by ASG trainers. The ASG team assigned for training was led by Gumbahali Jumdail, alias Dr. Abu Pula, from Tukay, Jolo. Dr Abu, a Libyan-trained former member of the Moro National Liberation Front, studied pre-medicine and performs surgery on wounded ASG members. Dr. Abu is closely associated with Dul Matin and Umar Patek, the two most senior JI leaders in the Philippines. The initial funding of 33,000 Philippine pesos for the training was provided through Maybank Branch in Tawau to Land Bank of the Philippines branch in Jolo, Sulu. However, the Malaysian Special Branch arrested both Jeknal Adil and Adzmi Pindatun in March 2006.

2.5 JI Off-shoots in the Philippines

Both mainstream, or “structured,” JI and breakaway, or “unstructured,” JI factions are located in Indonesia and the Philippines. Led by Abu Bakar Bashir of Indonesia, JI’s structured faction is represented in the southern Philippines by Usman. Noordin Mohomed Top in Indonesia and Umar Patek in the Philippines lead two breakaway or unstructured factions of JI. Operating out of Mount Kararawo, JI’s structured faction led by Usman is working with the MILF. JI’s unstructured faction led by Umar Patek operationally merged with ASG and works with Mujahidin Kompak in Indonesia. With the arrest of Abu Bakar Bashir after the Bali bombings in October 2002 and the disruption of the flow of funds to JI structured faction in the Philippines, Usman and his colleagues suffered. The JI chem-bio program originating from the JI structured faction in the Philippines could not be sustained. As a result, the chem-bio program was adopted by the JI unstructured faction in the Philippines.

42 Where Indonesia, Malaysia and Philippines come together, there are nationals that float around. In most cases, they are bilingual and bicultural. Born in one country, they live in another country, and often speak more than one language.
43 JI’s celebrated bomb maker Dr. Azahari Husin closely supported Top until his death in Batu Malang, Indonesia in 2005.
44 Another Bali I bomber Dul Matin supported Umar Patek in the Philippines. They both fled Indonesia after the Bali I bombing and the JW Marriott bombing, respectively.
After 2003, the JI faction led by Umar Patek and Dul Matin developed into the most prominent faction. With the faction led by Usman going into oblivion, the JI faction led by Umar Patek and Dul Matin survived by working closely with another group, Mujahidin Kompak. Until its leader Abdullah Sonata was arrested in Jakarta on July 6, 2003, Mujahidin Kompak provided finance, recruits and even planned to conduct joint suicide operations. As ASG was hard-pressed for resources, the JI unstructured faction increasingly relied on Mujahidin Kompak, initially a charity that had transformed into a terrorist group and maintained an Indonesia-wide, especially strong in Eastern Indonesia. Abdullah Sonata worked closely with Saudi charities and provided foreign funding to JI. Like JI, Mujahidin Kompak established a presence in Pamas in Mindanao. Mujahidin Kompak also ran a training camp in MILF-ASG controlled territory. The recoveries from Patikul in September 2006 demonstrate that JI leaders Umar Patek and Dul Matin had closer ties with Abdullah Sonata than with Abu Bakar Bashir and Noordin Mohamed Top, the leaders of Indonesia’s JI structured and unstructured factions. In addition, JI unstructured faction in the Philippines is working with a wide array of groups, both in Indonesia and in the Philippines. They include Negara Islam Indonesia, and other factions of D1, both in Indonesia and in Malaysia. In the Philippines, JI’s unstructured faction is also working with MILF leaders opposed to the peace process and with RSRM.

2.6 Recent Developments

Recent raids and recoveries demonstrate that JI is persistent in its interest in chem-bio agents. Until August 2006, ASG and JI operated together in the Sulu Province, Jolo. The Philippines Military, supported by the Intelligence Community, launched Operation Ultimatum on August 1, 2006. This operation aimed at dismantling the joint JI-ASG training and operational Infrastructure in Sulu Province. Just over a month after the incursion, the military encountered about 200-armed members of ASG and JI. The resulting firefight on September 4 killed six military personnel and injured nineteen. Khaddaffy Janjalani, Radullah Sahiron, Umar Patek, and Dulmatin led ASG and JI members. Although the leadership survived, ASG and JI suffered losses.

In nearby premises, among the recoveries were four CDs belonging to JI, which contained 874 files. Of these 874 files, 729 were exploitable, 107 transferable and 38 were password protected. They were in English, Arabic, Bahasa Indonesia, Tagalog and Tausug. In addition to the arrest of key operatives of MILF, ASG, RSRM, and JI, the recovery by the Philippines Military of JI documentation from a safe house in Barangay (village) Tugas, Patikul in the Sulu Province, Jolo, provides insight into attempts by JI to move in the direction of developing a chem-bio program.

Umar Patek, the leader of JI in the Philippines, considered using both explosives and poisons until the ASG and JI haven in Patikul was degraded in August-September 2006. Their

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45 104th Brigade of the Philippines Army and 3MBDE of the Philippine Marine Corps of the Philippines Military.
46 The combat and clearing operation was conducted by the elements of Force Recon Class 12 (FRC) under 3 MBDE at GS 8570.
47 Military Intelligence Group 9 (MIG 9), ISAFP analyzed the recovered material. The International Centre for Political Violence Research (ICPVTR), Nanyang Technological University, assisted in the translation and analysis of the Bahasa material.
main target was the presence of U.S. troops in Mindanao. With the intention of dislodging the U.S. military presence, the ASG-JI joint operations surveilled U.S. forces in Sulu Province. Umar Patek tasked DI members in Sabah to procure both electrical items for the fabrication of Improvised Explosive Devices and Sodium Sulfide, a base for manufacturing poisons. Umar Patek, who is a specialist in the use of poisons, planned to build a chemical lab in Sulu. However, due to the lack of resources and access to chemical agents, the JI instead decided to build a conventional weapons workshop. In a proposal JI submitted for funding, it stated:

We plead to the creator of heaven and earth so that all the existing programs and affairs can be well maintained and increased; therefore we sincerely hope that your investment in our company will continue to flow. (Amen)

From the past proposal submission themes, there are 2 points that we have not yet accomplished, which are:

1. The establishment of a chemical laboratory along with all the materials and equipment.
2. Internet connection.

This is due to the difficulty in acquiring chemical materials as well as the high-price of the materials itself. Therefore, we divert the budget allocated for the chemical lab to the establishment of the aslihah workshop in which the employees are currently undergoing a training phase – where the establishment of this workshop was not included in the submission of the previous proposal. While in regards to the Internet connection, the problem was the expensive cost of connecting via Sim-card (non-subscription). In the future - God willing - the connection will be established through direct connection via Hand phone with a subscription system, however, the expensive cost of the particular Hand phone which can be used for the connection does not allow us to accomplish this yet.

It is very likely that JI decided to invest in a conventional weapons factory because chemical and biological research is unprecedented and takes time. By nature, terrorists are copycats. They are more imitative than innovative. In addition to the availability of material, the required expertise to manufacture, repair, and employ firearms and explosives is widespread in the Southern Philippines.

3. the future

An assessment of the recoveries of evidence and a review of terrorist interrogations in Indonesia, Malaysia, and the Philippines indicates that the threat complexion in Southeast Asia is changing. As copycats, terrorist and extremist groups in the region are learning both by emulation and transfer of knowledge. Nonetheless, the immediate terrorist threat in Southeast Asia is manageable. Since the JI bombing of Bali in October 2002, the operational agencies

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48 Plans and Tactical Data, CD2-TRANS_MB LS FILE-4 Final Ouput, DOC EX, Operation Ultimatum, Brgy Tugas [Village of Tugas], Patikul, Sulu Province, September 4, 2006, p. 68
49 The financial details of the weapons workshop, recovered by the Philippines military in September 2006, were analyzed at the International Centre for Political Violence and Terrorism Research in Singapore.
have built considerable knowledge and understanding of the threat groups. For example: Detachment 88, Indonesia’s elite counterterrorism unit, working with the Australian Federal Police, has emerged as a capable force. Although JI is not yet formally banned, Detachment 88 has hunted and killed or captured those who have directly participated in violence. Likewise, the Philippine military units working with the U.S. Special Operations Forces and U.S. and Australian intelligence agencies have proven effective.

