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SPACE MISSILE DEFENSE

A PROFESSIONAL JOURNAL

SPACE PROS

Key Players 'Always in the Title Game'

GERMANY . JAPAN . SOUTH KOREA . QATAR

AFGHANISTAN

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SPACE PROS

Key Players 'Always in the Title Game'

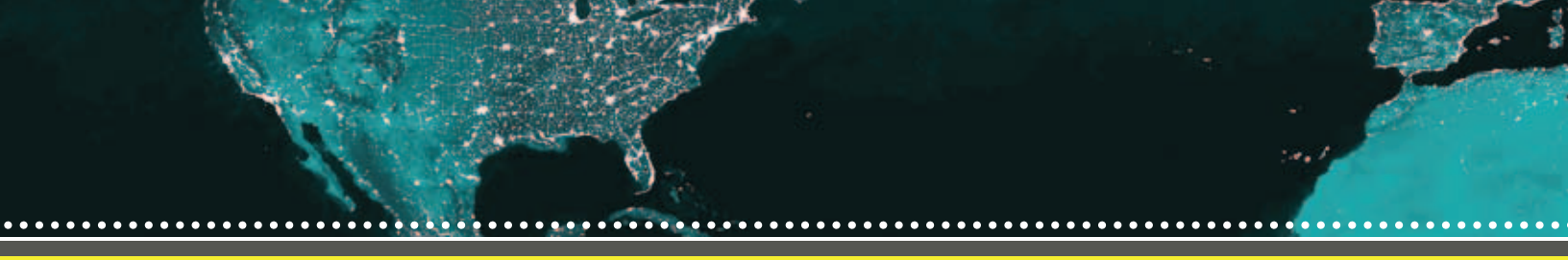
BY DOTTIE WHITE & RACHEL L. GRIFFITH,
USASMDC/ARSTRAT PUBLIC AFFAIRS

The Globe Visited

Earth's military and political hot spots are pretty obvious when you look at a map of assets belonging to the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command. Sixteen locations form a line that runs east to west, from Japan and Korea, across the Mideast and Europe, to California and Hawaii. The line also dips into the Pacific Ocean for the command's Space radar and test site at Kwajalein Atoll and swoops into Alaska for the Missile Defense installation at Fort Greely.

USASMDC/ARSTRAT operations located along the line have easy connectivity to all the regions represented by the Department of Defense's unified commands. In an era of persistent warfare and rogue nations, Afghanistan and its neighbors are key places. Within that region, the command's 1st Space Brigade supplies Space-based expertise and products to U.S. and allied forces in Afghanistan, while the 100th Missile Defense Brigade is on constant watch against missile attacks.

The Army Space Journal invites you to tour the command's world. We start with words of welcome from the brigade commanders, then visit customers across the globe.



GLOBAL SUPPORT

Command's Brigades Trained & Ready for Worldwide Customers

1st Space BRIGADE

Space Support

provides communication and navigation, anticipates weather, and protects forces based on combat and support assets available from Space.

Satellite Communications

provides worldwide, high-volume, voice and data communications necessary to the Warfighter.

In keeping America and its allies safe, the sun truly never sets on Soldiers of the U.S. Army Space and Missile Defense Command/ Army Forces Strategic Command.

As the Army's proponent for Space and ground-based midcourse defense and the operational integrator for global ballistic Missile Defense, USASMDC/ARSTRAT has a number of units around the globe affiliated with the 1st Space Brigade and 100th Missile Defense Brigade.

The 1st Space Brigade provides 24-hour satellite communications support and early missile warning around the world. In the Europe and Pacific regions specifically, the brigade has two primary Space support missions, according to COL Eric P. Henderson, its commander.

"One is enduring and the other is on call," Henderson said. "Soldiers at forward-stationed units such as Joint Tactical Ground Stations, or JTAGS, and Wideband Satellite Communications Operations Centers live day in and day out within the European Command and Pacific Command regions. They are a part of the tactical, operational, and strategic community providing early missile warning and satellite payload control.

"Additionally, deployable units such as Commercial Imagery Teams and Army Space Support Teams, residing within the brigade, stand ready to deploy on short notice to support operational plans to units that reside in these two areas of operations," he added.

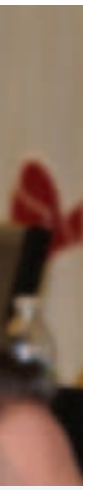
Definite technical skills are required of Soldiers assigned in these two fields.

"These Soldiers must be proficient in both operational and maintenance areas of expertise," Henderson said. "Soldiers with innate leadership and unflappable demeanor are the norm within these mission areas."

Henderson proudly described his brigade's mission as unique.

"There is no '2nd Space Brigade.' We are a one-of-a-kind organization with a vast global area of influence," he said. "The Soldiers, Civilians, and contractors on my team do not have the luxury of 'taking a knee' while someone else or some other Soldier performs the mission that is ours. We are the provider of 'trained and ready' Space and Missile Defense forces for this command. It is not a mission that is taken lightly."

Another element of the command, the 100th Missile Defense Brigade (Ground-based



Midcourse Defense), is responsible for providing trained and ready Missile Defense forces to the commander of U.S. Northern Command in support of the mission to defend the United States against ballistic missile attacks.

We do this by operating key command and control nodes in Colorado, Alaska, and California 24/7/365 with highly trained and certified Soldiers," said COL Gregory S. Bowen, brigade commander. "In addition to operating the global missile defense system, the 100th is responsible for protecting and securing the Missile Defense Complex at Fort Greely, Alaska. The military police from Alpha Company, 49th Missile Defense Battalion conduct the security mission 24/7/365, enduring all of the weather extremes the interior of Alaska has to offer.

"Finally, the 100th is a force provider for the AN/TPY-2 radars," he added. "These radars provide fire control data to the global missile defense system as well as supporting regional operations in several geographic combatant command areas of responsibility." AN/TPY-2 radars are located in Japan, Israel, and Turkey.

Bowen says that being the only Missile Defense brigade in the U.S. military brings challenges.

"Most Army units train, deploy, and perform their mission, then return home and reset. In contrast, the 100th is essentially deployed in place, executing its wartime mission 24/7/365," Bowen said. "We never get the down time, and as a result, we don't 'fit' well into what the rest of the Army is doing.

"Certified ground-based midcourse defense operators are a very scarce commodity; at any given time, there are about 75 Soldiers certified to operate the system," he added. "Managing the careers of these low-density specialists is one of the critical challenges we face."

Bowen said the training and mastery of the system are paramount as this is a no-fail mission.

"Beyond the tactical and technical skills you would expect the Soldiers to have, they must display a high level of commitment to the mission," he said. "We have a very demanding certification program which the GMD operators must complete every six months in order to remain qualified.

"There are similar programs for the military police and for the Soldiers in the radar detachments," he added. "The commitment comes into play as the Soldiers battle complacency. There are threats out there, so the Missile Defense crews and the MPs must maintain a very high state of readiness at all times, and under all types of conditions. They maintain this 'razor's edge' of readiness without any fanfare or accolades. They are quiet professionals who are doing a critical job on behalf of our nation; our citizens can go to sleep at night knowing they are out there, ready to defend the homeland at a moment's notice."

These two unique brigades provide support to numerous customers around the globe. Some of these customers spoke highly of the brigades' unique abilities in support of the Warfighter.

JTAGS detachments are located in Germany, Qatar, Japan, and South Korea. They supply real-time reporting and tracking of tactical ballistic missile launches to theater and national commanders by processing infra-red data from Defense Support Program and Space-Based Infrared System satellites.

"Simply put JTAGS is indispensable for this base. Every second counts," said Air Force Col. Van A. Wimmer Jr., vice commander of the 35th Fighter Wing at Misawa Air Base, Japan.

"You can imagine how amazed the command and I were when we got here and understood what JTAGS was, never having been exposed to what they do. But then also to know they understand the threat to us and give us a lot of instruction. They pick up the phone and call us directly to give us that warning, and they get it before anyone else."

"JTAGS Korea has a 24-hour real world mission that compliments what we do here as a forward-deployed Patriot battalion. Their job is to provide early missile warning to the Korean peninsula," said CSM Timothy D. Hockenberry, 6th Battalion, 52nd Air Defense Artillery Regiment, at Suwon Air Base, South Korea.

"Early missile warning for us is definitely something that we need. It benefits the systems we have organic to our battalion, anything that can extend the reach that we have. It allows our commander to determine which resources available to him are the better, or the best way, to combat that threat. We use it every day."

100th Missile Defense BRIGADE

AN-TPY2 Radar System

protects deployed forces and allies from ballistic missile threats, it is designed to detect, track and discriminate ballistic missile threats.

Ground Based Interceptor Missile

The nation's only long-range ballistic missile defense system. Designed to intercept incoming warheads in Space

They are quiet professionals who are doing a critical job on behalf of our nation; our citizens can go to sleep at night knowing they are out there, ready to defend the homeland at a moment's notice.

HELPING THEM HELP YOU

Professional Development Office Works to Meet Customers' Needs

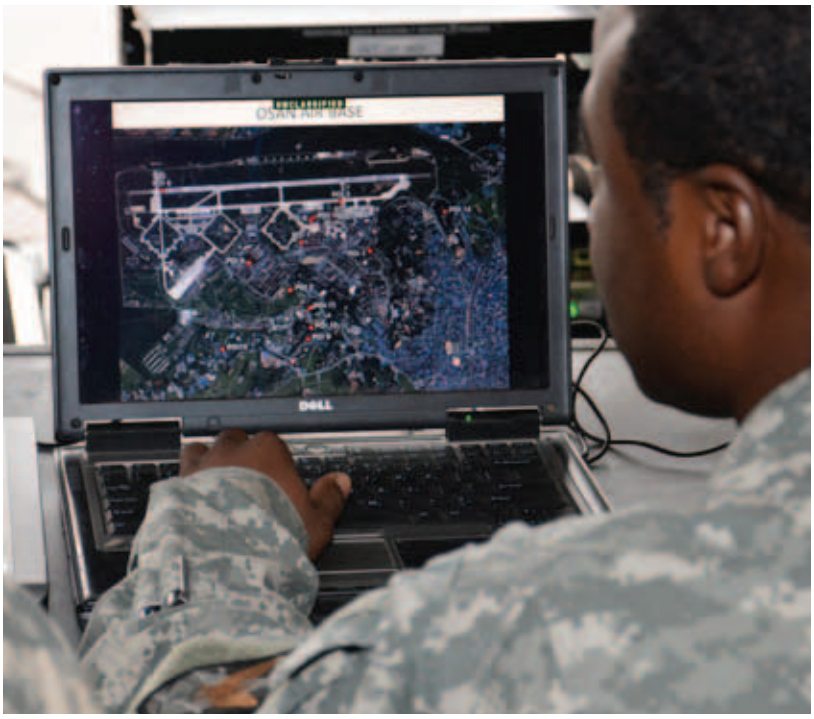
Mike Connolly is Director of the Army Space Professional Development Office for the U.S. Army Space and Missile Defense Command/ Army Forces Strategic Command. The office provides talent management for Functional Army 40 (FA40) Space Operations officers and develops opportunities for FA40s across the Army and join force structure, including USASMDC/ARSTRAT customers.

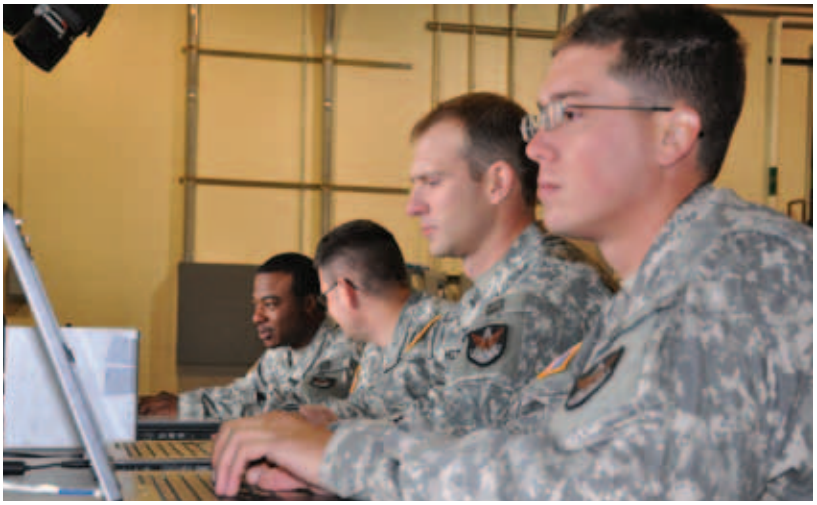
In today's world, Space is becoming normalized for many people. The early cadre of FA40s when the career field was first designated back in 1999 brought something new. We brought a capability that talked to Warfighters about Space-related capabilities, talked about satellites, whether it's communications or infrared detection. That was kind of new to the Army. Now, you go out to your car and you have GPS. Plug your ATM card into a machine and it's based on GPS. Space is normalized not only in the Army but in society. When there are operational Warfighters out there and they haven't thought about an aspect of Space, how it can support an operation, that's what the FA40s bring.

From an FA40 perspective and from the proponency side of the house, we are going to try to work with every organization that wants an FA40. We want to make sure we are getting FA40s to where the customer wants them. Operational commands are asking for FA40s on a recurring basis. For example, the special operations community came on line about 18 months ago to say they would like an FA40 at their group level. We have now worked through the process and those billets are documented on future manning authorization documents. That's a success story we have been able to do with the special operations community, the one that is most visible right now.

It's a very good news story for the Army Space community. Customers want FA40s. We continue to get phone calls, people saying, "I want an FA40 and am willing to do whatever it takes to get one." That's not a result of the work we are doing in this office. It's a result of the work the FA40s out in the field are doing. People are reacting and saying, "That's the kind of guy I need." The FA40s are doing great work.

1st Space Brigade Soldiers use access to satellites to ensure Warfighters on the ground receive the support they need. *Photos by Rachel L. Griffith*





THE CUSTOMER PERSPECTIVES

Middle East

CSM Marvin Hill

Interviewed while serving as Senior Enlisted Leader, International Security Assistance Force /United States Forces-Afghanistan

Our Soldiers are as technically savvy as they come. They are "real time" Soldiers. They are very comfortable with whatever we throw at them. The real challenge is providing the proper training prior to deployment that would allow the leaders to integrate the latest devices into their tactical plan.

I'm not sure if knowing who provides Space and Missile Defense capabilities is all that important to Soldiers. They know that it works. They know that there are far more capabilities to forge the fight, provide force protection, and locate potential threats then there were during their last deployment. They are familiar with the menu and often select the appropriate tools from the menu.

I am aware of both elements–JTAGS in Qatar and the Army Space Support Teams in Afghanistan. It's kind of hard to comment on a unit whose job is to keep stuff from happening. In all fairness to JTAGS, Missile Defense was not one of the things that kept me up at night. Unfortunately for them, they do not have the pleasure of saying, "My bad, it won't happen again." They are always in the title game.

We are making tremendous strides in Afghanistan. Our troopers have defined winning in their areas. Winning is something that we can apply a cookie-cutter approach to. They know what it takes to provide a safe and secure Afghanistan that is secured by the Afghanistan National Security Forces. They are getting there. Yet, they also understand how fragile and reversible their progress can be.

