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REGIONAL NUCLEAR DYNAMICS

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HEARING CONTENTS:

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STATEMENT BEFORE THE SENATE ARMED SERVICES SUBCOMMITTEE ON STRATEGIC FORCES ON THE IMPLICATIONS FOR U.S. SECURITY OF GROWING NUCLEAR CAPABILITIES IN THE MIDDLE EAST

By Andrew F. Krepinevich
President
Center for Strategic and Budgetary Assessments

Mr. Chairman, Senator Donnelly, Members of the Committee, thank you for inviting me to appear before you today to present my thoughts on the implications of growing regional nuclear capabilities for U.S. security. As requested, I will focus my remarks on the situation in the Middle East over the next decade. [1]

U.S. SECURITY OBJECTIVES IN THE MIDDLE EAST

The United States arguably has three overriding security objectives in the Middle East. First, we have to eliminate sanctuaries for fanatical cults like ISIS from which they could mount catastrophic attacks against the U.S. homeland in the future. Second, we want to maintain access to the global economy's principal energy source. Third, we want to prevent the spread of nuclear weapons in the region, particularly to Iran, whose hostility to the United States and its partners in the region has persisted over thirty-five years since the Khomeini revolution in 1979.

These objectives cannot be viewed in isolation. For example, should ISIS solidify its gains in the region, it could not only generate an ability to mount larger-scale terrorist attacks beyond the region, but also destabilize local oil and gas producing states.

Armed with nuclear weapons, Iran could prove an even more aggressive supporter of terrorism than it has been to date. Moreover, it could also be emboldened to increase its efforts to subvert the governments of regional U.S. partners. Over time a nuclear-armed Iran could threaten vast devastation to the region's oil and gas economic infrastructure, as well as to U.S. and allied military forces operating in the Middle East. Should Iran

[1] I would like to acknowledge the very helpful research support provided by Sean Cate in the preparation of this testimony.

develop an intercontinental ballistic missile and reduce the size of its nuclear warhead, it could also pose a direct threat to the U.S. homeland.[2]

As I will elaborate upon presently, a nuclear-armed Iran could create a structurally unstable nuclear balance with the region's only current (albeit undeclared) nuclear power, Israel. The balance would likely become even less stable should other states in the region follow Iran's path. With this in mind, my testimony first provides an overview of current Israeli and Iranian capabilities, both in terms of weaponry and delivery systems. Second, it offers some observations on the nuclear doctrine both Israel and Iran might adopt. This is followed by my assessment of the prospective characteristics of a nuclear competition between Israel and Iran, and those of a prospective "n-player" competition should Iran's acquisition of nuclear weapons lead other states in the region to follow suit. My testimony concludes with some thoughts on what this means for the United States, to include the strategic choices we confront.

CURRENT CAPABILITIES AND DOCTRINE[3]

Israel

Motivation, Arsenal and Delivery Systems

Israel began seeking nuclear weapons not long after its formation. As a small country with a small population surrounded by hostile, larger neighbors, Israel's leaders felt they could not count on being able to defeat their enemies in a conventional conflict. Nuclear weapons represented a way to offset a prospective inferiority in conventional forces. The Holocaust also had a substantial impact on the thinking of Israeli leaders of that time (as it still does), and there is a determination that such an abomination should never be allowed to happen again.[4]

Although Israel has been a nuclear power for nearly half a century, it follows a policy of "nuclear opacity." Under this policy, Israel does not admit to having nuclear weapons. As a result, no publically available official statements exist regarding Israel's nuclear doctrine.

Reliable and accurate information about Israel's nuclear arsenal is also difficult to obtain given its highly secretive status. Nevertheless, credible reports generally estimate Israel possesses enough weapons-grade plutonium for one hundred to two hundred nuclear

[2] Of course, there would be nothing to stop the Iranians from delivering a nuclear weapon to a major U.S. port in the hold of a cargo ship, a threat that occasionally worried Cold War era planners. While the shock of an attack such as this would be great, the damage caused by detonating a weapon at or below the surface would be far less than optimal.

[3] Those familiar with Israeli and Iranian capabilities may wish to proceed to the section titled, "Regional Response: Implications of a Nuclear Armed Iran."

[4] Jeffery Goldberg, "The Point of No Return," *The Atlantic,* September, 2010, available at http://www.theatlantic.com/magazine/print/2010/09/the-point-of-no-return/308186/.

warheads. Some estimates place Israel's arsenal as high as three hundred nuclear warheads, composed primarily of two-stage thermonuclear devices.[5]

Most of Israel's nuclear weapons are believed to be in unassembled mode, with "fully functional weapons" capable of being constructed "in a matter of days."[6] Israel is assessed to possess a "triad" of delivery systems that includes nuclear-capable F-16I fighters, road-mobile Jericho ballistic missiles with estimated ranges of 1,800–3,000 miles (depending on the variant),[7] and five German-built diesel-powered Dolphin-class submarines (with one more on order).[8]

Doctrine

Israeli national security decision-makers since the late 1960s have conceived Israel's nuclear arsenal solely as a deterrent against existential threats, and not as war-fighting instruments or means of coercion.[9] Israel's nuclear doctrine likely remains one of "defensive last resort," with procedural safeguards in place to minimize the risk of accidental or unauthorized use.[10]

That said, due to its lack of strategic depth and small population, Israeli military doctrine has emphasized preemption, preventive action, and fighting on enemy territory. How this would translate to nuclear doctrine against a regional power with nuclear weapons remains to be seen. To date the Israeli Defense Force (IDF) has relied on its conventional superiority to defeat its adversaries, with nuclear weapons assuming the role of "weapons of last resort" to be employed only if the country's very existence were at risk. Should Iran acquire nuclear weapons and Israel judge that such capabilities pose an existential threat, the IDF's nuclear forces could assume a substantially greater role in the country's defense planning.

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[5] International Institute for Strategic Studies (IISS), "Analysts: Israel viewed as world's 6th nuclear power," *AFP*, April 10, 2010, available at: http://www.iiss.org/whats-new/iiss-in-the-press/april-2010/israel-viewed-as-worlds-sixth-nuclear-power-analysts/. See also Goldberg, "The Point of No Return."

[6] IISS, "Analysts: Israel viewed as world's 6th nuclear power."

[7] "Jericho 1/2/3 (YA-1/YA-3/YA-4)," in, *Jane's Strategic Weapon Systems* (London: IHS Jane's, 2012); and "Israel Test-Fires Nuclear-Capable Ballistic Missile," *Press TV*, September 8, 2013, available at: http://www.presstv.ir/detail/2013/07/13/313543/israel-test-fires-nuclearcapable-missile/; and "Jericho 1/2/3 (YA-1/YA-3/YA-4)," in, *Jane's Strategic Weapons Systems* (London: IHS Jane's, 2015).

[8] Robert Farley, "Nukes on the High Seas: Israel's Underwater Atomic Arsenal," *The National* Interest, October 9, 2014, p. 1, available at http://nationalinterest.org/feature/nukes-the-high-seas-israels-underwater-atomic-arsenal-11434; and Barbara Opall-Rome, "Israel Inaugurates 5th Dolphin-Class Sub," *Defense News*, April 29, 2013, available at: http://www.defensenews.com/article/20130429/DEFREG04/304290008/Isra-el-Inaugurates-5th-Dolphin-Class-Sub.

[9] Avner Cohen, "Nuclear Arms in Crisis under Secrecy: Israel and the Lessons of the 1967 and 1973 Wars," in Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, eds., *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons* (Ithaca, NY: Cornell University Press, 2000), pp. 123–124.

[10] Avner Cohen and Marvin Miller, "Bringing Israel's Bomb out of the Basement," *Foreign Affairs*, September/October 2010, p. 39.

Command and Control: Authority

Command authority for the use of nuclear weapons almost certainly rests with the prime minister. However, specific lines of authority are not known.[11] One report states "Israel has an elaborate civilian-controlled [command-and-control] C2 system, which requires three layers of approval to be activated."[12] The one instance where there is publically available information on Israeli considerations of nuclear weapons use involves the 1973 Yom Kippur War. The accounts make it clear that the final decision was then Prime Minister Golda Meir's.[13]

Command and Control: Early Warning

Israel has advanced, networked command-and-control systems that are linked by satellite, fiber, and radio communications. Some command-and-control centers, such as the Israeli Air Force's operational command bunker in Tel Aviv, are believed to be hardened to withstand nuclear attack.[14]

Israel has an extensive early warning system that is integrated with its ballistic missile defenses. Its Elta Green Pine early warning and fire control radar for the Arrow anti-missile system can track targets out to 500 km. The U.S.-controlled AN/TPY-2 radar deployed to Israel has a detection range of over 4,500 km against ballistic missiles and can detect a launch from Iran within seconds. However, the U.S. controls this facility and shares the information it provides with Israel at its discretion. The Israeli military does operate its own reconnaissance satellites, some of which may be able to provide early warning, and it has modern airborne early warning and control aircraft.[15]

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[11] Bennett Ramberg, "Wrestling With Nuclear Opacity," *Arms Control Today,* The Arms Control Association, November 4, 2010, available at http://www.armscontrol.org/act/2010_11/BookReview.

[12] Shahram Chubin, *Command and Control in a Nuclear-Armed Iran,* Proliferation Papers No. 45 (Paris: Institut Français des Relations Internationale, 2013), available at http://www.ifri.org/sites/default/files/atoms/files/pp45chubin.pdf.

[13] Jeffrey Lewis, "Israel, Nuclear Weapons and the 1973 Yom Kippur War," *Arms Control Wonk,* October 21, 2013, available at http://lewis.armscontrolwonk.com/archive/6909/israel-nuclear-weapons-and-the-1973-yom-kippur-war.

[14] "Israel: Upgraded Air Force command center can withstand nukes," *I24News*, December 14, 2014, available at http://www.i24news.tv/en/news/israel/diplomacy-defense/54399-141214-israel-new-air-force-command-center-can-withstand-nukes.

[15] "Arrow 2 Theatre Ballistic Missile Defense System, Israel," *Army-Technology,* accessed February 17, 2015 at http://www.army-technology.com/projects/arrow2/arrow23.html; Karl Vick and Aaron J. Klein, "How a U.S. Radar Station in the Negev Affects a Potential Israel-Iran Clash," *Time,* May 30, 2012, available at http://content.time.com/time/world/article/0,8599,2115955,00.html; "CAEW Conformal Airborne Early Warning Aircraft, Israel," *Airforce-Technology*, accessed February 16, 2015 at http://www.airforce-technology.com/projects/caew/; "Israel—Air Force" *Jane's World Air Forces*, IHS Jane's; and Brian Berger, "Israeli Rocket Launches Radar Reconnaissance Satellite," *Space News*, April 10,2014, available at http://spacenews.com/40170israeli-rocket-launches-radar-reconnaissance-satellite/.

Iran

Motivation and Delivery Systems

Iran's rationale for seeking nuclear weapons has several possible elements, none of which preclude the others. One is regime preservation in the face of a hostile superpower in the form of the United States, a nuclear-armed enemy in Israel, Sunni Arab rival states, and a neighbor, Turkey, which aspires to expand its influence in the region. Yet Iran could also seek nuclear weapons to support its revisionist goal of reordering the regional geopolitical order with itself at the head, bolstering the regime's sagging domestic legitimacy. Nuclear weapons could enable Tehran to increase its efforts to coerce other states and to expand its support for proxies with less fear of reprisals.

At least initially, Iranian nuclear weapons are likely to rely on a simple design. Such a device would resemble first-generation implosion devices and have a low yield of around 20 kt (slightly more than the Trinity test shot conducted by the United States on July 16, 1945) and a weight of about 1,000 kg (or 2,200 pounds). [16] According to some estimates, Iran probably has enough low-enriched uranium to make seven such weapons upon further enrichment, and it could enrich enough additional material for one bomb every two months. Should Iran's supreme leader give authorization, it could likely convert sufficient low-enriched uranium to high-enriched uranium and assemble a bomb within a year.[17]

What can be stated with a high degree of confidence is that, in addition to its efforts to produce plutonium and enrich uranium to weapons-grade levels, Iran has also been purchasing or developing and fielding delivery systems that would likely comprise part of an overall nuclear force posture. Principal among these capabilities are its ballistic missiles. It seems unlikely, however, that Iran has the financial means, requisite technology, or sufficient skilled manpower to field, man, and maintain a state-of-the art early warning and command and control network of the kind required to deal effectively with the highly compressed warning times associated with an Israeli ballistic missile nuclear attack.

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[16] "Iran's Nuclear Timetable," *Iran Watch,* December 2, 2014, available at http://www.iranwatch.org/our-publications/articles-reports/irans-nuclear-timetable; and Abdullah Toukan and Anthony Cordesman, *Iran's Nuclear Missile Delivery Capability* (Washington, DC: Center for Strategic and International Studies, 2014), pp. 5, 10.