To survive, the threat groups are transforming. They maximize their modest resources by forging new alliances and partnerships. Despite their political and cultural differences, they are cooperating across borders. As groups are increasingly driven by the common ideology of Global Jihad, the extremist groups between Malaysia, Indonesia, Philippines and Thailand believe in a common fight. Despite intermittent counterterrorism successes by governments, terrorist groups are sharing new technologies and tactics. In addition to the operational milieu, the ideological milieu in Southeast Asia is conducive to the exploitation of CBRN agents. The recoveries from the Southern Philippines show that JI still demonstrates serious intent.

For instance, a Saudi cleric issued a fatwa, or religious edict, justifying the use of CBRN weapons in 2003, but no group has successfully manufactured CBRN weapons. Although intent does not equal capability, it is evident that terrorist groups in Southeast Asia are serious in their quest to develop unconventional agents. Currently, JI lacks resources and knowledge but a determined threat group can overcome this logistical barrier. Considering the increased flow of funding, terrorist groups could yet recruit a competent disgruntled scientist to develop and use an unconventional weapon.

To meet the new threat, government law enforcement and intelligence services will have to work closely with each other. They should seek to develop a common response both to the rise of extremism and terrorism in the region. Governments are comfortable devoting resources to target the threat groups operationally but not fighting them ideologically. There is no call from Southeast Asian leaders to the ulama, or community of clerics, to repudiate the CBRN fatwa of 2003. Similarly, there is no initiative to build a norm or ethic in society against the use of indiscriminate violence.

With the penetration of Global Jihad ideology into Southeast Asia, local extremist and terrorist groups are becoming interested in unconventional agents. The change in the global political environment after 9/11 has had both a regional and a local impact. Southeast Asian governments have been careful not to harm Muslim sensibility but both the U.S.-led invasions of Afghanistan and Iraq have galvanized a number of Islamist and jihadist groups in the region. In addition to the constant publicity and propaganda generated from Afghanistan and Iraq, the anger of Muslims over the developments in Lebanon during the 2006 Israeli attacks gave new life to the Sunni religious, extremist, and terrorist groups in the region. Six years after 9/11, the support for waging a Global Jihad has grown significantly in Southeast Asia.

Terrorism is incorrectly perceived as the biggest threat in Southeast Asia. The bigger threat is in fact ideological extremism. Middle Eastern ideologues continue to have a profound impact on the Asian Muslims and their groups. Southeast Asia’s most widely read Middle Eastern ideologue is Abu Mohammed al Maqdisi, the mentor of Abu Musab al Zarqawi, who was the Al Qaeda leader in Iraq until June 2006. The website www.tawhed.ws/ of Abu Mohammed al Maqdisi is the largest among the radical cleric websites and is hosted in Western Samoa, an island in the Pacific. As political leaders need the support of the Islamic
parties and Muslims, governments are tolerating extremism. As such, it is necessary to invest in the education of the Muslim masses that the fight against terrorism and, more importantly, extremism, is not a fight against Islam.

3.1 How the Threat is Likely to Evolve

The sustained interest of JI in acquiring, developing and using chem-bio agents has implications for the future security of Southeast Asia in general. Like ideology, knowledge proliferates. Al Qaeda’s ideology and operational knowledge proliferated from the camps in Afghanistan to JI. If JI survives, its intentions are likely to evolve and translate into human expertise and material resources. Considering the resilience of jihadist groups, JI infrastructures in the Philippines may be dismantled, but the group is unlikely to be destroyed completely, especially in Indonesia. Over time, JI is likely to ideologically infect Southeast Asian groups to move in this direction, as well as provide its current rudimentary and perhaps ultimately well-developed, knowledge to regional groups. Like Al Qaeda, JI is working with like-minded groups and is thus increasing the potential for sustaining the terrorist interest in chem-bio agents in the region.

What has prevented Al Qaeda, JI or any other group from successfully manufacturing and using chem-bio agents? In the Philippines, JI was denied a safe haven for too long. After JI embarked on a program to develop chem-bio weapons in early 2001, JI was steadfastly hunted. Contrary to public perception and media reporting, JI was under constant pressure from the armed forces of the Philippines. JI did not have an uninterrupted environment conducive to embark on chem-bio research. Although JI survived, its operatives had no comfortable safe haven for long. JI members were killed or captured and JI goods and funds were seized.

As JI led from the front, among those arrested were leaders, often the masterminds of the organization. They included Nasir Abbas, the founder-leader of Mantiqi III, Zulkifli, the leader of Mantiqi III, and Taufiq Rifqi, the deputy leader of Mantiqi III. These arrests gravely damaged JI and constrained programs that required financial resources, specialist materiel like chemicals, and access to strategic assets like scientists. Although a determined group, JI could not overcome the logical burden critical to both manufacturing and dispersing an agent.51

Due to the Indonesian pressure on JI, the group was incapable of investing in developing a chem-bio program on Indonesian soil. Although a few JI members expressed an interest, there was no sustained interest, structure, or resources to build such a program. There is neither intelligence nor evidence indicating any capability on the part of JI in Indonesia to manufacture chem-bio weapons. In Eastern Malaysia, too, the environment is not conducive either for JI or its associated D1 faction to move in this direction. Southern Philippines remained the only location in Southeast Asia where JI was able to develop a rudimentary program to develop chem-bio agents.

4. Countering the Chem-Bio Threat

Turning to what can be done to mitigate the threat, as long as regional governments are able and willing to infiltrate agents into JI and its associated groups and periodically arrest its leaders, members, and supporters, the threat can be managed. Both intelligence operations to

51 It is inappropriate to discuss the agents JI is most likely to acquire, develop or use.
penetrate or recruit, as well as operational counterterrorism efforts aimed at disrupting, killing and capturing operatives, were useful initiatives. More than intelligence, the debriefings, especially of leaders (for example, Zulkifli’s arrest in Malaysia), as well as raids of JI hideouts and recoveries of documents (for example, the JI manual and JI report on the failed project to build a chemical lab) helped to develop a more complete picture of the unconventional threats. However, if the case officers are better trained, briefed, and guided to elicit information on the CBRN threat, it is likely that the quantity and quality of intelligence on the unconventional threat will increase.

Concerning the CBRN threat, it was paramount for governments to work together and counterterrorism intelligence units across countries to communicate with each other. There was very little information sharing or interest on the part of the response community to better understand the threat. With the exception of the Japanese counterterrorism leaders who took the initiative to hold meetings in Tokyo and Kula Lumpur in 2005 and 2006, few efforts were aimed at promoting cooperation in the CBRN arena in Southeast Asia. In collaboration with the 5th SISPAT conference, Singapore’s Special Operations Community hosted an operational CBRN conference in November 2006.

Both within the scientific and the intelligence community, there should be greater interest and investment in examining the evolving CBRN threat. To accurately map the CBRN trajectory in Southeast Asia, both intelligence specialists and scientists must work together. To spur interest, those who have the intelligence must share it with the wider law enforcement and response community, including military, medical and health professionals, and other emergency response workers. To guide the research, it is necessary for the intelligence community to share their findings with the scientific community. Research without understanding the threat is not of immediate value to mitigate the extant and emerging chem-bio threat. To date, most of the research has not been threat-driven but fear-driven.

The international response to Al Qaeda, its associated groups and affiliated cells has reduced the immediate threat of a CBRN attack. Nonetheless, the intentions of the Global Jihad movement to use unconventional weapons have not diminished since 9/11. Disparate groups and cells that are ideologically or operationally linked to Al Qaeda are increasingly interested in operating in the CBRN domain. In Asia, the trend is not markedly different. Increasingly, South Asia and Southeast Asia is becoming an important hub for global terrorism, including in the research, development and acquisition of CBRN agents. Wherever there is an area under terrorist control or influence, terrorists are likely to invest in developing unconventional capabilities. In the post 9/11 environment, the Federally Administered Tribal Area (FATA) in Pakistan and Mindanao in the Philippines have emerged as two zones for CBRN research and development. The capabilities are rudimentary, but with significant investment and time, they are likely to grow.

APPENDIX VIII

Reflections on the Implications of Terrorism Campaigns

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1 INTRODUCTION

In November 2006, the Director General of the British Security Service MI 5, Dame Elizabeth Manningham-Buller, described the evolving WMD terrorism threat: “Tomorrow’s threat may include the use of chemicals, bacteriological agents, radioactive materials and even nuclear technology... It is a sustained campaign, not a series of isolated incidents. It aims to wear down our will to resist.” Dame Manningham-Buller’s discussion of the prospects of terrorist use of chemical, biological, radiological, or nuclear (WMD) weapons as well as terrorism’s characteristic form as one of campaigns, that is, multiple, related attacks occurring over time and, possibly across a geographically dispersed area, rather than one-off single attacks highlights a dimension of the evolving WMD terrorism challenge that has received less attention than it deserves. Since 9/11, U.S. government officials have demonstrated an increased awareness of the threat of terrorist WMD acquisition and use, resulting in substantial efforts to improve the nation’s ability to respond to and mitigate the effects of these attacks. Government at all levels -- federal, state, and local -- as well as non-government entities have expended enormous amounts of time and money in response planning and bolstering response capacity. Yet, response planning has too often revolved around response to a terrorism incident - a terrorist’s single use of a WMD weapon. Planning and capacity building efforts have given less attention to the possibility of a series of interconnected incidents in the form of a terrorism campaign.