Col. Clinton Crosier, USAF

Director of Space Forces in Afghanistan

It's been my experience that our Army Space pros are excellent planners and doctrinal thinkers with diverse backgrounds and experiences. Our Air Force Space pros bring capability-based knowledge and expertise from their work with the actual satellite systems. This combination makes the Space team extremely effective. A team of joint Space operators is exponentially more effective than a single-service team. Throw in interagency disciplines from our intelligence community, and we have a truly operational think tank. Senior officers often have commented on the innovative atmosphere in the DIRSPACEFOR shop. I attribute that directly to the diversity of our shop and our ability to share information and ideas across disciplines and across components.

Information sharing has come a long way over the last ten years. Ten years ago, National Technical Means was a foreign concept to tactical units. Satellite communications was only available to higher echelon headquarters. Blue Force Tracking was in its infancy. It's hard to believe how far we've come. I think our overall efforts to integrate Space across the warfighting functions have enabled this fundamental shift to how we handle data.

We are capable, collectively, of producing a myriad of Space force enhancement products and Space control effects to address challenges at the tactical, operational, and strategic levels. However, Space elements are typically small and resource limited. We cannot be everywhere all the time. Our challenge is to be at the right place at the right time with the right information to make the biggest impact. We can optimize our value through the planning process–planning to the left, as we call it.

Mastery of our tools is an important skill in warfare. We've found that our tools can be used in ways for which they were not designed. You can get more juice per squeeze if you open up to new ideas. We've tried to create an atmosphere where mission accomplishment serves as the catalyst for the application of technology. Technology does not accomplish the mission; people do!

Europe

CSM Thomas Capel

Former Command Sergeant Major, U.S. Army Europe

Now serving as the Senior Enlisted Leader, International Security Assistance Force/United States Forces-Afghanistan

I don't think USASMDC/ARSTRAT is getting out and beating their chest about all the things they do on the battlefield. They just do it. They've been doing a great job bringing equipment, technology, electronic warfare, and other things into the theater that help us find improvised explosive devices before they go off and hurt our Soldiers, since IEDs are the biggest threat and the biggest casualty-producing weapon on the battlefield. USASMDC/ARSTRAT has been focused on how to defeat the IED network for many years. And we are not all the way there yet, but we are a lot further ahead than we were in 2003 and 2004.

Every year there is some type of capability being built, some type of new weapon system being found by USASMDC/ARSTRAT to help Warfighters on the battlefield to help those guys get places safely before they walk over or step on or run over an IED. And they make sure they get to the people who need to have it on the battlefield.

It's just amazing now how we can look at our objectives by the imagery technology from Space and Missile Defense satellites, look at our targets before we get out and hit them. We know exactly where we're going; we see the enemy first. That comes from the communications and computer satellite systems provided by USASMDC/ARSTRAT. We give service members a huge advantage by this. It's not a total surprise for them when they get to the objective; they've already seen it.

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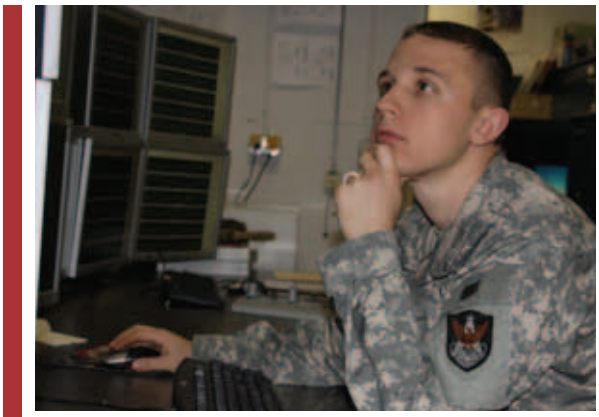
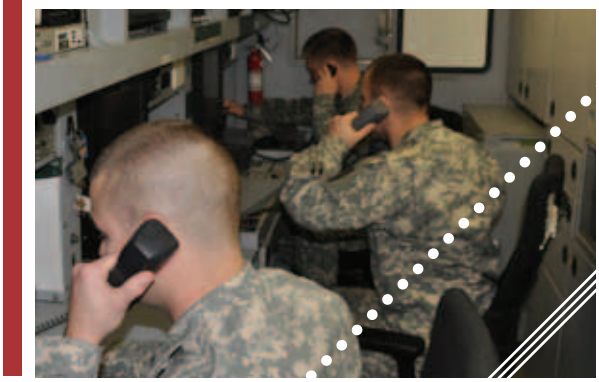




Soldiers working at Wideband Satellite Operations Centers and Joint Tactical Ground Stations are forward deployed worldwide ensuring 24/7 vital mission support to the Warfighter. *Photos by Rachel L. Griffith*

Teams of Soldiers are ready to deploy in-theater on short-notice to support Operation Enduring Freedom.
Photos by Rachel L. Griffith and CPT Brendan Curran.

Pacific

MG Michael T. Harrison Sr.

Commander, U.S. Army Japan/I Corps
forward deployed

We all benefit from the capability provided by U.S. Army Space and Missile Defense Command/Army Forces Strategic Command. Some of the capability we take for granted, especially in communications and imagery, is simply not possible without Space Soldiers and the USASMDC/ARSTRAT. In my role as commander of U.S. Army Japan and I Corps (Forward), much of the imagery we used during Operation Tomodachi here in Japan was made possible through the professional efforts of USASMDC/ARSTRAT.

I am very familiar with both of the sites in Japan. The sites in Okinawa and Misawa are critical to our military operations throughout the entire Pacific Command area of responsibility. As the commander for the U.S. Army component command in Japan, I closely monitor and have responsibilities pertaining to all activities involving U.S. Army Soldiers and their Families throughout all of Japan.

Our well-trained Army long ago developed a highly skilled and technically proficient force with the best noncommissioned officer corps in the world. To maintain this professionalism and proficiency, Space Soldiers are particularly important to not only the U.S. Army but also to the U.S. armed forces and our allies as well. These Soldiers represent one of our more important low-density military occupational specialties, so it becomes vitally important that we continue to focus our best efforts on their professional training, education, and development. This includes selecting the highest performers who have demonstrated the potential for increased levels of responsibility to serve as our noncommissioned officers. The responsibilities, competence, and resiliency required of Space Soldiers cannot be overstated; the Army and the Nation need them now more than ever given the potential threats we face.

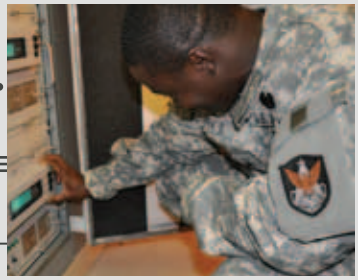
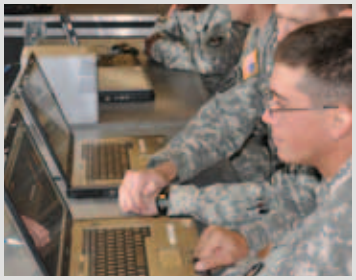
Lt. Col. Tony Jarry, USAF

Command Post Chief,
Misawa Air Base, Japan

JTAGS Japan is a close-knit team of highly professional Soldiers who represent the U.S. Army very well. I'm proud to serve with them here at Misawa Air Base. They provide an active Missile Defense system to Misawa Air Base and the surrounding community. This capability affords the 35th Fighter Wing and surrounding area a 24/7 defensive posture. Operationally, the early warning missile system allows the wing to prepare to deploy and fight in the Pacific Air Forces area of responsibility safely by providing us an early missile warning capability.

As we move forward with less funding and a smaller military force, we're going to increasingly rely on technology to help us fight and win wars. This means Soldiers are going to have to understand the systems they work with more intimately as well as know how to use them in both conventional and unconventional ways. It's not enough to have smart technology. We've got to have smarter, more technically educated Soldiers that can exploit the technology they're using.

Space and Missile Defense have been and will always be a large part of our nation's defensive posture. A good offense is strengthened through a good defense. As the long arm of the military reaches farther out, Space and Missile Defense is going to play a larger role in our nation's capability to defend, fight, and win wars.


United States

CSM James N. Ross

Command Sergeant Major, 32nd Army Air and Missile Defense Command, Fort Bliss, Texas

Formerly Command Sergeant Major, 1st Space Brigade

I think that the majority of the Soldiers in the Army, regardless of their career fields, understand the importance of Space and its capabilities. The average Soldiers rely on GPS and satellite communications as a basic part of their duties. At the same time, I know that most Soldiers do not understand the unique mission sets provided by USASMDC/ARSTRAT, for instance, Space control, missile warning, intelligence, surveillance, and reconnaissance, special missions, and satellite payload control. This has been a challenge for USASMDC/ARSTRAT, because it is difficult to educate the force due to the classification level of the operational missions.

The command is a great place to develop more technologically sound Soldiers. The Space career field is leading the Army in development of weapon systems, communication platforms, sensors, and command and control architecture. USASMDC/ARSTRAT focuses a lot on the strategic level of warfare, and most Soldiers do not operate at that level in conventional Army units. Soldiers in USASMDC/ARSTRAT learn to operate in teams, and most enlisted Soldiers will have responsibilities far greater than their current pay grade. Most Soldiers who serve a tour there will leave the command more competent, confident, and educated, which translates into future success. Their experience will benefit any unit in the Army.

I think the Space Professionals and Space Cadre of USASMDC/ARSTRAT are the critical link in educating the force. Their performance in support of theater and regional areas of operations is the best way to show their value. The Space Support Elements and Army Space Support Teams are critical to the reputation and legacy of Space operations because they are working daily with the maneuver forces at the corps and division levels.

USASMDC/ARSTRAT focuses a lot on the strategic level of warfare, and most Soldiers do not operate at that level in conventional Army units. Soldiers learn to operate in teams, and most enlisted Soldiers will have responsibilities far greater than their current pay grade.

- Space Operations
- Missile Defense Operations
- Satellite Communications
- Headquarters, Future Warfare Center, Technical Center and Army Astronauts

A Wahiawa, HI

B Fort Greely, AK

C Vandenberg, CA

D Colorado Springs, CO

E Houston, TX

F Fort Detrick, MD

G Mac Dill, FL

H Huntsville, AL

I Landstuhl, Germany

J Stuttgart, Germany

SSE
provides Space support in garrison to their respective headquarters and subordinate units

RSSC
Provides a single point of contact for the units they support, planning usage for satellite communications resources.

WSOC
controls the communications payload and communications transmissions of the DSCS and WGS constellations

CIT
provides unclassified commercial imagery to U.S. and coalition forces, as well as other government agencies.

A Global Command

A Wahiawa, HI
- D Company, 53rd Signal Battalion
- Regional SATCOM Support Center

B Fort Greely, AK
- 49th Missile Defense Battalion

C Vandenberg Air Force Base, CA
- 100th Missile Defense Brigade

D Colorado Springs, CO
- USASMDC/ARSTRAT Headquarters
- Future Warfare Center
- 1st Space Brigade
- 100th Missile Defense Brigade (GMD)
- Global SATCOM

E Houston, TX
- Army Astronaut Detachment

F Fort Detrick, MD
- A & B Company, 53rd Signal Battalion

G MacDill, FL
- Regional SATCOM Support Center

H Huntsville, AL
- USASMDC/ARSTRAT Headquarters
- Technical Center
- Future Warfare Center
- TCM - Space & Global Missile Defense

I Landstuhl, Germany
- C Company,53rd Signal Battalion

J Stuttgart, Germany
- JTAGS Joint Tactical Ground Station
- RSSC Regional SATCOM Support Center

K Osan, Korea
- JTAGS Joint Tactical Ground Station

L Okinawa, Japan
- E Company, 53rd Signal Battalion

M Misawa, Japan
- JTAGS Joint Tactical Ground Station
- AN/TPY-2 Forward Based Mode

N Doha, Qatar
- JTAGS Joint Tactical Ground Station
- ARSST Army Space Support Team
- CIT Commercial Imagery Team
- SSE Space Support Element

O Kurecik, Turkey
- AN/TPY-2 Forward Based Mode

P Negev Desert, Israel
- AN/TPY-2 Forward Based Mode

Q Kwajalein Atoll, Marshall Islands
- Reagan Test Site

ARSST
provides broadband communications, making possible in-theater Space analysis, Space support products, & Space planning

JTAGS
provides in-theater early missile warning support to combatant commanders around the world.

TaLKing SHOP

ASSURED Tactical ACCESS to Space

The following article was excerpted from a white paper, Assured Tactical Access to Space, a concept document produced by Dave Carrithers, Frank Cox, and George Luker of the Concepts and War Games Division of the U.S. Army Space and Missile Defense Battle Lab. The complete white paper can be found on the Army Space Journal Website.

The Military Problem

When considering future paths for the development and deployment of Space capabilities to support land combat operations, the required capabilities found in the Army Capstone Concept (ACC) and Army Operating Concept (AOC) serve as baselines for Army Space requirements, requirements that can be articulated to the joint Space communities responsible for the actual development and servicing of these assets. When considering the central ideas of these concepts we must ask the following questions. How do we assure access to the most important Space force enhancement capabilities for our tactical forces? How do we diversify our capability portfolio or employment procedures to mitigate an increasingly contested environment? What technologies do we pursue? How do we better leverage joint, coalition, and commercial partner capabilities? How do we develop and train our leaders to exploit better the advantages of our Space capabilities? The Army must answer these questions to make certain it has dependable access to Space-enabled capabilities.

Assured Tactical Access to Space

Meeting the challenges presented in the ACC and AOC–especially the characteristics of "operational adaptability" and "operating decentralized"–will place greater demands on our leaders and command-and-control mechanisms. It will be necessary to develop capabilities that deliver Space down to the lowest tactical level, the "tactical edge." Operating decentralized will require

competent and confident leaders supported by reliable capabilities that will enable communications, situational awareness, and superior decision-making. The Army modularity construct itself requires that units are dislocated geographically from higher headquarters; smaller Army units operate increasingly detached from, and independent of, more fixed and stable higher-level command-and-control (C2) headquarters. This increased responsibility has stressed not only the capabilities and skill sets of our younger leaders but has also outpaced the technical capabilities to keep these organizations connected. Thus, Army modularity, and the AOC, demand that tactical units have Space capabilities[1]–those capabilities once seen only at division-and-above will need to be accessed down to the lowest echelons. Space-based communications and Global Positioning System (GPS) are "must haves" that allow communications at long distances on the move and deliver accurate positioning, navigation, and timing information. They provide the capabilities and capacities for the Army to increase the coverage of operating areas, to have precise knowledge of troop locations, and to deliver fires more accurately.

Along with satellite communications (SATCOM) and GPS, Army Warfighters also depend on other Space-force enhancement assets, namely those on-orbit intelligence-and-warning resources that provide missile warning and overall battlespace characterization. A number of Space systems offer land Warfighters valuable battlespace situational awareness and missile warning. In particular, the Overhead Persistent Infrared program offers both missile warning and intelligence, real-time critical dependencies for theater commanders' decision-making and the execution of tactical ground missions. If the Army of the future is to fight effectively when decentralized–and at the same time maintain operational adaptability–assured tactical access to Space becomes imperative.[2] Simply put, this means Space must be delivered when and where Warfighters need it for mission accomplishment.

Supporting Ideas

Four supporting ideas contribute to the development and delivery of assured tactical access to Space capabilities. Although Space is often considered an esoteric and technical domain, the ideas that follow spread across the whole doctrine, organizations, training, materiel, leadership and education, personnel, and facilities-solutions construct and oblige the Army to take a more holistic approach toward them, an approach that goes beyond simply developing and procuring more user devices.

