

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE (DD-MM-YYYY) 5/17/2005		2. REPORT TYPE FINAL		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE How Can Unmanned Aerial Vehicles Be Best Integrated Into Homeland Security?				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) COL Michael K. Myers, USAF Paper Advisor (if Any):				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Joint Military Operations Department Naval War College 686 Cushing Road Newport, RI 02841-1207				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution Statement A: Approved for public release; Distribution is unlimited.					
13. SUPPLEMENTARY NOTES A paper submitted to the faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.					
14. ABSTRACT Unmanned aerial vehicles (UAVs) are evolving into a preferred method of accomplishing overhead military intelligence, surveillance and reconnaissance (ISR). Capable of carrying a variety of sensors and electronic tools, they can provide real-time still and video imagery, collect signal intelligence, support communication links, conduct electronic jamming and even deliver munitions on targets. Their long loiter time, low detectability, relative inexpensiveness and low-risk due to their unmanned nature have caused a revolution in battlefield surveillance.					
15. SUBJECT TERMS Unmanned Aerial Vehicles, Intelligence, Surveillance, Reconnaissance, Homeland Security					
16. SECURITY CLASSIFICATION OF: UNCLASSIFIED			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Chairman, JMO Dept
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED		27	19b. TELEPHONE NUMBER (include area code) 401-841-3556

NAVAL WAR COLLEGE
Newport, R.I.

How Can Unmanned Aerial Vehicles be Best Integrated into Homeland Security?

By

Michael K. Myers
Colonel, U.S. Air Force

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____
Date: 17 May 2005

INTRODUCTION:

Unmanned aerial vehicles (UAVs) are evolving into a preferred method of accomplishing overhead military intelligence, surveillance and reconnaissance (ISR). Capable of carrying a variety of sensors and electronic tools, they can provide real-time still and video imagery, collect signal intelligence, support communications links, conduct electronic jamming and even deliver munitions on targets. Their long loiter time, low detectability, relative inexpensiveness and low-risk due to their unmanned nature have caused a revolution in battlefield surveillance.

There is little wonder that they are now gaining attention in the nation's rush to increase homeland security and defense. Decision makers see them as force multipliers and perfect for patrolling borders, coasts, ports and critical infrastructure. Some even forecast that they will be used in domestic surveillance and counterterrorism.

As UAV technology continues to evolve, the types and capabilities of these vehicles will proliferate to meet individual customer requirements. Without an integration plan, applications across the homeland security and defense community will be pursued individually by each of the various agencies involved. Each will have to grow its own UAV expertise and, in their rush to acquire this technology, will likely end up with incompatible systems, further complicating integrated homeland security and defense command and control.

This very scenario played-out in the Department of Defense (DoD) as the services rushed UAVs still in development into the battlefields of Afghanistan and Iraq. In an April 2005 statement, General John Jumper, Chief of Staff of the Air Force, commented that the U.S. military is now operating 750 UAVs in Iraq, jamming each other's radio frequencies

and confusing command and control. Worse yet, there have been two mid-air collisions between UAVs and other airplanes in theater.¹ This same scenario should not be allowed to evolve in the crowded skies over and around North America.

The thesis of this paper is that the most efficient process for integrating UAVs into homeland security operations is to centralize responsibility under a Lead Federal Agency (LFA). Furthermore, the DoD's Northern Command (NORTHCOM) is the optimal agency to carry-out this responsibility. Most of the necessary structure and interagency relationships already exist, and NORTHCOM's roles in homeland security and national defense allow the command to streamline UAV operations across these communities at the same time. Successful integration depends upon formalizing command and control relationships; developing and implementing joint and interagency UAV doctrine and rules of engagement; and developing and implementing centralized training, certification and testing.

CURRENT UAV TECHNOLOGY:

Over 50 countries worldwide own and operate UAVs and over 40 manufacture them.² They have been employed for decades for such purposes as scientific research, border monitoring, military targeting drones and weather forecasting. The U.S. alone operates over 50 different types of UAVs across all military services, the Central Intelligence Agency, the National Aeronautics and Space Administration (NASA) and assorted research organizations.³ However, as a direct result of their significant contributions during U.S. military operations in Afghanistan and Iraq, interest in UAVs and associated technologies has skyrocketed.

¹ Hodge, Nathan, "Jumper: Military Must Reorganize UAV Efforts," *Defense Daily*, 29 April 2005, <<http://aimpoints.hq.af.mil>> [29 April 2005].

² "Worldwide UAV and Target Operators," *Jane's Defence Weekly*, 5 April 2005, <http://www4.janes.com> [11 April 2005].

³ Ibid.

Today's UAVs used for intelligence gathering range in size from hummingbirds such as the experimental 2-ounce AeroVironment Black Widow to the over 24,200-pound Northrop Grumman RQ-4A Global Hawk, a battle-tested condor of the UAV world.⁴ Depending on their size and carrying capacities, they have been outfitted with cameras (photo, video, infrared), radars, communication relay equipment, jammers, laser range finders, signals intelligence systems, electronic intelligence systems and weapons. Types of UAVs can be sorted into three general categories: tactical, medium-altitude long-endurance (MALE) and high-altitude long endurance (HALE).