[17] Based on the calculation that it could produce a 20 kt yield using 16 kg of highly enriched uranium. "Iran's Nuclear Timetable," *Iran Watch;* and Thomas B. Cochran and Christopher E. Paine, *The Amount of Plutonium and Highly-Enriched Uranium Needed for Pure Fission Nuclear Weapons* (Washington, DC: Natural Resources Defense Council Inc., 1995) Table 1, available at https://www.nrdc.org/nuclear/fissionw/fissionweapons.pdf; "Iran's Nuclear Timetable," *Iran Watch;* and Julie Pace, "Obama says Iran at least a year from getting bomb," *The Boston Globe,* October 7, 2013, available at http://www.bostonglobe.com/news/nation/2013/10/07/obama-says-iran-year-more-from-getting-bomb/MNBOHNW4ffkvONE24hRp1L/story.html. Although the last estimate is somewhat dated, it probably reflects the time for Iran to convert its low enriched uranium to highly enriched uranium and weaponize it, rather than any fixed timeline along which Iran may be proceeding.

Based on Tehran's recent and ongoing military efforts, an initial Iranian nuclear force would probably rely heavily on road-mobile ballistic missiles, such as the Shahab 3, as the principal form of delivering nuclear weapons to targets in Israel.[18] At least some of Iran's ballistic missiles are placed in underground silos. Others are kept on transporter/erector launchers (TELs) concealed in caves and bunkers.[19] It is unlikely that Iran has the ability to produce a warhead small enough to fit on a cruise missile. Since Iran's existing missile forces do not appear accurate enough to destroy hardened or buried targets (e.g., missile silos),[20] Tehran's initial nuclear weapons would likely be targeted against "soft" counterforce (e.g., unhardened naval and air bases) and especially countervalue (e.g., population and economic infrastructure) targets. It would also appear likely that, at least initially, Israel would be the primary and perhaps exclusive target of Iran's nuclear forces, although targets in Saudi Arabia and other Gulf states, as well as U.S. military bases in the region could also be placed at risk.

Doctrine

Given Tehran's repeated declarations that it is not developing nuclear weapons, there is nothing in the public domain in the way of an official statement as to what its nuclear doctrine might be.

Command and Control: Authority

There is little information on Iranian command and control systems, let alone on what a prospective Iranian nuclear command and control system might look like. There are reports of Iran recently fielding indigenously produced tactical command and control systems that can integrate command and control centers and early warning, air defense, and missile strike systems. These could be linked via fiber/wired and wireless connections to multi-layered communications networks that provide short-, medium-, and

[18] Iran has fourth generation fighters, such as F-14s and MiG-29s. However, without aerial refueling, they would be unable to reach Israel with a nuclear bomb payload (although they could be sent on a one-way "suicide" mission or attempt to recover in Lebanon or Syria). They would also likely be highly vulnerable to Israel's air defenses.

[19] The United States Institute of Peace, "US Intel Assessment," in, *The Iran Primer* (Washington, DC: United States Institute of Peace, 2014), available at http://iranprimer.usip.org/blog/2014/feb/01/us-intel-assessment; and Michael Connell, "Iran's Military Doctrine," in, *The Iran Primer* (Washington, DC: United States Institute of Peace, n.d.), accessed on February 15, 2015 at http://iranprimer.usip.org/resource/irans-military-doctrine

[20] The mainstay of Iran's long-range missile force is currently the Shahab 3, which is inertially guided and believed to have a circular error probable, or CEP, of roughly 8,000 feet (1.5 miles), although some analysts believe it may be as low as 600 feet. This means that Shahab 3 missiles will land within this distance (i.e., between 600-8,000 feet) of their target 50 percent of the time. When delivering nuclear weapons, this degree of accuracy is "good enough" for large, "soft" targets like cities or airbases. Destroying underground bunkers and missile silos, however, requires a much higher degree of accuracy or significantly higher-yield weapons. "Shahab 3," Missile Threat, available at: http://missilethreat.com/missiles/shahab-3/; and "Shahab-3/Zelal-3," Federation of American Scientists, October 1, 2013, available at: http://www.fas.org/programs/ssp/man/militarysumfolder/shahab-3.html.

long-range encrypted communications. Iran also has a network of underground command and control facilities.[21]

Command and Control: Early Warning

Iran's early warning system appears incapable of providing reliable detection of low-observable aircraft; however, it is assessed to be effective against fourth generation fighters. Most notably, three long-range early warning radars have been constructed in the past few years—two Ghadir radars with 1,000 km ranges and one Sepehr radar with a 3,000 km range. They provide 360-degree coverage of the entire country and significant coverage of the region. Tehran claims these radars can detect and identify aircraft, cruise missiles, ballistic missiles, and low-altitude satellites. There is an additional network of twenty-four shorter-range early warning radars located throughout the country.[22] Assuming these capabilities function "as advertised," Iran could have warning of a ballistic missile strike or non-stealthy cruise missile strike.

REGIONAL RESPONSE: IMPLICATIONS OF A NUCLEAR ARMED IRAN

A Bipolar Nuclear Balance

Should Iran acquire a nuclear capability, any assumption that mutual deterrence and strategic stability could be established between Iran and Israel along the lines of that which characterized the U.S.-Soviet Cold War competition should be viewed with skepticism. Based on the historical record of the Cold War and the circumstances in which Iran and Israel would find themselves, a nuclear competition between them will not necessarily curb risk-taking. There are several instances during the Cold War where one protagonist greatly miscalculated the other's willingness to take such risks.[23] Moreover, there is no compelling evidence that Iranian and Israeli leaders have a clear sense of how the other side calculates cost, benefit, and risk—the factors that form the basis of a deterrent posture. Nor does it seem likely at this point that they would engage in confidence-building measures to promote such an understanding if Iran were to field a nuclear weapons capability.

Israel's lack of strategic depth presents it with an enduring and supreme vulnerability, fundamentally different the vast territorial depth enjoyed by both the United States and

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[21] Sara Rajabova, "Iran unveils new command, control systems," *Azernews*, May 26, 2014, available at http://www.azernews.az/region/67421.html; "Iran unveils new air defense command systems," *Trend,* May 26, 2014, available at http://en.trend.az/iran/2278250.html; and William J. Broad, "Iran Shielding Its Nuclear Efforts in a Maze of Tunnels," *The New York Times,* January 5, 2010, available at http://www.nytimes.com/2010/01/06/world/middleeast/06sanctions.html?pagewanted=all&_r=0.

[22] "Sealing off skies: Iran finalizes 360 degree early warning air defense radar," *RT*, February 15, 2015, available at http://rt.com/news/232515-iran-sepehr-radar-installed/; and Joseph S Bermudez, Jr., "More long-range Iranian early-warning radars revealed," *IHS Jane's 360,* September 4, 2014, available at http://www.janes.com/article/42794/more-long-range-iranian-early-warning-radars-revealed; and Sean O'Connor, "Strategic SAM Deployment in Iran," *Air Power Australia,* April, 2012, available at http://www.ausairpower.net/APA-Iran-SAM-Deployment.html#mozTocId484494.

[23] The October 1962 Cuban Missile Crisis is perhaps the best example of risk-taking that brought the two nuclear powers perilously close to nuclear war.

Soviet Union during the Cold War. In terms of a nuclear strike, Israel has been described as a "one-bomb" country. While this may be an overstatement, a few nuclear detonations over cities like Tel Aviv and Haifa would represent the end of Israel as a viable state. Of course, in the event of such an attack Iran could count on being subjected to a devastating Israeli nuclear counterstrike. Thus Iran in principle would be deterred from initiating a nuclear conflict. Again, however, it is not clear how Iran's leaders would view nuclear weapons use. For example, former Iranian president Hashemi Rafsanjani argued that, "One nuclear bomb inside Israel will destroy everything, [but Israel's retaliation] . . . will only harm the Islamic world. It is not irrational to contemplate such an eventuality." [24]

Considering its inability to absorb even a limited nuclear attack of a half dozen or so warheads and the limitations of ballistic missile defenses, Israel will likely seek to maintain as long as possible the option of executing a decisive, preemptive nuclear attack against Iran's nuclear arsenal if it believes an attack is imminent. Israeli leaders recognize that a first strike against Iran would likely be met with universal condemnation from the international community. Nevertheless, if the very survival of the state of Israel were at stake, then the costs of failing to execute a first strike would likely be viewed as far exceeding the benefits of exercising restraint. Accordingly, Israeli decision-makers will have strong incentives to pursue a counterforce capability in addition to a countervalue ("assured destruction") capability. Yet Iran's mobile missile launchers would very likely present significant challenges to Israeli efforts at counterforce targeting. The Israelis' problems could be further compounded if the Iranians hide some missiles in underground shelters, or acquire the technology to deploy nuclear-tipped cruise missiles at sea. As Iran's nuclear arsenal becomes more survivable through their growing numbers and/or diversification of delivery systems, the challenges associated with Israel maintaining a preemptive nuclear posture would only worsen.

Even assuming both Israel and a nuclear-armed Iran would seek to avoid nuclear use, geographic realities combined with missile speed may conspire to undermine their efforts. Ballistic missile flight times between the two countries are so short that even advanced early warning and command and control systems are likely to be inadequate to enable their leaders to have confidence that they can confirm the attack, decide upon an appropriate response, and issue the commands for executing the response. The problem may not be acute in the course of day-to-day or steady state activities; however, in the event of a crisis, these factors may create an incentive to strike first.

The short warning times could pressure both sides to adopt a heightened alert status, especially in a crisis. Israel could choose to do so in order to preserve the option of launching a decisive pre-emptive first strike, while Iran would do so to avoid becoming the victim of such an attack. To the extent either side seeks to resolve the problem by placing its forces on a hair-trigger alert or extending nuclear release authority to lower

[24] Thomas C. Reed and Danny B. Stillman, *The Nuclear Express* (Minneapolis, MN: Zenith Press, 2009), p. 298.

commands, the risk of accidental launch or miscalculation would inevitably increase, especially during a crisis.

The prospects for avoiding nuclear use might be enhanced if, over time, both Israel and Iran fielded secure second-strike forces capable of inflicting assured destruction.[25] Yet even after both the United States and the Soviet Union accumulated vast numbers of nuclear weapons during the Cold War, fears continued to persist on both sides regarding their vulnerability to a disarming first strike.

An "N-State" Nuclear Competition?

It is possible—perhaps even likely—that Iran's acquisition of a nuclear capability would not only produce a nuclear competition with Israel, but also prompt other states in the region to acquire nuclear weapons, creating a multipolar, or "n-state," nuclear competition. While the path toward a nuclear capability has historically been long and arduous, this may not be the case in the wake of Iran's ascension to nuclear power status. Such a shock to the nonproliferation regime could, in fact, precipitate its collapse. Saudi Arabia might exercise what some believe to be a standing option to acquire nuclear weapons from Pakistan or base Pakistani nuclear weapons on its territory with Riyadh exercising de facto control.[26] Or nuclear proliferation might occur on an accelerated schedule, with designs, components, and even fissile material—everything but an assembled warhead itself—being provided on an "installment plan" in a market where the barriers to transfer have all but collapsed.[27]

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[25] Assured destruction as defined here refers to the ability to inflict casualties and economic damage against a state such that it is annihilated as a functioning entity.

[26] Saudi King Abdullah stated, "If Iran developed nuclear weapons . . . everyone in the region would do the same." A similar statement was made by Prince Turki al-Faisal, former head of Saudi Arabia's General Intelligence Directorate. In 2012, a senior Saudi source declared, "There is no intention currently to pursue a unilateral military nuclear program but the dynamics will change immediately if the Iranians develop their own nuclear capability. . . . Politically, it would be completely unacceptable to have Iran with a nuclear capability and not the kingdom." On the persistent but unconfirmed reports of a Saudi-Pakistani nuclear connection, see Naser al-Tami-ni, "Clear or Nuclear: Will Saudi Arabia Get the Bomb?" *Al Arabiya*, May 21, 2013, available at: http://english.alarabiya.net/en/News/middle-east/2013/05/21/Will-Riyadh-get-the-bomb-.html. See also *Chain Reaction: Avoiding a Nuclear Arms Race in the Middle East*, Report to the Committee on Foreign Relations, United States Senate (Washington, DC: Government Printing Office, 2008), pp. ix, 12, 20; and Ibrahim al-Marashi, "Saudi Petro-Nukes? Riyadh's Nuclear Intentions and Regime Survival Strategies," in William C. Potter and Gaukhar Mukhatzhanova, eds., *Forecasting Nuclear Proliferation in the 21st Century, Vol. II: A Comparative Perspective* (Stanford, CA: Stanford University Press, 2010), pp. 77–78.

