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14. ABSTRACT

As a result of the 9/11 terrorist attacks, the U.S. government established the Department of Homeland Security (DHS) and U.S. Northern Command (NORTHCOM). Working in partnership, they are tasked to defend against terrorism and respond to civil emergencies and natural disasters.

Space forces can fill critical capability gaps and provide key mission enhancements in NORTHCOM's Homeland Defense (HD) and Civil Support (CS) missions. However, integrating space assets into operations is a powerful capability that has not been fully leveraged, primarily due to NORTHCOM/DHS's lack of understanding of space capabilities and how to exploit them.

A striking parallel exists between the current lack of space integration within DHS/NORTHCOM and the lack of space integration within supported combatant commands in DoD prior to Desert Storm. Desert Storm was a turning point that demonstrated the need for deliberate integration of space forces into operational planning. Similarly, the events of 9/11 and the heightened priority of HD/CS missions underscore the need for space integration within DHS/NORTHCOM. Using DoD's post-Desert Storm corrective space integration efforts as a model, NORTHCOM should initiate a deliberate space integration program to maximize effectiveness in executing HD/CS missions.

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SPACE POWER AND HOMELAND SECURITY: IS NORTHCOM LEVERAGING EVERY TOOL IN THE ARSENAL?

By

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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.

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18 May 2004

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ABSTRACT

The 9/11 terrorist attacks against the United States significantly changed the way American's think about national security. The U.S. government responded by establishing the Department of Homeland Security (DHS) and U.S. Northern Command (NORTHCOM). Working in partnership, they are tasked to defend against terrorism and respond to civil emergencies and natural disasters.

Space forces can fill critical capability gaps and provide key mission enhancements in NORTHCOM's Homeland Defense (HD) and Civil Support (CS) missions. However, integrating space assets into operations is a powerful capability that has not been fully leveraged, primarily due to NORTHCOM/DHS's lack of understanding of space capabilities and how to exploit them.

A striking parallel exists between the current lack of space integration within DHS/NORTHCOM and the lack of space integration within supported combatant commands in DoD prior to Desert Storm. Desert Storm was a turning point that demonstrated the need for deliberate integration of space forces into operational planning. Similarly, the events of 9/11 and the heightened priority of HD/CS missions underscore the need for space integration within DHS/NORTHCOM. Using DoD's post-Desert Storm corrective space integration efforts as a model, NORTHCOM should initiate a deliberate space integration program to maximize effectiveness in executing HD/CS missions.

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> The U.S. government has no more important mission than protecting the homeland from future terrorist attacks. Yet the country has never had a comprehensive and shared vision of how best to achieve this goal … to meet this challenge we must make full use of every tool in our arsenal.
>
> President George W. Bush
> National Strategy for Homeland Security[1]

INTRODUCTION

The September 11th terrorist attacks shook America to its core, significantly changing the way American's think about national security. Americans had long felt insulated from attack by two vast oceans and friendly countries on both borders. Not since Pearl Harbor had a foreign attack of such magnitude and significance struck the American people, and even then it was a U.S. *territory* 3,000 miles from the U.S. mainland. Then … everything changed.

The U.S. government was quick to respond, declaring the protection of the homeland its number one priority and creating the Department of Homeland Security (DHS) in the most extensive reorganization of the federal government in over fifty years.[2] U.S. Northern Command (NORTHCOM) was subsequently established to integrate military capabilities from across the Department of Defense (DoD) and focus them into a coherent, synergistic force for deterring terrorism and responding to civil emergencies within the North American Area of Responsibility.[3] As a supporting command, NORTHCOM is specifically responsible for planning and organizing DoD support to DHS agencies (supported organizations) such as the Federal Emergency Management Agency (FEMA), the U.S. Coast Guard, the National Guard, the National Infrastructure Protection Center, and others.[4]

NORTHCOM is still in its infancy, but much progress has been made, especially in the areas of mission identification and creation of organizational infrastructure. However, now that initial milestones have been met and Concepts of Employment are being developed, NORTHCOM must perform a critical assessment as to whether, as President Bush has urged,

the United States is "*making full use of every tool in the arsenal*"; whether there are key functional capabilities that have not yet been adequately integrated into initial planning and operational processes.

