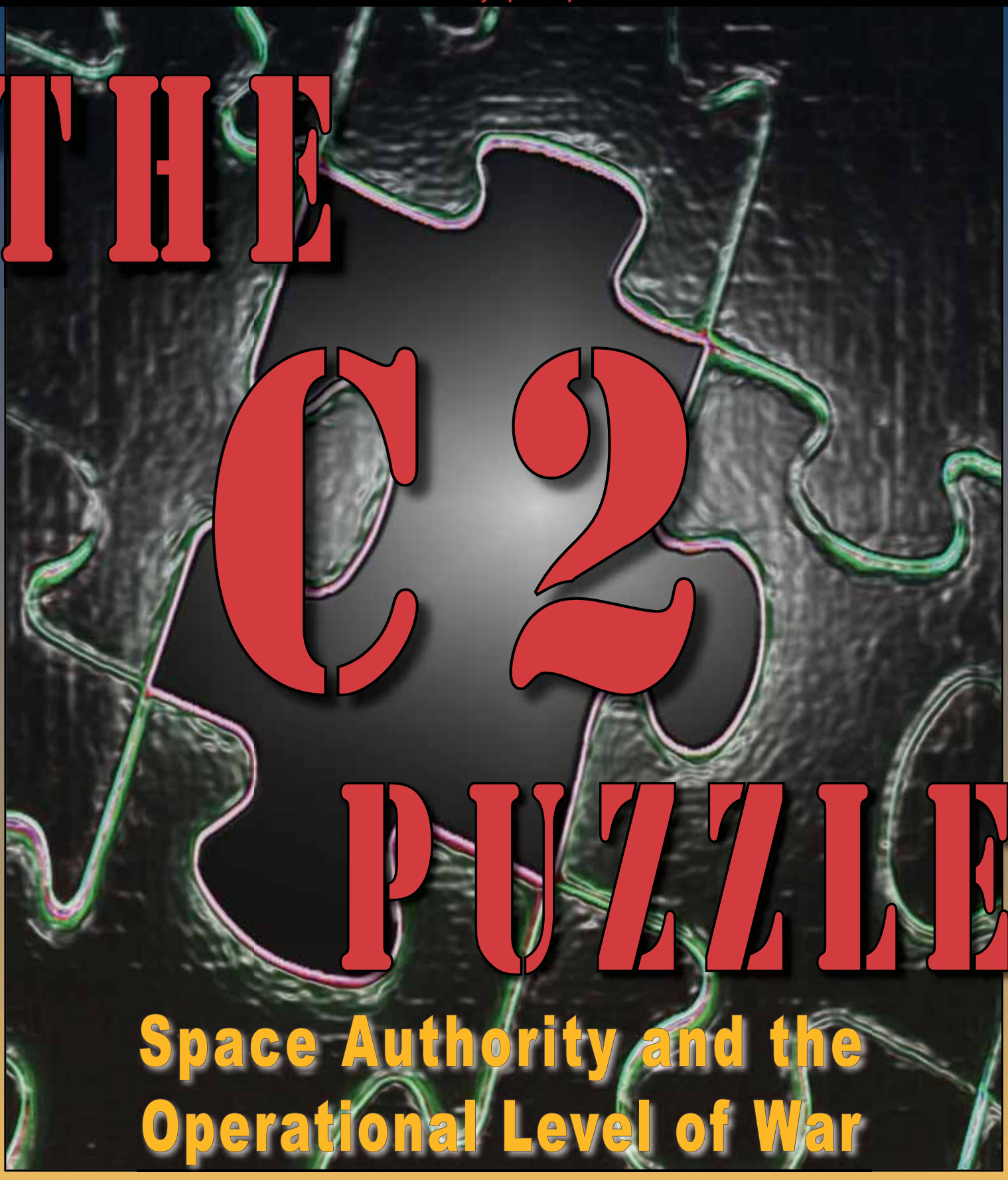
the Army Space Journal
A Professional Journal on U.S. Army Space Operations
2006 Summer Edition Vol. 5, No 2
Published by U.S. Army Space and Missile Defense Command