[27] Take the example of what Pakistan alone has provided and could provide to accelerate the rate of proliferation. It has, via the A.Q. Khan network, seeded parts of the developing world with nuclear weapon designs and key components (e.g., centrifuges). See *Nuclear Black Markets: Pakistan, A.Q. Khan and the Rise of Proliferation Networks: A Net Assessment* (London: International Institute for Strategic Studies, 2007). See also David Albright, *Peddling Peril: How the Secret Nuclear Trade Arms America's Enemies* (New York: Free Press, 2010). Moreover, Pakistan's projected production of plutonium will far exceed its projected arsenal's requirements. There are reports that Pakistan may have completed a second nuclear plutonium production reactor (Khushab-II) near Khushab, which is the site of the country's first plutonium production reactor (Khushab-I). A third reactor, Khushab III, is under construction. The two reactors are estimated to produce roughly 22 kg of plutonium a year, enough for 10 nuclear weapons. Assuming the third reactor is similar in design to the second (which it appears to be), within a few years Pakistan will be producing enough plutonium for thirty or more nuclear weapons each year. Paul K. Kerr and Mary Beth

Despite the uncertainties regarding which path the region will follow toward a multipolar nuclear competition once Iran achieves nuclear-armed status, several things seem clear. First, even if Saudi Arabia, Turkey, and/or Egypt were to follow Iran into the nuclear club, over the near-term, Israel would likely to maintain a dominant position in which its nuclear arsenal and capabilities far outstrip those of its neighbors. Absent a large-scale transfer of nuclear weapons from an established nuclear power to a regional nuclear aspirant, for perhaps a decade or so Israel's arsenal would likely far exceed the combined arsenals of all other nuclear powers in the region both in terms of the numbers of nuclear weapons and their respective yields. While Israel might lose its formidable advantage over time, early on it will likely maintain a very robust preventive strike capability as well as an assured destruction capability, especially considering that its rivals will also likely lack effective air and missile defenses, early warning, and command and control systems. Yet Tel Aviv would also confront the hard reality that still more countries in the region will have the ability, even with only a handful of nuclear weapons, to inflict devastating damage on the Israeli people and their economy.

A "Nuclear Great Game"

Some declared and undeclared nuclear powers, as well as non-nuclear powers that nevertheless have capable civilian nuclear enterprises outside the Middle East, might have strong incentives to assist states in the region seeking to create or enhance their nuclear posture. The region possesses the world's greatest concentration of oil and natural gas, which are critical to global economic growth. The region is a key geostrategic location, with several maritime trade chokepoints such as the Suez Canal, Strait of Hormuz, and Bab el-Mandeb. Given their dependence on oil and natural gas to fuel their economies, the major powers of the developed and developing world have strong incentives to seek access to and influence in that region. In a proliferated Middle East, this could be achieved in a number of ways, to include assisting local states' efforts to develop a nuclear weapons program, enhancing their existing nuclear forces, and/or providing competing nuclear security guarantees, any of which could further destabilize the region.

This could result in a latter-day "Nuclear Great Game" where states external to the region compete for power and influence within it. In such an environment there could be many potential suppliers of nuclear weapons-related technology. Not all extra-regional suppliers would necessarily have a strong interest in regional stability. Major oil and gas exporters outside the region, Russia in particular, could potentially benefit from the corresponding increase in oil and gas prices that would accompany instability. Thus

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Nikitin, *Pakistan's Nuclear Weapons: Proliferation and Security Issues* (Washington, DC: Congressional Research Service, June 2012), pp. 5–6, 26–27. See also Christopher Clary and Mara E. Karlin, "The Pak-Saudi Nuke, and How to Stop It," *American Interest*, July–August 2012, pp. 24–31.

Moscow may be far less concerned about the consequences of its actions on regional stability.[28]

Among the technologies and capabilities that are likely to be in highest demand by new nuclear powers in the region are those related to warhead miniaturization and precision guidance, missile defenses, and various forms of intelligence (e.g., early warning; rival force development), while thermonuclear weapons, MIRV technology, depressed trajectory ballistic missiles, and missile-carrying submarines are apt to be accorded lesser priority.

Even those states with an interest in stability may not act in their own best interests. States have been prone to act in ways that value narrow, short-term interests at the expense of more important long-term interests.[29] For example, states like Pakistan or North Korea that are financially strapped may act primarily out of an immediate need for revenue and discount heavily the longer-term consequences of their actions on regional stability and even their own long-term security. Nor can China be counted upon to exercise restraint, given its history of enabling nuclear programs in North Korea and Pakistan.[30]

Perhaps most worrisome from Washington's perspective, the opportunities for other powers to displace its influence could increase dramatically if the United States (and perhaps its allies as well) were to withhold military support for nuclear-armed states in an effort to shore up the NPT regime. Should these efforts fail the United States could end up in the worst of both worlds: failing to achieve its nonproliferation goals while also losing influence with regional nuclear powers to extra-regional rivals.

The "N-State" Competition and Crisis Stability

In a Middle Eastern "n-player" competition, all nuclear powers would be challenged to establish an "assured destruction" capability against all the other regional nuclear powers—another Cold War desideratum—given their relatively modest economies. An "assured destruction" capability in an "n-state" competition would require that each state have weapons sufficient to survive an initial attack by *all* potential rivals and still be able to devastate the countries of *all* potential attackers. It would also require that the source of the attack be reliably identified. This may prove difficult given likely limitations on these states' ability to field advanced early warning systems. For example, would Saudi Arabia be able to determine with confidence the perpetrator of a ballistic missile

[28] This is not to say that Russia would seek to promote a nuclear war, or even a nuclear crisis. Yet, as has been described above, political leaders are not always the masters of events once they are put in motion.

[29] For example, in the nuclear competition alone, China's support for Pakistan's nuclear program appears to be a case of pursuing short-term geopolitical gains at the expense of potentially far greater long-term problems, as described in this paper. Arguably, the U.S. pursuit of multiple independently targetable reentry vehicles (MIRV) technology, rather than first attempting to ban it through arms control agreements, proved short sighted, as it ultimately worked to the relative benefit of the Soviet Union, whose far larger ballistic missiles could accommodate more warheads than their U.S. counterparts.

[30] See Reed and Stillman, *The Nuclear Express*, pp. 328–29.

launched from a location along the Iranian-Turkish border? The origin of any cruise missile launched from a sea-based platform? Even assuming a state could identify the source (or sources) of an attack, could its command and control systems survive the attack sufficiently intact to execute a retaliatory strike? A decapitation strike could preclude an "assured destruction" retaliatory strike even if sufficient weapons survive to execute one.

This, in turn, raises the possibility of a "catalytic" war—one that is initiated between two states by a third party. Given a proliferated Middle East as described here, the chances that a regime would incorrectly attribute the source of an attack cannot be easily dismissed. To the extent cyber weapons could be employed to introduce false information into a state's decision-making process, the risks of catalytic war only increase.

Further complicating matters, the early warning requirement following a proliferation cascade could be multidirectional, and at some point perhaps 360 degrees, especially if multiple nuclear rivals deploy a portion of their nuclear forces at sea. Early warning requirements would be stressed even further if an adjacent state (e.g., Saudi Arabia in the case of Iran) were to acquire nuclear weapons. In this case warning times would be even more compressed than in an Israeli-Iranian competition. Owing to its proximity to Iran, Saudi Arabia, for example, could have less than five minutes to react to a suspected Iranian ballistic missile attack no matter how advanced its early warning and command and control systems.

As noted earlier, regardless of what assumptions are made with respect to a regional nuclear power's early warning system, given the short ballistic missile flight times, it seems likely that preserving command and control of the state's nuclear forces while under attack will prove challenging. States might be tempted to adopt a launch-on-warning posture, but this requires both early warning and a highly responsive command and control system. Should a state determine that it will not be able to launch-on-warning and instead attempt to "ride-out" a nuclear first strike and retaliate, it would still need its command and control system to function effectively in the wake of the nuclear attack. Absent a highly resilient command and control system, a state's ability to launch a retaliatory nuclear strike may require nuclear release authority to be diffused to lower-level commanders. But again, absent an effective early warning system it may not be possible to determine the attack source with confidence in a region with multiple nuclear powers.

Finally, a state could forego a prompt counterstrike in favor of responding days or even weeks following an attack. In theory there is no reason why a nuclear counterstrike would have to be prompt if it were focused solely on punishing the attacker through strikes on counter-value targets. Following this line of reasoning, a regime could hide its nuclear weapons and launchers, recover them in the days following an attack, and launch its retaliatory blow once its surviving nuclear forces had been reconstituted.

While this "buried bomb" posture might be appealing in the abstract, there are significant potential drawbacks that must be addressed. First, the country adopting this posture

would have to be able to identify the source of the attack. Second, depending upon the attacker's nuclear arsenal, a time delay may enable a follow-on strike. Third, there would always be a risk that the buried bombs would be located and destroyed in the initial attack or in the follow-on strike. Fourth, the nuclear weapons might even be physically seized by the attacker's conventional or special operations forces following the first strike during what would almost certainly be a period of widespread disorder in the state that had been attacked. Fifth, a coherent command and control system would need to be maintained, not only during the minutes or hours immediately following an attack, but also for days or weeks. Failing that, the state's leadership would likely have to devolve nuclear release authority to lower commands. While this could enhance the prospects of a successful buried bomb retaliatory strike, it would almost certainly increase the risks of an unauthorized or accidental use of nuclear weapons.

SOME IMPLICATIONS FOR U.S. POLICY AND FORCE POSTURE

Given the current state of Iran's nuclear program, the immense resources Iran's leaders have invested in it, the great lengths to which they have gone to deceive the international community regarding their nuclear program, and the substantial advantages that would accrue to Tehran from possessing nuclear weapons, it seems unlikely that anything short of the threat or use of force would deflect the current regime from its objective. Even if the United States and Iran concluded an agreement on Iran's nuclear program in the coming days or weeks, it seems unlikely to alter Tehran's ultimate aim.

If so, these circumstances would leave the United States and its security partners with two basic strategic choices: compel the Tehran regime through the threat or the use of force to abandon its nuclear weapons program, or prepare to live with whatever nuclear posture Iran chooses to adopt, which could range from a "short sprint" to a nuclear capability; an opaque nuclear posture similar to Israel's; or a declared nuclear capability such as North Korea's or Pakistan's.

I will focus my remarks here on the challenges associated with a nuclear-armed Iran. First, I offer some suggestions as to the kind of analyses we might want to do to help insure that we make the best of what is likely to be a difficult situation. Second, I present some thoughts as to what the character of a nuclear competition in the Middle East might imply for U.S. security policy and strategic force posture.

Before proceeding, however, I want to make clear that crafting a well-designed U.S. policy, strategy, and associated force posture in the wake of Iran becoming a nuclear-armed state would be a formidable task, requiring persistent, focused intellectual effort by skilled strategists, as well as execution by highly skilled diplomats and military leaders.

Determining the appropriate U.S. policy, strategy, and military posture in this regard might be usefully informed by assessments of the following issues:

- Developing as best an understanding as possible regarding how Israel and the region's prospective nuclear powers view nuclear weapons, to include the conditions under which they might be employed and how their decision-makers

tend to view costs, benefits, and risks (e.g., What do they value most, such as regime survival? What do most fear? How risk tolerant/risk averse are they? Do their worldviews match ours? Etc.)

- Identifying and evaluating a set of scenarios that address the prospective immediate and long-term consequences of a U.S./allied use of force to preclude Iran from acquiring nuclear weapons.
- Identifying and evaluating a set of scenarios that address a regional bipolar nuclear competition between Israel and Iran, to include potential crisis situations as well as a steady state, long-term competition to include the second-order effects on the region (such as an expanded use of proxy warfare by Tehran).
- Identifying and evaluating a set of scenarios that address the prospective emergence of an "n-state" nuclear competition in the region, to include potential crisis situations as well as a steady state, long-term competition to include the second-order effects on the region (such as in the event external major powers engage in a "Nuclear Great Game" for influence in the region).
- Undertaking an assessment of the implications of these prospective futures for U.S. security interests in the region, as well as our force posture and associated capabilities.

In structuring the kinds of assessments and planning scenarios described above, consideration should be given to a range of key factors shaping the nuclear competition, to include the dynamics of "n-player" competitions, the progressive blurring of the "firebreak" between nuclear and advanced conventional weaponry, and geography, to name a but a few.

The U.S. Nuclear Arsenal and Extended Deterrence

Should Iran acquire a nuclear capability, the United States might look to stretch its nuclear umbrella over friendly states in the Middle East in order to enhance their sense of security and reduce their incentive to obtain their own nuclear weapons. This would likely raise familiar issues regarding the size and composition of the U.S. nuclear arsenal, as well as Washington's credibility.