The integration of space forces into homeland security missions is one such critical capability that NORTHCOM has not fully leveraged. Space forces can fill capability gaps and provide significant mission enhancements to homeland defense/homeland security (HD/HS) organizations. Space force capabilities are not well known or understood by the disparate agencies that comprise DHS however, and therefore "space integration" has been a nearly non-existent priority in DHS tasking to NORTHCOM. Consequently, space forces have not been identified for maximum exploitation in executing HD/HS missions.

Interestingly, a striking parallel can be drawn between the current lack of space integration within DHS/NORTHCOM, and the lack of space integration within supported combatant commands in DoD prior to Desert Storm. Desert Storm was a turning point that demonstrated the need for concerted, deliberate integration of space forces into U.S. warfighting capabilities vice the ad hoc, unfocused use of space assets in the pre-Desert Storm environment. Similarly, the events of 9/11 and the heightened priority of HD/HS missions underscore the need for effective space integration within DHS/NORTHCOM.

By examining specific space capabilities, the key mission gaps they can fill, and enhancements they can provide to NORTHCOM missions, this paper will demonstrate the criticality of space integration to HD/HS. Using DoD's post-Desert Storm corrective space integration efforts as a model, specific recommendations will be provided as to how NORTHCOM should pursue space integration vis-à-vis maximizing its effectiveness in protecting America from a future 9/11 disaster and responding to national emergencies and civil crises.

ANALYSIS

> How the U.S. develops and integrates the use of space capabilities, for both defense and civil purposes, will affect the nation's security for decades to come.
>
> Commission for U.S. National Space Security[5]

In the 2002 Unified Command Plan, NORTHCOM is officially tasked with two critical missions in securing the homeland: Homeland Defense, and Civil Support.[6] Homeland Defense (HD) is defined as the protection of U.S. territory, the domestic population, and critical defense infrastructure against external threats. Civil Support (CS) involves DoD assistance to U.S. civil authorities for designated law enforcement activities, and ensuring processes, procedures, and resources are in place to support recovery and reconstitution efforts in a designated national emergency or civil crisis.[7]

Capability Gaps and Mission Enhancements

Documented capability gaps exist within both of NORTHCOM's HD and CS missions, gaps for which space assets offer potential solutions. Space assets can also provide key mission enhancements to existing programs, improving effectiveness of mission execution. Communications, environmental sensing, imagery, domain awareness, and surveillance are all mission areas that space assets could impact through effective integration.[*]

Communications. In the aftermath of any major terrorist attack or civil emergency, it is crucial for response personnel to be able to communicate with one another, quickly and continuously, to coordinate emergency relief efforts. However, today's current usage of UHF radios and cellular phones as the primary means of communications falls far short of requirements. According to FEMA multiple organizations at various levels of government employ different communications systems and equipment that do not allow cross-agency communication.[8] This capability gap has been labeled by DHS as "a critical public safety

shortcoming."[9] Converting to a satellite communications (satcom) network could solve this problem and fill this critical gap in NORTHCOM's CS mission.

Critics may argue that we need not focus specifically on space capabilities to solve the communications interoperability problem. An alternative solution might be as easy as selecting one of the existing cellular or radio systems and mandating it as a single standard. Further, the point could be made that current DoD satcom capabilities barely meet existing DoD bandwidth[*] requirements. Several points, however, negate these arguments.

First, developing a new standardized communications system for use across disparate, dispersed organizations is difficult and costly. DoD spent billions of dollars over a decade to develop the Defense Information Systems Agency (DISA) to manage DoD's satcom program providing interoperable communications throughout the world.[10] Building a parallel system would be redundant and expensive, and take many years to develop.

Secondly, many of the state and federal organizations called upon for emergency response are military units; the National Guard is a primary emergency response agency at the state level and active duty military organizations play a large federal role. Many, if not most, of these organizations already use the DISA system. Developing a separate standard cellular/radio system for DHS would require military responders to acquire, maintain, and operate two separate systems, duplicating effort and wasting limited fiscal resources.