Tactical UAVs are used at brigade or division level for battlefield surveillance and targeting. They tend to weigh 5 to 1,000 pounds and carry a payload of 45 to 220 pounds depending on their size.⁵ An example is the Marines' Dragon Eye weighing only 5 pounds. It is hand-launchable and easily transported, but due to its small size is limited in both payload and performance. The Dragon Eye flies low and slow at altitudes up to 1,000 feet and speeds up to 46 miles per hour. It provides only about one hour of surveillance and covers an area of around 110 square miles.⁶ These vehicles are ideally suited for observing enemy positions and strengths before moving on an objective but have little strategic value.

MALE and HALE platforms are capable of strategic, higher altitude surveillance. MALE UAVs fly at altitudes up to 30,000 feet and have an endurance of up to 24 hours. They can carry payloads of up to 1,100 pounds which enables them to carry a wide variety of sensors and combinations thereof. HALE UAVs fly at altitudes of up to 70,000 feet and have an endurance of 36 hours or more. They are capable of carrying payloads of up to 2,200

⁴ Richardson, Doug and Linda Deer, "UAV Payload Developments-Creatures GREAT Small," *Jane's Defence Weekly*, 21 July 2004, <http://www4.janes.com> [18 April 2005].

⁵ Ibid.

⁶ "Worldwide UAV and Target Operators."

pounds which obviously expands their sensor capabilities and has even allowed outfitting them with weapons such as Hellfire missiles and bombs.⁷

Examples of strategic UAVs are the Predator and the Global Hawk. Both are the size of small conventional aircraft and require prepared airstrips for launching and recovery. Each can loiter for over 24 hours unrefueled and both can carry all types of sensor and communications technologies. Flying at over 30,000 feet, the Predator can fly over 300 miles per hour while the Global Hawk can approach 400 miles per hour. At these speeds and altitudes, they can surveil up to 53,000 square miles in a 24-hour period. Furthermore, they can be controlled by pilots halfway around the world and well out of danger. The strategic value of such aircraft is undeniable. In fact, the replacement of the U-2 with the Global Hawk (also capable of flying up to 70,000 feet) continues to be discussed by the Air Force.

Today's UAV technologies continue to evolve. Not only are sensor packages getting smaller and lighter, but airframes are being adapted to many different needs. Currently in development, and scheduled for operational fielding in 2007, is the Coast Guard's Eagle Eye which provides tilt-rotor, vertical take-off and landing capability and better adapts UAV launch and recovery operations to ship decks. Eagle Eye will have limited operational capability (only about 4 hours of loiter and 130-mile radius) but will be able to carry a full suite of ISR tools as well as a mine detection system and munitions.⁸

Also being developed are: mini-UAVs which can be dispersed from larger UAVs to get closer "sniffs" of areas of interest (such as onboard ships, around port facilities or other critical infrastructure); UAVs with nuclear, biological and chemical detection systems; and UAVs that can automatically avoid obstacles.

⁷ Richardson.

⁸ Gourley, Scott R, "Deepwater Update," The United States Coast 2004, (2004): 95.

ROLES AND RESPONSIBILITIES:

The numbers and variations of UAVs continue to grow as an opportunistic market scurries to satisfy an ever-growing consumer base. “We’re seeing disjointed and disorganized but broad-based almost grassroots increase in interest in using UAVs...as knowledge of the technology spreads,” explains Mr. Darryl Davidson, Executive Director of the Association for Unmanned Vehicle Systems International.⁹ The U.S. Air Force recently explained that the combat-induced development of the UAV led to skyrocketing program costs, fuzzy requirements and near-limitless capability demands.¹⁰ A central agency in control of UAV integration into homeland security and defense operations, would allow a more coordinated, less expensive and more efficient procurement and implementation process.

Stood-up in 2002, DoD’s NORTHCOM is uniquely positioned for this task. In addition to its role as one of the five geographic combatant commands, it is DoD’s tie into the formal homeland security organization. Charged with homeland “defense” and military assistance to civil authorities during emergency responses, or as directed by the President, the command consolidates military resources and organizations under a single unified command.¹¹ This allows the Secretary of Defense, who is a key member of the Homeland Security Council¹² (Appendix A, Section 5), to efficiently blend military capabilities and contributions into the national homeland security effort.

⁹ Mulholland, David, “Global Hawk Authorization Lifts UAV Industry,” *Jane’s Defence Weekly*, 10 September 2003, <http://www4.janes.com> [25 March 2005].

¹⁰ “Unlike Predator A...USAF Set on Testing, Fine-Tuning Predator B Before Taking it to War,” *Inside the Air Force*, 8 April 2005, <http://www.insidedefense.com> [12 April 2005].

¹¹ “Who We Are...Mission,” *U.S. Northern Command Homepage*, <http://www.northcom.mil> [25 March 2005].

¹² President, Executive Order, “Executive Order Establishing Office of Homeland Security,” *Federal Register* 66, no. 196 (10 October 2001), 51815-51816.

Being a joint command, NORTHCOM has ready access to all of the military services' UAV "experts" and lessons learned in recent operations. Its links to the interagency team responsible for homeland security, provide relationships to all Department of Homeland Security (DHS) agencies that would employ UAVs. No other single organization possesses these pre-existing relationships within both DoD and DHS. By linking those most experienced in UAV procurement and application (DoD) with the combined group of homeland security agencies, focused UAV operations would be effected through unity of effort.