Let's take the last issue first. During the Cold War, America's NATO allies questioned whether Washington would risk a Soviet nuclear attack on Chicago by retaliating for a Soviet nuclear attack on Bonn. In the event of a nuclear-armed Iran, one might suspect Saudi leaders challenging Washington's willingness to order a nuclear response against Tehran should Riyadh be the target of an Iranian nuclear-tipped missile—particularly if Iran had acquired an ability to strike the United States.

The U.S. ability to assure those countries to which it proposes to offer extended deterrence may also depend to a significant extent on the mix of nuclear weapons in its arsenal. While many other nuclear powers—China and Russia in particular—are investing in advanced nuclear designs, to include weapons with very low yields and more focused effects, the United States has chosen to limit its nuclear weapons inventory to weapons designed during the Cold War. By limiting the range of nuclear response

options available to the president, this posture may run a significant risk of weakening the U.S. ability to deter its enemies as well as the credibility of U.S. extended deterrence guarantees to allies and partners.

Given the dramatic reductions in the U.S. nuclear arsenal since the Cold War, questions might also arise as to how thinly America's nuclear umbrella is stretched. New START provides the United States parity with Russia in numbers of strategic nuclear weapons. Moscow, however, has not sought to extend nuclear guarantees to other states, while the United States has done so with its European allies, and other allies such as Japan and South Korea—presumably to counter any threat that might be posed by China and/or North Korea. When the United States had thousands of nuclear weapons, one might discount the matter. With the New START commitment to reduce the arsenal size to 1,550, and with the administration floating proposals to reduce the number further to 1,000, one can understand why those offered shelter under the U.S. nuclear umbrella are beginning to wonder if it leaks. Put another way, the United States has nuclear parity with Russia, but it is also committed to defend allies and partners against nuclear threats posed by China, North Korea, and, prospectively, Iran as well.

Thank you again for the opportunity to share my thoughts on these important issues. I will be happy to respond to any questions you might have to the best of my ability during the discussion period.

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The Center for Strategic and Budgetary Assessments (CSBA) is an independent, nonpartisan policy research institute established to promote innovative thinking and debate about national security strategy and investment options. CSBA's goal is to enable policymakers to make informed decisions on matters of strategy, security policy and resource allocation. CSBA provides timely, impartial and insightful analyses to senior decision makers in the executive and legislative branches, as well as to the media and the broader national security community. CSBA encourages thoughtful participation in the development of national security strategy and policy, and in the allocation of scarce human and capital resources. CSBA's analysis and outreach focus on key questions related to existing and emerging threats to US national security. Meeting these challenges will require transforming the national security establishment, and we are devoted to helping achieve this end.

Statement of Dr. Matthew Kroenig

Associate Professor of Government and Foreign Service, Georgetown University and
Senior Fellow, Brent Scowcroft Center on International Security, Atlantic Council

Hearing on "Regional Nuclear Dynamics"
Senate Armed Services Committee
Subcommittee on Strategic Forces
Thursday February 25, 2015
2:30 p.m. –222 Russell Senate Office Building

Chairman Sessions, Ranking Member Donnelly, members of the committee, thank you for inviting me to participate in this important hearing. I am pleased to be here alongside my distinguished colleagues Andrew Krepinevich, George Perkovich, and Ashley Tellis.

I would like to commend the committee for initiating this timely discussion of regional nuclear dynamics. I have worked on nuclear issues both in and out of government for over a decade and, as a professor at Georgetown University and a senior fellow at the Atlantic Council, I have focused increasingly on Russian nuclear capabilities and strategy and its implications for the United States and NATO.[1] It is this subject on which I have been invited to speak today.

I will begin with Russia's nuclear capabilities. Along with the United States, Russia is one of the world's foremost nuclear powers. At the strategic level, it possesses a triad of nuclear bombers, intercontinental ballistic missiles (ICBMs), and submarines.[2] Under the New START Treaty, signed in 2010, Russia has committed to deploying no more than 1,550 strategic nuclear warheads by 2018.[3]

Russia has made the thoroughgoing modernization of its nuclear forces and the development of new nuclear capabilities a national priority even under difficult economic circumstances.[4] Russia is updating its bomber fleet, which will carry a new precision-strike, long-range, nuclear-armed cruise missile. A new generation of nuclear submarines is set to enter service and they are designed to deliver a new, more advanced submarine-launched ballistic missile (SLBM), intended to penetrate enemy missile defenses. Moscow is also developing new silo-based and

[1] For my recent work in this area, see Matthew Kroenig and Walter Slocombe, "Why Nuclear Deterrence Still Matters to NATO," The Atlantic Council (August 2014), available at http://www.atlanticcouncil.org/images/publications/Why_Nuclear_Deterrence_Still_Matters_to_NATO.pdf and Matthew Kroenig, "Facing Reality: Getting NATO Ready for a New Cold War," *Survival: Global Politics and Strategy* (February/March 2015), pp. 49-70.
[2] For more detail on Russia's nuclear forces, see Hans M. Kristensen and Robert S. Norris, "Russian Nuclear Forces, 2014," *Bulletin of the Atomic Scientists*, Vol. 70, No. 2 (2014), pp. 75-85.
[3] New Strategic Arms Reduction Treaty (New START), April 8, 2010, available at http://www.state.gov/t/avc/newstart/c44126.htm
[4] On Russian nuclear modernization, see also Kristensen and Norris, 2014.

road-mobile ICBMs capable of carrying warheads with multiple independently-targetable reentry vehicles (MIRVs), also designed to defeat enemy defenses.

In addition, Russia has tested a new intermediate-range, ground-launched cruise missile (GLCM).[5] This development is of particular concern because it is in violation of Russia's commitments under the 1987 Intermediate Range Nuclear Forces (INF) Treaty, the only arms control treaty ever to eliminate an entire class of nuclear weapons.[6] In addition, Russia's RS-26 ballistic missile, although tested at longer ranges, can be operated at intermediate range, providing a technical circumvention of the INF Treaty.

In addition to its strategic forces, Russia retains an arsenal of around 2,000 tactical nuclear weapons for battlefield use.[7] This arsenal includes nuclear-armed: torpedoes, depth charges, short-range surface-to-surface missiles, air-to-surface missiles and bombs, and surface-to-air missiles for use in air defense. Although Russia has not publicized plans to modernize its tactical nuclear forces, it is possible that Russia is also upgrading some of these systems as it modernizes its strategic forces.

Turning next to Russian strategy and doctrine, it is important to emphasize that, unlike the United States, since the end of the Cold War, Russia has moved nuclear weapons toward the center of its national security strategy and military doctrine. In the past, Moscow maintained a nuclear "no first use" doctrine, but this policy was abandoned in the year 2000. Since the early 2000s, Russian strategists have promoted the idea of "de-escalatory" nuclear strikes.[8] According to this "escalate to de-escalate" concept, Moscow will threaten, or, if necessary, carry out, limited nuclear strikes early in a conventional conflict in order to force an opponent to sue for peace on terms favorable to Moscow.[9] Russia's 2000 military doctrine stated that nuclear strikes might be conducted in any situation "critical to the national security" of the Russian Federation.[10] The more expansive language about nuclear preemption was excluded from Russia's most recent public documents, but the idea remains firmly engrained in Russian thinking and some speculate that the language remains in classified annexes.[11]

At least as telling as public documents, however, are how military forces actually plan and exercise. Nearly all of Russia's major military drills over the past decade have concluded with

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[5] Michael R. Gordon, "U.S. Says Russia Tested Cruise Missile, Violating Treaty," *The New York Times*, July 28, 2014.
[6] Treaty Between The United States Of America And The Union Of Soviet Socialist Republics On The Elimination Of Their Intermediate-Range And Shorter-Range Missiles (INF Treaty), December 8, 1987, available at http://www.state.gov/t/avc/trty/102360.htm.
[7] Krisetenen and Norris, 2014.
[8] Nikolai N. Sokov, "Why Russia Calls a Limited Nuclear Strike 'de-escalation,'" *Bulletin of the Atomic Scientists*, March 13, 2014, available at http://thebulletin.org/why-russia-calls-limited-nuclear-strike-de-escalation.
[9] Ibid.
[10] Military Doctrine of the Russian Federation, 2000, available at http://igcc.ucsd.edu/assets/001/502378.pdf
[11] Elbridge Colby, "Nuclear Weapons in the Third Offset Strategy: Avoiding a Blind Spot in the Pentagon's New Initiative," Center for a New American Security (February 2015), pp. 6, available at http://www.cnas.org/sites/default/files/publications-pdf/Nuclear%20Weapons%20in%20the%203rd%20Offset%20Strategy.pdf.

simulated nuclear strikes.[12] Moreover, President Putin himself has personally overseen such nuclear exercises.[13]

In some ways, it is not surprising that Russia, as the conventionally inferior power in relation to the United States and NATO, would consider the use of nuclear weapons early in a conventional war, as this is essentially the reverse of NATO strategy during the Cold War when it faced a conventionally superior Soviet Union. Nevertheless, Russia's nuclear capabilities and strategy pose a serious threat to the United States and should be a cause of concern.

This brings me to my next major subject, the possibility of nuclear escalation. For years, Western analysts assumed that Russia's heavy reliance on nuclear weapons was envisaged in the context of a defensive war, but recent events have shown that these tactics can also be employed as part of an offensive campaign. The ongoing conflict in Ukraine is very much a nuclear crisis.[14] Throughout the crisis, President Putin and other high-ranking officials have repeatedly issued thinly-veiled nuclear threats. Moreover, these threats are backed up by explicit brandishing of Russia's nuclear forces at a level we have not seen since the end of the Cold War. Russia has also reserved the right to deploy nuclear weapons in Crimea and Kaliningrad.[15] The message is clear: the West must not interfere in Russia's invasion of Ukraine lest things escalate to catastrophic levels.

If the conflict in Ukraine were to escalate or President Putin were to rerun his playbook of hybrid warfare from Ukraine against a NATO member, the United States could find itself in direct military confrontation with Russia. In the event of such a conflict, Russia will likely issue nuclear threats in a bid to force NATO capitulation and, if on the losing end of a conventional conflict, Moscow may conduct a limited nuclear strike in an effort to "de-escalate" the conflict.

I will conclude with a discussion of the implications of these developments for U.S. nuclear strategy and posture. So long as nuclear weapons retain such a prominent place in Russian force structure, procurement priorities, doctrine, and political rhetoric, it remains an important deterrence mission for the United States and NATO to retain a policy of, and a serious capability for, nuclear deterrence as a potential instrument for dealing with the remote but calamitous contingency of a military confrontation with Russia.

At a minimum, U.S. nuclear deterrence doctrine needs to be clear and firm that any use of nuclear weapons against the United States or an ally would result in a nuclear counterstrike. In addition, the United States should leave on the table the possibility of a nuclear response to a

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[12] Sokov, "Why Russia Calls a Limited Nuclear Strike 'De-escalation.'"
[13] Alexey Nikolsky, "Putin Holds Military Drills to Repel Nuclear Strike," *RT*, May 8, 2014, available at http://rt.com/news/157644-putin-drills-rocket-launch/.
[14] For more on this point, see Kroenig, "Facing Reality."
[15] On Russia's claims about nuclear weapons in Crimea, see Sergei L. Loiko, "Russia Says it Has a Right to Put Nuclear Weapons in Crimea," *Los Angeles Times*, September 15, 2014, available at http://www.latimes.com/world/europe/la-fg-russia-nuclear-crimea-20141215-story.html. On Russia's threats to deploy nuclear weapons in Kaliningrad, see Bruno Waterfield, "Russia Threatens NATO with Military Strikes over Missile Defence System," *The Telegraph*, May 3, 2012, available at http://www.telegraph.co.uk/news/worldnews/europe/russia/9243954/Russia-threatens-Nato-with-military-strikes-over-missile-defence-system.html.

strictly conventional Russian assault against a NATO ally. The reason for not foregoing this option is not that an early nuclear response would be necessary or automatic, but rather because there is no reason to assure Russia that this would not happen. Moreover, the possibility of nuclear response to nonnuclear attack has a critical assurance element as NATO's easternmost neighbors would prefer that any potential Russian attack be deterred by the threat of nuclear strike, rather than needing to wait for a costly and lengthy conventional war of liberation.

To make these threats credible, the United States must field a sufficiently large, flexible, and resilient nuclear force, including capable nuclear delivery systems and supporting infrastructure. I, therefore, urge this body to fully fund the much-needed modernization of this country's nuclear forces and infrastructure as planned.

In addition, the United States should upgrade its homeland and theater ballistic and cruise missile defense systems. While missile defenses could not meaningfully blunt a large-scale Russian attack, an upgraded system could better provide a defense against, and thus complicate Russian calculations for, a more limited strike on the United States or its allies.