Additionally, a standardized cellular/radio system would not solve two other related capability gaps--coverage and survivability. Cellular and radio systems are often impaired by terrain, line-of-sight limitations, and proximity to transmitter towers. Consequently, it is not surprising that over one-third of all emergency response agencies have reported

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[*] For a complete summary of potential uses of space assets by HS agencies, see Appendix A.
[*] Bandwidth is a nominal measure describing a system's maximum communications throughput capability.

unsatisfactory communications capability during incident response due to poor area coverage.[11] Concerning survivability, a WMD attack could destroy transmitters within the emergency response area potentially rendering cell phones and radios unusable, and likely atmospheric interference from a nuclear explosion could significantly impair radio usage. Satcom systems are not subject to line-of-sight or transmitter tower limitations. With respect to survivability, satcoms do not rely on local transmitters, and the Military Strategic and Tactical Relay (MILSTAR) satellite was specifically designed for a nuclear environment.[12]

As for the bandwidth limitation, the Air Force is currently developing three new satellite systems,* with the first scheduled on-line in 2005, that will increase bandwidth capabilities tenfold.[13] And, although expensive in the short term, commercial satcoms are available for lease to fill any gaps that arise should simultaneous military-civil requirements occur.

Environmental Sensing. Environmental sensing satellites can be used to fill key gaps and provide mission enhancements in both of NORTHCOM's HD and CS missions.

NORTHCOM's HD mission includes providing chemical, biological, radiological, and nuclear (CBRN) detection capabilities to civilian authorities. According to DHS, current CBRN detection capabilities are "modest" and require improvement.[14] In fact, three of DHS's top six "major initiatives" include enhancing CBRN detection capabilities.[15] Current systems are limited by line-of-sight sensing requirements, provide only narrow area coverage, and require continuous human interaction to operate.

Remote sensing satellites could overcome each of these limitations and significantly enhance CBRN detection capabilities. Multispectral and hyperspectral sensors deployed in the proper constellation could provide 24-hour continuous, automated coverage of virtually

* The Wideband Gapfiller, Advanced Extremely High Frequency, and Transformational Satellite Communications satellites. Source: Air Force Space Command 2004 Strategic Master Plan.

the entire United States, alerting NORTHCOM to CBRN threats. In addition to filling key gaps in HD, remote sensing satellites can also provide mission enhancements to NORTHCOM's CS mission. Commercial systems such as Land Satellite (LandSat) and NASA's Earth Observing System can detect changes in radiation levels and water tables, and seismic and atmospheric disturbances.[16] These capabilities would improve crisis response by assessing thermal activity, flood levels, infrastructure damage, and debris patterns.

One might argue that a new satellite constellation would be very expensive. However, spectral sensors would not necessarily require an independent satellite constellation. They could be incorporated as secondary payloads into existing programs such as the Global Positioning System (GPS), NASA weather satellites, and commercial satellites. Further, any costs must be weighed against the benefit of reducing the probability of major WMD attacks.

Imagery. Imagery satellites may provide the quickest, safest means to gain situational awareness in the aftermath of a major WMD attack or natural disaster. Especially when wide-area coverage is needed, satellite imagery can provide an integrated picture of an incident area, providing a pseudo Intelligence Preparation of the Battlespace (IPB). Space imagery can gather essential information such as overall scope of damage, determination of evacuation routes, and identification of areas of specific hazard for response personnel.

Critics might rightly point out that DoD imagery satellites are limited, subject to extremely high priority requirements, and classification levels would make it difficult to share imagery with local and state responders. These points are valid. However, a major terrorist attack against the United States such as 9/11 would clearly meet the highest priority requirements. Further, imagery is often "descoped"* to allow access to allies, and a similar

* Descoping is the process of masking key data, providing only certain parts of images, or decreasing resolution so as not to reveal classified capabilities.

process could be developed for local/state responders. Finally, in most cases classified-level resolution would not be required to perform IPB functions. Lesser resolution commercial satellites would meet IPB requirements, avoiding classification and priority limitations.

***Domain Awareness/Surveillance*.** Maritime Domain Awareness is a key part of NORTHCOM's HD mission and has been identified as a targeted improvement area.[17] GPS tracking of ships destined for the United States could provide critical information about past port calls in suspected terrorist enclaves. The Space Based Radar (SBR) satellite currently in development could be merged with GPS and ship "squawking" devices to give the Coast Guard its first real-time surveillance capability of the maritime environment much like the Federal Aviation Administration and NORAD possess for airspace.