NORTHCOM also maintains Federal Aviation Agency (FAA) representation on its staff¹³ that will be critical in adapting UAVs to domestic airspace. Employing hundreds of UAVs over Iraq is much different than alongside the thousands of civil aircraft that transit U.S. airspace daily. Many of the regulations governing controlled airspace and aviation safety are based on manned aircraft and need to be carefully examined to provide alternate procedures.¹⁴ To date, only the Global Hawk has received FAA certification to fly in controlled domestic airspace.¹⁵ However, as more UAVs are outfitted with transponders and see-and-avoid technologies, demand for certification will increase. Even with these safety systems employed, common sense would dictate minimizing the number of UAVs in controlled airspace. By centralizing responsibility for all UAV integration into homeland security and defense with NORTHCOM, resources can be minimized through shared use and close coordination. Having embedded FAA staff will facilitate regulator/operator interaction and optimize regulatory changes. This centralized FAA control and oversight of UAV airspace issues will be mutually beneficial to regulators and operators alike.

¹³ Gregory, Lisa, "Inside Cheyenne Mountain," *Soldiers*. (November 2004): 46.

¹⁴ Mulholland.

¹⁵ Ibid.

In addition to the benefits that existing NORTHCOM staffing and interagency relationships provide, the command has the ability to synthesize information from multiple sources to ensure the defense of North America. The North American Aerospace Command (NORAD) is collocated with NORTHCOM and provides aerospace control and aerospace warning for North America.¹⁶ This complete picture of airborne threats provides NORTHCOM unparalleled situational awareness and is a major piece of what the joint military community and the homeland defense community refer to as the “common operational picture”. This picture is a single identical display of relevant information shared by more than one command and which facilitates collaborative planning and shared situational awareness.¹⁷

Both the previous NORTHCOM Commander, General Eberhardt, and the current Chief of Naval Operations, Admiral Clark, advocated for the creation of a “maritime NORAD” that would provide the same level of situational awareness and input to the common operational picture as NORAD. General Eberhardt went on to say that, “Homeland defense relies on the sharing of actionable intelligence among appropriate federal, state and local agencies...Our goal is to help connect the dots to create a clear threat picture, playing our appropriate military role as part of the interagency team.”¹⁸

Joint Publication 3-26, Joint Doctrine for Homeland Defense, reinforces this noting that, “Detection is a national effort, which involves maintaining a common operational picture and the sharing and fusing of information/intelligence through a network of federal,

¹⁶ Joint Chiefs of Staff, Joint Doctrine for Homeland Security, Joint Pub 3-26 (Washington, DC: 25 February 2005), II-7.

¹⁷ Ibid, GL-6.

¹⁸ Truver, Scott C., “Maritime Domain Awareness: If it Moves in the Maritime Domain...The Coast Guard Will Know,” The United States Coast 2004, (2004): 121.

state and local agencies.”¹⁹ Any feeds or products generated by UAVs must be compatible with this common operational picture. While each agency involved in homeland security operations will want to collect and utilize UAV feeds for its own daily operations, it is necessary to have the capability to readily feed the same data into systems available to national decision makers. With NORTHCOM setting standard protocols and technology requirements, all agencies will be able to push and pull data from fusion centers and command and control centers – from the national decision maker to the tactical on-scene commander. Just as NORAD is currently capable of doing this, so too will each agency performing homeland security missions.

An example might be the U.S. Coast Guard which collects intelligence via a ship-controlled Eagle Eye UAV and pushes the data to their Intelligence Coordination Center which is already synergistically collocated with the Navy’s Office of Naval Intelligence. The same data must be compatible with systems at sister agencies such as the Federal Bureau of Investigations or Immigration and Customs Enforcement so that they can readily respond to situations which fall into their jurisdictions. As well, national level decision makers at NORTHCOM, the Terrorist Threat Information Center or higher will need to be able to act. Such interconnectivity demands centralized control as this system for a common operational picture evolves. NORTHCOM is uniquely positioned to lead this integration and ensure robustness of the common operational picture.

DOCTRINE:

In addition to formalizing command and control relationships, someone needs to standardize UAV operations through doctrine and rules of engagement. Doctrine presents fundamental principles that guide the employment of forces. It provides authoritative

¹⁹ Joint Pub 3-26, 1-10.

guidance based upon extant capabilities of the Armed Forces of the United States. It incorporates time-tested principles for successful military action as well as contemplating lessons which together guide aggressive exploitation of U.S. advantages against adversary vulnerabilities. Doctrine shapes the way the Armed Forces think about the use of the military instrument of national power.²⁰

Doctrine has certainly benefited today's joint military environment. It provides the basis for all operations, incorporates lessons learned from previous experience and allows the diverse services to quickly integrate and operate alongside each other. This same foundation must be developed for interagency homeland security and defense operations or else the diversity and parochialism of each agency will diminish what could be achieved together.

The military has used UAVs as far back as the 1960s, when the nation used them to overfly the Soviet Union because of the concern over the vulnerability of the U-2 aircraft.²¹ While technology has continued to improve UAV capabilities, doctrine has lagged. In fact, each service utilizes UAVs independently and are all fighting to be named the lead service for UAV employment.²² As of the writing of this paper, there is still no joint doctrine for UAV operations. Joint Publication 3-55.1, Joint Tactics, Techniques and Procedures for Unmanned Aerial Vehicles, was developed by the lead service, the U.S. Marines, in the early 1990s but was cancelled during rewrite in 2002.²³ Currently, only the Army maintains doctrine for UAV operations.