Moreover, government and non-government planning for dealing with a terrorist WMD attack has assumed that both the incident and the response will progress in a linear fashion - moving from prevention to crisis management, to consequence management, to post incident recovery. This concept of a neatly phased progression could prove to be untenable in the face of a WMD terrorism campaign involving a series of attacks, separated temporally and spatially. Under campaign circumstances, prevention, crisis management, consequence management, and recovery will likely need to take place concurrently.

Addressing the issue of WMD terrorist campaigns is important because, even at lower levels, terrorist campaigns with unconventional weapons pose questions not confronted in a campaign waged with bombs and bullets. WMD terrorist campaigns, for example, create additional requirements related to public health, such as the question of whether to quarantine a population. They foster more demands for medical treatments whose supplies are limited. They impose more intense mitigation challenges such as decontamination, not just of specific locales, but potentially of widespread geographic areas. They can create unique jurisdictional issues, especially if the attack involves a biological agent that causes a disease that passes across state or national boundaries. Also, because the consequences of such attacks are unfamiliar, they reflect a different political psychology and decision process for both the U.S.
government and the public. Thus, policy makers confronting a WMD campaign must address a number of tough issues that relate to developing appropriate preparedness and response requirements, making difficult tradeoffs regarding the allocation of limited resources, reconciling competing political and economic interests, promoting international cooperation, and reassuring publics. Answers to these questions that might be suitable for dealing effectively with a single incident or a bombs and bullets campaign are likely to fall short in addressing WMD campaigns because of the additional responses they require which are both unfamiliar and more complex. This essay addresses these challenges.

2. Definitions and Distinctions

Webster’s Dictionary defines a campaign as “a connected series of operations designed to bring about a particular result.” The important characteristics of a terrorist WMD campaign, then, are that the operations or attacks are related, rather than a random set of events that happen to use the same materials; they are goal-oriented, intended to work together to achieve a specific set of outcomes.

Three key variables will shape a terrorist WMD campaign: time, geographic scope, and weapons used. The time associated with a WMD campaign has three dimensions: duration, frequency, and the location of the attack on the timeline. Any terrorist campaign is initiated with the intention of it lasting for as long as it takes for the terrorists to achieve their objectives. Historically, some terrorist campaigns, such as those of the Basque Euskadi Ta Askatasuna (ETA – “Basque Homeland and Freedom”) or the Irish Republican Army (IRA), have lasted for decades. The factors determining the length of any terrorist campaign are many, but two that have received prominent attention in the literature are the effectiveness of the response (in terms of both the ability to shut down the operations and the resilience of the popular response) and the emergence of an acceptable alternative to achieving the terrorists goal, such as a legitimate political pathway to advocate change.¹

The second time dimension is the frequency of attacks. Obviously attacks can range from frequent, indeed simultaneous, to temporally widely spaced, as was the Unabomber’s efforts. Just one set of simultaneous attacks does not qualify as a campaign, however, as the concept generally involves some lapse of time between related events. The third temporal dimension relates to where the attack sits on a campaign timeline. Responses to attacks that occur if the campaign has been ongoing for some time are likely to be quite different than those at the outset of a campaign because the amount of information to responders will be different, the levels of available resources will change, and the terrorists themselves could adapt their tactics in light of earlier responses.

In terms of geographic scope, a campaign can be localized or spread over a wide area. An important dimension of terrorism today is its global reach, so the potential exists for the targets of single terrorist WMD campaign to be in more than one part of the world.

A third factor that characterizes a WMD campaign is the nature of the weapons used. Again the potential range is quite broad, from one kind of weapon exploiting a single agent (e.g., a short-range missile with sarin or a crop duster airplane with anthrax) to a variety of weapons with multiple payloads (e.g., a radiological weapon followed by a biological weapon with plague and anthrax). It is important to recognize that terrorist use of a nuclear weapon, even one of small yield, is sui generis in terms of the catastrophic consequences that would result. In addition, a terrorist group is unlikely to have more than a single nuclear weapon because of the difficulty for any non-state group, regardless of how well funded and technically competent, would encounter either in making the necessary weapons-grade material or acquiring multiple weapons through other means such as theft or purchase. By definition, use of only one weapon makes a “nuclear campaign” impossible.

For the other components of the WMD contingency, however, while catastrophic levels of casualties may be possible, they are not easy to achieve. The example of biological weapons provides a particularly good illustration of reasons this is the case. The first is the technical challenge. In the biological case the ways in which a terrorist group or individual can produce catastrophic levels of casualties is limited (although as science and technology and their commercialization advance, they are likely to increase); those that do exist are technically difficult. On the other hand, the technical means for producing a low to mid-range bioterrorism incident are more numerous, less technically challenging, and fit better perhaps with the motivations and constraints of terrorists. As the number of casualties desired decreases, the number of viable options available to the terrorist goes up, thereby increasing the probability that such an attack might occur.

Moreover, unlike chemical, radiological, or nuclear attacks, biological attacks can go undetected for days or even weeks while victims disperse geographically; if a contagious agent has been used, the impacts of those attacks would continue to grow in scope and scale. Furthermore, because bioterrorism agents often produce similar clinical characteristics in their victims, for example “flu-like symptoms,” it is unlikely to be immediately known whether one agent or a “cocktail” of agents was released. These characteristics of a biological weapon (BW) attack make it difficult to determine whether a single attack or multiple attacks have occurred, complicating the response for decision makers.

3. WMD TERRORISM CAMPAIGNS: ISSUES AND CONSIDERATIONS

3.1 Amplifying the Impact of a “Tactic of the Weak”

Why think about terrorism campaigns? Because terrorists do. Indeed, it is hard to identify a specific act of terrorism that has been a single stand-alone incident rather than part of a broader set of orchestrated events. Terrorism is understood as a tactic of the weak, and terrorist leaders seem to understand that single acts will have limited impact both because of the circumscribed physical damage a single act can produce and the resilience of a population in its response. Even the level of fatalities and injuries on 9/11 and the physical destruction of the Twin Towers, as horrific as those tragedies were, did not produce a collapse of U.S. society, governing, financial, security, or other institutions, or infrastructures.

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2 This is true for individuals just as much as groups, as demonstrated by the “campaigns” of the ABC Bomber and the Unabomber.
Terrorists wage campaigns then, to generate outcomes that, in their cumulative effects, cannot be produced by single events. Their goal is at least three-fold:

- To change facts on the ground through ongoing destruction, hopefully making life for the targets increasingly difficult;
- To generate new political and social dynamics in the target to force accommodation with a seemingly unending sequence of violence; and perhaps most importantly,
- To alter the adversary's psychological state by eroding his willingness to engage in a prolonged confrontation involving the use of violence,³ both through fear and anxiety fostered by anticipating the next blow and through exhausting his resources.

As Dame Manningham-Buller put it, the aim is “to wear down our will to resist.”

It is useful to think about the WMD threat as a continuum in which a hoax and/or small scale, low-impact event stand at one end of the continuum and a catastrophic event is at the other (See Figure VIII-1). The plausible “threat envelope,” however, that is, those contingencies with a higher probability of occurring against which most planning efforts should be directed, rest at the lower end of the spectrum.

Those lower-level cases, however, are also ones that may lend themselves best to campaign contingencies. For example, a terrorist may be capable of producing a BW agent but only in small quantities. He may choose, therefore, to use that agent sparingly to carry out multiple events. Similarly, a terrorist may be able to produce low-grade agent of multiple types – anthrax, botulinum toxin, tularemia, etc. - but does not possess the technical capability to make them of a quality high enough to kill people in large numbers. In such scenarios the terrorist may choose to use small amounts of agent or one particular agent at a time in a series of attacks, producing low casualties but considerable uncertainty and fear about what might come next.