GPS could also be used in a surveillance capacity to covertly tag and track suspected terrorist vehicles within the United States, enhancing NORTHCOM's HD mission and the law enforcement aspect of its CS mission. Employment in this manner could provide information about terrorist cell activity 24 hours a day without endangering surveillance personnel, and reduce manpower requirements. Some may argue this violates Posse Comitatus, giving DoD too large a role in domestic law enforcement and could lead to surveillance of U.S. citizens. This is a valid concern, but precedent exists for revision of U.S. law for the specific purpose of thwarting terrorism; the U.S. Patriot Act legitimized the need for broader government authority in some key areas in the interest of national security.

Lack of Space Integration/Deliberate Planning

Clearly, there are many ways NORTHCOM could leverage space assets to bridge capability gaps and enhance key missions for HD/HS. However, as beneficial as space assets could be, they have not been effectively integrated into NORTHCOM's planning processes to fully harness their effects. Understanding why is helpful in identifying potential solutions.

Space capabilities were first developed and used almost exclusively for strategic intelligence, and information about their existence and capabilities were highly classified and stovepiped.[18] Even as new capabilities and wider applications were developed, that early mentality prevailed. As powerful as space capabilities such as GPS and satcom were in 1991, almost a decade after the creation of Air Force Space Command (AFSPC), their full force-enhancement effects were understood by only a limited number of leaders outside of AFSPC. Desert Storm is often heralded as the first "space war" due to America's extensive utilization of space assets.[19] However, the Air Force's official Lessons Learned report indicated that space assets "were used ad hoc, were poorly understood, and therefore not fully leveraged."[20] Without fully understanding the capabilities of space assets, leaders of warfighting commands did not pay much attention to their integration into theater operations.

Given this difficulty of integrating new space applications "in-house" within DoD, it is no surprise they have been slow to migrate to civil agencies that have little exposure to space programs. Prior to 9/11 deliberate planning and/or liaison relationships between AFSPC and FEMA/emergency response organizations were nonexistent.[21] Two examples are illustrative.

Desperate for information in the aftermath of 9/11, one employee of the New York governor's office spent four hours on the internet trying to find a way to access commercial space imagery for pictures of lower Manhattan to enable damage assessment. He finally contacted Space Imaging and used his personal credit card to order the first pictures of the Twin Towers disaster.[22] In the second example, responders from lead agencies such as FEMA and local police/fire departments were unable to communicate with each other due to overload of the local cell phone grids and massive radio interference.[23] When National Guard personnel arrived with satcom capabilities, first responders were patched into FEMA

command centers. In these two examples, space capabilities were ultimately employed, but only through fortuitous circumstances, and luck is not an operational planning factor.[24]

A review of the National Strategy for Homeland Security and DHS Strategic Vision reveals neither document contains any reference to exploiting space assets. Lacking awareness of space capabilities and how space assets can meet their mission requirements, DHS is unable to pre-identify requirements and "pull" space integration into its operations.

Similarly, several factors conspire to reduce NORTHCOM's ability to "push" space integration into HD/CS. The draft Joint Doctrine for Homeland Security (JP 3-26) references space forces only for command and control support, and only for HD missions. JP 3-26 makes no reference to exploiting space assets in support of any of NORTHCOM's myriad CS missions. NORTHCOM's Homeland Security Joint Operating Concept (JOC) is silent on leveraging any space capabilities. Regarding personnel, neither Headquarters NORTHCOM nor Joint Force Headquarters Homeland Security (JFHQ-HLS), responsible for NORTHCOM's CS mission, has any space officer billets assigned to J-5 planning staffs. In fact, there are few space officer billets anywhere on the NORTHCOM staff. [25]

In tandem, DHS's inability to "pull" and NORTHCOM's inability to "push" space integration frames the current environment. A FEMA adage says, "it is much better to trade business cards before a major crisis than afterwards." But business cards are not being traded vis-à-vis space integration, with a direct impact on mission readiness at the operational level.