These ideas are:

- Diversifying architectures using a multidomain approach
- Influencing partners' capabilities and programs
- Gaining and maintaining advantages to tactical Space access
- Building versatile and adaptable Army Space organizations
- Diversifying Architectures Using a Multi-Domain Approach

It is no longer the case that the Army operates in an assured and non-contested Space environment. In the early stages of Operation Iraqi Freedom, for instance, the Iraqis attempted to jam GPS signals with jammers readily available for purchase online. Thus, the Army must be prepared to fight in denied, degraded, and disrupted Space operational environments.[3] To prepare to fight Space capabilities in a contested Space environment, it is incumbent on the Army to follow a multidomain approach by advocating for and leveraging capabilities in the terrestrial, aerial, high-altitude, and Space layers. This approach would diversify networks; it would construct a NetOps environment that builds secure and reinforcing information architectures; and it would create a redundant, reliable system of intelligence, surveillance, and reconnaissance (ISR) platforms and payloads. A multidomain approach provides defense-in-depth, making it both

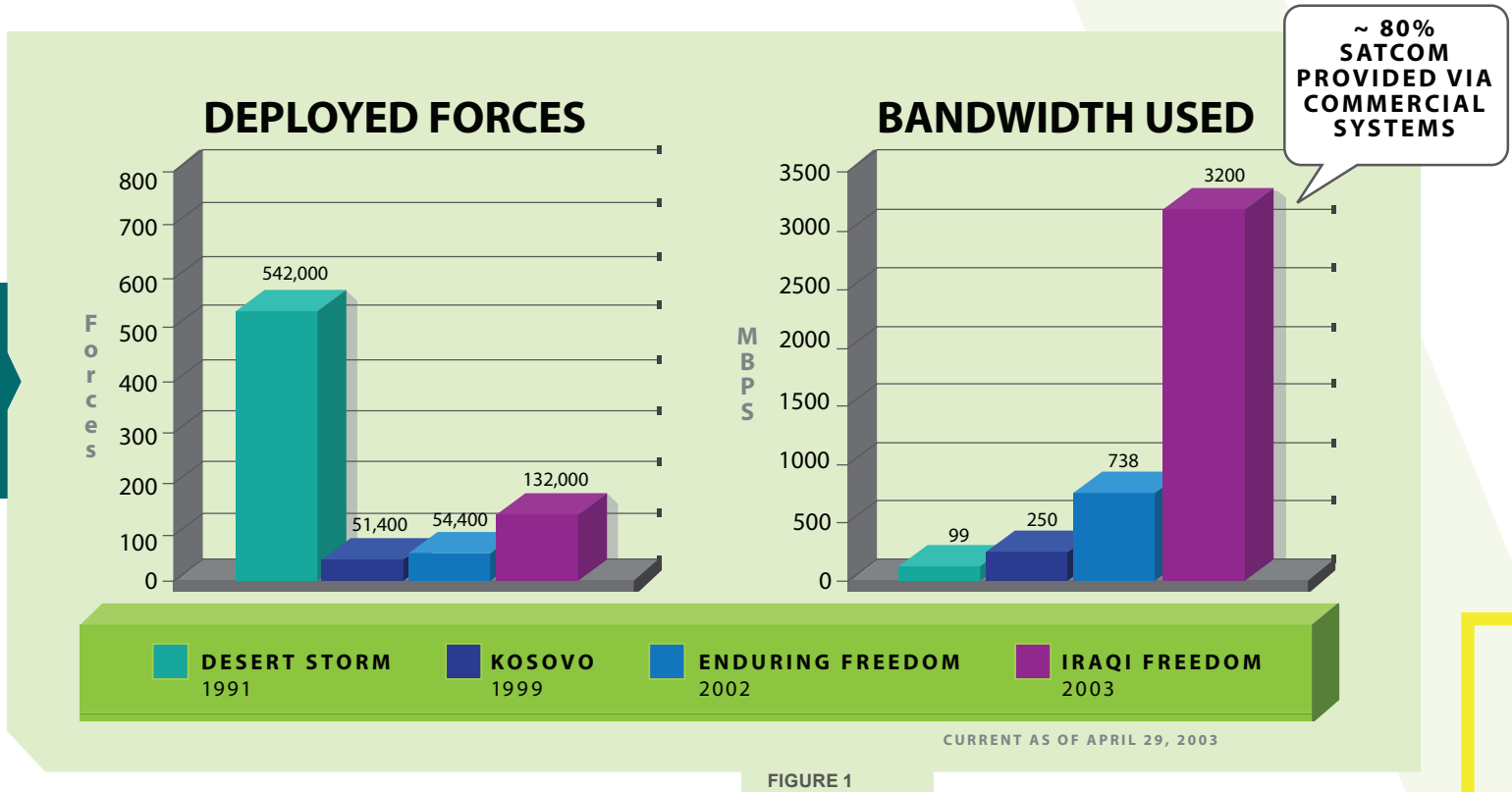


FIGURE 1
Increase in Bandwidth Requirements since Operation Desert Storm

When is enough, enough?
The United States Army's appetite for wideband SATCOM has grown exponentially. Army requirements for SATCOM in the early days of Operation Iraqi Freedom quadrupled in comparison to Operation Desert Storm despite a significantly lower number of deployed command echelons and force levels. With further emphasis placed on Network Centric Operations, this requirement seems almost certain to maintain a consistent growth path.

difficult and resource-intensive to attack military communications and ISR delivery systems. A multi-domain approach not only provides resiliency it also grows bandwidth capacity, increasing the likelihood of timely tactical access. Finally, operating over widely dispersed operating areas, and in the most austere environments, will challenge Army Warfighters to establish and maintain communications links–a multi-domain approach will be required for wide-area and austere operations in order to establish networks swiftly and securely.

Influencing Partners' Capabilities and Programs

When considering the Army's growing dependencies on Space, it is important to realize that the Army is fully dependent on the joint community and commercial markets. The Army does not primarily build, launch, and operate any Space systems. In past cases, the Army was unable to voice capability requirements or prioritize operational requirements. The Army's approach was to focus on building terminals that leveraged pre-existing on-orbit capabilities. The Army should avoid this approach in the future. In the future, the Army must use the Army Concept Framework as an opportunity to flex its institutional muscles, to articulate and justify its operational requirements to the joint Space community–the goal being to ensure strategic on-orbit assets will deliver tactical effects for the Army when and where they are needed.[4]

The emerging joint Operationally Responsive Space (ORS) program offers an opportunity for the Army to influence the development of rapid-response Space solutions intended to solve operational problems or fill the gaps in under-serviced regions. If executed as currently conceived, combatant command commanders would be able to leverage ORS satellites for land-component operations under their areas of responsibility for ISR and satellite communications.

In the case of SATCOM, the joint Space communities' capacity has already been outstripped by operational demands. To meet the growing appetite for bandwidth, the joint warfighting community has turned to the commercial market to meet over 80 percent of its wideband SATCOM needs.[5] Programs such as the Transformational Communications Satellite were intended to reverse this trend. However, competing funding demands and schedule delays led to the cancellation of this program with no suitable replacement identified (Figure 1).

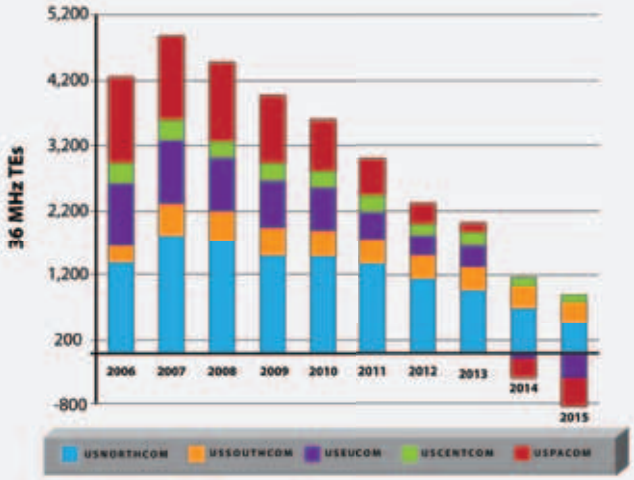


FIGURE 2
Commercial SATCOM Capacity May Not Meet Demand in Key Regions Because of Tightening Spot Lease Markets

The growing dependency on the commercial sector is complicated by the fact that the Department of Defense (DOD) does not procure commercial SATCOM in a long-term manner and depends on the commercial spot market to meet unforeseen operational demands. Although this approach has worked in the past, long-term market surveys indicate that by 2017 there will be little or no useful available bandwidth available in the spot market. Moreover, several regions will see a decrease in overall available bandwidth by 2014-15 (Figure 2).[6]

The Army must work with its DOD partners to develop a strategy that recognizes the value of commercial Space-based assets and that recommends procurement of contracts that offer vital long-term global access. As the Army deliberately brings new commercial capabilities to bear, they must set their sights on enduring programs and contract for long-term commercial Space access. As part of that effort the Army would gain greater capability flexibility by influencing requirements that commit to acquiring customized hosted payloads that fill the gaps in critical communications and multi-intelligence services. At the same time, as the Army works with the joint community on defining and establishing system requirements, the Army must also overcome current policy hurdles relating to security and information assurance so that greater access can be offered to our allies and, as necessary, with other non-traditional coalition partners. Furthermore, as the Army builds partnership capacity, it must become adept at, and more willing to, leveraging coalition partner capabilities, going well beyond established data-sharing relationships. As a growing number of nations develop Space-based technologies, the Army must consider how to integrate and leverage these capabilities so they can be brought into the fight.

Gaining and Maintaining Advantages to Tactical Space Access

As discussed earlier, assured access will require more than a different materiel acquisition process for Space systems. Assured tactical access to Space will require training in the proper employment of these capabilities. As was noted during the recent Unified Quest 2010 Campaign of Learning, our forces deploying into the Iraqi and Afghan theaters are not training with Space capabilities in mind nor are they training for the eventuality that Space access will be degraded during critical phases of the fight. We have already mentioned the growing number of countries that are pursuing, if not already possessing, capabilities to counter our advantages gained from Space access. Although these adversaries may pose the greatest risk, they do not represent the most prevalent risk–the threats from our own forces. Recent experience in Operation Iraqi Freedom has shown that most Space-system degradation is a result of self-inflicted electromagnetic interference, not hostile action. Much of the friendly interference can be attributed to a lack of proper training and non-existent tactics, techniques, and procedures (TTPs) to guide employment of Space, aerial, and terrestrial radio frequency receivers and transmitters operating in-theater. In a word, inefficient frequency and spectrum management makes information access problematic.

Today's Army strives to train the way it plans to fight; the Army of the future must do the same. This means the future force needs to train in environments that allow leaders and units all levels to build confidence while fighting through adversaries' attempts to degrade Space capabilities. This training must be grounded in validated TTPs that provide guidance in the proper employment of Space systems in conjunction with other radio frequency emitters on the battlefield but also provide a basis for rapid mitigation and restoral actions against hostile actions intended to disrupt friendly Space capabilities. Based on lessons learned in recent operations we must assure these TTPs can be adapted to agile adversaries who have proven themselves readily adjustable to our protection methods or countermeasures.

Because we can expect a contested electromagnetic environment during future conflicts, Army forces will require an ability to have situational awareness over the entire Space-supported network architecture. Continuous monitoring of communications architectures and an acute awareness of its risks and vulnerabilities will become key responsibilities of Army Space operations officers and mission partners (signal and intelligence officers, for instance) during combat operations. Our Space forces must be able to discern quickly hostile action from self-inflicted electromagnetic interference so that proper remedial actions can be taken and, if necessary, apply countermeasures to isolate and eliminate threats.

Because we will be operating in a more contested and congested Space environment, securing tactical access must include more than protecting Army systems. The Army's tactical advantage must also be sustained by achieving sufficient Space Situational Awareness (SSA); only by having an adequate level of SSA will the Army be able to deny those Space control capabilities–capabilities such as jamming and spoof-

the Army will require Space forces that are trained in planning, operating, and delivering tactically focused Space support.

ing–that future adversaries will likely employ. With ample SSA, Army forces of the future will also have the ability to integrate capabilities to disrupt future adversaries' command, control, communications, computer, and intelligence capabilities.

Since commercial Space assets and services are becoming so prevalent, it is very likely that future adversaries will be operating on the satellites the United States uses or they will lease other satellites vital to our own or coalition interests. Therefore, the Army must have the capability to employ precise measures to deny access to adversary-based platforms. As multiple countries pursue Space-based positioning, navigation, and timing (PNT) capabilities, Army forces must likewise adopt the means to deny those Space force enhancements to our enemies.

Building Versatile and Adaptable Army Space Organizations

Assured tactical access to Space will depend in large measure on the abilities of trained Army Space operators and units skilled in leveraging and integrating Space capabilities in support of the tactical fight. Future operations will place great demand on the abilities of all Army organizations to accomplish full spectrum operations and to adapt to rapid transitions from one operational phase to another. The Army's Space forces, integral to planning and execution of full spectrum operations, must likewise adapt to phased transitions, whether they are organic Space personnel or Space teams attached to various Army echelons.

Tactical Space planning must begin early, early enough to identify the initial operational requirements and then integrate and synchronize the required capabilities into the fight. Because Space capabilities cut across domains and warfighting functions, Space officers must be adept at assessing operational architectures for vulnerabilities and identifying approaches to mitigate the associated risks. Space officers at the tactical level will be in the vanguard by leading efforts to mitigate the effects of a denied, degraded, and disrupted Space operating environment. Space officers must ensure commanders understand the risks to operations when C2, intelligence-gathering, and PNT functions have been degraded and assist them in developing training programs and TTPs to overcome degraded operations. Since tactical users will often first notice the effects of degradation, Space teams must be trained and equipped at the tactical level to monitor and detect attacks within the spectrum, the networks, and relevant Space architectures. Along with monitoring and responding to degraded capabilities, Army Space operations officers, furthermore, must also become adept at planning and performing missions related to Special Technical Operations, Alternative Compensatory Control Measures, and the full complement of Space control capabilities afforded to ground Warfighters. In so doing, they will gain a fuller understanding of defensive and offensive Space operations and will be better able to adapt.

Because Space is an inherently technical domain and a key aspect of the information environment, the Army will require Space forces that are trained in planning, operating, and delivering tactically focused Space support. As we have seen demonstrated over the past two decades, the rapid pace of technology advancement and fielding presents challenges on how to best leverage the latest relevant technologies to ensure the Army maintains the tactical advantage. With new capabilities on the horizon such as Operationally Responsive Space assets and high altitude platforms, needs will arise to control platforms, manage payloads, and perform post-mission analyses. The current structure of the Army's Space brigade should evolve from a "Space-planning augmentation" capability into Army Space brigade teams bringing primary capabilities to future ORS and high altitude operating concepts and architectures. Furthermore, the Space brigade of the future should continue to enhance current SSA planning efforts at Army tactical operations centers, especially those activities that help integrate Space and cyber operations into headquarters' fires-and-effects cells. To conduct activities such as these, Army Space forces will require having a robust operational suite that adds ground-based offensive technologies to deny the advantages of Space to adversaries.

The generating force is the foundation of adaptable Space forces. The Army must continue to advance its Space training, incorporating the latest operational trends and capabilities into its education and training programs. Space training must be broadened beyond the current focus on designated Space operations officers; it must include other Space professionals and enablers found in the growing civilian Space cadre.

These civilian Space professionals must become fully vested in the Army profession of arms by adopting a warrior ethos. This ethos will not only help ready Army Space forces for combat but will complement the uniformed Space force by being willing and able to perform any and all Space measures short of down-range presence.