At the sub-strategic level, the United States must seek to negate Russia's overwhelming battlefield nuclear advantage as this is a major contributing causes to Russia's belief that it can achieve escalation dominance through a limited nuclear strike. Ideally, this would be done through arms control negotiations, but the Russians have refused to discuss the reduction of their tactical nuclear weapons and striking an agreement under current conditions would be extremely challenging.

The United States must make sure, therefore, that it has a credible response to any Russian battlefield use of nuclear weapons and it is not at all clear that it does at present.[16] The yields of strategic warheads may be too large for a credible response to a tactical strike and their use would risk escalation to a catastrophic, strategic nuclear exchange. The B61 gravity bombs in Western Europe are out of range of potential conflict zones in the East without redeployment and/or refueling, and the aircraft on which they are delivered would be highly vulnerable to Russian air defenses. American B-52H bombers and nuclear-armed ALCMs are based in the United States, reducing their utility for deterrence and assurance missions in Europe.

The United States should, therefore, consider additional options to deter Russian nuclear aggression, assure regional allies, and if necessary, respond to a limited Russian nuclear strike. The options could include: placing lower-yield nuclear warheads on SLBMs and ICBMs, training European crews to participate in NATO nuclear strike missions, forward basing B61 gravity bombs in Eastern Europe, rotationally basing B-52 bombers and nuclear air-launched cruise missiles in Europe, and developing a new sea-launched cruise missile, or designating the planned long-range standoff weapon (LRSO) for delivery by both air and sea.

The United States must also convince Russia to return to compliance with the INF Treaty and, if that fails, to prevent Russia from gaining a military advantage from its violation. Washington should, therefore, study the development of new GLCMs and their deployment to Europe. It

[16] For information on U.S. nuclear forces and further details on the items in this paragraph, see Hans M. Kristensen and Robert S. Norris, "U.S. Nuclear Forces, 2014," *Bulletin of the Atomic Scientists* vol. 70, no. 1 (2014), pp. 85-93.

should also consider the deployment of cruise missile defenses in Europe to defend against Russian nuclear aggression.

Following through on some of these proposals would reverse longstanding U.S. and NATO policy of reducing reliance on nuclear weapons as an objective in and of itself. This policy was justifiable so long as Russia remained cooperative, but given increased Russian nuclear aggression, we no longer have the luxury of reducing reliance on nuclear weapons for its own sake and arguably never did.

Some of these proposals, if adopted, would also run counter to promises made to Russia in the NATO-Russia Founding Act of 1997, but Putin has already violated key provisions of this act, including the commitment to refrain "from the threat or use of force against … any other state, its sovereignty, territorial integrity or political independence in any manner."[17] It would be foolish for the United States to be constrained from taking action necessary for its national security by a document that Russia routinely ignores.

I know this Committee will help ensure the maintenance of the strong American nuclear forces that have undergirded international peace and security for nearly seventy years.

Thank you again for the opportunity to be here today. I look forward to your questions.

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[17] "Founding Act on Mutual Relations, Cooperation and Security between NATO and the Russian Federation," May 27, 1997, available at http://www.nato.int/cps/en/natolive/official_texts_25468.htm.

Testimony by George Perkovich
Vice President for Studies
Carnegie Endowment for International Peace

Senate Armed Services Committee
Subcommittee on Strategic Forces
February 25, 2015

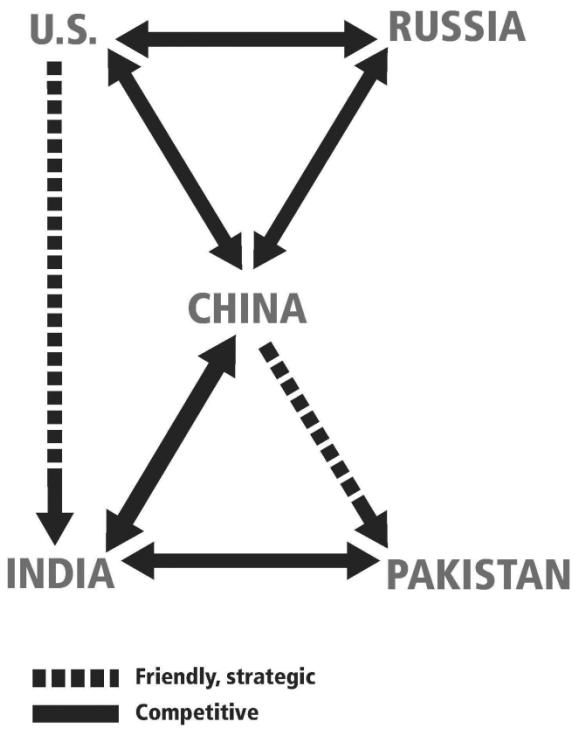
Mr. Chairman, members of the subcommittee, it is an honor to testify before you. I have worked on nuclear-weapons-related issues since 1982, first with a focus on the Soviet Union, then, after 1992, on India, Pakistan and Iran. I have written extensively on each of these countries' nuclear programs and policies. Over the past ten years I also have analyzed nuclear dynamics in Northeast Asia, particularly Chinese and Japanese perspectives on them.

Because time here is short and the range of topics you have asked my colleagues and me to address is extensive, I concentrate my testimony on what I think are some cutting-edge strategic challenges in Northeast Asia and South Asia that need to be more creatively addressed by U.S. policy-makers. These are problems to which no one has tidy, feasible solutions – that is, solutions that would change to our complete satisfaction the military capabilities and behaviors we want other states to change, and thereby significantly reduce risks of conflict that could escalate to the use of nuclear weapons. This is largely because the other states involved have different interests and objectives than the U.S. does and will search for ways to pursue them. Knowing that they cannot compete directly and symmetrically with U.S. conventional and strategic forces, these states will often seek to develop and apply asymmetric capabilities and strategies to balance U.S. power. This is especially true of two of the states under consideration – the DPRK and China – whose governments fear the U.S. seeks ultimately to displace them. The challenge, then, for the U.S. and these states is to achieve tolerable stability, avoid escalatory warfare, and establish ways of getting along through political-diplomatic processes backed by balances of power.

I have divided my testimony into five key points that describe the regional dynamics at play and suggest priority policies the U.S. could pursue to mitigate instabilities and risks of nuclear escalation.

1. Complex causal dynamics drive the threat perceptions and nuclear requirements and policies of states in Northeast Asia and South Asia.

This is an analytic and conceptual point that must be recognized if the U.S. and others are to devise policies and deploy capabilities that will improve security and ameliorate instability in these two inter-related regions. Setting North Korea to the side for a moment, it may help to conceptualize the Northeast Asian and South Asian nuclear "system" in the form of two strategic triangles that are connected by a common node, which is China. The following diagram represents this idea.



The first triangle includes the U.S., Russia and China. Each of these state's nuclear requirements and policies (as well as non-nuclear instruments of force, deterrence and coercion) affects and is affected by the other two states. For example, the U.S. has long seen Russia as a benchmark for determining U.S. nuclear posture and policy, and recently has factored China more heavily into policy calculations, including regarding strategic conventional weapons, cyberwarfare capabilities, and ballistic missile defenses. China in turn calculates its strategic military requirements and options by reference to current and potential threats that it perceives emanating from the U.S., and to a lesser extent from Russia.

The second triangle includes China, India and Pakistan. India seeks strategic capabilities to deter major aggression from China and from Pakistan today and in the future. Many of the delivery systems and nuclear warhead capabilities India seeks are intended to increase its capacity to deter China, whose current and future capabilities in turn are driven in large part by perceptions of threat from the U.S. Pakistan then seeks nuclear and other capabilities to balance what it perceives India to be acquiring. Many Indian analysts perceive that China is assisting Pakistan's strategic acquisitions, so India seeks not only to balance China, but also to balance the gains Pakistan may achieve in cooperation with China. For its part, Pakistan increasingly perceives the U.S. and India to be cooperating in buttressing Indian military capabilities with which Pakistan must contend.

From the perspective of the United States, the main takeaway from this depiction of the strategic force dynamics involving these states is that policies, capabilities, and operational plans we develop to affect one of these states may cause others also to react in turn.

For example, a former commander of India's strategic forces recently explained to me that "what the U.S. does to extend deterrence to its allies in East Asia affects China which then acts in ways that challenge India. The Chinese note and build up capability, strategy and philosophy to deal with what the U.S. is doing. The Chinese have deployed large numbers of conventionally armed ballistic missiles and cyber capabilities and anti-satellite weapons to deny U.S. forces access into areas sensitive to them, primarily around Taiwan. Those capabilities could be used against India, too."

Pakistanis constantly assert that the so-called U.S.-India nuclear deal could significantly boost India's stockpile of fissile material that could be used to build up its nuclear forces. Similarly, they say, potential U.S. cooperation with India on ballistic missile defenses could require Pakistan to further increase the numbers and diversity of its missile armory and nuclear warhead inventory.

Of course, much the same could be said about China's cooperation with Pakistan and Russia's cooperation with India. This is not to suggest that the U.S. and these other states should desist from all such policies and activities. Rather, the point is that these policies and activities are inter-related more than is commonly recognized. If strategic instability is going to be redressed in Northeast and South Asia, each state, including the U.S. must be more willing than they heretofore have been to acknowledge and address how their own capabilities and actions affect the others. Among other things, this means that prospective policies must be considered in a regional context, not merely a bilateral one.

2. Regarding China, the most fundamental challenge for U.S. policy is to engage Beijing in tempering several forms of security dilemmas and affirming that neither state will initiate the use of force to change the territorial status quo in Northeast and South Asia.

In John Herz's famous words (at least amongst wonks), the security dilemma is "A structural notion in which the self-help attempts of states to look after their security needs tend, regardless of intention, to lead to rising insecurity for others as each interprets its own measures as defensive and measures of others as potentially threatening."

The U.S. and China confront security dilemmas of their own making in at least three domains.

One pertains to concerns of the U.S. and its protectorates – most acutely Taiwan and Japan – that China may use its growing economic and military power to coerce them in territorial and political disputes. China, for its part, has countervailing concerns that the U.S. and its allies may seek to apply military power to advance their preferred positions vis a vis China, particularly in case of a crisis over the political evolution of Taiwan as it relates to China. (China has a deeper concern that the U.S. seeks to subvert its political order and foster democratization. It is difficult for the U.S. to convince Chinese leaders that while we desire political change in their country we

do not intend to use our military capabilities and policies to bring this change about). The famous "three communiques" issued by the U.S. and China between 1979 and August 1982[1] created a modus vivendi on these questions related to Taiwan, but both countries remain wary that it could be fragile. Each side in this security dilemma builds military power, and, in the U.S. case occasionally sells arms to Taiwan. Each also sometimes makes political declarations intended to preserve its defensive positions, but which the other side may interpret as expressions of intent to change the status quo.

A second security dilemma arises from each side's build-up of non-nuclear forces – conventionally-armed ballistic missiles, naval and air forces, ballistic missile defenses, and cyberwarfare capabilities – which each justifies as means to defend against the presumed offensive intentions of the other. This dynamic creates arms race instability, whether of a symmetric or asymmetric nature. For example, China for years has steadily augmented its arsenal of conventionally-armed ballistic missiles and anti-satellite weaponry to offset the United States' superior naval power projection capabilities. The United States' ongoing ballistic missile defense program can be seen as an effort to maintain a long-standing asymmetric advantage in the nuclear domain, and as a way to offset China's build-up of conventionally armed ballistic missiles. Both states, led by the U.S., are developing conventional prompt-strike weapons. Additionally, the U.S. and China both are engaged in a cyberweapon arms race, with China trying to catch up to the U.S.

A third security dilemma exists in the domain of nuclear policy. China fears that the U.S. seeks to acquire means to negate its nuclear deterrent, through some combination of offensive nuclear forces, future hypersonic conventionally-armed missiles, ballistic missile defenses, and cyberwarfare capabilities.

China is assessed to possess approximately 250 nuclear warheads. It is assessed to deploy between 50-75 ballistic missiles capable of carrying nuclear weapons to the United States, and another approximately 60 intermediate range ballistic missiles suited for use against India, Japan or Taiwan. By comparison the United States' operationally deploys 2,200 nuclear weapons. China is estimated to possess an additional 16 tonnes of highly-enriched uranium and 1.8 tonnes of non-civilian separated plutonium, compared to the United States' stockpile of 604 tonnes and 87 tonnes, respectively. The U.S. and its proteges fear that China may someday add dramatically to its nuclear forces in ways that would undermine – along with conventional anti-access area-denial capabilities – the American deterrent extended to Taiwan and Japan. Each side in this competition does not adequately acknowledge how its own actions drive the other to take the actions that it sees as threatening.