Comparatively, NORTHCOM is in a similar position today as DoD was prior to Desert Storm. In both cases, space assets offered significant enhancements if effectively integrated into operations. Similarly, in both cases, supported organizations (combatant commands in the DoD case, DHS agencies in NORTHCOM's case) lacked understanding of space capabilities, hence did not pursue their integration, thereby inducing sub-optimal operations.

Given this parallel between DHS/NORTHCOM and pre-Desert Storm DoD, examination of DoD efforts to rectify this lack of synergy suggests potential NORTHCOM solutions.

SOLUTIONS

> Space assets have proven a significant force multiplier when integrated into joint operations. Commanders must address space forces during deliberate planning, integrating space capabilities into all facets of strategy, doctrine, and operations.
>
> Joint Publication 3-14, Joint Doctrine for Space Operations[26]

As previously discussed, the Desert Storm Lessons Learned report indicated the integration of space assets into DoD operations prior to Desert Storm was ad hoc. Warfighters did not fully understand space assets' capabilities, and consequently did not actively integrate them into operations to leverage their potential. Today's landscape is quite different. The capabilities space forces provide is widely understood across DoD, and space assets have become part of the critical foundation that underpins U.S. military power.

In testimony before the House Armed Services Committee, General Richard Meyers, Chairman of the Joint Chiefs of Staff, noted:

> "Space systems are absolutely critical to America's warfighting capacity, and have been integrated into Operation Iraqi Freedom with unprecedented success."[27]

Two examples underscore this point. First, space officers were integrated into the Joint Targeting Coordination Board and Air Tasking Order Cell. By altering the schedule of daily GPS timing updates to coincide with scheduled airstrikes, they were able to improve the accuracy of GPS-guided munitions by 30%. In the second example, an Army Space Support Team was embedded with the 1st Marine Expeditionary Force providing on-scene satcom and counter GPS-jamming capabilities to advancing forces fighting their way toward Baghdad. [28]

The U.S. Commission on National Security for the 21st Century summarized in crescendo:

> "Today, the U.S. military cannot undertake any major operation, anywhere in

the world, without the support of space systems."[29]

Clearly, a significant transformation has taken place with respect to space integration across DoD since the ad hoc operations of Desert Storm. Transformation of this magnitude, in a bureaucracy as diverse as DoD, did not occur by accident. Examination suggests three key themes were primarily responsible for yielding DoD's success: 1) effective advocacy and infrastructure; 2) focused training and dedicated liaison to supported commands; and 3) full spectrum integration. Each of these themes positively impacted warfighting capabilities at the operational level, and offers insight into potential solutions for NORTHCOM.

Effective Advocacy and Infrastructure

Following Desert Storm, AFSPC began an aggressive campaign to publicize the valuable contributions space assets made to the war effort, culminating in the operation being labeled as America's first space war.[30] Simultaneously, AFSPC began developing the Desert Storm Lessons Learned report touting the improved capabilities space forces could provide to combat forces if deliberately integrated into operations. As DoD's leading cadre of space professionals, AFSPC's credible and effective advocacy laid the foundation for a broader DoD effort. DoD tasked the Air Force as the lead agent for space integration, which served as the first step toward a formalized infrastructure to shepherd the new initiative. The Space Warfare Center at Schriever Air Force Base was created to develop new doctrine and systems to integrate space assets into joint warfighting, and the Office of Space Integration was created at the Air Staff to provide Pentagon oversight of the overall DoD effort.[31] These new organizations created the institutional infrastructure necessary to propel integration initiatives through the often-stifling DoD bureaucracy. Effective advocacy and formalized infrastructure enabled DoD to successfully "push" space integration to the supported warfighting commands.

Leveraging this concept, two recommendations are provided in order for NORTHCOM to develop the ability to effectively "push" space integration to its supported organizations.