One should not totally discount the notion that some terrorists may not even be interested in producing mass casualties through WMD use, but might seek to achieve other goals in

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exploiting such capabilities in a campaign. These goals might include WMD use to heighten a group’s visibility, to demonstrate its prowess so as to enhance its stature with both its supporters and its adversaries, or to cause significant economic or other types of disruption while minimizing “collateral damage” so as not to alienate those from whom it is seeking support. Examples of such campaigns might include biological attacks against the U.S. agricultural sector, or sustained use of chemical weapons against shipping in transit in a highly congested maritime area such as the Straits of Malacca. In both cases, human casualties could be very limited, but the accumulating economic, psychological, and, hence, political impact could be significant.

The “Amerithrax” case of the autumn of 2001 provides interesting insights into the impact of non-mass casualty WMD campaigns, even if that was not the perpetrator(s) intent. The U.S. anthrax mailings came within weeks of the World Trade Center and Pentagon attacks, leading most people initially to assume that al Qaeda was escalating its attacks and could employ biological weapons (BW) and possibly other WMD weapons against the United States. Such speculation amplified the sense of threat and sent ripples of fear throughout the country, prompting many to overreact beyond the real risks posed by the anthrax letters. The mailings to news organizations in Florida and New York and to the U.S. Senate were relatively small-scale, isolated incidents that would have only put several dozen people in harm’s way had it not been for contamination of the postal facilities from which the letters were processed, which fostered the perception of a greater number of people at risk. Whether or not the perpetrator(s) intended to produce this amplifying effect, it happened, and it terrorized the U.S. population to the extent that many were unsure whether routine postal service would put them in danger. Furthermore, the anthrax letter that contaminated Senator Daschle’s office rendered some Senate offices unusable for months while the Washington, DC-based Brentwood postal facility was closed for nearly a year and a half because of fears of secondary exposure and the need to decontaminate the building.

The amplifying impact of a terrorism campaign could be increased by hoaxes and false alarms. History argues that both phenomena are almost certain to accompany an attack, particularly one using biological or chemical materials. In the months following the Amerithrax mailings, for example, the participants in the U.S. Laboratory Response Network had to analyze more than 100,000 samples of “white powder” and other substances, overloading their capabilities. It is not hard to imagine the amplifying affect that could have been produced had the perpetrators combined the mailing of real anthrax letters to individual Senators with hoax letters sent to other Senators over a period of weeks. Not only would such a tactic have produced widespread fear and insecurity among Congressional staff and other federal employees, but a major branch of the federal government would have been even more disrupted than it was. Even the letters that were sent effectively shut down Senate business for a period while sampling and diagnostics were performed, antibiotics administered, and offices certified safe for work.

3.2 Coping with Uncertainty

The dangers of not knowing if one confronts a campaign could be significant. If the perpetrator(s) of the autumn 2001 attacks are not identified and captured, for example, any other terrorist use of anthrax will immediately raise questions about whether the new event(s) are linked to those attacks and whether “resumption” of using this tactic foreshadows more
attacks to come. While it may be suggestive, a single data point does not make a trend, and it is virtually impossible to predict that a single terrorist attack constitutes the onset of a campaign. It is only as the campaign progresses that uncertainty may be dispelled, perhaps quickly, perhaps slowly, but perhaps not at all. Even the public statements of a terrorist group announcing the launch of a campaign need not provide definitive proof that such a campaign will actually be conducted. Yet, it is at the onset of a campaign that decisive action may have its greatest impact.

Two factors in particular signal that a campaign is underway: repetitiveness and signature attacks. Each one, however, is problematic in removing uncertainty. If a series of similar attacks were conducted in the same geographic area over a short period of time, decision makers will confront the likelihood that a campaign has begun. But the time that elapses between attacks in a campaign could be quite lengthy, as was the case of the Unabomber whose campaign extended for more than a decade and who could be a for-runner of the type of next generation “loner” discussed in earlier parts of this report. Indeed, some terrorists may take a long view, not feeling a sense of urgency to conduct more attacks at specific intervals. They may be in no rush and extend the temporal gaps between attacks. Some commentators suggest this was the view of the al Qaeda leadership in its formative and early operational periods before it evolved into a looser network that now “franchises” to self-contained cells. In that view, al Qaeda saw its continuing pressure through attacks on various targets as fostering the unraveling of its adversaries in the West, but it spaced its major attacks sufficiently far apart to try to ensure they were effectively planned and conducted.

Use of the same agent in the same way, or more generally the use of a “signature” method of attack could be another indicator of a campaign. The recent attacks in Iraq using chlorine and explosives in suicide truck bombs provide an example of a similarity in mode of attack that leaves little doubt that something other than a “one off” attack is underway. The Unabomber’s devices, while delivered at widely spaced points in time, also so resembled one another that the conclusion could be drawn that they were the work of the same party.

Should a series of attacks involve multiple agents, however, such as first anthrax and then plague, uncertainty as to the nature of the terrorists’ action could be much greater. Uncertainty will also remain regarding whether subsequent attacks will occur and where and what agents will be used. Likewise, if a terrorist employs a strategy of gradual escalation whereby the first attack is small and subsequent attacks gradually escalate in terms of casualties or other consequences, considerable uncertainty might exist regarding when the terrorist’s technical capabilities might reach their limits. Is the current attack the worst case? Or can the terrorist continue to escalate their use of the weapons with even deadlier attacks? Will the next one be the “big one?”

Uncertainty will be further magnified by ever-present hoaxes, possible copycats, and by a jump in false alarms that will result from more sensitive monitoring by government, intelligence, and other officials. Improved forensics and attribution capabilities, however, may help distinguish the work of the “campaigners” from those incidents perpetrated by others, particularly if technical and other details of an attack are not made public.

Uncertainty about the scale and intensity of a WMD terrorism campaign, or perhaps even its existence, is important because the inability to determine how much more pain is yet to be
felt could fuel significant debates at all levels of government and elsewhere, particularly regarding whether and how limited resources should be deployed. Lacking any additional information, allocating available resources to deal with a single attack is likely to be considered a rather straightforward exercise. The belief that a new incident is part of a series of attacks whose geographic scope, level of destructiveness, and frequency cannot be determined, however, is likely to generate demands by government leaders, officials with preparedness responsibilities, and the public at large beyond the immediate locale of that attack for resources, such as medical supplies. Everyone will want some form of protection and some means to ameliorate the impact of an attack should it occur in their area of responsibility. This level of demand would rapidly run up against the reality that protective measures, supplies, and other needs are insufficient to meet demand. An emotional debate about “equity” is then likely to ensue among both officials and the general public. This is likely to be as true at the international level as it is on the national level, as a number of official and unofficial exercises involving terrorist campaigns have suggested.

3.3 Managing an Action-Reaction Cycle

The history of terrorism reveals that many of the specific dynamics of a given campaign are shaped by the way governments react to it. Indeed, many campaigns are intended to provoke a series of reactions from the governmental adversary that change the political, social, and psychological milieu in the terrorists’ favor. The goal is to induce responses that are seen as excessive and thus discredited. The accumulation of effects from governmental responses is one component of the overall cumulative impact that campaigns are intended to produce.

Although WMD terrorist campaigns will not resemble conventional ones in all respects, conventional experience can shed some light on particular issues in WMD campaigns, such as the one being considered here of the importance of the character of a government’s response. In response to suicide bombings, for example, Israeli authorities closed off the Occupied Territories to stop the flow of goods and people in an effort to prevent further bombings. Some Israelis also saw the exclusion as a way to break the will of Palestinians. At first this tactic proved successful as Palestinians spoke out against the use of suicide bombings against Israel. Israel’s repeated employment of this tactic, however, fostered a change in Palestinian public opinion; the view evolved that if the Israelis were going to make Palestinian life miserable then they would reciprocate. The outcome was that suicide bombings became legitimized, partly as a result of Israel’s response.4

The British experience with the IRA demonstrates how this action-reaction cycle during a campaign can be managed. The IRA sought to justify its violence as a fight against a much larger and more powerful aggressor perpetrating violence on a beleaguered and endangered minority community. Neither the British nor the IRA, however, ruled out a political solution as a potential settlement, and neither wanted to risk eliminating this option by fostering an unacceptable level of violence. What emerged was a delicate balance in which the IRA carried out relatively small-scale bombings, for which they provided forewarning, but without crossing the threshold that would elicit an all-out British response. The strategy of the British, on the other hand, was not to seek to destroy the IRA (because this was impossible),

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4 It was also due, in part, to Palestinian leaders shaping public opinion through constant public discourse over the role of suicide bombings in the struggle.
but to shape the IRA’s behavior and guide it into more acceptable actions such as political negotiation.