[1] The third communique, in August 1982, states in part: "The United States Government attached great importance to its relations with China, and reiterates that it has no intention of infringing on Chinese sovereignty and territorial integrity, or interfering in China's internal affairs, or pursuing a policy of ''Two Chinas'' or ''one China, one Taiwan.'' The United States Government understands and appreciates the Chinese policy of striving for a peaceful resolution of the Taiwan question as indicated in China's Message to Compatriots in Taiwan issued on Jan. 1, 1979, and the nine-point proposal put forward by China on Sept. 30, 1981."

To deal with these challenges, the U.S. does not need more or different nuclear forces than it already possesses and plans to possess after implementation of the New Start Treaty with Russia. In terms of capabilities, the greater imperative is to acquire and/or deploy non-nuclear instruments to preserve the United States' capacity to quickly defend its protectorates against and to deter Chinese actions to initiate changes in the territorial status quo in the region. Such potential Chinese actions are very unlikely to involve its nuclear forces, and it is thus in the U.S. interest to counter with strong, symmetrical conventional capabilities.

A more immediately pressing need is to motivate Chinese leaders to join the U.S. and, where appropriate its allies, in articulating and authenticating policies that would reassure all sides in these security dilemmas that they will not initiate the use of force to change the territorial or political status quo or to otherwise coerce each other. To this end, it will be necessary for Chinese officials to understand the concept of the security dilemma and recognize how their words and deeds sometimes exacerbate it.

With regard to nuclear policy, the key dilemma concerns first-use of nuclear weapons. Retaliatory use of nuclear weapons is a comparatively straightforward proposition; the destabilizing factor is the prospect that the U.S. or China would initiate attacks -- by nuclear, conventional, or cyber means -- on the other's nuclear deterrent forces and/or their command and control systems. The U.S. would be wise to overcome its politically motivated reluctance to assure China that it will not seek to negate China's nuclear deterrent. Washington should do this out of recognition that mutual nuclear vulnerability is a fact of 21st century life with China, and attempting to negate this fact through a combination of new offensive and defensive systems would not succeed at a cost that the U.S. would find acceptable to itself. The language authored by a 2009 Council on Relations Task Force on U.S. Nuclear Policy chaired by William Perry and Brent Scowcroft could be a model: "mutual vulnerability with China – like mutual vulnerability with Russia – is not a policy choice to be embraced or rejected, but rather a strategic fact to be managed with priority on strategic stability.'"

For its part, China should be motivated to reciprocate constructively by clarifying that as long as U.S. policies and military capabilities reflect this assurance China will not significantly increase its nuclear weapon arsenal and threaten to use force to alter the territorial status quo and/or resolve "the Taiwan question."

Such declarations of fundamental policy would not preclude the U.S., China, or other states from modernizing and bolstering their strategic offensive and defensive capabilities, but they would provide a framework within which each party could explain to the other how its actions are not inconsistent with fundamentally defensive intentions and assurances. This would be constructive on its own terms, and could eventually create conditions for possible negotiation of arms limitations.

3. One of the most complicated challenges facing U.S. policy-makers today is to reassure Japan that the U.S. has the resolve and capabilities to defend it against armed attack from China or any other state.

Extended deterrence is never easy to provide or depend upon. The protege often will fear that its protector will abandon it. At other times, the protege may fear that the protector will entrap it in a war that the protege would otherwise seek to avoid. The guarantor, on the other hand, must convince the protégé as well as the adversary that the guarantor will put its soldiers and citizens and treasury at risk in order to defend another. This is especially problematic insofar as the protege may itself act in ways that instigate a potential conflict, raising legitimate questions about whether the guarantor should or would invite the costs of coming to its defense in such a situation.

Extended deterrence is often conflated with extended *nuclear* deterrence. While it may be tempting to believe that the potential use of nuclear weapons always strengthens extended deterrence, the issue is problematic. Potential use of nuclear weapons in an escalating conflict can indeed strengthen the potency of the guarantor's deterrent against a potential aggressor. But the very destructiveness that this portends also can weaken the resolve of the guarantor state's population (should we trade Los Angeles for Taipei?) as well as the protege's population (if the U.S. uses nuclear weapons on China, China will respond first by targeting nuclear weapons at Japan). These possible reactions may tempt a potential aggressor into thinking that the mere threat of aggression that could escalate to nuclear use can split an alliance, or demonstrate the guarantor's weak resolve, constituting a bluff that may be called.

On the other hand, if the guarantor's resolve is unquestioned in the face of a countervailing nuclear threat, nuclear moral hazards may be created. Like a finance company whose managers believe that the government will bail them out if they face ruinous losses, the protege may take unwise risks in its policies toward its adversary, feeling that the nuclear threat proffered by the guarantor will deter the adversary from reacting forcefully. The protege also may under-invest in non-nuclear defensive capabilities that would otherwise obviate the need to resort to nuclear threats to deter the adversary, like a bank that does not maintain conservative levels of reserves to cover its commitments.

This sort of hazard has long affected the United States' relations with its NATO allies, most of whom do not meet their commitments to devote two percent of their GDP to defense. Japan, too, has not always carried its full share of the defense burden with the United States. Its defense spending declined between 2002 and the arrival of the new Abe government in 2013. Now Japan is pursuing plans for an increase in procurement of major systems, and the U.S. and Japan have intensified exercises and other cooperative activities to solidify defense in the East China Sea. Still, the national government in Tokyo has not successfully overcome local governments' reluctance to cooperate in relocating U.S. military bases on Okinawa. It is common in Washington to hear complaints that an administration is not doing enough to reassure Japan of the United States' commitment to defend it; it is less common to hear of even private congressional remonstrances to Japanese officials that they should do more to buttress the alliance materially *and* diplomatically (vis a vis Japan's neighbors). A careful complementarity is required to match increases in defense preparedness with political and diplomatic sensitivity to the concerns this can cause in states that experienced Japanese aggression in the 1930s.

These considerations can be applied to the issue that currently poses the greatest risk of potential conflict involving Japan and China, and implicating the U.S. as Japan's protector.

There is a cluster of islands and rock outcroppings in the East China Sea that Japan calls the Senkaku Islands and China calls the Diaoyu Islands. Japan incorporated the islands under the administration of Okinawa, in January 1895, during the first Sino-Japanese War. The U.S. took control of these outcroppings as a result of World War II, and returned them to Japanese control in 1972. China disputes Japan's right to sovereignty over these islands. The U.S. does not offer a judgment on the disputed claims to sovereignty, but says that the islands fall within the territory the U.S. is obligated by treaty to help Japan defend. The Japanese government in late 2012 bought the islands from a private owner, explaining that it did so to prevent the nationalist governor of Tokyo from acquiring and developing them. Reflecting the logic of security dilemmas, China intensified its contestation over the issue, and deployed naval vessels and aircraft around and over the islands in order to manifest its claim and pressure Japan to proceed carefully. A non-trivial risk now appears that either state could act physically to change the status quo on or around these islands, and/or that the naval vessels or aircraft could collide, as happened with a Chinese fishing vessel and a Japanese Coast Guard ship in 2010. Such collisions could create a severe crisis that the highly nationalistic Chinese and Japanese governments could find difficult to de-escalate.

Were such a crisis to occur when China and Japan are led by strength-projecting nationalistic figures, the U.S. would face excruciatingly complex challenges. The first priority would be to resolve the crisis diplomatically. But this could be very difficult to do, depending on the circumstances. Japan and China would dispute whose actors and actions were to blame for the precipitating action. If the U.S. did not take its ally Japan's side, whatever the merits of the case, some faction in Washington would decry the abandonment of an ally. And, if Japan were at fault and the U.S. did not acknowledge this for political-diplomatic reasons, China would become even more determined to press its claims on this dispute and others that involve U.S. allies. If evidence held that China was at fault, the political-diplomatic position of the U.S. would be simpler, but then the U.S. and Japan would likely find themselves in a potentially escalating conflict with China.

In either case, to augment diplomacy and strengthen deterrence, and to prevail in case diplomacy fails, the U.S. and Japan would need to have the conventional military means to prevent China from creating new "facts on the ground," for example by physically taking control of the islands. Failure to ensure this initial defense could create a situation where the U.S. and Japan would feel compelled to fight China to reverse its gain. Such a conflict could escalate and expand to a wider naval battle or blockade contest as each leadership would feel its credibility and political survival at stake. Were the U.S. and Japan not prevailing, someone in Washington or Tokyo would at least raise the prospect that the conflict could escalate to the use of nuclear weapons. After all, that's how nuclear deterrence is supposed to work. Yet, would even implying a nuclear threat be advisable and therefore credible? Would and should the United States be willing to risk nuclear war over uninhabited rocks in East Asia that 99 percent of the American people have never heard of and could not find on a map? Recall, the issue here would be first-use of nuclear weapons: if China, despite its commitment and force posture of no-first-use, took steps signaling that it would break the nuclear taboo, U.S. recourse to retaliatory nuclear weapons reasonably would be on the table. But threatening to *initiate* the use of nuclear weapons in conflict that erupted over these disputed outcroppings – no matter how far it escalated -- would constitute a profound over-reaction.

Japanese leaders and citizens may not appreciate this analysis. They may prefer to over-rely on the magic of nuclear deterrence. But statesmanship requires realism, dealing with facts and assessing strategic risks. Japan and the United States must recognize the imperative of developing and deploying diplomacy and conventional military power to prevent efforts by anyone to forcibly change the status quo surrounding this territorial dispute. The combination of clear commitments not to upset the status quo and demonstrable non-nuclear means to prevent anyone else from physically changing it constitutes the strongest possible extended deterrent, for it reaffirms a fundamentally defensive posture that augments national and international resolve.

The current and projected nuclear arsenal of the United States is more than sufficient to perform the physical requirements of extending nuclear deterrence to Japan against China. Nor is it evident that "strengthening" U.S. declaratory policy regarding the use of nuclear weapons would enhance (and not otherwise undermine) the feasibility and durability of the extended nuclear deterrent.

4. North Korea will not in the foreseeable future agree to relinquish all of its nuclear weapons and related capabilities. The near-term imperative should be to negotiate constraints on the buildup of DPRK nuclear capabilities and enforceable commitments not to transfer them to others.

Japanese and South Korean leaders are politically and psychologically unprepared to negotiate anything less than complete DPRK disarmament, for complex reasons. This in turn intensifies political pressures on any American administration not to deviate from this stated objective. This motivates North Korea to demand an exorbitant price for cooperation, which its interlocutors doubt the DPRK will fully implement in any case.

A more realistic alternative would be to bargain for incremental steps by the DPRK to stop increasing its nuclear stockpile and to eschew proliferation of nuclear materials and know-how to other actors. These forms of restraint by the DPRK could be more achievable at a lower price than the DPRK seeks for the illusory objective of total nuclear disarmament.

Acknowledging that DPRK will retain some nuclear weapons for the foreseeable future offends our sense of virtue, as does embarking on what amounts to a protection-racket arrangement to pay the DPRK for not damaging the neighborhood. But the perfect may be the enemy of the somewhat tolerable here: by acknowledging that the DPRK would retain a limited nuclear capability to satisfy its regime's need to deter U.S. and other efforts to displace it, the U.S. and other negotiating parties would strengthen their leverage to obtain North Korean cooperation in mitigating its other threatening behaviors. Arguably, this is the best outcome that might be achieved today.

For such an adjustment in negotiating objectives to be sustainable, the U.S., Japan, South Korea, China and Russia would need to devise a formula that would affirm their ultimate goal to be the creation of a regional security environment free of nuclear weapons on the Korean Peninsula. Such a goal is necessary to satisfy the political-psychological needs of South Korea

and Japan. Yet, the prospect of freeing the Korean Peninsula of all nuclear weapons and (still to be defined) supporting infrastructure would be more realistic after the relevant parties had incrementally built mutual confidence by stopping the expansion of North Korea's nuclear arsenal and infrastructure and authenticating that the DPRK was not transferring weapons, material, and know-how to others.

In terms of U.S. nuclear force requirements and posture, the nuclear threat posed by the DPRK is a lesser-included challenge that can be more than adequately covered by nuclear (and non-nuclear) forces that the U.S. will retain as part of its larger requirement to deter Russia and China.

5. India and Pakistan will continue to augment their nuclear arsenals. The imperatives now are to prevent another major terrorist attack from Pakistan against India and reduce the risks of escalation to nuclear war.

South Asia is the most likely place nuclear weapons could be detonated in the foreseeable future. This risk derives from the unusual dynamic of the India-Pakistan competition. The next major terrorist attack in India, emanating from Pakistan, may trigger an Indian conventional military riposte that could in turn prompt Pakistan to use battlefield nuclear weapons to repel an Indian incursion. India, for its part, has declared that it would inflict massive retaliation in response to any nuclear use against its territory or troops. Obviously, this threatening dynamic – whereby terrorism may prompt conventional conflict which may prompt nuclear war -- challenges Indian and Pakistan policy-makers. India and Pakistan both tend to downplay or dismiss the potential for escalation, but our own history of close nuclear calls should make U.S. officials more alert to these dangers. The U.S. is the only outside power that could intervene diplomatically and forcefully to de-escalate a crisis.