Recommendation 1: Develop a cadre of trained space officers on the J-3/J-5 staffs at Headquarters NORTHCOM and JFHQ-HLS. As noted previously, NORTHCOM does not possess a sufficiently trained cadre of space professionals with the requisite experience to effectively advocate for HD/CS space integration. AFSPC was successful in its advocacy efforts by leveraging space officers who, through previous experience, also had a solid understanding of combat operations. Together, these two experience bases merged to create officers who understood space capabilities and how to use them as combat force multipliers. NORTHCOM must build the same synergy within the operations and planning staffs of its two primary headquarters components. Whether sending officers with HD/CS backgrounds to space orientation training, or cross-flowing space officers into HD/CS billets, NORTHCOM must develop a cadre of officers who understand both missions. Only then will NORTHCOM be able to effectively advocate for space integration in a way that maximizes mission success.

Recommendation 2: Create a Space Integration Division within the J-5 staff at Headquarters NORTHCOM and a Space Integration Cell at JFHQ-HLS. A Space Integration Division (SID) at NORTHCOM would serve as the lead agent for space integration within the command. Command level oversight and functional management by the SID will ensure space integration is merged into all levels of NORTHCOM, providing focused emphasis and measured progress. The SID would also provide operational level integration for NORTHCOM's HD mission, working in partnership with the Coast Guard, FBI, and other HD organizations. Given that JFHQ-HLS is the command component responsible for executing NORTHCOM's CS mission, a J-5 Space Integration Cell (SIC) would enable integration of space capabilities at the operational level with CS organizations

such as FEMA and the National Guard. Together, the SID and SIC would form the infrastructure necessary for long-term sustainment of the NORTHCOM integration effort.

Critics might argue that U.S. Strategic Command (STRATCOM), as the force provider for DoD space forces, already performs a SID-like function for supported commands, and a NORTHCOM SID would be redundant. This view however, is too broad. STRATCOM must provide oversight, but NORTHCOM is the DHS operational interface, and clearly has the greatest vested interested (i.e., its mission). Maximum space integration at the operational level can only occur through focused integration between the two operational partners.

Focused Training and Dedicated Liaison to Supported Commands

As important as NORTHCOM's ability to "push" space integration, is the supported command's deliberate desire to "pull" space integration into operations. Otherwise, NORTHCOM's unilateral efforts could well be fruitless. Within DoD, this "pull" shortfall was due to a simple lack of understanding within supported commands of space systems and their capabilities. In response, AFSPC developed a cadre of Space Support Teams (SST) permanently assigned to supported command staffs to train senior leaders, operators, and planners on how space capabilities could be tailored for specific theater support. The SSTs also provided important liaison roles with reach-back capability to the global space network.

This model is equally applicable to NORTHCOM and its DHS partners. Supported DHS organizations such as FEMA, the Coast Guard, and the National Guard do not fully understand space capabilities and how they can be tailored for HD/CS support. Two initiatives are offered as potential solutions to overcome this shortfall.

Recommendation 3: Develop Training and Contingency Support Teams (TCST) from among SID/SIC assets and formalize liaison relationships with supported organizations. TCSTs should be thought of as the space integration linchpin connecting

supported DHS organizations and NORTHCOM (the supporting command). TCSTs can provide space capabilities training to senior leaders, operators, and planners bridging the awareness gap. Face to face training for key planners will also facilitate formal liaison roles, providing DHS pre-coordinated reach-back capability to NORTHCOM space experts, and fill the "trading business cards before the crisis" function. Viewing the subject critically, one might question why TCSTs should be limited to SID/SIC personnel rather than leveraging the few existing space officers assigned to other parts of the NORTHCOM staff. But building TCSTs from SID/SIC assets will ensure synergy and unity of effort, with the same personnel who work steady-state planning/integration issues also providing leadership/staff training and filling formal liaison roles. An argument could also be made that because NORTHCOM, unlike in the DoD SST model, does not possess enough trained space experts to allow permanent assignment within supported organizations, liaison relationships may not fully meet DHS needs. Permanent assignment would be preferred, but a pre-coordinated planning/liaison role is far better than the current absence of integration. Additionally, inability to permanently assign TCSTs to supported agencies can also be minimized by implementing Recommendation 7 (deployable space teams) described in the next section.

Recommendation 4: Identify key operational planners within DHS's supported organizations for advanced space capabilities training. AFSPC offers a series of space orientation courses ranging from several days to several weeks in duration. NORTHCOM should identify key operational planners within DHS organizations and facilitate their completion of appropriate levels of training. This would create an in-house cadre of space knowledgeable planners to facilitate space integration from within supported organizations.