²⁰ Joint Chiefs of Staff, Joint Warfare of the Armed Forces of the United States, Joint Pub 1 (Washington, DC: 14 November 2000), 2.

²¹ Reinhardt, James R. and Jonathan E. James, "Future Employment of UAVs Issues of Jointness," Joint Forces Quarterly, (Summer 1999): 37.

²² Schmitt, Eric, "Remotely Controlled Aircraft Crowd Dangerous Iraqi and Afghan Skies," The New York Times, 5 April 2005, sec. A, p. 9.

²³ Joint Chiefs of Staff, Chairman, Joint Chiefs of Staff Note 3255, 7 June 2002.

Much must be done to develop joint doctrine for UAV operations. Common operating systems and shared protocols reduce development and procurement costs by providing economies of scale. Doctrine can reduce mutual interference and offer solutions to problems of information flow. In sum the advantages being sought in joint integration, including unity of effort and the concentration of military power at decisive points, should also guide the employment of unmanned systems.²⁴

The proliferation of UAVs across DoD has led to concern in the Pentagon about fixing uniform requirements and the possible need for a DoD executive agent to oversee all UAV initiatives. General Jumper agrees, “let’s get everybody under the same roof and make sure that we’re all talking the same language and organizing these things so we can get them where they are needed.” The General is realistic about service rivalries and bureaucratic turf and said that he would welcome someone from another service to lead the effort.²⁵

These same arguments exist for employment of UAVs among the various agencies within the homeland security and defense community. NORTHCOM, whether through the Joint Doctrine Center or as the lead, should be assigned the responsibility for developing joint doctrine for UAV operations, applying the experiences and lessons learned by the services during OPERATIONS ENDURING FREEDOM and IRAQI FREEDOM. At the same time, provisions should be included to adapt tactics, techniques and procedures to homeland security in order to guide interagency efforts and synergize missions and strengths.

TRAINING:

The common operational picture and standards of operation cannot rely solely on written doctrine and rules of engagement. Operators must be trained and certified: certified

²⁴ Reinhardt.

²⁵ Hodge.

not only in how to fly and maintain the equipment, but also certified by the FAA for flight safety (especially for operations in domestic airspace).

Recently, the Air Force has started to forward the concept of a joint center of excellence for UAVs to better focus technology development, UAV integration into military operations and rules of engagement for operators. Again, they worry about interservice rivalries and bureaucratic turf warfare that may adversely impact such a facility. The fear is that if a single service is named to lead this center of excellence and all UAV development and training, control of DoD UAV budgets will follow.²⁶

NORTHCOM not only presents itself as the natural LFA to integrate UAV technology into the homeland security and defense community, but also as the impartial facilitator for military UAV operations. The joint-service character of NORTHCOM alleviates the concerns that a single service will be named to control UAVs and associated budget authority across the services. While military UAV operations development, training, doctrine, rules of engagement and technical protocols would be concentrated at a single center of excellence run by NORTHCOM, budget authority for UAVs and associated assets would be retained by each service.

The Air Force has recommended that this center of excellence for UAVs be located in Nevada where there is a vast area of uncontrolled airspace and where major military air operations already exist. They further note that it is in close proximity to the National Training Center at Fort Irwin, California; Twentynine Palms, California; and Fallon Naval Air Station and Nellis Air Force Base, both in Nevada.²⁷ The site seems ideal for not only

²⁶ Ibid.

²⁷ Ibid.

UAV flight but for integration of UAV operations into service-specific training scenarios at these bases.

Just as NORTHCOM would be able to leverage joint military expertise in the development of doctrine and technical protocols that would benefit both homeland security and military operations, they could expand this center of excellence to include homeland security requirements. The center should be developed with the homeland security and defense community in mind. In fact, representatives from DHS's Science and Technology Directorate should be included on the center's staff. This Directorate is the primary research and development arm of the DHS and is charged with organizing the scientific and technological resources of the U.S. to prevent or mitigate the consequences of attacks on the nation.²⁸ The Directorate also sponsors research, development and testing which would provide another source of capital for center operations. Linking DoD and DHS UAV operators, trainers, equipment and funding will capitalize on such principles as unity of effort, concentration and simplicity.

Is centralization of all UAV doctrine, development and training under NORTHCOM really the best answer? Some maintain that the rapid success of UAVs over the battlefield is largely attributable to the intense competition driven by independent military services and units pushing maturity of the market. Case in point, the U.S. Air Force rushed the Predator, which was still under development, into the air over Afghanistan to provide intelligence for OPERATION ENDURING FREEDOM. Less than a year later, not only was the Predator a mainstay of intelligence gathering, but it had been adapted to carry missiles which were successfully used to destroy targets.

²⁸ Joint Pub 3-26, II-19.

Specialized military UAV requirements flooded the market, however, the process was disjointed and disorganized. Nonetheless, manufacturers and developers rushed to meet demand.²⁹ So lucrative was this market that a new organization named Unite was created by seven UAV companies (Lockheed Martin, Boeing, Northrop Grumman, Scaled Composites, AeroVironment, General Atomics Aeronautical Systems and Aurora Flight Sciences). Unite is working with DoD and NASA to lobby the removal of barriers to operation of UAVs in national airspace by 2008.³⁰ All of these companies are competing to provide the military with unmanned platforms and pushing to open the domestic market.