Using Space-enabled devices and tools have become common tasks. Instructors and trainers must work to integrate those common tasks into soldier and leader training venues. Theater-tailored training must be developed and integrated into pre-deployment programs to support deploying forces.

To leverage fully what Space can offer Army Warfighters, the Army's technical community must take fundamentally different approaches to conducting research and development and finding materiel solutions. Primary efforts should no longer focus strictly on developing programs of record and formulating risk-reduction activities. The Army's Space materiel developers must shift their attention toward making Space capabilities more tactically responsive, focusing on capabilities that meet the most urgent mission needs. Instead of pursuing the most exquisite capabilities that require lengthy and costly development cycles, greater importance should be placed on integrating commercial Space capabilities to ensure more rapid development of resources to meet the more pressing needs of the tactical fight. Finally, the Army must consider alternative acquisition strategies outside of the ponderous Joint Capabilities Integration and Development System process for Space acquisition; an effort such as the highly successful Army Tactical Exploitation of National Capabilities program, for instance, could be expanded beyond its current emphasis on intelligence services.

Space in Support of Army and Joint Operations

As part of a force that includes joint, interagency, and multinational partners, Army forces exercise mission command[7] to conduct combined-arms maneuver[8] and wide-area security[9] to defeat enemies and stabilize environments. Space capabilities support all three battlefield functions–mission command, combined-arms maneuver, and wide-area security–and without access to Space, Army forces performing these functions would not operate as effectively, efficiently, and safely. Without adequate Space PNT support, combined arms maneuver (which includes fires) would become slow, cumbersome, unsynchronized, and much less accurate. Without sufficient coverage by on-orbit ISR collection assets, wide-area security would become less-intelligible guesswork, especially when operating across far-reaching areas of responsibility. Without access to SATCOM, mission command, the function that provides command and control and synchronization of forces, would become tremendously difficult and would bog down Army forces tasked with either combined-arms maneuver or wide-area security missions.

To leverage fully what Space can offer Army Warfighters, the Army's technical community must take fundamentally different approaches to conducting research and development ...

As the Army Operating Concept frequently suggests, then, Space-enabled effects are indispensible for supporting joint and Army missions.

For Army forces to prevail in a wide range of contingencies–including defeating adaptive enemies in major combat operations, responding with civil agencies to attacks or natural disasters, supporting and stabilizing fragile states facing internal or external threats, and preventing human suffering–requires assured tactical access to Space capabilities. Just as Army forces must be operationally adaptable and able to rapidly transition from one mission to another, Space forces and capabilities must be able to adapt rapidly to a variety of operations including full-spectrum operations, humanitarian relief missions, and missions within the homeland. The AOC establishes eight Army operations that must be integrated throughout all of the Army's mission areas.[10] All eight operational areas require Space capabilities for effective operations and mission success: Full-Spectrum Operations, Homeland Defense and Civil Support, Sustained Engagement, Entry Operations, Preventing Proliferation and Countering Weapons of Mass Destruction, Cyberspace Operations, Foreign Humanitarian Assistance, and Space Operations. A brief discussion of each area and its Space requirements follow. The section below on Army Space Operations highlights more fully how Army Space operations influence the joint fight.

Full-Spectrum Operations

Army forces down to the company level conduct offensive, defensive, stability, and civil support operations simultaneously to defeat enemies and secure populations. This range of contingencies requires integrated Space capabilities that can rapidly transition from one operation to another without the loss of access or capability. This requirement for rapid transitions will require Space architectures (Space, link, and ground elements) responsive to dynamic environments. Each type of operation will require access to a full range but different mix of Space force enhancement capabilities delivered by a combination of systems (a multi-layered approach). Army forces are likely to face an adaptable enemy with similar technical capabilities; therefore, a full range of Space control capabilities must be integrated into land combat operations. A crucial part of that

integration is an understanding that the Army must assure that Space control activities–separate and distinct from cyber operations–are synchronized effectively within the cyber/electromagnetic contest. Coordination between Space and cyber operations is discussed more fully below.

Homeland Defense and Civil Support

The Army supports the security of the homeland through homeland defense and civil support operations. Homeland Defense operations, much like full-spectrum operations, require ample access to Space force enhancement capabilities. Because much of the military Space architecture is dedicated to geographical areas overseas, Army operations in the homeland will require greater access to commercial Space capabilities. Space capabilities may be employed to support response-and-recovery efforts by leveraging Space sensors for surveillance and post-event assessments; Space payloads may also be used for communications to restore civil authority and repair critical C2 infrastructures. Both operations will require Space forces capable of interacting with civil authorities and providing Space products that have few security-classification barriers.

Sustained Engagement

The Army conducts engagement activities to increase partner security and capacity. Space operations are conducted to support Army forces employed in these operations through a tailored mix of Space force enhancements. Space operations can also be used in direct support of host-nation partners in support of internal security needs and command and control mechanisms.

Entry Operations

Always operating as part of the joint force, the Army frequently conducts opposed or unopposed entry operations to accomplish missions in support of the joint commander's campaign objectives. Prior to beginning entry operations Space capabilities can provide geo-intelligence and electronic intelligence to support intelligence preparation of the battlefield activities. When entry operations begin, Space-based communications are employed to support enroute mission planning and command and control networks. In most cases, joint and Army forces' primary communications backbones will be Space-based until initial lodgment is secured. Overhead Persistent Infrared systems will provide timely intelligence, battlefield awareness, and missile warning during all phases of entry operations. Once initial entry is established, Space capabilities will be reinforced by the rapid establishment of a multidomain network to facilitate a timely buildup of the Army tactical network. To support forced entry operations, Space operations must be considered for interdiction and disruption of adversary C2 systems.

Preventing Proliferation and Countering Weapons of Mass Destruction (WMD)

The proliferation of WMD continues to undermine global security, further complicating efforts to sustain peace and prevent arms races. Space operations support counter-WMD with multi-intelligence activities and by monitoring high-risk areas for potential WMD or chemical, biological, radiological, nuclear, and explosive events. Space capabilities will provide event detection and early warning to counter the employment of WMD and, if necessary, help mitigate mass effects.

Cyberspace Operations

Cyberspace operations include computer network operations and activities to operate and defend the global information grid. Space operations is a key element serving as primary means of extending the global information grid to the tactical fight as well as providing the precise timing needed to synchronize digital networks. Defensive Space Control operations will ensure that Army forces prevail in the cyber/electromagnetic contest by providing an awareness of critical interdependent Space and communication nodes. Offensive Space Control operations will also be conducted alongside other cyber/electromagnetic a ctivities to deny technical advantages to established and potential adversaries.

Foreign Humanitarian Assistance

Foreign humanitarian assistance operations assist governments and security organizations in easing human suffering caused by natural and manmade disasters such as hurricanes, tsunamis, earthquakes, mass atrocities, or terrorist attacks. When Army forces are called upon to respond to crises outside the U.S. homeland, Space capabilities will be employed to respond to disaster events as well as providing other Space force enhancements to enable mission command of Army forces deployed to support these operations.

Army Space Operations in Support of the Joint Fight

Space operations by their nature are joint enterprises. All service components use strategic Space assets to create desired tactical advantages, and the Army is no different, providing joint theater support in a number of ways. Army Forces support the Joint Force commander by employing Army-unique Space-related capabilities to meet his critical information requirements. Unquestionably, Army Space uniforms already bring land Warfighter expertise to planning, allocation, and the employment of joint and national Space capabilities. To ensure the land-combat vision contributes to the joint fight, the Army assigns Space operations officers to combatant joint staffs for key operational planning functions; the Army also

provides Army Space teams to augment joint and operational elements during combat operations.

Army forces also execute several Space-support activities for the joint Warfighter by planning and managing communications satellite payloads for DOD. Army forces likewise conduct a full range of ground-based Space superiority activities using both non-kinetic and kinetic means to support U.S. Strategic Command and Joint Functional Component Command–Space's critical operational demands. Leveraging on-orbit strategic assets–Defense Support Program and Space-Based Infrared System[11] satellites–the Army's Joint Tactical Ground Station system provides continuous ballistic missile warning to combatant commanders. Finally, the Army's generating force–through means of its technical base–provides rapid Space technology solutions to respond quickly to theater-specific shortfalls. In the future, Army Space teams may actually be responsible for payload control on high altitude and other aeral platforms to help prosecute the joint fight.

Land Warfighters' DEPENDENCIES on Space will only increase as time goes on ...

Conclusion

Future tactical land Warfighters must have assured access to Space. Land Warfighters' dependencies on Space will only increase as time goes on and requirements for Space access will expand at rates even greater than before. As Army leadership begins to recognize the concept of assured tactical access to Space, the Army will be compelled to take a more engaged approach to ensuring Warfighters have the best capabilities delivered at the right place, at the right time.

The Space domain arrays itself across all warfighting functions and all phases of operations. Operational adaptability requires access to Space in all environments and access to Space becomes even more critical when operating under austere conditions. Diversifying networks by employing all domains–terrestrial, aerial, high altitude, and Space–as a unified architecture makes good sense. The Army must also expand joint, coalition, and other partnerships to reassure ready access to Space-enabled capabilities. By developing versatile, adaptable Space organizations, the Army will remain ready to deploy all types of mission sets and across all warfighting functions. The Army must be prepared to fight using Space, but must also be prepared to fight under degraded Space conditions. To fight on the tactical edge, Army units must gain and maintain situational awareness of the electromagnetic spectrum, must understand when electromagnetic interference comes from friendly or enemy sources, and must train to respond and operate under both sets of conditions.

The intent of this essay was to outline a number of present and future concepts based on observations made during recent wargame events and to address future Army warfighting operations pertinent to Space; also proposed is an enabling concept, assured tactical access to Space, a concept the Army must embrace to ensure mission success of future land combat operations. The discussion also highlighted a number of those vital connections between Army operations and Space that were not treated in the Army Capstone Concept and the Army Operating Concept. It is the intent that the concepts discussed here will be readily accepted by key Army stakeholders to assure the success of forces operating at all echelons, and especially those ground forces operating on the tactical edge.

Footnotes

[1] U.S. Army Training and Doctrine Command, Army Operating Concept, TRADOC Pamphlet 525-3-1 (Fort Monroe, Va.: 2010), para. 3-5d, p. 18. "... organizations at the lowest tactical level must have required enablers to integrate joint capabilities in mission planning and execution."

[2] More fully, this essay defines "assured tactical access to Space" as guaranteed access to Space capabilities that meets land Warfighter mission requirements and timelines (during all phases of full-spectrum operations).

[3] "Preparing to Fight through Degraded Space Operations," memorandum, Commander, U.S. Army Training and Doctrine Command to Chief of Staff of the Army, 27 July 2010, encl. 6.

[4] Space and Missile Defense Battle Lab, Frontiers Division, Army Space Power 2035: A Look Forward (Colorado Springs, Colo.: U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, 2007), p. 1. "Space capabilities once thought of as strategic in nature will now be applied onto the battlefield for tactical effects."

[5] Space and Missile Defense Future Warfare Center, 2009 Satellite Architecture (Huntsville, Ala.: U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, 2009).

[6] Daniel Gonzales, Isaac R. Porche III, Shara Williams, and Bradley Wilson, Managing Growing Army Demands for Bandwidth: Predicting Growth Trends and Developing Solutions for Future Army Forces (Santa Monica, Calif.: RAND, March 2009), pp. 59-64.

[7] U.S. Army Training and Doctrine Command, para. 3-4 a (1), p. 12. Mission Command is defined as "the exercise of authority and direction by the commander ... to integrate the warfighting functions using the operations process and mission orders to accomplish successful full-spectrum operations."

[8] Ibid., para. 3-4 c (1), p. 13. Combined Arms Maneuver is defined as "the application of the elements of combat power in a complementary and reinforcing manner to achieve physical, temporal, or psychological advantages over the enemy, preserve freedom of action, and exploit success."

[9] Ibid., para. 3-4 d (1), p. 14. Wide-Area Security is defined as "the application of the elements of combat power in coordination with other military and civilian capabilities to deny the enemy positions of advantage; protect forces, populations, infrastructures, and activities; and consolidate tactical and operational gains to set conditions for achieving strategic and policy goals."

[10] Ibid., secs. 5-1 to 5-9, pp. 26-34.

[11] U.S. Air Force, "Defense Support Program Satellites," fact sheet, Sept. 15, 2010, http://www.af.mil/information/factsheets/factsheet.asp?id=96, and "Space-Based Infra-Red System," fact sheet, Nov. 15, 2010, http://www.af.mil/information/factsheets/factsheet.asp?id=17514

TaLKing SHOP

INFORMATION SHARING IN COALITION SPACE OPERATIONS

BY CPT BRAD HAMLETT

The U.S. Army, Air Force, and NATO have formally identified coalition Space operations as an area of concern for future multilateral engagements. All three organizations have discussed draft policies, established committees, and published reports outlining the way forward for coalition Space operations. Given the social, cultural, and religious complexity and staggering costs of modern warfare, unilateral actions will likely make up the minority of military operations the United States conducts in the next few generations. The United States continues to field the most powerful military in the world and to lead the most powerful and capable coalitions in the history of warfare.

Since Space operations are so tightly integrated into modern warfare and information-driven warfare is vital to achieving military objectives, the United States must ensure that information-sharing policies maximize its coalitions' abilities to employ military capabilities. The United States reserves the right to protect national intelligence assets through information classification, while coalition partners are sometimes frustrated by American unwillingness to share information that could multiply their application of force or reduce casualties in their operations.

As the Department of Defense establishes coalition Space operations centers with Australia, Canada, and Great Britain, the problems with information sharing will become readily apparent unless the department establishes information-sharing policies at the coalition staff level (C-6/J-6) and incorporate commercial off-the-shelf information-sharing technologies into computer software programs that provide Space products and services on classified and unclassified networks. The goal is to promote flexible, interoperable, and secure information sharing while complying with the existing system of information classification.