In the face of terrorism campaigns involving WMD weapons it would likely be more difficult to achieve this kind of calibrated action-reaction dynamic, if only because of the public response to such use, especially in the early stages of a campaign. If the argument is correct, however, that WMD campaigns are more likely to involve attacks that produce limited rather than mass or catastrophic levels of casualties, then such calibration might still be possible. Achieving that, however, requires both a reasonable level of capabilities to ameliorate the consequences of a specific attack and, perhaps more importantly, an effective public information effort aimed at shaping a well-informed and resilient public response (which is discussed in more detail below).

Some terrorists, however, may not be interested in engaging its adversary in such a calibrated back-and-forth, and will seek to use WMD weapons to multiply destruction and intensify various forms of pressure. Government reactions in these cases are still important. In particular, the terrorists will be paying attention to the government’s response in order to learn either what the government might be doing well so that they can devise a “workaround” for subsequent attacks or to exploit what the government does poorly.

3.4 Innovation, Adaptation, and Learning

Terrorists who have successfully waged campaigns of some duration are those who have exploited their ability to learn and adapt. Historically, however, these groups are not ones committed to apocalyptic violence. This phenomenon may further suggest that WMD terrorism campaigns will have limits on the casualties or other objectives they seek. The innovation, learning, and adaptation that characterize more successful terrorism groups, however, do pose some difficult dilemmas in the context of WMD campaigns.

Al Qaeda materials found in caves in Afghanistan suggest that its leadership and technical experts had a rather unsophisticated understanding of unconventional weapons capabilities. The combination of rapidly advancing science and technology in fields relevant to WMD capabilities and the global diffusion of such knowledge that is bringing such information into the hands of more and more people in more and more places means that, with proper recruitment, that level of understanding could likely increase.

The scenario of a terrorist group “learning” over time and improving on each subsequent attack until gradually it can and does conduct attacks that generate large-scale consequences is especially challenging. We may be witnessing such a “learning” scenario in Iraq with respect to the chlorine devices. The terrorists appear to have been experimenting with various configurations in order to maximize lethal effect. This does not appear to be a case of terrorists just taking advantage of an opportunity, but one of individuals – whose level of experience cannot be determined but which appears to have improved – using the civilian population as a test target to work the bugs out of what might become a fairly effective weapons system.

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6 Hand-written lists of biological agents, for example, included names for agents that are no longer in use, suggesting that they were drawn from out-of-date textbooks.
The Iraq experiences also suggest, however, that such a scenario is not something that is likely to emerge overnight, but is only likely to evolve over time. In the limited time frame within which the chlorine bomb attacks occurred, the perpetrators seemed to have advanced technically, but their impact remain limited in terms of the death and destruction caused. That time during which terrorists learn and adapt must be exploited, then, in terms of both bolstering preventive and preparedness measures to improve response capabilities and seeking to disrupt the terrorists’ learning cycle.

4. WMD TERRORISM CAMPAIGNS: IMPLICATIONS

4.1 Implications for Multiple Interests

WMD terrorism campaigns promise to engage multiple actors with varying interests that have not been involved previously, at least not to the same extent or in the same way. These include federal, state, and local government interests, U.S. interests abroad, the interests of the private sector, and the interests of allies and foes. These interests are sometimes consistent and sometimes competitive. Although many commentators note that a terrorist attack can bring a country together, in an environment in which multiple attacks occur against different sectors with different interests or in different geographical areas, decision makers will confront growing difficulties in balancing these potentially competing interests. Among the many interests that may conflict along one or more divides during a WMD terrorism campaign are the following:

- Federal versus state versus local interests;
- National versus international interests;
- Private sector versus government interests;
- Agricultural versus industrial interests;
- The interests of people in areas that are under quarantine versus those that are not;
- The interests of people in areas with national significance – New York City or Washington, DC – versus those that do not have national significance – e.g., Omaha, Nebraska or Sioux Falls, South Dakota;
- The interests of sectors with national significance – banking and finance or agriculture – versus those that do not have national significance – e.g., local small business owners; and
- The interests of people in areas that have been attacked first versus those in areas that have not yet been attacked (and may never be).

Under the strain of a WMD terrorism campaign all interests may not be treated equally. In fact, with limited response resources in such areas as detection, medical treatment, or decontamination, many difficult tradeoffs about who gets what and how much will have to be made. Some of these decisions will not be well received by those who feel that more could and should be done to protect their interests. Areas that are first to be attacked, for example, could receive the “lion’s share” of resources as policy makers scramble to deal with the crisis at hand and use every tool available to minimize the damage. If this happens, areas attacked later will be left to respond to attacks with whatever resources remain. A similar situation could arise regarding quarantine in which areas attacked early in a biological campaign are
The interest of private sector entities may conflict with government interests and with other parts of the private sector. For example, if shopping malls across the country were targeted at the same time as brokerage houses, or if private sector buildings are targeted at the same time that federal buildings are hit, who should get priority for decontamination capabilities which are certain to be inadequate to meet everyone’s needs? Would continuity of government receive a higher priority than ensuring the resumption of business? Meanwhile, the law enforcement community will be reluctant to decontaminate any facilities too quickly for fear of destroying evidence that may be useful at later stages of an investigation. Squaring these interests in the middle of a crisis will not be easy.

A tabletop exercise conducted by a private policy research organization involving just this scenario highlighted these important, but unexpected and, perhaps surprising issues. During the exercise, in the wake of a series of biological attacks around the country, players representing state and even regional officials put increased political pressure on their members of Congress to influence executive branch decision making to ensure that their areas receive their “fair” portion of available resources, creating a divide between executive and legislative branch officials during a time of crisis. Another scenario involved a west coast metropolitan area as the victim of a small-to-medium-scale bioterrorist attack to which were deployed many if not all available federal assets, including components of the Strategic National Stockpile. Subsequently, over the next several weeks, additional attacks occurred elsewhere, thus placing enormous strain on resources such as the National Stockpile. The exercise generated a number of questions for the participants: How would the federal government respond in such a situation? How much does it deploy to the site of the initial attack and how much should it hold in reserve as a hedge against subsequent attacks elsewhere? Or will it deploy everything it has to the site of the initial attack and then just hope for the best and try to “make do” with whatever it can if additional attacks occur? Neither the exercise organizers nor the participants had anticipated the priority that such questions would receive during the play or the intensity of the debate the attempt to provide answers would engender.

The prospect that competing interests can create tensions and debates over resource allocations and other decisions during a WMD terrorism campaign is an important factor to appreciate. Such tensions and disputes could lead to slower responses that diminish their effectiveness. They could result in resources being misapplied for political reasons rather than as the result of needs-based logic or clear priorities established through rigorous planning. These disagreements may also impede the restoration process as public confidence wanes, resentment lingers, and disputes continue unresolved.

The United States has not yet had to confront a terrorist WMD campaign, and it is impossible to predict with certainty just how people will respond. Moreover, the lessons learned from exercises of the kind mentioned above must be handled with care and not treated as if they were revealed truth. But, such efforts do raise questions about which planners and policy makers should be concerned. Further, some experience, albeit not related to terrorism, further suggests that attention be paid to such issues. Hurricane Katrina provides one example. Decision makers - government and non-government alike - were quick to point a finger at others as responsible for the disaster, creating a residue of ill feeling.
that has still not subsided. Moreover, two years after the tragedy, tension and resentment continue to exist among people in Mississippi who perceive that Louisiana, and New Orleans in particular, received better treatment in terms of the resources, priority, and commitment they received at Mississippi’s expense.

4.2 **Political Implications**

The implications of a WMD campaign for the polity are potentially enormous, particularly with respect to public confidence in government at all levels – federal, state, and local. By definition, a WMD terrorism “campaign” will not necessarily have a clear end in sight. The government’s capture of perpetrator(s) associated with one incident is no guarantee that all the perpetrator(s) are caught and that some still at large will continue the campaign at some point in the future. In the case that the government is unable to halt the WMD terrorist campaign – whether or not the perpetrator(s) are captured – the loss of public confidence in the government could be significant. Diminished trust in government spokespersons could lead people to take ill-advised actions or dismiss useful advice about emergency responses. Some of the political divisions that may arise could impair decision-making. Regional political tensions could arise over how resources are allocated, for example, as multiple events unfold, producing less regional cooperation in complex response situations. Or disputes could slow down decision making when timely action is critical.