By centralizing DoD and homeland security UAV operations, development and training under NORTHCOM, equipment would become standardized. Market competition and drive for innovation would become stifled. The economies of broad competition would be eroded.

The military has evolved UAV operations very quickly and has managed to work through problems over Afghanistan and Iraq without a center of excellence or doctrine. Issues with frequencies, bandwidth and command and control will continue to be addressed and solutions to the types of problems General Jumper alluded to will eventually be solved just as interoperability problems that were identified during Operation Desert Storm were solved prior to OPERATION IRAQI FREEDOM.

In addition, technology is evolving quickly to provide fully automatic UAVs that are touted as having little need for human operators. Already, the Defense Advanced Research Projects Center has tested a UAV outfitted with “Software Enabled Control” (SEC). SEC technology allows the unmanned vehicle to fly closer to the ground at higher speeds while

²⁹ Mulholland.

³⁰ Fulghum, David A., “Sharing the Sky Government and Industry Believe the Time May be Right to Allow UAVs to Venture into National Airspace,” Aviation Week & Space Technology, 3 (March 2003): 53.

automatically avoiding obstacles. The operator merely inputs a starting point and an ending point and tells it to avoid things in between.³¹ Such technology may make the need for certified operators obsolete. Perhaps natural evolution is the best way to integrate unmanned vehicle technologies into homeland security and defense operations.

CONCLUSION: The task of securing our homeland is daunting with 7,514 miles of border with Canada and Mexico, 95,000 miles of shoreline and 3.4 million square miles of exclusive economic zone. Each year, more than 500 million people legally enter our country as well as 16 million containers of imported goods.³² The prospects of utilizing UAVs to help surveil these accesses are obvious.

Already the U.S. Coast Guard, Navy and Customs and Border Control have ordered UAVs to augment their individual homeland security/defense missions. Discussion also focuses on their use to help protect critical infrastructure and even conduct domestic counterterrorism efforts. However, without a coordinated effort to integrate this technology into the security and defense of our homeland, we are likely to see agencies developing their own expertise; using dissimilar and incompatible airframes and communication packages; and learning the importance of interoperability the hard way.

As the agency charged with homeland defense, NORTHCOM is integrating information from military, national intelligence, law enforcement and open sources to build a common operational picture and disseminating it across the spectrum of users. This common operational picture is critical to homeland security and defense and must be constructed carefully with fully interoperable systems and knowledgeable team members.

³¹ Garamone, Jim, "Digital Advances Produce Improved UAVs," American Forces Press Service, 3 April 2005, <http://aimpoints.hq.af.mil> [3 April 2005].

³² The White House, National Strategy for Homeland Security, Office of Homeland Security, (July 2002), 21-23.

NORTHCOM is the appropriate agency to lead integration of UAVs across the homeland security and defense community and fold them into this common operational picture. They are also suited to unite the DoD and smooth UAV operations within the military. Drawing on the military's experience, NORTHCOM can develop doctrine, rules of engagement and technical protocols to guide military use of unmanned vehicles. This same knowledge and set of rules can be leveraged and applied to homeland security agencies.

Furthermore, by establishing a center of excellence for UAVs, NORTHCOM can focus all development, testing, training and operational exercising for homeland security and defense at a single site. This will not only focus integration, but will foster interagency cooperation and synergy.

Even though technology continues to evolve toward fully automatic unmanned vehicles, the human element will assuredly be necessary for the foreseeable future. We have not solved problems surrounding the integration of human-controlled UAVs into national airspace. The days of autonomous unmanned vehicles flying around our cities, coasts and borders are well into the future.

Until then, the best way to integrate UAVs into homeland security is to unify these efforts under a single LFA. It is recommended that NORTHCOM be named as this LFA. It is also recommended that NORTHCOM be charged with formalizing command and control relationships; publishing doctrine and rules of engagement; and centralizing training, certification and testing. NORTHCOM's unique position within the homeland security and defense communities makes it the optimal candidate for this job.

APPENDIX A

Executive Order Establishing Office of Homeland Security

Executive Order 13228 of October 8, 2001: Establishing the Office of Homeland Security and the Homeland Security Council

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

Section 1. Establishment. I hereby establish within the Executive Office of the President an Office of Homeland Security (the "Office") to be headed by the Assistant to the President for Homeland Security.

Sec. 2. Mission. The mission of the Office shall be to develop and coordinate the implementation of a comprehensive national strategy to secure the United States from terrorist threats or attacks. The Office shall perform the functions necessary to carry out this mission, including the functions specified in section 3 of this order.

Sec. 3. Functions. The functions of the Office shall be to coordinate the executive branch's efforts to detect, prepare for, prevent, protect against, respond to, and recover from terrorist attacks within the United States.

(a) National Strategy. The Office shall work with executive departments and agencies, State and local governments, and private entities to ensure the adequacy of the national strategy for detecting, preparing for, preventing, protecting against, responding to, and recovering from terrorist threats or attacks within the United States and shall periodically review and coordinate revisions to that strategy as necessary.