Perspectives from Doctrine and Allies

Joint Air Power Competence Center

In 2009 the North Atlantic Treaty Organization's Joint Air Power Competence Center published the Space Operations Assessment to make recommendations on integrating Space into NATO's military operations, based on the organization's experience in Afghanistan. The Space Operations Assessment identifies numerous Space products and services required in coalition operations including positioning, navigation, and timing; intelligence, surveillance, and reconnaissance; satellite communications; weather; and missile warning.[1] While the United States' Space capabilities far exceed most coalition partners, few national security Space products are available at a releasable or unclassified level.[2] Policies and procedures for sharing U.S. Space products and services with Australia, Canada, and Great Britain or "Five Eyes" members are fragmented at best, and virtually nonexistent at worst in the International Security Assistance Force coalition.[3] Even worse, top-secret products and services from as little as ten years ago are now unclassified and commercially available, although at great expense.[4]

The Space Operations Assessment recommends embedding joint coalition Space Support Teams (SSTs) in J-3 (operations) and J-5 (plans) staffs.[5] Additional coalition SSTs are recommended at the combatant command level (or regional level in future operations structured like the International Security Assistance Force). The Space Operations Assessment additionally recommends that the United States provide education and training opportunities for multinational partners, as those nations establish and build career fields for Space specialties. The United States has the most senior, combat-experienced Space cadre of any nation, so it is America's responsibility to lead the creation of new information-sharing policies to maximize coalition military capabilities.[6] To date, no defense agency has published a report comprehensively detailing the problems with coalition Space operations, although both the Army and Air Force have working groups currently discussing the issue with information sharing at the center of these discussions.[7]

Royal Air Force in Operation Iraqi Freedom

Royal Air Force Squadron Leader Sophy Gardner identifies information sharing as one of the most difficult challenges for British forces during the opening phases of Operation Iraqi Freedom. Information classified as secret releasable had to be manually transferred from U.S. SIPRNET systems to British

computer systems.[8] Efficient transfer of the information depended on the personalities and good working relationships of the people involved, often impacting operations.[9]

Aside from information classification, system interoperability was another critical factor impacting information sharing during coalition operations. British and U.S. computer systems were not compatible, and the manually reviewed and transferred information had to be reformatted by British personnel in order to be usable.[10]

National Security Space Strategy

On April 9, 2011, the Secretary of Defense ordered the creation of policies to promote coalition Space operations based upon the new National Security Space Strategy (NSSS). The NSSS, jointly written by the Secretary of Defense and the Director of National Intelligence, calls for the development of combined Space doctrine with international partners.[11] The NSSS calls for the Department of Defense (DOD) and the intelligence community to work with federal agencies, international partners, and commercial firms to share capabilities, data, services, personnel, operations, and technology.[12] The purpose of this goal is to achieve common objectives, to ensure the United States has access to redundant Space capabilities, and to share costs and risk.[13] The NSSS also calls on the DOD and the Intelligence Community to write coalition Space doctrine, develop common computer network standards to promote information sharing and coalition Space operations, and endorse the sharing of Space capabilities during conflicts.[14]

While the NSSS specifies satellite systems, orbital assignments, and the radiofrequency spectrum as areas of interest for combined Space doctrine, the DOD Near Term Tasks memorandum targets U.S.-led coalition operations for new policies to share Space products and services.[15] Most importantly, the memo directs U.S. Strategic Command to develop near, mid, and far-term plans for a networked coalition Space operations center with Australia, Canada, and Great Britain.[16] The memo also requires that the network be flexible to include additional partners and command authorities.[17] Although not specified, this requirement implies that the computer network should be available to combatant commands during coalition military operations.

Policy and Technology Solutions

Organizations subordinate to the Office of the Secretary of Defense and the Office of the Director of National Intelligence are preparing to publish policies for sharing information in coalition Space operations, in compliance with the new NSSS and the DOD Near Term Tasks memo. These policies will cover both the acquisition of new Space systems and capabilities as well as the sharing of Space products and services. Since these are pending policies, this article will focus on coalition-level policies for use by the C-6/J-6, and propose technological solutions to implement the policies. Grandiose solutions, such as overthrowing the current system of information classification and replacing it with a new system, are unrealistic, given the institutional knowledge and familiarity with the current system found throughout the federal government. Instead, technological solutions promote flexible, interoperable, and secure information sharing while complying with the existing system of information classification.

The proposed solutions are based on two standard technologies: Extensible Markup Language (XML) and Application Programming Interfaces (APIs). XML standards are developed and promoted by the World Wide Web Consortium, a nonprofit international organization that develops and publishes international protocols and guidelines to ensure the long-term growth of the Internet.[18] XML is a flexible programming language used widely in electronic publishing and data exchange interfaces throughout the Internet. The language is based upon ISO 8879 standards for markup languages.[19] In short, XML is both a commercial-off-the-shelf technology and a flexible, widely available technology for sharing information across the Internet. The DOD already uses XML extensively in many applications on both SIPRNET and JWICS networks.

An API is a set of rules within a computer application that permits information sharing.[20] APIs allow computer applications to communicate with each other using a common language.[21] The most common API language is XML, although many variants for XML exist.[22] APIs can be created for nearly any type of computer application, including programs, databases, and operating systems. For the U.S. federal government, the most common and widely used standard is the Government Linked Data (GLD) API standard promoted by the GLD Working Group, under the World Wide Web Consortium and chaired by George Thomas from the Department of Health and Human Services.[23]

Policy Solutions

Based upon GLD Working Group standards for federal APIs, C-6/J-6 staffs can establish policies for flexible, interoperable, and secure SIPRNET APIs designed for sharing Space products and services with coalition partners, with broader future implications for the development of SIPRNET and JWICS APIs for many programs dealing with many levels of classified information. API policies should establish standards for writing APIs, and standards for computer systems and programs connecting to the APIs.

Coalition partners also should be provided with a policy memorandum precisely defining technology and security standards for them to connect to APIs. These policies should define the minimum hardware requirements for each computer system and the minimum software requirements, including the operating system and installed software necessary to use API data. The policy memo also should define security standards, including permissions for physical connections to the unclassified Internet

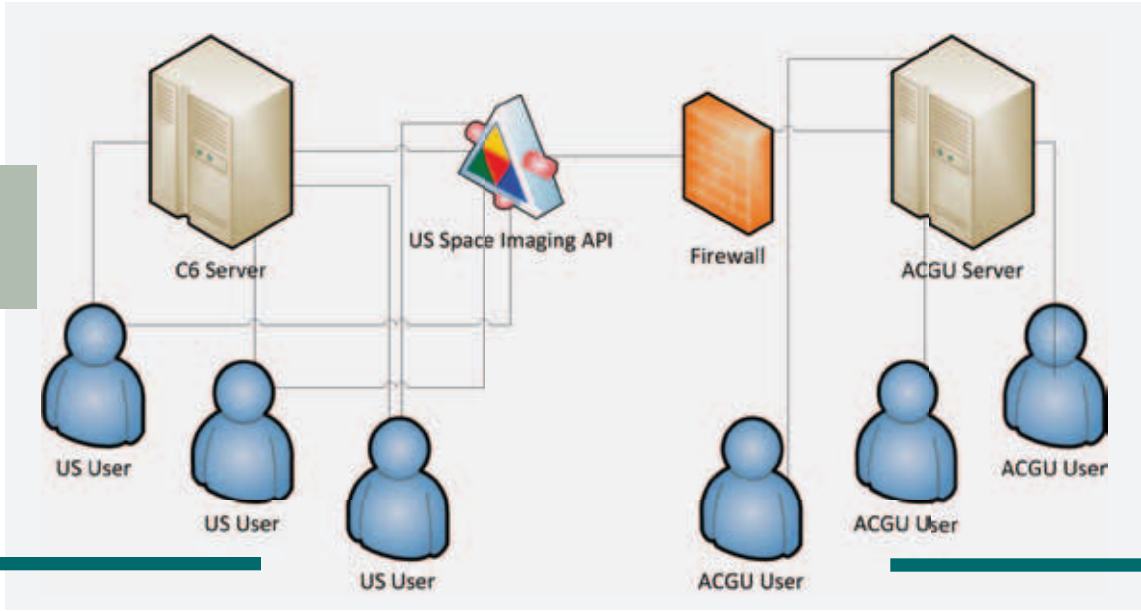


Figure 1. Simple illustration of network connections to an imagery Application Programming Interface.

and hardware and software firewalls between computer systems. The memo also should include specific details including the type of cabling allowed for networks such as CAT5 or CAT5e, and labeling standards for the cables so technicians and operators can clearly identify which cables connect with which networks.

In addition to the policy memo provided to coalition partners, an internal C-6/J-6 memo should be developed defining procedures for connecting coalition partners' networks to the U.S. networks. These procedures should define security requirements including software and hardware firewalls between U.S. and coalition networks. Additional policies should be developed to define the goals, standards, and architectures for APIs. The API policies should be designed to promote flexibility, interoperability, and security for U.S. and coalition personnel. The overall goal of these policies is to clearly define the standards coalition partners must meet in order to connect to U.S. networks. In exchange for meeting these requirements, coalition partners can obtain U.S. Space products and services at no cost. If coalition partners choose not to meet U.S. standards, there is no penalty and coalition partners can obtain unclassified Space products and services from commercial providers.

Technology Solutions

Using XML to create APIs for Space products and services allows C-6/J-6 staffs and Space professionals to share information in ways that create additional force multipliers from existing Space capabilities. The goals for Space APIs should be flexibility, interoperability, and security. Flexibility is the ability of the API to generate information that can be read and manipulated by receiving programs in ways defined by the user. Interoperability is the ability of the API to generate information that can be used and read by as many programs as feasibly possible. Feasibility must be defined by the requirements of each program in order to write an interoperable API. Security is the ability of the API to share information while preventing unauthorized use and maintaining information classification standards and safeguards.

Designing APIs

Joshua Bloch, a programmer at Google, argues that APIs should perform a single function very well. In the case of an imagery API, the goal should be to provide classification level, the image, and meta data. From these requirements, the designer should establish a single function that is easy to explain to users in a few words.[24] Functionality can always be added to an API, but it can never be removed.[25] Coalition users will write their own software to receive data from U.S. APIs, so removing a function will cause coalition users' software to malfunction. Therefore, any API for Space information should be simply written to perform a single function.

The Google Earth API is used extensively to share information and create new capabilities for Warfighters. High-quality imagery and map overlays can be manipulated in a variety of ways to make the presentation more relevant to Warfighters with data points and mission parameters embedded in the map. Classified capabilities present information in even more relevant ways. The Google Earth API is flexible, so many users and programs can access its information and manipulate it. Users can import data files that Google Earth displays on the map. Google Earth also can export data files that users can import into other programs and manipulate as needed. The public version of Google Earth even allows companies to update their location, contact, and business information in real time through the business's Google Places account. The type of programming in the Google Earth API represents a new way of thinking about programming. Fundamentally, programmers need to think in terms of APIs to improve code quality for programs that handle Space products and services to meet the goals of flexibility, interoperability, and security.

Imagery API Discussion

An imagery API is a good illustration of designing for flexibility and interoperability. XML can be used to define classification, the type of object, and any metadata for the object. Figure 2 illustrates how XML (in Microsoft C# format in this example) can be used to provide Space imagery through an

API. The XML code defines the type of image as a JPEG file, the location of the image on the server, the classification of the image as secret, and additional meta data including the originator, keywords, and notes. This simple illustration meets the criteria of flexibility, interoperability, and security. A coalition partner with any C# based XML parser (such as Microsoft SharePoint) can read and import the image. Furthermore, including classification information in the XML string allows the United States to control access to information based upon the clearance level of the recipient. The classification element in figure 2 can be changed to any level using software on the U.S. side of the network. Classification is written into the language, so the API only allows users to access information that meets their security clearance level.

Security Concerns

Cryptographic protocols can be built into Space APIs on C-6/J-6 networks. The protocols include mechanisms for key agreement and user authentication, symmetric encryption during data transport, and non-repudiation methods.[26] Key agreements are common security methods that allow only computers with installed keys to exchange information, prohibiting any unkeyed system from accessing the information.[27] The C-6 can generate keys to provide U.S. and coalition networks as a security method to authenticate users and prevent data leakage. Additionally, the C-6 can require 256- or 512-bit data encryption to transmit information between APIs on U.S. and coalition networks. SSL 256 is a common standard used in financial transactions. Requiring a secure data transport mechanism and secured software for both the sender and receiver are policies that the C-6 can propagate to coalition partners. A non-repudiation method is used to ensure the integrity and origin of the data, ensuring that the data has not been intercepted and changed in transport.[28] Digital certificates already are used by the DOD as a non-repudiation method, and they can be used on coalition networks for Space APIs.

Conclusion

The National Space Security Strategy and Office of the Secretary of Defense directives require the creation of policies, facilities, and mechanisms for coalition Space operations. The U.S., NATO, and Australia, Canada, and Great Britain have identified information sharing as one of the biggest challenges in this process. The Army Space community needs to work within the existing information classification system to create software that allows data from Space products and services to be flexible, interoperable, and secure.

Designing Space software with XML-based APIs integrated into the software is a solution that uses existing commercial-off-the-shelf technology to meet the goals of flexibility, interoperability, and security. XML-based APIs do not require any new inventions, major investments in new computer systems, or any major Doctrine, Operations, Training, Materiel, Leadership and Education, Personnel, and Facilities changes. APIs can be written for existing applications, and new applications can be designed with integrated APIs. Positioning, navigation, and timing; intelligence, surveillance, and reconnaissance; satellite communications; weather; missile warning; and additional Space products and services can take advantage of APIs to securely share information in coalition Space operations while maintaining flexibility, interoperability, and security.

```
<xsd:complexType name="ImageObject">
  <xsd:sequence>
    <xsd:element name="ImageType" type="xsd:JPG"/>
    <xsd:element name="Location" type="\\server1\c6\spaceimg\aor6.jpg"
      maxOccurs="unbounded"/>
    <xsd:element name="Classification" type="secret"
      maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="Originator" type="xsd:text" use="required"/>
    <xsd:attribute name="Keywords" type="xsd:text"
      use="optional"/>
  <xsd:attribute name="Notes" type="xsd:text"
    use="optional"/>
</xsd:complexType>
```

Figure 2. Example of an XML code sample defining classification and additional attributes for Space imagery.

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Footnotes

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TaLKing SHOP

BY LTC VICTORIA MIRALDA

SATELLITE BANDWIDTH CAPACITY

Challenges to Ensuring Future Availability

The National Space Policy identifies the importance of the U.S. Space industry to American national security:

> **"A robust and competitive Space sector is vital to continued progress in Space. The United States is committed to encouraging and facilitating the growth of a U.S. commercial Space sector that supports U.S. needs, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship."**[1]

Despite this national security imperative, considering the cost and the likely surge in bandwidth requirements for U.S. government and military purposes during national crises, the health of America's commercial Space industry is at risk. While the National Space Policy accurately portrays the significant role a healthy Space sector provides to national security, there are indicators U.S. policy and activities are not resulting in assured access to and availability of future Space capabilities, specifically bandwidth.

Recent contingency operations demonstrate an exponentially increasing global demand for satellite bandwidth during times of operational surge. Unpredictable bandwidth demand strains capacity limits within the commercial satellite industry. The risk escalates when juxtaposed with the last ten years' unprecedented Department of Defense (DOD) reliance upon commercial satellite capabilities to support operations. Market dynamics such as long lead times and high commercial demand during non-crisis periods constrain commercial industry's ability to meet DOD satellite bandwidth capacity requirements on short notice.

Given the realities of this new global environment, there are three areas where the U.S. government (USG) and DOD can evolve to mitigate risk and enhance the potential for future availability and affordability of satellite bandwidth, both commercial and military.

Revoke current restrictions on exporting commonly available commercial communications satellite technology by replacing outdated U.S. law that impedes global competitiveness with responsive legislation to protect critical technologies while permitting U.S. competitiveness in global markets.

Evolve and enforce processes for procuring and managing satellite bandwidth capacity through an empowered USG focal point for commercial satellite communications (COMSATCOM) in accordance with national priorities.

Establish a national Space executive authority empowered to responsively drive essential future military satellite communications (MILSATCOM) capability requirements for the United States, to include the intelligence community and other USG agencies and departments.

The Army Space community, comprised of Civilians and Soldiers from every branch of the Army, impacts the Department of Defense's interaction with the U.S. Space industry by identifying priority Space requirements, developing Space-enabled capabilities, and influencing DOD policy and strategy. It serves national and DOD

interests to both ensure the availability of future military satellite capacity and to enforce optimized procurement of commercial bandwidth capacity.

This article is the first of two addressing challenges in ensuring available and affordable satellite communication (SATCOM) bandwidth in support of DOD operational requirements. The first segment specifically explores those SATCOM challenges the Army Space community can help the nation address. It explores obstacles and opportunities to the satellite market segment the DOD should remain cognizant of to help shape future availability of all satellite communications capacity by U.S. companies.