Providing focused training and formalized liaison functions to supported organizations, these two recommendations will allow NORTHCOM to create an environment in which DHS organizations begin to "pull" space integration into their operations.

Full Spectrum Integration

Once the proper "push" and "pull" environments have been established creating fertile ground for effective space integration, it is important to identify initiatives that will sustain the effort and provide meaningful enhancements to mission capabilities. At the operational level, mission execution is, by design, affected by strategic decisions. In turn, tactical objectives and capabilities must be linked to the operational in order to provide coherence and synchronicity. Therefore, effective space integration at the operational level must occur across the full spectrum of environments, from tactical to strategic. To that end, three final recommendations are provided to begin the process of full spectrum integration.

Recommendation 5: Strategic--Build space integration into NORTHCOM/DHS doctrine. For space integration to be widespread and lasting, it should be codified into official doctrine. In the DoD model, Joint Doctrine for Operations (JP 3-0) was amended to highlight space integration,[32] and a new publication, Joint Doctrine for Space Operations (JP 3-14) was specifically added to articulate how space forces can be best integrated into operations. Likewise, NORTHCOM should incorporate space integration into its Strategic Vision, Joint Doctrine for Homeland Security (JP 3-26), and the Homeland Security JOC. This will codify space integration within HD/CS, signaling a leadership priority and laying the foundation for follow-on operational and tactical level improvements.

One could argue with the premise of this recommendation by asserting that doctrine is operational rather than strategic in nature. While it is true that some doctrine is operational, such as the Joint Doctrine for Countering Air and Missile Threats codifying operational

principles of execution, broader level documents such as JP 3-26 and the DHS Strategic Vision articulate general principles that provide strategic guidance to operational planners.

Recommendation 6: Operational--Establish formal, structured deliberate planning process between NORTHCOM and DHS supported organizations. The National Strategy for Homeland Security declares, "an effective response to a major terrorist attack or natural disaster depends on being prepared" and calls for a "comprehensive system to coordinate response assets quickly and effectively."[33] Deliberate planning is the critical first step in achieving that requirement. Recognizing the importance of a structured planning approach to integrating space capabilities into combat operations, DoD mandated inclusion of a Space Operations annex, Annex N, into all Operations Plans. This process ensured supported commands executed structured, pre-coordinated planning for space integration, leading to tailored, synchronized employment. NORTHCOM should work with its supported organizations to develop an Annex N equivalent to DHS's Crisis Response Plans. These annexes could include satcom channel designations, pre-coordinated commercial imagery agreements, and environmental sensing requirements, all of which would significantly streamline operations. This recommendation might be criticized as overly optimistic in that, unlike DoD, NORTHCOM cannot mandate deliberate planning on the part of its supported DHS organizations. Nonetheless, by successfully implementing Recommendations 1-5, NORTHCOM can create an environment in which DHS fully appreciates the value of deliberate planning in terms of closing capability gaps and providing mission enhancements, and seeks a full partnership in deliberate planning. Just like in coalition operations, relationship management and mutual benefit will be the keys to NORTHCOM's success.

Recommendation 7: Tactical--Develop TCSTs as deployable support forces. Clearly, the closer space forces are integrated into HD/CS operations the more effectively they can be

leveraged. But as pointed out in Recommendation 3, NORTHCOM does not possess enough trained space experts to allow permanent assignment within supported organizations. To bridge this gap and provide maximum support to DHS during crises, NORTHCOM should model the TCSTs in Recommendation 3 as rapidly deployable teams. This will provide on-scene space expertise to crisis response personnel at the tactical level, similar to the example of the Army Space Support Team embedded with the Marines, and fully leverage the experience and relationships TCSTs will already enjoy due to their training and liaison roles.