(b) Detection. The Office shall identify priorities and coordinate efforts for collection and analysis of information within the United States regarding threats of terrorism against the United States and activities of terrorists or terrorist groups within the United States. The Office also shall identify, in coordination with the Assistant to the President for National Security Affairs, priorities for collection of intelligence outside the United States regarding threats of terrorism within the United States.

(i) In performing these functions, the Office shall work with Federal, State, and local agencies, as appropriate, to:

(A) facilitate collection from State and local governments and private entities of information pertaining to terrorist threats or activities within the United States;

(B) coordinate and prioritize the requirements for foreign intelligence relating to terrorism within the United States of executive departments and agencies responsible for homeland

security and provide these requirements and priorities to the Director of Central Intelligence and other agencies responsible for collection of foreign intelligence;

(C) coordinate efforts to ensure that all executive departments and agencies that have intelligence collection responsibilities have sufficient technological capabilities and resources to collect intelligence and data relating to terrorist activities or possible terrorist acts within the United States, working with the Assistant to the President for National Security Affairs, as appropriate;

(D) coordinate development of monitoring protocols and equipment for use in detecting the release of biological, chemical, and radiological hazards; and

(E) ensure that, to the extent permitted by law, all appropriate and necessary intelligence and law enforcement information relating to homeland security is disseminated to and exchanged among appropriate executive departments and agencies responsible for homeland security and, where appropriate for reasons of homeland security, promote exchange of such information with and among State and local governments and private entities.

(ii) Executive departments and agencies shall, to the extent permitted by law, make available to the Office all information relating to terrorist threats and activities within the United States.

(c) Preparedness. The Office of Homeland Security shall coordinate national efforts to prepare for and mitigate the consequences of terrorist threats or attacks within the United States. In performing this function, the Office shall work with Federal, State, and local agencies, and private entities, as appropriate, to:

(i) review and assess the adequacy of the portions of all Federal emergency response plans that pertain to terrorist threats or attacks within the United States;

(ii) coordinate domestic exercises and simulations designed to assess and practice systems that would be called upon to respond to a terrorist threat or attack within the United States and coordinate programs and activities for training Federal, State, and local employees who would be called upon to respond to such a threat or attack;

(iii) coordinate national efforts to ensure public health preparedness for a terrorist attack, including reviewing vaccination policies and reviewing the adequacy of and, if necessary, increasing vaccine and pharmaceutical stockpiles and hospital capacity;

(iv) coordinate Federal assistance to State and local authorities and nongovernmental organizations to prepare for and respond to terrorist threats or attacks within the United States;

(v) ensure that national preparedness programs and activities for terrorist threats or attacks are developed and are regularly evaluated under appropriate standards and that resources are allocated to improving and sustaining preparedness based on such evaluations; and

(vi) ensure the readiness and coordinated deployment of Federal response teams to respond to terrorist threats or attacks, working with the Assistant to the President for National Security Affairs, when appropriate.

(d) Prevention. The Office shall coordinate efforts to prevent terrorist attacks within the United States. In performing this function, the Office shall work with Federal, State, and local agencies, and private entities, as appropriate, to:

(i) facilitate the exchange of information among such agencies relating to immigration and visa matters and shipments of cargo; and, working with the Assistant to the President for National Security Affairs, ensure coordination among such agencies to prevent the entry of terrorists and terrorist materials and supplies into the United States and facilitate removal of such terrorists from the United States, when appropriate;

(ii) coordinate efforts to investigate terrorist threats and attacks within the United States; and

(iii) coordinate efforts to improve the security of United States borders, territorial waters, and airspace in order to prevent acts of terrorism within the United States, working with the Assistant to the President for National Security Affairs, when appropriate.

(e) Protection. The Office shall coordinate efforts to protect the United States and its critical infrastructure from the consequences of terrorist attacks. In performing this function, the Office shall work with Federal, State, and local agencies, and private entities, as appropriate, to:

(i) strengthen measures for protecting energy production, transmission, and distribution services and critical facilities; other utilities;

telecommunications; facilities that produce, use, store, or dispose of nuclear material; and other critical infrastructure services and critical facilities within the United States from terrorist attack;

(ii) coordinate efforts to protect critical public and privately owned information systems within the United States from terrorist attack;

(iii) develop criteria for reviewing whether appropriate security measures are in place at major public and privately owned facilities within the United States;

(iv) coordinate domestic efforts to ensure that special events determined by appropriate senior officials to have national significance are protected from terrorist attack;

(v) coordinate efforts to protect transportation systems within the United States, including railways, highways, shipping, ports and waterways, and airports and civilian aircraft, from terrorist attack;

(vi) coordinate efforts to protect United States livestock, agriculture, and systems for the provision of water and food for human use and consumption from terrorist attack; and

(vii) coordinate efforts to prevent unauthorized access to, development of, and unlawful importation into the United States of, chemical, biological, radiological, nuclear, explosive, or other related materials that have the potential to be used in terrorist attacks.