While the purpose of this article is not to evaluate the merits and costs of COMSATCOM compared to MILSATCOM, that topic is a natural residual question and is worthy of a separate analysis. Considering the trends of DOD operations in the past decade, it is safe to assume both sources of bandwidth will continue to be required given the degree of overall USG reliance. The decision factors for the right mix of military and commercial satellite communications capacity are many and vary with budget, global operational environment, and security demands. However, ensuring the availability of both categories is a measurement of U.S. satellite industry health. Understanding the nature of the two categories and their costs, program risks, operational resiliency, and developmental timelines is essential to making informed decisions. The percentage of bandwidth capacity from each source the USG pursues, whether leasing from industry providers or owning through a Program of Record (POR) acquisition effort, must be weighed against projected whole of nation requests and national strategic priorities.

U.S. Space Industry-Satellite Segment

The Space industry broadly encompasses nongovernment, for-profit Space companies. Within the Space industry there are multiple market segments, one of which is the satellite industry segment. The satellite segment is comprised of four components: satellite manufacturing, satellite services, launch, and ground equipment. All four segments are essential to support USG and DOD operations, but it is the satellite manufacturing component that provides the spacecraft for bandwidth capacity to the DOD. This component produces both COMSATCOM and MILSATCOM spacecraft the Department of Defense relies upon.

Spacecraft transponder services, whether American, foreign, or consortium are in turn provided and sold by commercial providers such as SES World Skies, INMARSAT, and INTELSAT. Services may range from bandwidth capacity access to full-scale end-to-end network services. The satellite transponder bandwidth portion is the primary focus for availability concerns and is addressed in this article. However, DOD is reliant upon all four segments for advanced access to and use of satellite carriers. It is in this aspect that the health of the U.S. satellite industry is a vital DOD and national security interest.

Separately but related, the U.S. satellite industry also builds MILSATCOM capabilities such as the Wideband Global Satellite System, Defense Satellite Communications System, and Mobile User Objective System. The three U.S. satellite manufacturing companies are Boeing, Lockheed Martin, and Space Systems Loral. The DOD or USG then manages, operates, and maintains these military-owned spacecraft as a POR throughout the system's lifecycle.

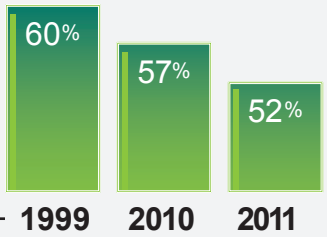
The Impact of ITAR

A leading issue impacting the U.S. satellite industry remains export restrictions imposed since 1999. There is widespread consensus these restrictions have marginalized American technology leadership in a globally competitive environment. Despite enduring U.S. Space policy advocating this competition, the U.S. Space industry is constrained by export trade regulations having negative effects on competitiveness. The satellite manufacturing industry is the only American commercial sector mandated by law to have all goods managed as munitions. The effect has been markedly negative.[2] In the view of many analysts, export restrictions have hampered America's commercial Space technology vitality, leadership, and workforce.

In a global environment, this self-imposed trade barrier is the natural result of U.S. export regulations implemented through the State Department's International Traffic in Arms Regulations (ITAR). Each U.S satellite built incurs approximately $1 million in additional costs due to ITAR compliance requirements. Loss of market competitiveness is compounded by the decrease of scientists and engineers in the U.S. Space industry workforce, again attributed at least in part to the impact of costly U.S. trade restrictions.[3] Considering the overall Space industry revenue growth of 11 percent in 2009, a sustainment or growth in employment would be expected. Instead, in 2009 there was a 5.5 percent decline in the Space industry workforce, keeping with the general trend since 2002.[4] In 2010 employment declined even more steeply.

In 2010 proposed U.S. legislation, House Resolution (H.R.) 2410, the "Foreign Relations Authorization Act, Fiscal Years 2010 and 2011," addressed the need to reform satellite industry export controls. This legislation was proposed to alleviate some of the more damaging process and blanket categorization restrictions automatically applied to all Space and satellite components on the U.S. Munitions List. The proposed legislation would have restored the President's authority to decide when this restriction was or was not appropriate based upon current availability of technologies worldwide. The Satellite Industry Association president, in a letter to the chairman of the House of Representatives Committee on Foreign Affairs, stated H.R. 2410 will "help put U.S. manufacturers of satellites and related components on more competitive footing in the $144 billion global satellite market, reinforcing America's global technological leadership, while safeguarding jobs and critical Space technology for the nation."[5]

H.R. 2410 did not pass in 2010. It was re-introduced in 2011 as H.R. 3288, the "Safeguarding United States Satellite Leadership and Security Act of 2011," to reform the



framework for satellite export controls. The bill would authorize the President to remove satellites and related components from the U.S. Munitions List, subject to certain restrictions and congressional oversight. The bill's last action was referral to the House Committee on Foreign Affairs on Nov. 11, 2011.

The Health of the Space Industry

The 2008 Center for Strategic and International Studies report titled "Health of the U.S. Space Industrial Base and the Impact of Export Controls" concluded that American preeminence in Space is challenged in many areas. "Satellites and their components were placed on the U.S. Munitions List due to congressional action with the intent of limiting the spread of Space technology. However, this has had the unintended consequence of encouraging the proliferation of Space capabilities, [and] has not prevented the rise of other Space powers but has impacted U.S. competitiveness."[6] When satellites were placed under the ITAR in 1999, the U.S. Space industry held more than 60 percent of the global manufacturing market. For the year ending 2010, U.S. market share was below 57 percent, and for 2011, 52 percent. In 2011 satellite manufacturing revenue globally declined 20 percent, and the U.S portion declined at a sharper rate of 27 percent.[7]

While some of that decline may be a natural result of globalization, the lost potential may never be known in terms of sales, competitiveness, and human capital in the U.S. satellite industry. In 2010 global satellite industry employment fell 2.9 percent from 2009, including the loss of 7,302 American high-tech jobs.[8] The health of the satellite industry directly impacts the ability of the United States to inspire future expertise in the science, technology, engineering, and math fields critical to the recovery of the U.S. economy and its ability to support a healthy gross domestic product and ultimately America's national security.

"The U.S. government is the single largest customer of the commercial satellite industry today," said Robert T. "Tip" Osterthaler, president and chief executive officer of SES Government Solutions, a SATCOM service provider. "Satellites are expensive but an absolute necessity in meeting the demands of the U.S. government. In this tough budget environment, the country cannot afford business as usual and what we've experienced with the traditional ways of purchasing satellite communications capabilities. By fostering competition and increasing opportunities for the government to work directly with satellite operators, we can ensure that American taxpayers get their money's worth and that our service men and women in harm's way have the satellite communications they need to perform their missions."[9]

The U.S. satellite industry is losing share and confidence among international markets. Placing all satellite components under the U.S. Munitions List continues to constrict U.S. international engagement, economic partnerships, and coalition interoperability with the global Space community. This circumstance feeds a growing separation between the U.S. commercial Space industry, DOD, and emerging international Space powers.

Operational Reliance

In the majority of contingency operations, force projection operations, and disaster relief support operations conducted by the U.S. military, satellite communication capabilities are the strategic umbilical cord linking USG, private contractor, agency, and military teams. Contingency operations are inherently reliant upon non-line-of-site communication capabilities due to either a contested security environment or the need for rapid U.S. assistance where a crisis is evolving. Such operations are typically conducted with minimal notice in distant and austere locations where terrain or infrastructure realities limit access to terrestrial-based communications and autonomy in operations often is a required condition for success. COMSATCOM is a critical component of assured force projection and the USG's ability to globally conduct operations. Recent examples include USG disaster relief support to Japan and operations in Libya that highlight the need for swift initial and often continued reliance on COMSATCOM assets.

Augmenting and enhancing MILSATCOM capabilities, COMSATCOM is a co-partner in providing America's industrial base strength as a vital component of national security. It enables U.S. diplomatic, information, military, and economic elements of power. In addition, national Space capability and capacity are natural deterrents to threats. However, assessing the satellite industry's ability to support DOD operations and strategic USG objectives presumes adequate access to assured communications capabilities. This is an increasingly risky assumption as evidenced by the decline in U.S. leadership in the Space industry and satellite segment.

In interviews with private-sector companies supporting USG service contracts, each indicated their support operations rely almost exclusively on COMSATCOM. This connectivity provides them access to U.S.-based logistics and supports contract personnel with

$500 Million Amount U.S. military spent on COMSATCOM 2009

resources for contingency operations. In addition to increased DOD reliance on private-sector services, and their compounding demand for COMSATCOM capacity, military use of this bandwidth has exceeded the capacity provided by MILSATCOM since 1993, shifting reliance to the private-sector market.[10] The combined demand military and contractor support operations place on COMSATCOM capacity creates competition for access and drives higher pricing. Yet, current DOD reliance on COMSATCOM remains extensive. Considering the laws of supply and demand, increased contractor demand on COMSATCOM capacity creates a supply dynamic that has further driven up market prices.

Constraints

A driving business case constraint is that USG commercial bandwidth providers, no matter how patriotic, require a high percentage of investment capital up front in order to build and launch a satellite. It is becoming more infrequent that such investment security comes from the USG. Thus, satellites built with venture capital and private funding typically have a small percentage of remaining, uncommitted capacity available for DOD use. Therefore, when unplanned requirements arise in frequency bands or geographical locations that MILSATCOM cannot accommodate, options are becoming more and more limited.

One COMSATCOM company explained that due to the risk in short-term DOD bandwidth leases and Defense budgets, it must sell available capacity to commercial buyers even at a lower price when the buyer agrees to the stability of a long-term contract. The resulting capacity limitation influences both COMSATCOM cost and access for the USG and DOD. This is seen first in the price of contractor support, including the contractors' expenses for COMSATCOM capacity, and second in an overall higher cost due to the increased commercial demand.

In 2009 the U.S. military spent approximately $500 million on leased COMSATCOM capacity.[11] Recent Wideband Global Satellite System costs show a well-run MILSATCOM POR can produce a satellite for approximately $300 million. In light of the fact that most satellites have a life expectancy of seven to 12 years, this indicates an efficient POR can be cheaper than leasing ($2.1 billion versus $3.5 billion), assuming seven years' use and not taking into account payload monitoring and health expenses. Often, satellites far exceed their life expectancy, providing even greater return on USG investment and making the case for a strong fleet of MILSATCOM despite the upfront POR "sticker-shock."

Conclusion

While the U.S. government and Department of Defense rely upon commercial satellite communications and expect it to be available, they must collectively do more to improve and assure future satellite communication bandwidth access and availability. The USG and DOD must leverage whole of nation purchasing power to obtain supportable rates while supporting the Space industry's health by improved forecasting and planning and by pursuing reliable and effective Programs of Record for Space capabilities. The national security risk is avoidable if the USG and DOD can support a healthier Space and satellite industrial base during non-crisis periods. This step requires removal of International Traffic in Arms Regulations restrictions and improving MILSATCOM processes to provide a balanced mix of both commercial- and military-provided bandwidth options. Satellite bandwidth will be available at affordable rates in the future only if the United States takes these active steps and reforms to permit true national prioritization of capabilities. These actions will not only stimulate healthy competition but also fuel workforce innovation and strengthen the Space industrial base domestically and internationally, thus providing increased American national security.

The next article on SATCOM challenges will address the establishment of a national executive authority empowered to drive Program of Record capability requirements for whole of government military satellite communications and the need for an empowered U.S. government focal point for procurement of commercial satellite communications in accordance with national priorities.

Footnotes

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Crew Chief Sgt Jeffery Blake Powell works with his crew at Alpha Detachment in Stuttgart Germany. Powell's crew won site Best Crew for JTAGS Europe. *Photo by Rachel L. Griffith*

Osan Soldiers Named as

BEST MISSILE WARNING CREW

STORY BY RACHEL L. GRIFFITH, USASMDC/ARSTRAT PUBLIC AFFAIRS

SPC Jonas Knehans and SPC Trenton Huntsinger, both of Delta Crew, Charlie Detachment, work together to perform routine maintenance on one of Charlie Detachment's satellite dishes at Osan Air Base. *Photo by Rachel L. Griffith.* CPL Daniel Romero, Delta crew chief, adjusts a satellite dish on Osan Air Base. Romero and his team were named the Army's Best Missile Warning Crew for 2011. *Photo by Rachel L. Griffith.* The Army's Best Missile Warning Crew for 2011 poses with detachment and brigade leadership LEFT TO RIGHT: CPT Corey H. Ruckdeschel, commander, Charlie Detachment, 1st Space Company; SPC Trenton Huntsinger, SPC Jonas Knehans, CPL Daniel Romero, and COL Eric P. Henderson, commander, 1st Space Brigade. *Photo by Dottie White*

A team of Soldiers stationed at Osan Air Base, South Korea, won the title of the Army's Best Missile Warning Crew for 2011.

Delta Crew from Charlie Detachment, 1st Space Battalion, 1st Space Brigade received the honor after competing against 15 other similar-sized teams from theater early missile warning detachments. The 1st Space Company has four detachments located around the world known as Joint Tactical Ground Stations (JTAGS). In the late fall, the Soldiers at these sites, located in Germany, Qatar, South Korea, and Japan, competed for the title.

Led by crew chief CPL Daniel Romero, Delta Crew members showed excellence in all aspects of their job as JTAGS operators. They are Romero, primary operator; SPC Jonas Knehans; and SPC Trenton Huntsinger, secondary operator.

"The competition has been a tradition for quite a while in JTAGS," said SFC Andrew B. Brown, the JTAGS training and evaluations noncommissioned officer in charge at U.S. Army Space and Missile Defense Command/ Army Forces Strategic Command. "It's important to the crews because it gives them a chance to showcase their knowledge and expertise that they are using on a daily basis. We have four detachments within JTAGS, and it's a friendly competition, but each site is always trying to outdo each other."

The JTAGS mission is one that never rests, with crews on watch 24 hours a day, seven days a week. The crews work long hours on a daily basis to accomplish their mission, providing early missile warning.

"They were tested on a variety of skills, from physical fitness aspects, to simulated real-world operations designed to test their decision making ability and the crew chief's ability to lead," said Brown.

Brown was part of a three-person evaluation team from Colorado Springs that traveled to all four detachments to oversee the competition. The competition was also overseen by the 1st Space Company's commander, MAJ Christopher Turner, and first sergeant, SFC Joseph Collins.

"I think it's a great honor to recognize excellence, which is what the best crew does," said COL Eric P. Henderson, 1st Space Brigade commander. "It's important to point out that our adversaries do not take into account 'who' is on watch as it relates to missile warning. My thought is that every crew needs to be 'best crew' when the lives of our countrymen and our allies and national interests are at stake."

"Korea is a site that rarely has longevity. To have a crew from here that has only been together for four months prove that dedication and know-how can outweigh longevity and experience is excellent."

— CPT Corey H. Ruckdeschel

Delta Crew is unique, as its crew leader is a corporal, the lowest of the noncommissioned officer ranks. Most crew chiefs within JTAGS detachments are staff sergeants.

Romero didn't get to be the crew chief he is on his own. The detachment leadership is in place to help mentor and guide the young Soldiers who are assigned to JTAGS. Charlie Detachment is no exception. Commanded by CPT Corey H. Ruckdeschel and expertly led and run by noncommissioned officer in charge SFC Christopher L. Barber, the dedication of the leadership in Korea has not gone unnoticed by senior leaders within the command.