India, is believed to possess approximately 90-110 nuclear weapons. It plans to deliver them via aircraft and/or a growing fleet of ballistic and perhaps cruise missiles. Available information suggests it keeps the nuclear bombs and warheads separate from their aircraft and missile delivery systems. With a historically entrenched doctrine of No First Use, and a strict insistence on civilian control over nuclear policy, India plans to mate weapons and delivery systems only when the need for their potential use appears imminent. While India retains significant quantities of plutonium outside of civilian control, which it conceivably could use to dramatically expand its nuclear arsenal, India thus far rejects ideas of nuclear war-fighting and corresponding development of a large nuclear arsenal, much as China does.

Pakistan is estimated to have 100-120 nuclear weapons, with a continually growing capacity to produce plutonium and highly-enriched uranium to expand this arsenal if it chooses to. Pakistan continues to add new missile delivery capabilities to its arsenal. Most noteworthy has been the development of the NASR 60-kilometre range missile, which Pakistan projects as a battlefield weapon to deter Indian ground-force incursions into its territory. Pakistan proffers the threat of initiating nuclear use if and when it would be necessary to defeat what it would perceive as Indian aggression from land, air and/or sea.

India faces two inter-related strategic challenges vis a vis Pakistan: to compel Pakistani authorities to curtail the operations of anti-Indian terrorists; and to deter Pakistan from engaging in escalatory warfare if and when India responds violently to a terrorist attack. The new prime minister of India, Narendra Modi came to power with a reputation for strong action, which he and his supporters juxtapose to the perceived weakness of his predecessors. Indeed, Modi's government recently unleashed the Indian Army to retaliate with disproportionate force against traditional Pakistani artillery shelling across the disputed Line of Control in Kashmir. Senior advisors to the prime minister have said that there should be little doubt he will respond forcefully if India is attacked again by terrorists associated with Pakistan.

The questions are, what strategy (or strategies) and capabilities would be *feasible and effective* to enable India to motivate Pakistan's security establishment to demobilize anti-India terrorist groups? If terrorist attacks cannot be prevented, how can India respond to them in ways that minimize risks of escalation that would be unfavorable to India?

Since the major Indo-Pak crisis of 2001-2002 following a terrorist attack on India's parliament building, Indians have debated options ranging from Army-centric ground thrusts into Pakistan, precision air strikes, covert operations, and non-kinetic efforts to isolate and sanction Pakistan.

Clearly, some actions that could most probably satisfy one of India's multiple domestic and bilateral objectives would lessen the chances of achieving others. For example, satisfying the desire to punish Pakistan could be achieved by a relatively wide range of military actions and international economic sanctions. But the more destructive of possible military actions could raise the overall scale and costs of the conflict to levels disproportionate to the harm done by the initial attack on India, and invite unwelcome international responses. For example, a successful ground campaign into Pakistan would be most likely to prompt Pakistan to use battlefield nuclear weapons to stop Indian forces and compel them to leave Pakistani territory.

No theories in the existing international literature or in other states' practices offer guidance regarding how India could most effectively proceed here. Studies of strategies and tactics to deter and defeat terrorism have not addressed situations when the major antagonists possess nuclear weapons. Theories and case studies of nuclear deterrence and escalation management in a nuclearized environment have not involved cases where terrorists with unclear relationships to one of the state antagonists are the instigators of aggression and the "unitary rational actor" model may not apply. The Indo-Pak competition features both sets of challenges with the added complication that third states – primarily the U.S. and China – also figure heavily in the calculations of decision-makers.

All of this has implications for U.S. policy-makers. Historically and today, the U.S. has not planned for its nuclear forces to serve deterring or war-fighting roles against Pakistan and/or India. Thus, South Asian scenarios do not figure in calculating the adequacy of U.S. nuclear forces.

However, there are possible scenarios in which the U.S. could become directly implicated in nuclear crises with Pakistan and/or between India and Pakistan. Pakistan fears that the U.S. in

certain circumstances might conduct military operations to capture or otherwise neutralize Pakistan's nuclear forces and fissile materials. Indeed, one of the most telling Pakistani reactions to the U.S. raid that killed Osama Bin Laden was to intensify efforts to hide and secure their nuclear assets. Some of these protective steps could be welcome insofar as they also could help secure Pakistan's nuclear assets against possible efforts by militant non-state actors or rebelling military units to capture them. This scenario – radicals in Pakistan acquiring nuclear weapons and/or fissile materials – has alarmed successive U.S. administrations. Given fears of nuclear terrorism, it would be reasonable for relevant U.S. government actors to aspire to have the precise intelligence and capabilities required to, in a crisis, locate Pakistan's nuclear assets and seek to remove or disable them. Whether the U.S. has the requisite capabilities cannot be gleaned from public sources, but the task would be extremely daunting given the number of Pakistan's nuclear weapons, the volume of its fissile material, and their dispersal to well-hidden and defended facilities.

In any case, while some Pakistani authorities might welcome a successful U.S. operation during an internal Pakistani crisis to keep the country's nuclear weapon capabilities from falling into the hands of anti-state groups, the possibility of such an operation would generally be seen as deeply threatening to Pakistan. Few would be confident that the U.S. would only intervene when it might be welcomed; all would worry that the U.S. might intervene in a very different scenario in which Pakistan was embroiled in a conflict with India. Indeed, the worst nightmare for Pakistani strategic planners is a combined U.S.-Indian effort to negate, or at least degrade, their nuclear deterrent.

This may seem far-fetched today, and I am unaware of scholarly or official analyses of such a possibility. However, I think the following questions suggest that it would behoove the U.S. government to work discreetly on this problem. If India and Pakistan become embroiled in a major military conflict following a major terrorist attack on India attributed to Pakistan, and the U.S. detects Pakistan to be readying nuclear forces for use, should the U.S. intervene to prevent the use of nuclear weapons?

Consider that the U.S. and India are now self-proclaimed strategic partners, and many thousands of Americans live in India or regularly visit it, reflecting ever-increasing U.S. commercial investments and interests in India. Consider also the large and prominent Indian-American community who feel passionately about their native home and participate ever more actively in American politics. If nuclear weapons were being readied for use, with a real prospect of escalation to nuclear war between India and Pakistan, would U.S. leaders feel they should simply stand back and watch? If, God forbid, nuclear weapons were detonated and Americans were among the casualties, would not Congress demand an inquiry to learn "what did the president know and when did he know it, and why did he or she not act to try to prevent it?" Would there not be an expectation that the government had done contingency planning for such an emergency, given how long Pakistan and India have had nuclear weapons and how central the U.S. has been in resolving earlier crises between them?

Members of Congress are much better positioned to answer these questions than I am. But I would wager that there is some prospect that U.S. leaders would at least be expected to

have prepared for such a contingency, even if the preparations concluded there was little that could be done physically to prevent it.

Indeed, we should assume that Pakistani military strategists are thinking of scenarios in which the U.S. might alone, or in cooperation with India, intervene in a looming nuclear conflict to stay Pakistan's hand. In this case, Pakistani planners will be considering whether and how they could deter the U.S. from such intervention. Of course, inviting war, possibly nuclear war, with the United States would be a terrible risk. But in a scenario in which Pakistani military leaders were considering nuclear war with India already, and the U.S. was seen to be denying this recourse to a perceived existential necessity, this could be a risk that they could be willing to threaten to run.

I close by suggesting that, as in the earlier discussion concerning Northeast Asia, the nuclear challenges in South Asia will not be redressed by more or newer U.S. nuclear weapons or changes in U.S. nuclear doctrine. There is no evidence to the contrary. The most immediately pressing objective of U.S. policy should be to apply vigorous, creative diplomatic and political energy to prevent another crisis between India and Pakistan, and if one cannot be prevented, to enhance the preparation of Indian, Pakistani and American officials to manage it with minimal escalation.

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Congressional Testimony

CHINA, INDIA AND PAKISTAN—GROWING NUCLEAR CAPABILITIES WITH NO END IN SIGHT

Testimony by **Dr. Ashley J. Tellis**
Senior Associate,
Carnegie Endowment for International Peace

Strategic Forces Subcommittee of the
Senate Armed Services Committee
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Chairman Sessions, Ranking Member Donnelly and Members of the Subcommittee on Strategic Forces, thank you for the invitation to testify on regional nuclear capabilities and their impact on U.S. security. I will focus my attention today on a segment of the Asian nuclear space, namely China, India, and Pakistan, their strategic interactions, and the impact of their nuclear weapons modernization on each other and on the United States. The nuclear weapon programs in these three countries are worthy of attention because they are active, expanding, and diversifying at a time when the overall global trend remains a continuing contraction of nuclear inventories. As requested by you, Mr. Chairman, my testimony will explore why this is the case and what challenges ensue from such expansion.

China

Unlike India and Pakistan, China is formally a nuclear weapon state under the nuclear Non-Proliferation Treaty (NPT). China is also a major nuclear power possessing advanced, repeatedly tested, and diverse nuclear weapons designs, diverse delivery systems, and a centralized command and control network that is intended to ensure that the leadership of the Chinese Communist Party can exercise effective command of the country's nuclear weaponry.

In contrast to the United States and the former Soviet Union, China historically maintained a small nuclear force consisting primarily of land-based missiles whose warheads were stored separately, with the delivery vehicles maintained routinely in un-alerted status in silos or caves. This relatively relaxed posture was viewed as sufficient to protect Chinese security during the Cold War because Beijing believed that the positive externalities of mutual U.S.-Soviet nuclear deterrence bestowed on China sufficient protection. Because even a small number of survivable nuclear weapons capable of reaching an adversary's homeland could wreak unacceptable damage, Chinese leaders sought to maintain relatively modest forces that through a combination of opacity, sheltering, and sometimes limited mobility, could survive the remote contingencies of direct nuclear attack at a time when these dangers were limited principally by the political constraints of strong bipolar competition.

With the ending of the Cold War and with the progressive rise of Chinese power, Beijing—whether it publicly admits it or not—has come to view the United States as its principal strategic competitor. Given China's recognition of the sophistication of U.S. nuclear and conventional forces in the face of Beijing's desire to reclaim the strategic primacy it once enjoyed in Asia, Chinese nuclear modernization became inevitable. This modernization, which consists principally of efforts to increase the survivability of its nuclear deterrent in the face of what it perceives to be a formidable U.S. nuclear threat supplemented by other major regional dangers from Russia, India, and other prospective nuclear powers, has taken the following form: the deployment of new land-based solid-fueled ballistic missiles of varying ranges (to include intercontinental-range ballistic missiles); ballistic missile submarines with weapons capable of reaching the continental United States; new highly

survivable nuclear weapon storage sites; and a robust national command and control system that incorporates a resilient, dedicated nuclear command and control segment.

The number of nuclear warheads in the Chinese arsenal has also progressively increased as the nuclear delivery systems have been augmented, but there still significant uncertainties about the existence and the number of nuclear gravity bombs and tactical nuclear weapons in the Chinese arsenal. The total size of the Chinese nuclear weapons inventory today is widely believed to consist of some 250 nuclear warheads, but the accuracy of these or any other numbers is debatable. China has a substantial fissile material stockpile consisting of some 16 metric tons of highly enriched uranium and some 1.8 metric tons of weapon-grade plutonium, so there are no practical constraints on its ability to produce an arsenal of any size it chooses. Given the choices China makes in regard to delivery systems, it could deploy anywhere up to an additional 150 warheads over the next ten years.

At arsenal levels of such size, the Chinese nuclear force will be oriented fundamentally towards deterring nuclear use (or the threat of use) against China by maintaining a survivable retaliatory capacity during conflicts with any nuclear-armed state and by maintaining the capacity for escalation dominance vis-à-vis weaker nuclear adversaries. Toward these ends, China will continue to reiterate its "no first use" nuclear policy, though what that doctrine means precisely is unclear.

China today views the United States as its principal active nuclear and conventional threat, followed by India in the nuclear realm. Russia remains a latent nuclear threat and although it was historically an important driver of Chinese nuclear planning, Russia has receded considerably in Chinese calculations today. North Korea, Taiwan, and Japan remain longer-term sources of strategic uncertainty for Beijing, with nuclear threats remaining a current or prospective challenge in all three cases. The most pressing practical contingencies involving Chinese nuclear use in the prospective future, however, involve employment against U.S. forces to forestall defeat or signal a willingness to risk further escalation in the context of a successful U.S. intervention in a Taiwan crisis or in another crisis of similar magnitude in East Asia (for example, on behalf of Japan), and the use of tactical (or other) nuclear weapons in a conflict with India.