(f) Response and Recovery. The Office shall coordinate efforts to respond to and promote recovery from terrorist threats or attacks within the United States. In performing this function, the Office shall work with Federal, State, and local agencies, and private entities, as appropriate, to:

(i) coordinate efforts to ensure rapid restoration of transportation systems, energy production, transmission, and distribution systems; telecommunications; other utilities; and other critical infrastructure facilities after disruption by a terrorist threat or attack;

(ii) coordinate efforts to ensure rapid restoration of public and private critical information systems after disruption by a terrorist threat or attack;

(iii) work with the National Economic Council to coordinate efforts to stabilize United States financial markets after a terrorist threat or attack and manage the immediate economic and financial consequences of the incident;

(iv) coordinate Federal plans and programs to provide medical, financial, and other assistance to victims of terrorist attacks and their families; and

(v) coordinate containment and removal of biological, chemical, radiological, explosive, or other hazardous materials in the event of a terrorist threat or attack involving such hazards and coordinate efforts to mitigate the effects of such an attack.

(g) Incident Management. The Assistant to the President for Homeland Security shall be the individual primarily responsible for coordinating the domestic response efforts of all departments and agencies in the event of an imminent terrorist threat and during and in the immediate aftermath of a terrorist attack within the United States and shall be the principal point of contact for and to the President with respect to coordination of such efforts. The Assistant to the President for Homeland Security shall coordinate with the Assistant to the President for National Security Affairs, as appropriate.

(h) Continuity of Government. The Assistant to the President for Homeland Security, in coordination with the Assistant to the President for National Security Affairs, shall review plans and preparations for ensuring the continuity of the Federal Government in the event of a terrorist attack that threatens the safety and security of the United States Government or its leadership.

(i) Public Affairs. The Office, subject to the direction of the White House Office of Communications, shall coordinate the strategy of the executive branch for communicating with the public in the event of a terrorist threat or attack within the United States. The Office also shall coordinate the development of programs for educating the public about the nature of terrorist threats and appropriate precautions and responses.

(j) Cooperation with State and Local Governments and Private Entities. The Office shall encourage and invite the participation of State and local governments and private entities, as appropriate, in carrying out the Office's functions.

(k) Review of Legal Authorities and Development of Legislative Proposals. The Office shall coordinate a periodic review and assessment of the legal authorities available to executive departments and agencies to permit them to perform the functions described in this order. When the Office determines that such legal authorities are inadequate, the Office shall develop, in consultation with executive departments and agencies, proposals for presidential action and legislative proposals for submission to the Office of Management and Budget to enhance the ability of executive departments and agencies to perform those functions. The Office shall work with State and local governments in

assessing the adequacy of their legal authorities to permit them to detect, prepare for, prevent, protect against, and recover from terrorist threats and attacks.

(l) Budget Review. The Assistant to the President for Homeland Security, in consultation with the Director of the Office of Management and Budget (the "Director") and the heads of executive departments and agencies, shall identify programs that contribute to the Administration's strategy for homeland security and, in the development of the President's annual budget submission, shall review and provide advice to the heads of departments and agencies for such programs. The Assistant to the President for Homeland Security shall provide advice to the Director on the level and use of funding in departments and agencies for homeland security-related activities and, prior to the Director's forwarding of the proposed annual budget submission to the President for transmittal to the Congress, shall certify to the Director the funding levels that the Assistant to the President for Homeland Security believes are necessary and appropriate for the homeland security-related activities of the executive branch.

Sec. 4. Administration.

(a) The Office of Homeland Security shall be directed by the Assistant to the President for Homeland Security.

(b) The Office of Administration within the Executive Office of the President shall provide the Office of Homeland Security with such personnel, funding, and administrative support, to the extent permitted by law and subject to the availability of appropriations, as directed by the Chief of Staff to carry out the provisions of this order.

(c) Heads of executive departments and agencies are authorized, to the extent permitted by law, to detail or assign personnel of such departments and agencies to the Office of Homeland Security upon request of the Assistant to the President for Homeland Security, subject to the approval of the Chief of Staff.

Sec. 5. Establishment of Homeland Security Council.

(a) I hereby establish a Homeland Security Council (the "Council"), which shall be responsible for advising and assisting the President with respect to all aspects of homeland security. The Council shall serve as the mechanism for ensuring coordination of homeland security-related activities of executive departments and agencies and effective development and implementation of homeland security policies.

(b) The Council shall have as its members the President, the Vice President, the Secretary of the Treasury, the Secretary of Defense, the Attorney General, the Secretary of Health and Human Services, the Secretary of Transportation, the Director of the Federal Emergency Management Agency, the Director of the Federal Bureau of Investigation, the Director of Central Intelligence, the Assistant to the President for Homeland Security, and such other officers of the executive branch as the President may from time to time designate. The Chief of Staff, the Chief of Staff to the Vice President, the Assistant to the President for National Security Affairs, the Counsel to the President, and the Director of the Office of Management and Budget also are invited to attend any Council meeting. The Secretary of State, the Secretary of Agriculture, the Secretary of the Interior, the Secretary of Energy, the Secretary of Labor, the Secretary of Commerce, the Secretary of Veterans Affairs, the Administrator of the Environmental Protection Agency, the Assistant to the President for Economic Policy, and the Assistant to the President for Domestic Policy shall be invited to attend meetings pertaining to their responsibilities. The heads of other executive departments and agencies and other senior officials shall be invited to attend Council meetings when appropriate.

(c) The Council shall meet at the President's direction. When the President is absent from a meeting of the Council, at the President's direction the Vice President may preside. The Assistant to the President for Homeland Security shall be responsible, at the President's direction, for determining the agenda, ensuring that necessary papers are prepared, and recording Council actions and Presidential decisions.