"It's awesome that a crew from JTAGS Korea can represent not only the 1st Space Company, but the Army," Ruckdeschel said. "Korea is a site that rarely has longevity, and to have a crew from our location that has only been together for four months prove that dedication and know-how can outweigh longevity and experience is excellent. Their win in this competition was about heart, dedication, and willingness to learn."

The senior enlisted leader on site appreciates the efforts of these Soldiers.

"This crew took a great interest in the competition," said Barber. "They dedicated many hours of their off time to not only prepare for the Best Crew Competition, but to make themselves better JTAGS operators overall. To have them win the title of the Army's Best Missile Warning Crew is a reflection of the effort the Soldiers put into preparing for their mission."

TaLKing SHOP

BY LTC J. DAVE PRICE

STRATEG
PHILOSOPHY

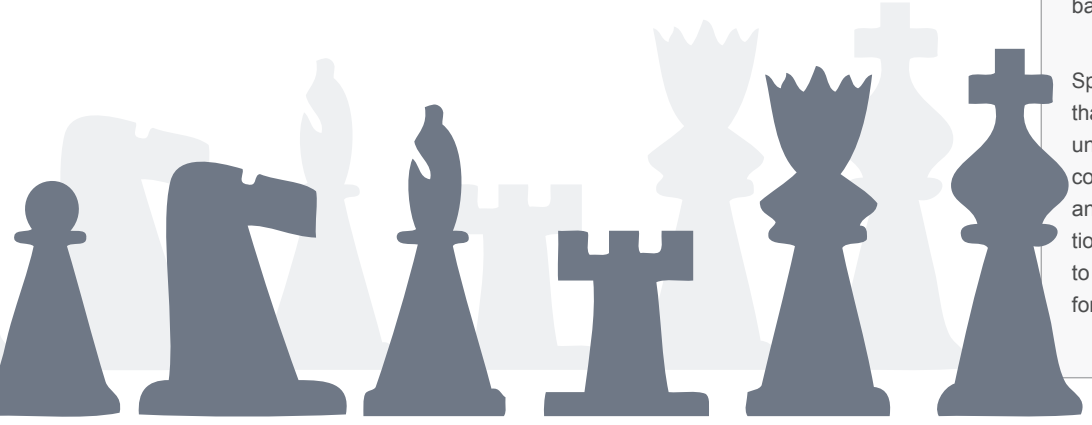
LTC J. DAVE PRICE

is a student at the U.S. Army War College in Carlisle, Pa., and former commander of the 1st Space Battalion, 1st Space Brigade, U.S. Army Space and Missile Defense Command/ Army Forces Strategic Command at Peterson Air Force Base, Colo.

Author's Note

This article was written to encourage new ideas and infuse our organizations with innovative thought and strategic thinking. As a company commander, I was motivated and excited to lay out a philosophy and plan. In most instances, my thoughts focused on physical fitness, morality, discipline, maintenance, safety, quality of life, and awards. I provided a philosophy for company teams but probably not very well, in hindsight. In battalion command, I did not provide a philosophy or a vision. My belief was that brigade commanders had a philosophy, and general officers had visions. I had a mission, purpose, and key tasks, and I was in direct support of the higher headquarters. In lieu of a philosophy, I gave "day one" command guidance that provided purpose and intent and laid out the principles of the organization. Instead of presenting "new" command principles, I emphasized those offered by Colin Powell–for example, "not to defend your base but to let change lead growth."

Having commanded four times, twice in Space units, gives the perspective to understand that the Army's only Space brigade requires an unusual framework and strategy. The brigade concepts presented are a framework that can, and should, apply up and down the organization. This article should in no way be construed to undermine the hard work and initiatives put forward by previous or current brigade leaders.



IC LEADERSHIP, Y, AND THE SPACE BRIGADE

One of the greatest problems of our time is fostering a leadership climate that in turn creates a learning organization. "It is just not possible any longer to figure it all out from the top, and have everyone else following the orders of the grand strategist. The organizations that will truly excel in the future will be the organizations that discover how to tap people's commitment and capacity to learn at all levels of the organization [and to pass it on]."[1] This article is not designed to show you "how" to create a learning organization but how leadership and philosophy will help you set the conditions and shape the outcome and end-state for organizational learning to occur.

Command philosophy is a state of mind and must be translated into working concepts.The key to success is to be yourself, and the most important document in your command is your philosophy. COL John G. Meyer, Jr., also stated many of the company essentials in a command philosophy in his book Company Command.[2] These philosophies are by necessity focused on the tactical aspects of command.

Understanding the proposed and possible missions of the organization is the first step in developing a strategy and philosophy. Tactically speaking, "colonels and lieutenant colonels–the leaders of battalions, squadrons, regiments, and brigades–are responsible for directing and controlling the battle."[3] Those words were written 30 years ago, and they remain viable today. However, brigade commanders require a broader approach in their strategy and philosophy for developing a vision and a team, specifically in a Space brigade. The current mission of the 1st Space Brigade is close to this: conduct continuous global Space force enhancement operations, Space support, and Space control operations in support of U.S. Strategic Command and supported combatant commanders, enabling shaping and decisive operations.[4]

Strategic leadership, in error, implies a command philosophy should lay out leadership priorities in your command. To avoid confusion let's define these terms better. Command is the authority given in accordance with the United States Code and Army regulation with taking over a military organization whereby the commander is invested with official responsibility for team and mission. Leadership is the method by which a commander chooses to guide his or her organization and complete the mission; there are many leadership styles. A command philosophy is used to identify factors which are important to the leader and should be closely observed. Command priorities are tasks or lines of operations identified as essential for the success of the mission or unit. A vision is the end-state that the commander wants to achieve. Finally, the command strategy is tasks (ways) and resources (means) tied directly to the philosophy (concept of the operation) and vision (ends or commander's intent).

Space is no longer unordinary to the Warfighter. The Space brigade is responsible for providing world-class Space force enhancement, satellite control, Space control, and Space special technical capabilities to the Warfighter. The brigade will meet the growing demands that the Space field requires, and it must remain flexible to respond to emerging missions. It must be predictive in shaping and understanding the needs of theater commanders. The brigade must remain agile in building and providing detachment-level teams when and where needed.

The Space brigade must take deliberate steps to meet these requirements with high-demand, low-density assets and must review the capability to grow within resources as needed. It must reduce overhead and "fat" in the organization and streamline staffs, efforts, and resources where feasible.

The brigade can and should task organize to provide combat-ready Space forces and capability, leveled on operational requirements, and become a learning and strategically oriented organization. Space Soldiers cannot fail to meet missions and must assume reasonable risk when necessary to keep the organization on task and simultaneously tackle these challenges.

The 1st Space Brigade is a multi-component unit with diverse Space missions and capability. The brigade's three battalions are made up of and resourced from both active, Army Reserve, and Army National Guard higher headquarters. However, it will be important to consolidate staff, resources, and requirements where U.S. law and Army regulations permit in all three components. The brigade forces are focused on all pillars of Space capability minus Space force application which is provided by the 100th Missile Defense Brigade. However, the 1st Space Battalion is tasked to train and organize Army support teams, conduct global missile warning, and conduct Space control and special missions simultaneously.

The command could task organize into a 2nd Space Battalion in order to focus operational capability on special and Space control missions, both of which are critical assets for combatant commanders. A task force needs to be created to provide options in grouping battalion and brigade staffs and efforts together. Also, a task force could be created that will devise options in reducing legacy missions and options to synchronize and create efficiencies within Space support, satellite control, and reserve component missions.

The brigade will have to continue to provide highly trained and ready Space forces and capability while becoming more predictive of the future and scanning the environment. The unit must be able to re-organize into flexible detachment-level teams and provide agile Space capabilities. This brigade command must become more adaptive and efficient in using resources and providing Space capabilities, while postured to learn and operate effectively in support of combatant commanders now and with a focus through ten years out.

There are important factors in leading a strategic organization, developing strategic leaders and thinkers on your team, and developing a strategic philosophy. Some key elements in strategy development are environmental scanning, futuring, organizational culture and leadership, and leading change. In order to develop a strategically oriented organization, strategic leaders must at a minimum look at those four influencers.

Environmental scanning is detecting the external environmental demands on an organization. The organization should scan to detect trends, define threats, promote a future orientation, and alert staff and commanders of near- and far-term factors and influences.[6] In the 1st Space Brigade, there are many outside influences and stakeholders that impact it, including the higher headquarters (U.S. Space and Missile Defense Command/Army Forces Strategic Command) and its multiple divisions; many Space and defense contractors that support operations and logistics contracts; U.S. Strategic Command and its Joint Functional Component Command for Space (JFCC-Space); Air Force Space Command; the U.S. Air Force as Executive Agent for the Department of Defense Space; the Colorado Army National Guard component; the U.S. Army Reserve component; and many others.

All stakeholders manipulate the shaping, direction, and velocity of the brigade organization and impacts in the maturation of the unit. Scanning is necessary to keep external organizations in its field of view continually and determining those impacts on the brigade and its mission. For our purpose here, there is not enough time to identify all of the influences by each organization or be predictive of their impacts. However, in one example of scanning, in hindsight, the higher headquarters (for global Space operations) changed multiple times in the course of a decade.

U.S. Space Command in Colorado Springs merged with U.S. Strategic Command at Offutt Air Force Base, Neb., in 2002.[7] It was later split into subordinate functional commands, and the Space brigade assets were assigned to JFCC-Space and JFCC-Global Strike. Later responsibility for Space was given to the commander of the 14th Air Force as the Commander, Joint Space Operations, before later being re-designated as JFCC-Space with the majority of Space command and control assets. While all of these changes could not all be observed through continuous scanning, some issues may have been recognized and adjustments made in response.

Futuring is predicting outcomes of decision-making inside an organization. Predictions are conducted to identify worst case, most probable, or alternative courses of actions in the environment with likely inputs by stakeholders. Understanding these potential outcomes may arm an organization on how it may conform, act, or mature to be ready for the future. This is done by "detecting scientific, technical, economic, social, and political-military trends and events important to the institution (brigade), and defining the potential threats, opportunities, or changes for the institution implied by those trends and events."[8] Futuring will identify reasonable gaps in planning operations and Space. These gaps may be closed using quantitative and qualitative analyses.

For example, if the brigade predicted a future where additional Space control and special mission capabilities will be requested by combatant commanders, then it would posture for that outcome. Leadership would make the decision

Proper environmental scanning and futuring are necessary to remain proactive and strategically capable, competent, and organizationally sound.

required to take on those responsibilities and introduce an additional force (Space battalion) designed for these requirements. Why would it predict this? If scanning and stakeholder show trends in Space control and special mission capability are not yielding or shrinking, then the organization will prepare to command and control a growing capability. If, in another example, global missile warning capability was predicted to no longer be a core Army mission or requirement, the brigade would conduct analysis and take measures to manage resources inside the organization to accept these changes.

Predictions might be wide of the mark, but it is more damaging to fail to acknowledge the environment and its impacts on a strategic organization. Proper environmental scanning and futuring are necessary to remain proactive and strategically capable, competent, and organizationally sound. Of course, there are other stakeholders with the responsibility for developing requirements and conducting combat and force development. The intent is not to compete with these stakeholders but to be responsible and act independently at first, and later compare notes to reach viable consensus for the growth and best interest of the overall team. But to become a strategic organization, you must first act like one. Organizations require the right command climate to allow cross talk and analysis along varying lines of effort.

The organizational culture and leadership is again unique in Space. There are two brigade headquarters under USASMDC/ARSTRAT; one is a reserve component and the other is a multi-component headquarters. USASMDC/ARSTRAT has diverse active, research, and development missions. There are four cultural misalignments: power distance, in-group collectivism, institutional collectivism, and assertiveness.[9] One example of this is the power distance between Huntsville, Ala., where the major command headquarters is and Colorado, where the two brigade headquarters and the deputy commanding general for operations reside. This circumstance has to do with the legitimate pull between essential centralized control and necessary decentralized innovation.[10] This originality can be stifled, imagined, or real when this power distance exists, even if this is more a factor of distance than power.

In leading change, senior leaders need to flatten the internal environment in order to reduce the power distance. The goals and objectives can be stated in tactical and strategic terms and correlated so all members are empowered to act on them. Army Space commands are few in number with limited resources and assets, and it is absolutely necessary to link their strategy from the top down.

In summary, these responsibilities lie within the brigade as well as cooperatively within the other elements of the higher headquarters. The brigade and higher headquarters must create efficiencies in order to survive and remain effective to meet the needs of the Joint and Army communities, but more importantly to meet the needs of the American people. It all begins with a strategy through a sound vision and philosophy with an acceptable end-state. This organization must be pro-active and become a learning organization willing to listen to its junior and senior members alike and ensure institutional knowledge is captured and does not "PCS."

Leadership must be courageous in making decisions and predicting outcomes; it must hold up moral and ethical values, all while being a good steward of resources within the broader Department of Defense and the Space community. It must be imaginative, predictive, lasting, and foster a learning environment and culture. The brigade must actively shape its environment with inventive people all while maintaining its sharp technical and tactical edge.

The "ideas presented [in this article] are for destroying the illusion that the world is created of separated, unrelated forces. When we give up this illusion–we can then build 'learning organizations' where people continually expand their capacity to create results they truly desire."[11]

Footnotes

1 Peter M. Senge, The Fifth Discipline: The Art and Practice of the Learning Organization (New York: Doubleday/Currency, 2006), pg. 4.

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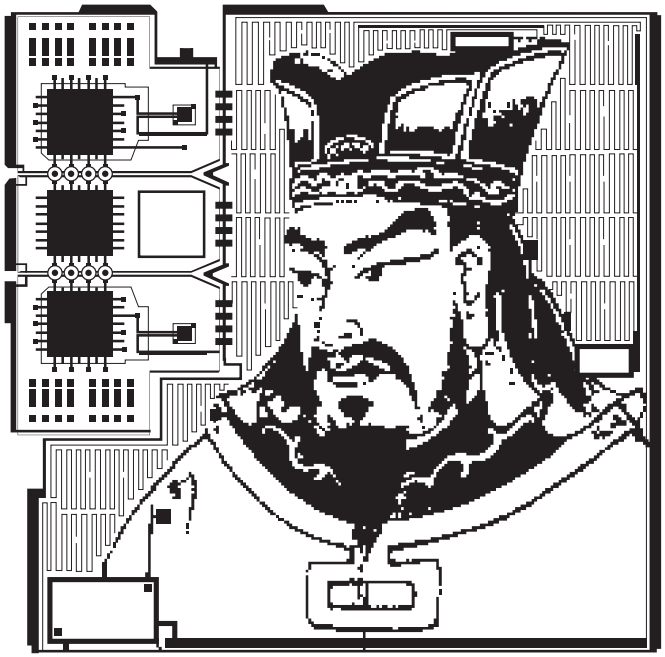
TaLKing SHOP



孫子兵法

SUN TZU
SPACE WARRIOR

Although Space operations had yet to be envisioned at the time he lived, the timeless theories on war put forth by Sun Tzu almost 2,600 years ago remain relevant to military planners, especially in the context of the unconventional warfare our nation continues to wage against those who aim to harm our way of life. The continued conflict the United States faces requires the development of new and innovative strategies that surpass conventional thought to achieve victory against a non-traditional enemy who is elusive, ideologically driven, and hides from direct confrontation on the battlefield.

This article is the first in a series where we will explore the question of what if Space and Missile Defense operations existed at the time many of the world's classical military theorists wrote their seminal works. What would they have said about these domains that are relevant to us today as we continue to develop, shape, and deliver the capabilities for today, tomorrow, and the day after tomorrow?