India

The rivalry between China and India since their birth as modern states after the Second World War created the preconditions for a nuclear rivalry between them—a competition that was inflamed when China first tested nuclear weapons in 1964 driven by its antagonism to the United States and its emerging split with the Soviet Union. The first Chinese nuclear test, coming two years after India's defeat in the 1962 Sino-Indian conflict, precipitated the Indian nuclear weapons program, which in turn first demonstrated its capacity in 1974. Despite the supposed Chinese disdain of India, Beijing began to systematically target India with nuclear weapons after the latter's first nuclear test, and sometime in the late-1980s

transferred a nuclear weapon design and fissile material to Pakistan, at least in part as a strategy of containing India. New Delhi responded to the Chinese challenge with additional nuclear tests in 1998, declared itself to be a nuclear weapon state, and began to overtly develop its nuclear deterrent since—aimed at both China and Pakistan.

India today is believed to possess an arsenal of some 100 nuclear weapons, though this figure is highly uncertain. The country is thought to have produced close to 600 kilograms of weapons-grade plutonium, though it is unclear whether all this material has been machined into warheads. India can produce extremely large quantities of weapons-grade plutonium, should it chose to use its power reactors currently outside of safeguards for this purpose. To date, however, there is no evidence that India has embarked on any crash program to enlarge its nuclear arsenal, despite its having the technical capacity to do so. If India persists in producing about 5-6 nuclear weapons annually (as it is believed to have done since 1998), the India nuclear deterrent would consist of some less than 200 nuclear weapons by 2025—assuming the public assessments of its current inventory are correct. These weapons will be deployed aboard primarily mobile, solid-fueled, ballistic missiles of up to intermediate range, though these will be supplemented by a limited number of legacy gravity weapons and a small but growing number of sea-launched ballistic missiles. All Indian nuclear weapons currently are maintained routinely in de-mated condition, though whether this posture will persist after the four ballistic missile submarines are eventually inducted into its arsenal is unclear.

The heart of India's current nuclear modernization program, which is centered on developing and inducting mobile, sold-fueled intermediate-range ballistic missiles, deploying ballistic missile submarines, developing a ballistic missile defense system, building weapon storage and integration sites, and completing its command and control network, is aimed principally at refurbishing its deterrence capability vis-à-vis China. The threats emerging from Pakistan are significant, but Indian policy makers judge that their current deterrent against Islamabad as generally adequate. The deterrence gap versus China, however, is considerable and it will not be bridged until India acquires the capacity to range the Chinese heartland with missiles of adequate reach.

Even when the effort to reach this goal is completed—an endeavor that will continue well beyond 2025—it is likely that New Delhi will persist with its currently relaxed nuclear posture so long as current trends in Sino-Indian and Indo-Pakistani relations persist. This posture is predicated on the requirement of a "minimum" deterrent (whose numerical size is not publicly known) and a strict "no first use" policy (which is likely to subsist durably because of India's general conventional military superiority over Pakistan and its still substantial, though decaying, operational military superiority over China along their disputed border). As long as these conditions obtain, there is little incentive for India to violate its "no first use" policy, which is oriented fundamentally towards deterring nuclear attack (or threats of attack) emerging from Pakistan and China.

Pakistan

The contrast between India and Pakistan on "no first use" could not be greater. Unlike India, which is both stronger than Pakistan and no pushover where China is concerned, Pakistan is a weak state that is unfortunately growing even weaker as a result of its awful strategic choices. Pakistan's security competition with India, which dates back to the creation of the two countries as independent states, is multi-dimensional in nature and involves territorial, religious, and power-political dimensions. These grievances have combined in unhelpful ways to make Pakistan the anti-status quo power in the Indian subcontinent. Having fought four unsuccessful wars with India in an effort to secure its strategic aims, Pakistan switched to a dangerous and provocative strategy in the last decades of the 20th century—a strategy of supporting terrorist groups aimed at enervating India through "a thousand cuts," even as Pakistan began to feverishly expand its nuclear arsenal in an effort to prevent New Delhi from retaliating with conventional forces.

The post-2001-02 shift in Indian policy, which holds out the threat of conventional retaliation to Pakistani-supported terrorist attacks (despite the overarching presence of nuclear weapons in the subcontinent), has only deepened Pakistan's dependence on nuclear weapons further, resulting in an acceleration of its weapons program. Today, the Pakistan arsenal includes both gravity weapons and ballistic missiles of up to medium range as well as cruise missiles, glide bombs, and a plethora of new and diverse tactical nuclear weapons. The Pakistani nuclear arsenal is judged by many reputable scholars to consist of some 90-110 weapons, though at the current pace of growth the force could easily expand to over three times that number within a decade.

Pakistan's strategic weaponry is believed to be deployed in de-mated condition routinely in peacetime. Whether that posture will apply to the newer tactical systems is unclear. Pakistan's nuclear doctrine, unlike India or China's, is centered fundamentally on first use, and it is oriented primarily towards defeating India's conventional superiority in the event of conflict. Although Pakistan's nuclear forces are intended, strictly speaking, for deterrence and not war fighting, Islamabad's emerging tactical capabilities could inadvertently push Pakistan towards the latter.

The external dangers of deterrence breakdown, which could precipitate the catastrophe of Pakistani nuclear use against India, are complemented by internal dangers as well. Pakistan's internal fissures, it is often feared, could bleed into its armed forces, resulting in risks to the security of its nuclear weaponry. Although the Pakistani military has made enormous investments in enhancing nuclear security (aided by the United States) in recent years, fears about the loss or compromise of its nuclear weaponry because of domestic dangers still persist—and not unreasonably so.

Taking Stock

When all three states are synoptically considered, therefore, the following contingencies remain the most pressing from the viewpoint of U.S. strategic interests for the reasons adduced below:

1) Chinese use or threats of use of nuclear weaponry to deter U.S. military intervention on behalf or Taiwan or other American allies in Asia.

Of the three nuclear weapons states that are the subject of this testimony, only China conceives of its nuclear arsenal as having direct utility for deterring U.S. military operations directed against its interests at various locations along the Asian rimland. Any contingency that brings U.S. forces in confrontation with China would represent a dangerous predicament and would require both local conventional and overall nuclear superiority for political and military success. Any failure on this score could not only precipitate immediate operational reverses that would frustrate the realization of U.S. political aims, but it could lead over time to the erosion of the U.S. alliance system in East Asia, the future acquisition of nuclear weapons by current American allies, and the eventual loss of American primacy in the Indo-Pacific. For all these reasons, preparing seriously to ensure success in this contingency should remain at the top of American strategic priorities. The recent innovations centered around the "AirSea Battle" concept indicate that the Pentagon has taken the emerging Chinese threats to the U.S. ability to aid its East Asian allies seriously, though it is unclear whether force planning for nuclear escalation vis-à-vis China has been adequately integrated into the current war plans. If this lacuna is real, it could prove costly in the context of a conflict—and could undermine the confidence of the allies in the viability of the U.S. nuclear umbrella.

2) Pakistani "use" of nuclear weapons as cover to support continued terrorist attacks against India.

Although this contingency derives from Pakistan's ability to exploit the deterrence capability inherent in its nuclear reserves for revisionist ends—and represents the dominant threat levied by the Pakistani military against India now for some three decades—it embodies the most likely route to nuclear deterrence breakdown in South Asia. Neither Indian nor U.S. nuclear capabilities are directly useful in defeating this threat, but U.S. and international political pressure on Pakistan, which has been employed episodically, might offer a means of mitigating its worst dangers. The most likely antidote that could alter such Pakistani behavior, however, would be the rising costs of terrorist blowback within Pakistan—which is, unfortunately, an expensive way of getting Pakistan to change course.

3) Pakistani nuclear use against India or against Indian military forces in the context of Indian retaliation against Pakistani-supported terrorist attacks against India.

This contingency arises if India decides to retaliate against Pakistan through the large scale use of military force for punitive purposes. Any significant employment of Indian military force obviously carries the risk of a Pakistani nuclear response, which is why Indian leaders have shied away from exercising major conventional war options that require especially the large scale use of land forces. Should India contemplate major military operations, however, it is likely that the United States would intervene, but mainly through energetic diplomacy as it did in 2001-02 and again in 2008. It is unlikely that the United States would choose to intervene militarily to prevent either conflict escalation or nuclear weapons employment for a host of operational reasons, though some kinds of trans- or post-conflict assistance might be feasible: in such circumstances, the most important U.S. capabilities that would be relevant would be intelligence, surveillance and reconnaissance (ISR) assets, capabilities required for noncombatant evacuation operations, and Nuclear Emergency and Support Teams (NEST) and other assets essential for post-detonation assistance and recovery (if nuclear use has occurred). Because of the large numbers of U.S. citizens normally resident or traveling in India, and the complexity of evacuation operations in a nuclear environment, this scenario can be more stressing than is commonly realized. The most useful U.S. contribution towards preventing a Pakistani use of nuclear weapons in such a scenario—and the Indian nuclear retribution that would result thereafter—would be to press Pakistan to exit the terrorism business or risk being left alone (or, even worse, the object of international sanction) if a major Indian military response ensues in the aftermath of any pernicious terrorist attack. Other than this, there is little that the United States can do to preserve deterrence stability between two asymmetrically-sized states where the gap in power promises to become even wider tomorrow than it is today.

4) Pakistani loss of control over nuclear assets in the context of conventional military operations against India OR a compromise of nuclear security in peacetime in Pakistan.

This scenario, which has been discussed considerably in recent years both in India and in the United States, would also be highly complex in the demands it places on the U.S. military, depending on the details of the contingency. U.S. ISR elements, special operations forces, and other quick reaction capabilities would be highly relevant in such a contingency—as would close coordination with the government of Pakistan and its armed forces. The United States has already aided Pakistan significantly in regards to nuclear weapons protection, but there are obvious limits to further assistance beyond a point, not least because of the deep-rooted Pakistani fears about the United States seeking access and information about the location of Pakistan's nuclear weaponry.

5) Chinese or Indian nuclear coercion against the other in the context of a border crisis OR in the limiting case, the actual use of nuclear weapons to stave off battlefield defeat.

This last contingency, admittedly remote today, would put a high premium on U.S. ISR assets as well as, obviously, active U.S. diplomacy. At the present, it is unlikely that the United States would find itself involved in such a conflict except as a concerned bystander, but if this situation were to change as U.S.-Indian ties grow deeper over time, U.S. conventional and nuclear forces might acquire new roles for extended deterrence and reassurance with respect to India. Until then, however, U.S. ISR capabilities and diplomacy would represent the instruments most relevant to coping with such a scenario.

Implications for the United States

The broad range of nuclear challenges arising from a consideration of the problems involving China, India and Pakistan suggest several important conclusions as far as U.S. strategic forces are concerned.

First, U.S. nuclear forces will continue to remain the ultimate backstop where American national security is concerned. The notion that these forces will become irrelevant any time soon, or that their abolition can be contemplated, is a dangerous fantasy. Eliminating nuclear weapons globally must instead take a backseat to protecting U.S. nuclear dominance and maintaining the effectiveness of the U.S. nuclear deterrent over the long term.

Second, the progressive growth of Chinese, Indian, and Pakistani nuclear forces over the next ten years—and the likelihood of further proliferation elsewhere in years to come--implies that any further reduction of U.S. nuclear forces beyond the New Start treaty ought to be eschewed. Given the complexity of the emerging nuclear environment—a world that is best described as asymmetric nuclear multipolarity—the United States must seek to maintain the requisite superiority of the total force that permits it to achieve conventional success in regional contingencies while preserving the advantages currently enjoyed by U.S. nuclear forces. Given the onerous U.S. extended deterrence commitments in Europe and Asia, American nuclear parity with Russia must not diminish to a point where parity with China slinks into reach.

Third, the United States must think seriously about the threat of nuclear deterrence breakdown in Asia as a time when the continent will host many nuclear powers whose arsenals vary in capacity, architecture and doctrine. The desire to reduce the salience of nuclear weaponry in global politics is estimable. That means that U.S. nuclear weapons ought not to be brandished unnecessarily. However, it does not imply forgetting that U.S. nuclear weapons are still essential for deterring not only nuclear attacks (or the threats thereof) on the United States and its allies but also major conventional attacks as well, while still remaining useful as tactical warfighting instruments in certain specific, admittedly limited,

contingencies where conventional weapons currently remain ineffective. As a general rule, therefore, the desire to reduce the salience of nuclear weapons in world politics should not extend to devaluing the utility of nuclear weapons for deterrence because these instruments will continue to remain the *ultima ratio* in an environment that only promises more, not less, proliferation.