4.3 **Economic Implications**

The economy and trading activities will almost certainly be affected by a WMD terrorism campaign, particularly given that today’s economy is influenced by increased globalization and a need for just-in-time supply and production. Hospitals, manufacturing, construction, repair, food service and many others sectors are dependent on just-in-time business models – the regular delivery of goods by vendors – to maintain a regular business flow. When one link in the chain breaks, it disturbs the downstream flow and other associated businesses. A series of WMD attacks could significantly disrupt business operations, especially if multiple but related business sectors are targeted, creating a ripple effect across the economy. A concerted campaign against entities that supply and are dependent on the automobile industry may be one example. Moreover, if the objective of a terrorist is to disrupt the U.S. economy, there is no reason to believe that he will target a single sector. A concerted campaign over time against multiple sectors is a more likely possibility.

Likewise, in the face of a WMD campaign, finance activities could be negatively impacted as well as investor confidence. Because of the uncertainty surrounding a campaign, particularly regarding the next target, the finance sector could become hesitant to invest in anything other than the safest options. The good news is that after September 11th $7 trillion was taken off the market overnight but the market did not collapse. The Japanese market did not disintegrate as a result of the sarin attacks. Similarly, the 2001 anthrax attacks did not come even close to crippling the economy, although there was a discernable negative impact on markets because of the attacks. A campaign of WMD attacks would likely magnify this impact.

Some sectors of the economy are especially vulnerable to a WMD campaign. Agriculture, for example, traditionally accounts for about 15 percent of the U.S. Gross Domestic Product. A biological attack against high concentrations of livestock and poultry that are susceptible to
contagious animal disease such as foot-and-mouth disease (FMD) or avian influenza could have a devastating effect. Previous FMD outbreaks in the United Kingdom and Taiwan illustrate the enormous economic impact of an infectious disease outbreak in livestock. A WMD terrorism campaign against the agricultural sector could put the U.S. portion of the international agricultural market in jeopardy indefinitely, especially if it targeted multiple products.

Once again, potentially conflicting interests could emerge. Should a WMD terrorism campaign target both human and animal populations, for example, the President may face a dilemma in having to justify efforts to control an animal outbreak while also pursuing efforts to control a human outbreak, particularly if the latter efforts have not yet achieved the desired results. As with other issues, a legislative-executive divide as well as federal, state, and local differences could emerge. Governors from both farm and non-farm states will be calling their senators and representatives to have their interests safeguarded.

Another vulnerable economic sector is the biotechnology industry. Another tabletop exercise convened by a private policy research center involved the deliberate release by a terrorist of a BW agent near a biotechnology firm. The terrorist then publicly suggested that the firm and industry were responsible for the event. In this exercise, these developments severely undermined trust in this sector, eroded capital investment, and risked the collapse of the businesses involved. The impact could be even more widespread, threatening the stability of an industry that is increasingly seen as key to providing improvements in health, environment, agriculture and other areas bearing on the quality of life. It could also put pressure on the underlying scientific research. If the negative pressure were strong enough - and the public’s view of biotechnology and the related scientific research is already fragile as a consequence of debates over genetically modified food and the use of stem cells - it could lead to funding cuts that impede important scientific breakthroughs.

4.4 International Implications

Besides the economic aspects, a series of WMD terrorist incidents aimed at the United States will generate significant international political implications that may result in conflicts of interest. First, in the case of a bioterrorism incident, particularly if it is contagious, other countries and the World Health Organization (WHO) would need to take measures to prevent the spread of the outbreak internationally. This could mean restrictions on trade and travel originating in the United States, fostering potentially significant impacts on the U.S. economy. The outbreak of Severe Acute Respiratory Syndrome (SARS) is an example of how an infectious disease outbreak can quickly become an international issue and impact trade and travel. A disease with transmissibility and contagiousness characteristics similar to SARS that is deliberately introduced could have similar health, economic, and political impacts.

Another international implication relates to the question of how effectively governments and other actors involved in a crisis will communicate across national boundaries. This is important because good communication is a critical element in any effective response. Using a smallpox outbreak scenario, the 2003 Exercise Global Mercury sponsored by the Global Health Security Action Group, demonstrated the communication challenges that are likely to exist among international crisis managers. Perhaps most importantly, the exercise highlighted that all forms of international communication are likely to be more challenging than had been
anticipated. In this case, despite the fact that many of the participating states were allies with a long history of working together, they were unable to communicate with one another and share the vital information that they had about both what was happening on the ground and what they were planning to do in response. Their communications were so ineffective, that the WHO had to be called in to mediate communications among them.

Beyond communications, international cooperation could suffer from other strains. One is the challenge of distributing or sharing limited medical resources. Understandably, most nation-states will have a predisposition to hoard their medical stockpiles for their own populations rather than sharing with an ally that has been the object of an attack (unless the first nation-state can be certain that it will not be a target). While international cooperation has improved through such efforts as improved coordination of national approaches to dealing with a global influenza pandemic, it is not clear that states share the same set of expectations regarding the burden that international cooperation should bear in the event of a WMD terrorist campaign.

4.5 Psychological Implications

Despite the fact that society is often more resilient than commentators give it credit for, life in a prolonged state of emergency could produce deep stresses. If WMD attacks appear to be part of a campaign that the government is unsuccessful in stopping, an intense debate about making concessions to the terrorists could create additional political rifts. Even if a sense of solidarity prevails early in the campaign, as the campaign progresses this solidarity may give way to a desire to end the attacks through concessions. A special dilemma could emerge if the terrorists are not asking the U.S. government, in particular, to concede anything politically or financially. With nothing to offer, officials will have little assurance to provide the public other than that all efforts are being made to capture the perpetrator(s). Though such a promise may be true, it will do little to calm fear if WMD attacks continue. Growing frustration or desperation could also prompt the infringement of civil liberties or a hunt for supporters, “fellow travelers,” or anyone “disloyal.”

The psychological stress of living in such an environment could also negatively affect people’s individual wellness, their ability to maintain stable relationships, including those with spouses and family, and/ or their ability to carry out their jobs effectively. The psychological impact is uncertain, but what is clear is that the public health requirements of treating a populace living under constant threat of WMD terrorism have not been fully considered. The “worried well” will place a greater burden on the public health and medical systems in addition to those who actually require treatment. With already overwhelmed response capacities, decisions must be made regarding who needs attention and who does not, leading to the inevitability that bad judgment will be used in some instances. Such cases will generate bad publicity and place additional political strain on decision makers.

5. Responding to WMD Campaigns: Risks and Opportunities

Building on the preceding discussion, the following discussion turns to questions related to U.S. responses raised by the contingency of WMD terrorist campaigns. It highlights both some broad response issues as well as a number of specific actions that could be taken. To a considerable extent, the discussion focuses on resources for the following reason: If one is to
address the contingency of WMD “campaigns” one must assume that attacks occur. If attacks occur, the major challenge for policy makers is responding to them, and responses entail, first and foremost, the allocation of resources.

5.1 Risks and Opportunities

After Robert Stevens came down with the first case of anthrax in the fall of 2001, Tommy Thompson, Secretary of the U.S. Department of Health and Human Services, said that it was unlikely that he had contracted the disease from a deliberate release, but that he probably done so while fishing, despite no hard evidence to support the claim and a paucity of such cases in recent experience. In the eyes of many people, as a result of issuing inaccurate information, albeit in an attempt to maintain calm, Secretary Thompson undermined his credibility with the public and thus his ability to manage the crisis from a public health and medical perspective. It was not until some days later that the National Institute’s of Health’s Dr. Anthony Fauci emerged as a credible spokesperson. The destruction of trust and the creation of an environment of fear that can result from such mistakes, as the anthrax case suggests, only plays into the terrorists’ hands.

WMD terrorism campaigns represent both risks and opportunities for those with the responsibility to prevent and prepare for them. The biggest challenges derive from the simple fact that decision makers can make some very damaging mistakes that fuel fear or heighten public skepticism regarding the government’s competence or credibility. In the environment of a WMD campaign, in which the number of attacks is potentially unlimited whereas resources for preventing and mitigating them are finite, decision makers will find themselves in a situation in which they risk committing too many resources to deal with any particular event or too few. Particularly challenging is a strong likelihood that the response to the first event is abundant, leaving fewer resources available for response to subsequent attacks, if they occur. Some resources may be readily replenished. But others cannot be. Shortcomings in U.S. – indeed global – vaccine production capabilities, for example, are well documented. Studies have also identified shortfalls in such critical equipment as respirators or decontaminating units that cannot be met overnight. Dedicating resources to the second, third, fourth and subsequent events with some sense of rationing would seem to make sense, especially as local communities facing later attacks will likely demand that they receive the same resources as did locales that were attacked earlier. At the same time, decisions to keep some resources in reserve as a hedge against possible future contingencies are also likely to be hotly disputed. It is precisely because of the uncertainty over whether a campaign is underway that the kinds of resource allocation issues discussed at length here are likely to arise.