Chinese Author Travels through Time, Updates His "Art of War"

BY COL TIMOTHY R. COFFIN & MAJ KEN RICH

The first and arguably one of the oldest theorists, Sun Tzu, has chosen the interview style to open our conversation on the applicability of classical military theory to the congested, contested, and competitive domain of Space. A profound aspect of Sun Tzu's 13 principles in "The Art of War" is that they can be applied to almost any problem. He demonstrated an extensive understanding of all aspects of warfare, providing us with a comprehensive and coherent guide to the way war should be conducted.

We transported Sun Tzu from 500 B.C. to the present day, made him the honorary Deputy Commanding General for Operations for a day at U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, and asked for his guidance.

ASJ BG Sun Tzu, your 13 principles are certainly worthwhile; they allowed you to successfully lead your army to victory thousands of years ago. How can we as military Space professionals understand and apply your principles? We thought we would turn your principles into cool bumper stickers, then we could just grab one of your quotes and apply it to the situation we find ourselves in.

BG SUN TZU Let's get one thing straight right from the start. I do not organize my thoughts into systematic procedures that you can just pick up and follow. I am not giving you a concrete plan of action, but a series of recommendations that can be adapted to your circumstances. Let me give you an example that will help you understand where I am coming from. When you read a book, I am sure that you find it helpful to skim through the entire text to seek out the essential principles, extracting each one and generalizing, and then applying them to new situations. This can be an extremely powerful and efficient way to acquire and structure new knowledge. My philosophies are a loosely linked set of observations, not logical demonstrations. I teach by analogy and metaphor. You cannot simply pluck out my insights and drop them into your existing framework. You must develop new ways to use your mind.[1]

ASJ There are a dozen translations of your work, with many different interpretations and descriptions of your chapters. The main connection in the literature among scholars who have attempted to review your work is that your 13 principles are powerful tools that can be applied to almost any situation, from the smallest engagement to the largest campaign. Would you briefly go through each one and highlight the significance of each?

BG SUN TZU Yes, I certainly have created a firestorm of reviewers who all have a different take on my work. Briefly, there are 13 chapters and each is dedicated to a particular facet of warfare. Let us take a minute so I can review each one.

1. LAYING PLANS
There are five fundamental factors and seven elements that determine the outcomes of military engagements.

2. WAGING WAR
The cost of warfare and how to win decisively.

3. ATTACK BY STRATAGEM
The idea that the source of an army's strength is not in its size, but in its unity, as well as critical factors in achieving success in any conflict. Something you may want to pay special attention to today given the strategic and fiscal environment.

4. TACTICAL DISPOSITIONS
The defense of your tactical position and the importance of strategic opportunities.

5. ENERGY
The creativity and timing required to build momentum.

6. WEAK POINTS & STRONG
Opportunities caused by the weaknesses of your enemy.

7. MANEUVERING
The danger of direct conflict and how a commander can achieve victory through maneuver.

8. VARIATION IN TACTICS
The importance of flexibility and how to respond to changing circumstances.

9. THE ARMY ON THE MARCH
How to respond to tactical situations as you move through unfamiliar enemy territory.

10. TERRAIN
Advantages and disadvantages.

11. THE NINE SITUATIONS
The nine situations that you will face in a campaign and how a commander should approach them.

12. THE ATTACK BY FIRE
The use of weapons, targets of attack, and the responses to those attacks.

13. THE USE OF SPIES:
Information gathering and the five sources of intelligence.

ASJ Sir, now that you have succinctly summarized your principles, I believe I have a much better understanding of this masterwork on the conduct of war. If you had to pick one central theme, what would it be?

BG SUN TZU You are always looking for the simple answer. There is no sound bite that leads to a winner. Victory is not served in a McMinute in the comfort of your vehicle. Years and decades of proper planning, preparation, and patience will bear its fruit in season. I will tell you my central theme. The opening verse of my book is the basic cue to my philosophy. War is a grave concern of the state that must be thoroughly studied. Armed conflict is not a passing anomaly, but a continuing act worthy of detailed study. It therefore deserves thorough analysis on your part. Your moral strength and intellectual capability are decisive factors in war. If you apply them properly, you will be victorious. Professionals in the business of protecting the United States must take their obligation seriously and learn the craft of warfare. It is a matter of life or death, a road either to safety or to ruin. It is up to you which destination you will arrive at.[2]

Within this framework, my number-one theme is that you can avoid fighting when you plan the right strategy before the battle. War is to be preceded by measures designed to make it easy to win[3] If you have any doubts about this, my principles have been the foundation of Eastern strategy for thousands of years leading to many successful victories.

ASJ With all due respect, most Western strategists regard "On War" by Carl von Clausewitz as the best way to defeat our enemies. His theory concentrates on the big battle as the way to win. What do you have to say about this?

BG SUN TZU Look, Carl is a great strategist, but "On War" does not hold a candle to "The Art of War." I wrote 13 chapters for the King of Wu, who was not easily impressed to say the least. He made me thoroughly test my ideas and afterwards made me a general. I subsequently led my army westward, crushed the Ch'u state, and entered Ying, the capital. And in the north I kept the Ch'I and Chin in awe. Moreover, Western commanders who happened to unwittingly use my principles in important campaigns over the past two centuries were successful, while commanders who did not apply them suffered defeat–sometime disastrous, war-losing calamities.

Carl's main mantra is that war is merely a continuation of national policy, not an end in itself. The mistake he makes, however, is that his emphasis on total war and bloodshed undermines this theory. If war is indeed a continuation of policy, then the goal is the primary purpose. In emphasizing total victory, Clausewitz looked only at the end of the war, not the subsequent peace.[4] In comparison, my principles are a masterpiece of simplicity. The well-known British strategist B.H. Liddel Hart, whose own philosophy affirms my emphasis on doing the unexpected and adopting the indirect approach in strategy,[5] described me as "the most concentrated essence of wisdom on the conduct of war."[6] More to the point, he stated that the clarity of my thought "could have corrected the obscurity of Clausewitz."[7] At the expense of sounding trite, I could have not said it any better.

ASJ Sir, that is quite enlightening. What you are saying is that Clausewitz was a believer in a direct approach, meaning that combat was everything in his mind. In contrast, it appears that you favor deception and an indirect approach. Would you elaborate and compare these principles to what we do in the Space business?

BG SUN TZU Look, if you believe that the United States will not encounter a peer force-on-force in the near future and that we will continue to face the asymmetrical threat we have been dealing with over the last decade, then yes, you will need to look beyond what Carl has to offer for relevant information. As I stated in the Art of War, the object of military action is not the complete destruction of your enemy's army, their cities, or the depletion of their countryside, its victory. Plainly stated, I want to defeat my enemy without fighting so that we may live in peace. If this is not possible, I want to use deception and indirect means to bring about swift victory with the least amount of damage.[8]

Let me highlight a couple of my main elements from the Art of War that relate to deception and the indirect approach and place them in the context of Space operations. This answer will be the longest of all your questions.

In war, do not launch an ascending attack head-on against an enemy who holds the high ground. Do not engage him when he makes a descending attack from high ground. Lure him to level ground to do battle.[9]

First of all, Space power is a key ingredient for achieving operational environment superiority. Space is considered the ultimate high ground, and control of Space is critical to ensure availability of the capabilities it provides. For centuries commanders have fully understood the significance of the "high ground" in combat operations. A higher vantage point certainly offers both defensive and observational benefit to the forces who occupy it over their enemy.[10] Moreover, Space capabilities provide many of the products and services Warfighters depend on. For example, satellite communications provide intratheater beyond line-of-sight and intertheater worldwide communications. Additionally, GPS provides position-location information and critical timing signals that support friendly situational awareness, precision fires, and unified action maneuver and collaboration. Moreover, a variety of satellite sensors (surveillance and reconnaissance and missile warning) provide the Army with critical surveillance information to answer commanders' priority intelligence information requirements, provide indication and warning, and support strategic to tactical decision making. As I have said,

Know your enemy and know yourself; in a hundred battles you will never be in peril.

I cannot overemphasize the importance of knowing your enemy and gaining as much information as possible. This means learning your adversary's capabilities, potential, and intentions–digging down to the smallest detail. My last chapter was devoted to this very topic–the use of spies. In my time, we were limited to collecting information by direct human observation of the enemy and collecting information through the use of five types of agents: agents from the enemy's own country, enemy officials, enemy spies, my own spies who are sacrificed with false information, and spies who have returned with accurate information. The message to commanders was that, of all those who are close to you whom you rely on, the most valuable person in your command is the secret agent.[11] The knowledge you garner prior to any engagement is the key to defeating the enemy. You must fully understand the enemy; not from hearsay, analogy, or deliberations, but directly from those who know the enemy situation in every detail. In the 21st century, Space capabilities give us the ability to transfer, collect, and defend information as well as the ability to provide information on terrain, location, or activities of interest. Space capabilities also deny or degrade your enemy's ability to gain or acquire that information from Space.

All warfare is based on deception.

"If you are able, appear unable, if active, appear not active, if near, appear far, if far, appear near. If they have advantage, entice them; if they are confused, take them; if they are substantial, prepare for them; if they are strong, avoid them; if they are angry, disturb them; if they are humble, make them haughty; if they are relaxed, toil them; if they are united, separate them. Finally, attack where they are not prepared and go out to where they do not expect. This specialized warfare leads to victory, and may not be transmitted beforehand."

Warfare is the art of deceit. Deception, in my opinion, is the most critical piece toward achieving victory over your enemy. I want to make the point of deception perfectly clear; all warfare is based on deception. A skilled leader must master the disparate elements I stated a minute ago in order to confuse and delude the enemy while simultaneously concealing your true circumstances and ultimate intent.[12] My point is that you can achieve a competitive advantage by deceiving the enemy into believing that you are weaker or stronger than you actually are.[13]

Clearly deception has a role to play in the Space and, I might add, the Missile Defense arena. Your adversaries will use decoys to lead you astray, cause you to waste your assets, and lead you down paths toward destruction. Your own effective use of deception could mislead your enemy into believing incorrect information about the systems you have in Space or could put into Space. Even knowing that you have deployed decoys, the enemy could withhold action for fear that it is engaging a decoy.

Another deception tactic is the dispersal of your Space systems. Scattering satellites into various orbital altitudes and positions, as well as building "micro-sats" to collectively perform the functions of what larger and more vulnerable satellites perform, allows for added protection and increased survivability. Another example would be flooding satellite receivers with false communication links, making it extremely difficult for the enemy to separate critical communications from false traffic. There are many matters you could discuss here given the appropriate venue and a few creative minds.

ASJ Thank you, BG Sun Tzu, for taking the time to discuss the Art of War. I know we have only touched the surface of what your work has to offer us. Even though you wrote the Art of War thousands of years ago, it is fully apparent that your principles are as relevant today as they were in your time. Perhaps you would consider writing a 2012 edition to cover your thoughts more completely. As Space professionals, and more importantly as Soldiers, we must take our obligations seriously and study your masterwork of strategy in order to adequately plan for the future. Now please go back to your time; COL Coffin wants his office back.

Footnotes

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The Art of War by Sunzi (Lionel Giles, translator), http://www.gutenberg.org/ebooks/132

"Learning from Sun Tzu," Douglas McCready, Military Review, May - June 2003

Understanding Sun Tzu on the Art of War, Robert L. Cantrell (Arlington, Va.: Center for Advantage, 2003)

TaLKing SHOP

BY LTC M. TROY BENTLEY

OUR HIGHEST

Satellite Launches Carry Names of Fallen Heroes

This decal honoring special operations personnel killed in an Afghanistan helicopter crash was displayed on a Minotaur-IV+ launch vehicle carrying the TacSat-4 spacecraft.

ABOVE A Minotaur-IV+ launch vehicle displaying a specially designed decal in honor of U.S. special operations personnel killed in action takes flight from the Kodiak Launch Complex in Alaska.
Photo by Office of Naval Research

LEFT A Minotaur-1 launch vehicle displaying a decal in honor of recent Medal of Honor recipients stands ready at the Mid-Atlantic Regional Spaceport on Wallops Island, Va.
Photo courtesy of Operationally Responsive Space Office

T DEDICATION

In the hush of morning twilight, a brilliant light and deafening roar shattered the tranquility of the Alaskan wilderness launch complex at Kodiak, Alaska. This was the scene of the Naval Research Laboratory's TacSat-4 launch on Sept. 27, 2011, and the second event dedicated to fallen American heroes by the Operationally Responsive Space (ORS) Office.

The Minotaur-IV+ launch vehicle displayed a specially designed decal in honor of U.S. special operations personnel killed in action. An earlier launch lauded recipients of the Medal of Honor.

On Aug. 6, Americans were shocked to hear of the single deadliest loss of U.S. forces in the decade-long war in Afghanistan. Thirty brave Americans, eight Afghans, and a military working dog perished in the crash of a CH-47 Chinook helicopter in Wardak province, Afghanistan. The tragedy was compounded by the fact that 22 of the dead were Naval Special Warfare Command Sailors (SEALs), including 15 SEALs who participated in the operation that killed Osama Bin Laden three months earlier. Other U.S. casualties were five Soldiers of the 135th and 158th Aviation regiments and three Airmen from Air Force Special Operations Command.

The TacSat-4 dedication also included having SEAL team members present for the launch. The launch vehicle decal listed the names of every American killed in the crash and even Bart the military working dog. To signify their bravery, silver wings are the most prominent part of the design. A purple heart enfolds the U.S. Special Operations Command spear tip, SEAL trident badge, Air Force Special Operations Command symbol, and 7th Battalion, 158th Aviation Regiment insignia.

ORS-1 Dedication

On June 29, the ORS office dedicated the launch of the ORS-1 satellite to honor the extraordinary courage and selflessness of Soldiers, Sailors, and Marines who received the Medal of Honor, the nation's highest award for valor, in Somalia, Iraq, and Afghanistan. The ORS-1 satellite blasted off atop a Minotaur 1 rocket from NASA's Wallops Flight Facility and Mid-Atlantic Regional Spaceport on Wallops Island, Va. ORS-1 is an electro-optical/infrared satellite employing a U-2 reconnaissance aircraft sensor package covering seven different wavelength bands. It is the first operational satellite launched by the ORS office.

About TacSat-4

The TacSat-4 mission will provide enhanced Space-based communication to U.S. forces in Afghanistan. The satellite's highly elliptical orbit brings it close enough for a service member using a handheld radio or pack radio to communicate effectively in the deep valleys of Afghanistan. It will also provide ten additional Ultra High Frequency channels and allow forces using existing radios to communicate on-the-move. Moreover, TacSat-4 provides flexible up and down channel assignments, which increase the ability to operate in busy radio-frequency environments and will cover the high latitudes and mountainous areas where users currently cannot easily access UHF satellite communications.

TacSat-4 will maintain a highly elliptical orbit of 435 miles by 7,470 miles at a 63.4-degree inclination. This unique flight path, three times closer to the Earth than most communications spacecraft, will enable TacSat-4 to provide four-hour coverage in the northern hemisphere during each of its six daily treks around the globe.

LTC M. TROY BENTLEY is an aviation officer who became a Space Operations Officer in December 2010. He currently serves as the Tier-2 division chief in the Operationally Responsive Space Office. He has served as a National Police Transition Brigade team chief in Iraq and as a senior military adviser in Saudi Arabia, and worked for NASA at the Kennedy Space Center as an operations engineer, payload test director, and in program management.