CONCLUSION

This paper has demonstrated that space assets can fill critical mission gaps and provide key enhancements to NORTHCOM's HD/CS missions. Consider the following scenario:

A small Yemeni-flagged transport ship veers out of the New York harbor transit lane and stops squawking GPS tracks. Turning off their GPS in the fog and driving rain, the terrorists think they will be almost impossible to find. Ironically, killing their GPS squawk is exactly what alerts the Maritime Surveillance Center to cue NORTHCOM for an unscheduled sweep of the harbor. The whole process takes only seven minutes, just like in the weekly training exercises. An all-weather capable Space-Based Radar satellite quickly finds the target and provides coordinates to Coast Guard interceptors. The captured ship yields the largest radiological "dirty bomb" intercepted to date. With American waters penetrated, standard protocol requires environmental sweeps of all major cities and ports. Within 30 minutes, hyperspectral sensors on LandSat pick up abnormally high radiation levels from a warehouse district in Dallas. An hour later, satellite imagery of the entire complex is beamed via satcom to the Dallas FEMA command center, where an FBI counter-terrorism team begins planning an assault. All in all, a pretty good day for NORTHCOM's space integration team.

The preceding vignette illustrates just a few of the powerful capabilities space forces can bring to U.S. homeland security--but only if deliberately integrated into NORTHCOM's operational planning. Initial efforts to achieve this vision are not taking place. The time is now for NORTHCOM to make space integration a critical priority, not only to leverage current capabilities, but also to influence/define requirements for future space enhancements. The recommendations in this paper are only the first step. But if implemented, NORTHCOM can lay the foundation for full spectrum space integration, thereby improving mission effectiveness at the operational level and increasing the safety and security of America.

Notes

[1] Office of Homeland Security, National Strategy for Homeland Security, (Washington DC: 2002), i, 26.

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APPENDIX A

Summary of Potential Space Capabilities[34]

Homeland Security Agency	Potential Areas of Space Support
U.S. Northern Command	**Imagery, Satcom, Navigation, Weather, Remote Sensing**
Federal Bureau of Investigation	**Imagery, Satcom, Remote Sensing**
Federal Emergency Management Agency	**Imagery, Satcom, Navigation, Weather, Remote Sensing**
National Infrastructure Protection Center	**Imagery, Satcom, Navigation, Weather, Remote Sensing**
Office of Domestic Preparedness	**Imagery, Satcom, Navigation, Weather, Remote Sensing**
U.S. Border Patrol	**Imagery, Satcom, Navigation, Weather, Remote Sensing**
U.S. Coast Guard	**Imagery, Satcom, Navigation, Weather, Remote Sensing**
Environmental Protection Agency	**Imagery, Satcom, Navigation, Weather, Remote Sensing**
U.S. Customs Agency	**Imagery, Satcom, Navigation**
U.S. Department of Energy	**Imagery, Satcom, Weather, Remote Sensing**

APPENDIX B

Summary of Recommendations

Effective advocacy and formalized infrastructure, achieved by implementing the following two recommendations, will enable NORTHCOM to effectively "push" space integration to its supported DHS organizations.

Recommendation 1: Develop a cadre of trained space officers on the J3/J5 staffs at Headquarters NORTHCOM and JFHQ-HLS.

Recommendation 2: Create a Space Integration Division within the J5 staff at Headquarters NORTHCOM and a Space Integration Cell at JFHQ-HLS.

Providing focused training and formalized liaison functions to supported organizations, the following two recommendations will allow NORTHCOM to create an environment in which DHS agencies begin to "pull" space integration into their operations.

Recommendation 3: Develop Training and Contingency Support Teams (TCST) from among SID/SIC assets and formalize liaison relationships with supported organizations.

Recommendation 4: Identify key operational planners within DHS's supported organizations for advanced space capabilities training.

Three final recommendations will enable NORTHCOM to lay the foundation and begin down the path to achieving full spectrum integration.

Recommendation 5: Strategic--Build space integration into NORTHCOM/DHS doctrine.

Recommendation 6: Operational--Establish formal, structured deliberate planning process between NORTHCOM and DHS supported organizations.

Recommendation 7: Tactical--Develop TCSTs as deployable support forces.

Combined, these recommendations will significantly improve space integration into NORTHCOM's HD and CS missions, and provide opportunities to close critical mission gaps and enhance key mission capabilities. Doing so will improve operational effectiveness in protecting America from future 9/11 disasters and responding to national emergencies.