The problem of managing resources in the face of a WMD campaign goes well beyond this issue of the level of resources allocated over time in an environment of uncertainty. First, the allocation issue will be exacerbated by the need to meet unforeseen demands. This is especially the case with respect to financial resources that will be demanded to compensate particularly hard-hit economic sectors. Funds are not reserved, for example, to reimburse farmers whose livestock might have to be slaughtered in the millions to curb an infectious disease outbreak. What kinds of insurance claims will be filed in the event of an attack or as time goes by and the attacks continue in different places? Would the U.S. government be expected to bail out especially hard-hit industrial sectors?
Second, different types of decision makers and consequence managers will confront
diverse resource demands. Local officials will certainly have to meet multiple demands,
adding one on top of the next. In that sense, the demands they will meet are cumulative. For
national officials, however, particularly in such high demand areas as health, law enforcement,
and intelligence, in the face of a campaign, multiple demands will come from multiple areas, in
a sense multiplying the demands not cumulatively but exponentially. These different
demands will create different decision making frameworks and contexts that could also lead to
disagreements. Campaigns will also be personally psychologically taxing on the decision
makers, increasing the risks of mistakes.

Third, international resources will be required. A plethora of government reports,
independent studies, media stories, and other sources conclude that the United States - or any
country - on its own does not have sufficient resources to respond successfully to a sustained
WMD attack. If the campaign is geographically dispersed across a number of countries, the
challenges for resource management and sharing become particularly acute.

Although WMD terrorism campaigns will pose acute challenges, they also create
important opportunities, including, as one study points out, principally those to learn and
adapt, gain the initiative, and exploit mistakes the terrorists make. Seizing the initiative by
attacking the terrorists’ ability both to adopt new tactics and techniques as they become
technically and operationally available and to adapt to the responses of their adversary is
especially important. That adaptation is as much about the way terrorists do business as it is
about the tools they use. Disrupting that adaptive capability, then, includes cutting off
information sources, terminating financing, destroying sanctuaries, and eliminating ‘coalition
partners.’

Another important opportunity will be successfully meeting the chance to demonstrate
that response capabilities and actions can and do get better. Targets of terrorism can adapt as
well, and a campaign will test a nation’s ability to learn. Passing that test is important, not
least because it is a major contributor to public confidence and trust in its leaders. Doing
better each time depends not only on shoring up one’s own vulnerabilities and bolstering
response capabilities and efforts, but more fundamentally on having institutional and
intellectual resources oriented toward and capable of learning and adaptation. Government
institutions and government bureaucrats are not well known for their flexibility, innovation, or
willingness to try new ways of doing business. They must become all of those things if they
are to respond effectively to the increasingly complex, multifaceted, and evolving problem that
WMD terrorist campaigns represent.

The timing and character of a campaign are likely to influence the balance or risk and
opportunity. Risks are likely to dominate in campaigns that unfold with great speed as attacks
will have to be met with available resources over a short period of time and may provide little
or no time to recover between events. In contrast, campaigns that unfold slowly will provide
more opportunities for government to gain the initiative and do better over time. At the same
time, however, slower campaigns are likely to generate more debate about whether and how
long it is necessary to pay the price for preparing for an eventuality that may never come.

7 “Combating the WMD Challenge for the Next 10 Years,” Center for the Study of Weapons of Mass
Some experts feel that interest in funding WMD counter-terrorism efforts has already begun to wane.

5.2 The Importance of Public Information Efforts

Strategic communication has become an intense battleground between terrorists and their adversaries. Terrorist organizations use communication strategies to attract recruits to their cause, win political, moral and other forms of support, and shape the will of its governmental targets and their populations.

Governments increasingly recognize the critical role that good movement of information between intelligence and law enforcement agencies as well as between response communities plays in effectively managing the terrorism threat. Governments also attempt to communicate to terrorists to manipulate their cost-benefits calculations. For example, the U.S. government’s public discourse regarding homeland security-related activities is intended in part to send the message to terrorists that conducting a successful WMD attack is either unlikely to succeed or will produce consequences for the terrorists that they will find to be too high a price to pay.

Communication with the public in the face of a WMD campaign is a particularly critical task. Communicating to the public regarding not just appropriate measures that can be taken to reduce the potential consequences of an attack, but also what appropriate attitudes should be adopted is critical to managing the public’s perceptions before, during, and after an attack to ensure that fear and panic does not complicate and impede the response. Getting and keeping the full range of federal, state, and local officials and experts “on message” is a major challenge. Given that weapons of mass destruction are perceived to be primarily the purview of the federal government, the federal government will probably have to set the main messages. Without a coherent line of argument and explanation from credible government officials, the field will be wide open for wildly divergent assessments, rumors, and “expertise.” Crisis exercises have identified a number of other significant challenges in shaping effective public information efforts. These include:

- Understanding that not all officials have the same degree of credibilty, even those that seem to be in the right bureaucratic “slot”; exercises show, for example, that local officials are deemed more credible when it comes to health-related information.
- Recognizing that telling the “whole truth” may, in fact, not always be helpful, especially in times of uncertainty. This is not to suggest that incorrect information should be provided; honest information is essential for maintaining credibility. Rather, it is to argue that when key information is not available, an “I’ll get back to you on that” might be the best answer.
- Overcoming the reluctance to discuss “taboo” subjects which, if not considered beforehand, could undermine response efforts. Questions such as mass quarantines, the potential for imposing martial law, and health and medical priorities (e.g., who gets immunized and who does not when vaccine supplies are limited) are only some of those kinds of issues.
5.3 **Fostering National Resilience**

Government’s engagement with the public regarding potential terrorist WMD campaigns obviously should extend beyond communications during a crisis or in the immediate aftermath of an attack. Most importantly, perhaps, governments should seek to draw from a concept developed by the British (among others) to emphasize national resilience. Resilience is, of course, more than infrastructure redundancy. It is as much about the psycho-social attitudes of the public in the face of prolonged stress. Although history tells of many occasions in which societies have collapsed in face of continued intense stress, it is also replete with times in which societies confronting tremendous pressure have survived. The London blitz and the history of Israel are only two examples. Resilient societies seem to have been those that manage to cope with loss while keeping or recovering hope. Governments as well as all of the non-government stakeholders involved in successfully dealing with the contingency of WMD terrorist attacks must work continually with publics to ensure both.

6. **Responding to WMD Campaigns: Some Specific Response Capabilities**

Predicting precisely what form a terrorist WMD campaign will take is a non-starter. Rather, the goal should be to be prepared for a wide range of possible contingencies by developing a robust set of critical response capabilities. One set of capabilities focuses on prevention, including measures in such critical areas as law enforcement, intelligence, pathogen security, export controls, and cooperative threat reduction. Necessary preparedness capabilities also span a wide spectrum and include such elements as effective disease surveillance and reporting, health monitoring, quality epidemiology, robust laboratory-based analysis, appropriate diagnostics and medical countermeasures, and sufficient medical stockpiles, among others. A national effort to develop these capabilities also requires a robust research and development agenda and an effective strategy of communication both among policy makers and responders and for the general public, both of which cut across and facilitate the achievement of goals related to both prevention and preparedness.

While identifying the components of an effective response is relatively straightforward, structuring appropriate capabilities in an effective strategic architecture is not easy. It entails the difficult tasks of establishing criteria to determine the appropriate levels of relevant capabilities, balancing a wide set of competing interests, and involving the right set of players. It also requires the management of a number of difficult trade-offs such as emphasizing prevention or preparedness, the relative investments that should be made in people and technology, and the relative importance that should be given to immediate requirements as opposed to longer-term needs.

To facilitate these decisions, government officials and other key decision makers might consider the following concrete steps.

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8 Among its other definitions, “resilience” in materials science relates to the property of withstanding a shock and bouncing back.
6.1 Foster Conceptual Shifts

Developing more effective response capabilities could be facilitated if those addressing the WMD campaign challenge shifted their conceptual approach in at least two ways. First, emphasis should be placed not on threat elimination but risk reduction and mitigation. The possibility of terrorist use of WMD capabilities can never be completely eliminated. In the area of biological weapons, for example, work in the life sciences will continue and should do so for important legitimate reasons, so the potential for misusing the life sciences and related technology and know-how to make biological weapons remains a permanent reality. The objective therefore should not be the unachievable goal of driving the probability of such a contingency to zero, but reducing the risk as low as possible or at least to a level acceptable to society. Identifying that level is, of course, a difficult task and requires an ongoing exchange among key officials, other critical stakeholders, and the public at large.