Sec. 6. Original Classification Authority. I hereby delegate the authority to classify information originally as Top Secret, in accordance with Executive Order 12958 or any successor Executive Order, to the Assistant to the President for Homeland Security.

Sec. 7. Continuing Authorities. This order does not alter the existing authorities of United States Government departments and agencies. All executive departments and agencies are directed to assist the Council and the Assistant to the President for Homeland Security in carrying out the purposes of this order.

Sec. 8. General Provisions.

(a) This order does not create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its departments, agencies or instrumentalities, its officers or employees, or any other person.

(b) References in this order to State and local governments shall be construed to include tribal governments and United States territories and other possessions.

(c) References to the "United States" shall be construed to include United States territories and possessions.

Sec. 9. Amendments to Executive Order 12656. Executive Order 12656 of November 18, 1988, as amended, is hereby further amended as follows:

(a) Section 101(a) is amended by adding at the end of the fourth sentence: ", except that the Homeland Security Council shall be responsible for administering such policy with respect to terrorist threats and attacks within the United States."

(b) Section 104(a) is amended by adding at the end: ", except that the Homeland Security Council is the principal forum for consideration of policy relating to terrorist threats and attacks within the United States."

(c) Section 104(b) is amended by inserting the words "and the Homeland Security Council" after the words "National Security Council."

(d) The first sentence of section 104(c) is amended by inserting the words "and the Homeland Security Council" after the words "National Security Council."

(e) The second sentence of section 104(c) is replaced with the following two sentences: "Pursuant to such procedures for the organization and management of the National Security Council and Homeland Security Council processes as the President may establish, the Director of the Federal Emergency Management Agency also shall assist in the implementation of and management of those processes as the President may establish. The Director of the Federal Emergency Management Agency also shall assist in the implementation of national security emergency preparedness policy by coordinating with the other Federal departments and agencies and with State and local governments, and by providing periodic reports to the National Security Council and the Homeland Security Council on implementation of national security emergency preparedness policy."

(f) Section 201(7) is amended by inserting the words "and the Homeland Security Council" after the words "National Security Council."

(g) Section 206 is amended by inserting the words "and the Homeland Security Council" after the words "National Security Council."

(h) Section 208 is amended by inserting the words "or the Homeland Security Council" after the words "National Security Council."

[signed:] George W. Bush
THE WHITE HOUSE, October 8, 2001.

APPENDIX B

Bibliography

- Fulghum, David A. "Sharing the Sky Government and Industry Believe the Time May be Right to Allow UAVs to Venture into National Airspace." Aviation Week & Space Technology. 3 (March 2003): 53.
- Garamone, Jim. "Digital Advances Produce Improved UAVs." American Forces Press Service. 3 April 2005. <<http://aimpoints.hq.af.mil>> [3 May 2005].
- Gourley, Scott R. "Deepwater Update." The United States Coast 2004. (2004): 87-99.
- Gregory, Lisa. "Inside Cheyenne Mountain." Soldiers. (November 2004): 44-47.
- Hodge, Nathan. "Jumper: Military Must Reorganize UAV Efforts." Defense Daily. 29 April 2005. <<http://aimpoints.hq.af.mil>> [29 April 2005].
- Mulholland, David. "Global Hawk Authorization Lifts UAV Industry." Jane's Defence Weekly. 10 September 2003. <http://www4.janes.com> [25 March 2005].
- National Strategy for Combating Terrorism. Washington D.C. February 2003.
- Reinhardt, James R. and Jonathan E. James. "Future Employment of UAVs Issues of Jointness." Joint Forces Quarterly. (Summer 1999): 36-41.
- Richardson, Doug and Linda Deer. "UAV Payload Developments-Creatures GREAT Small." Jane's Defence Weekly. 21 July 2004. <http://www4.janes.com> [18 April 2005].
- Schmitt, Eric. "Remotely Controlled Aircraft Crowd Dangerous Iraqi and Afghan Skies," The New York Times. 5 April 2005, sec. A, p. 9.
- Truver, Scott C. "Maritime Domain Awareness: If it Moves in the Maritime Domain...The Coast Guard Will Know." The United States Coast 2004. (2004): 114-123.
- _____. "Unlike Predator A...USAF Set on Testing, Fine-Tuning Predator B Before Taking it to War." Inside the Air Force. 8 April 2005. <http://www.insidedefense.com> [12 April 2005].
- U.S. Joint Chiefs of Staff. Chairman, Joint Chiefs of Staff Note 3255. 7 June 2002.
- U.S. Joint Chiefs of Staff. Joint Warfare of the Armed Forces of the United States. Joint Pub 1. Washington, DC: 14 November 2000.

U.S. Joint Chiefs of Staff. Joint Doctrine for Homeland Security. Joint Pub 3-26. Washington, DC: 25 February 2005.

U.S. President. Executive Order. "Executive Order Establishing Office of Homeland Security." Federal Register 66, no. 196 (10 October 2001): 8 October 2001. 51812-51817.

The White House. National Strategy for Homeland Security. July 2002.

"Who We Are...Mission." U.S. Northern Command Homepage. <http://www.northcom.mil> [25 March 2005].

"Worldwide UAV and Target Operators." Jane's Defence Weekly. 5 April 2005. <http://www4.janes.com> [11 April 2005].