A risk perspective also introduces the important sense of probability. As was noted earlier, if the terrorist goal in using WMD weapons is catastrophic casualties or widespread disruption, fewer pathways are available to them to achieve that goal and those that do exist are more difficult than those pathways that will produce less significant results. A risk assessment approach would conclude that the degree of risk declines as the level of desired casualties or disruption increases, insofar as it becomes less likely. Such a finding could have important implications for planning and resource allocation decisions. It allows for planning efforts to focus on the “plausible risk envelope,” while hedging against less likely, but more high consequence possibilities.

The second conceptual shift that should be entertained is one from traditional institutional/hierarchical responses to more network-based approaches. Such a shift may be especially important with respect to both disrupting terrorist learning and adaptation and promoting innovation and learning by those who confront them.

Jean-Francois Rischard, the World Bank’s Vice President for Europe, argues that “[t]raditional institutions are incapable of addressing the growing list of complex global issues.” He argues further than changes of the kind fostered by globalization “put existing human institutions (nation states, governments, ministries, international institutions, any large hierarchy)... under massive pressure - and tend to overwhelm them.” Terrorist WMD campaigns certainly represent the kind of complex phenomenon Rischard describes. Rather than relying on stovepiped, top-down measures, efforts should be made to exploit what globalization now makes possible. Princeton University’s Anne-Marie Slaughter points out, “Networked threats require a networked response.” Fostering such a dynamic must be the objective in building relationships among those communities with responsibility for managing the risks associated with WMD terrorism campaigns. Moreover, promoting a disaggregated approach not only accommodates but facilitates the multiple forms of response that are needed - local, national, regional, multilateral, global, formal, and informal.

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Doing so, however, will not be easy. So far, “using networks to fight networks” is a mantra, a slogan without content. One of the most crucial areas in which new thinking is needed is how this networking approach can be operationalized and put into action. The attempt should be made, therefore, to develop new network theory-based analytical and policy tools. Making the challenge even more complicated, however, is that networks must be built on an international basis. The problem is global; the response must be as well.

6.2 Make Better Use of Exercises

Since 9/11 governments at all levels – local, state, national, and international – have conducted myriad exercises to highlight shortcomings in response capabilities and identify measures to fix them. That many of these exercises have been useful cannot be questioned. But questions exist with respect to how they could be improved or focused better to address the challenge of WMD terrorism campaigns.

Three questions in particular should be explored. First, are important exercises addressing WMD campaigns issues? The key U.S. exercises to deal with the prospect of major terrorism contingencies have been the Top Officials (TOPOFF) series. The last two elements in this program, TOPOFF 3 conducted in 2005 and TOPOFF 4 held in October 2007, incorporated multiple terrorist attacks against U.S. targets, but were they conceived in terms of campaigns? The TOPOFF 3 scenario involved a chemical incident in Connecticut and a biological attack in New Jersey, as well as associated exercises in the United Kingdom and Canada. The attacks in this scenario, however, seemed to be random, although simultaneous attacks rather than having those characteristics that would denote a campaign, particularly the related nature of the incidents and their conduct jointly to achieve a specific goal. It appears that the important relational aspect among the incidents was missing. Further, the scenario for TOPOFF 4 involved dirty bomb attacks in Guam, Phoenix, and Portland. While the Portland portion of the play included a full field effort, the exercises in the former two locations, however, were described in press reporting as only tabletop exercises focused on communications.12

In both cases, then, the question can be asked whether these exercises captured the full range of dilemmas and challenges that would confront decision makers at all levels of government in the face of a terrorist WMD campaign. Perhaps they were not designed to do so. If not, a serious gap remains. As this paper has argued, the challenges posed by WMD campaigns constitute unique problems for policy makers and responders, and exercises should be developed that highlight those unique stresses and problems.

Second, are lessons from exercises being learned? The answer to this question is probably “yes, but not widely enough.” On the positive side there is the example that TOPOFF 3 highlighted the unrealized fact that although the president declared a disaster, it proved to be extremely difficult to obtain assistance during a biological event because the relevant law governing such assistance does not cover biological incidents. On the negative side, more than two years after TOPOFF 3 was conducted, the final report on the exercise has not yet been issued but remains “under review.”

12 See, for example, “TOPOFF 4 Exercise Begins in U.S., Guam,” Global Security Newswire, October 17, 2007
Third, have the international dimensions of WMD campaign contingencies been captured? In some cases, exercises conducted by non-government entities, such as Atlantic Storm, have done well in capturing international tensions and dilemmas that would arise in confronting a sustained challenge (although these efforts are not without their shortcomings and their critics). Government-sponsored efforts appear to have done so less well. It is difficult, for example, to find public discussions of the way in which the associated exercises in the United Kingdom and Canada played in TOPOFF 3. Some attention should be given then to designing exercises that capture this international dynamic.

6.3 Leverage Research and Development

Recognition that a terrorist WMD campaign has begun could be critical to an effective response. This analysis has suggested that one means to determine whether this is the case is signature recognition. Are we exploiting research and development efforts sufficiently to foster that recognition? In the biological arena, for example, significant investments are being made in the emerging field of bioforensics, and efforts should be made to ensure that some attention is paid to whether advances there could be applicable to the recognition issue.

6.4 Promote National Dialogue

The preceding discussion has highlighted a number of sensitive political issues about which better understanding – and ultimately more effective responses – could be achieved through a national dialogue among those with a stake in the outcome. Three particularly strong candidates for inclusion in such a dialogue are “taboo” issues such as quarantine, the tensions and problems that will arise as a function of resources allocation dilemmas, and equity, that is, what is “fair” to all the stakeholders in terms of setting priorities for action and ameliorating consequences.

6.5 Bolster Public Resilience

Public intimidation is among most terrorists’ top priorities in conducting any campaign. Campaigns are specifically intended to achieve “social amplification of risk.” Bolstering public resilience, therefore, emerges as one of, if not the key area in successfully countering such campaigns. Many studies have concluded that mass panic, that is, irrational fear leading to the breakdown of normal constraints on social behavior, is less likely than often feared. But a resilient response is not necessarily automatic, and steps can be taken – or avoided – to foster a more resilient public.

In the first instance, resilience entails avoiding what John Steinbruner has called the “societal autoimmune effect,” in which the damage that society does to itself is greater than the damage produced by the terrorists’ action. A public that flees an area, for example, could

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yield greater casualties than one that stays in place. Looting or an increase in other crimes following an incident would only exacerbate the social tensions and the drain on the mechanisms for maintaining public order that will already be stressed by the pressures of a campaign. Given that one goal of a terrorist campaign is often to elicit a government response that cumulatively would be perceived as excessive and therefore illegitimate highlights the need for government’s reaction to be equally sensitive to not worsening the physical or psychological damage produced by an attack. One British commentator following the London bombings made the point succinctly: “The bombs made more than enough victims; it is important that we do not inadvertently create more.”

On the positive side, several studies have shown that public resilience can be enhanced by a number of factors, including preparation, a perception of an ability to cope, and experience of a successful recovery from a past trauma. These traits are fostered through a combination of positive individual perspectives, strong social connectedness developed through the creation of supportive networks, and effective problem solving skills. Lessons from military experience reinforce these findings, showing that soldiers overcome their fear if they have appropriate information, training, and social cohesion.

Disseminating information and leveraging existing social networks, then, are key to shaping public resilience. These requirements, in turn, call for strong government communication efforts. Clearly, these must include direct communication with the public about why and how they should be prepared. But the government should consider going beyond such broad-based efforts. In Israel, the government is already implementing resilience-building programs in the country’s high schools. The U.S. government might also consider more public school-based education, perhaps through a program jointly developed by the Department of Homeland Security and the Department of Education. No one would want a program that could be ridiculed as a contemporary version of the 1950s civil defense program, now associated in the public mind with school children engaged in what would have been futile “duck and cover” exercises. But the centrality of resilience in the effective counter to terrorism campaigns demands that the government do all that it can to build the perspectives, confidence, and social cohesiveness that are key to sustaining a resilient public.

16 Gino Verley, Pieter Maeseele, Isabelle Stevens, and Anne Speckhard, “Resilience in an Age of Terrorism: Psychology, Media and Communication,” prepublication copy, p. 4.
18 Ibid. pp 10-17.