THE C2 PUZZLE

Space Authority and the Operational Level of War

the Army Space Journal

Communicating Space to the warfighter

The U. S. Army Space and Missile Defense Command publishes **the Army Space Journal** quarterly, with special editions as required. The publication consists of four sections, FROM THE TOP – Leadership Updates; JOURNAL FORUM – Space Topics; TIP OF THE SPHERE – SMDC Features; and FLIPSIDE – Space Cadre News /Features.
The Journal provides a forum through which Space operations professionals can disseminate professional knowledge and furnish information within the U.S. Army. The purpose is to increase the effectiveness of Space operations through a professional discussion of events and lessons learned. It is also intended to inform the Army warfighter on Army Space issues.

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Distribution is made to the general public, Functional Area 40 officers and associated military officers, civilians, and contractors. Changes to addresses and requests for this publication should be made to the Future Warfare Center, Directorate of Combat Development address listed above.

The Army Space Journal is an authorized publication of the U. S. Army Space and Missile Defense Command in accordance with AR 25-30 and AR 360-1. The Commanding General, U. S. Army Space and Missile Defense Command, has directed that the publication of this periodical is necessary in the transaction of the public business as required by law. Use of funds for printing this publication were approved by the Commanding General in January 2001.

The views and opinions expressed in the Army Space Journal are not necessarily those of the Department of the Army or U. S. Army Space and Missile Defense Command.

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What you didn't know ...

Charlie came by the office waving a printed copy of an e-mail he received during the night from Iraq. "This is what I've been talking about," he said in his typical loud voice. "Old School Army. We need more of that around here."

Charlie is hard-of-hearing from 30 years of enlisted service in the Army around guns, so most of us around the office have learned to tolerate his disturbingly loud voice. Still on this morning, as is the case for most mornings, his big booming voice interrupted my quiet room. I jumped and Charlie scolded me for being too jumpy. I scolded him for sneaking up on a guy. Then he planted the page in the center of my desk, folded his arms across his chest and sat down to await my response.

I read the letter. It was from a colonel in Iraq telling Charlie that she was proud of him as a parent. Charlie is a retired Army command sergeant major. Charlie's eldest son, a graduate of the U.S. Air Force Academy, is a lieutenant colonel in the Air Force who had just completed a tour in Iraq working for the colonel who wrote the letter. It was only a couple sentences long and it really didn't say much more than telling a parent his son had contributed to a very complicated war effort. "Despite what you may hear in the media (about Iraq), we are making a difference. I may be too optimistic about it, but I really think we are and I know that you are proud your son is part of it."

"So when does he come home?" I asked Charlie. "Should be home in a few weeks," he said in as quiet a voice as any parent would use in that moment to show the relief only a parent could know. "I'm sending him an airplane ticket from my frequent flyer miles. His mom will be happy to see him home from the war." And it ended like that. Charlie with all the bravado his manhood, pride and poor hearing could muster was reduced to a quiet father reflecting on kind words about his son from a colonel he did not know commenting on a war he did not know. I am sure no words could adequately describe how he felt — or feels — about the e-mail saying his son was coming home safe and that he had made a great contribution.

A moment later Charlie was his old self snatching the letter off my desk and walking out the door.

As he left, I thought of my own daughter. She too graduated from the Air Force Academy, only for her it was a few short months ago. We sat in the football stadium as Secretary of Defense Donald Rumsfeld shook the hand of each of the nearly 900 graduating cadets. The night before, I had the privilege with her mother to swear her in as a second lieutenant. My take on Rumsfeld's words: These new lieutenants would be involved in a very difficult and long fight against terrorists and it would take courage for each of them to stand up with creative solutions which may go against the grain of narrow-minded thinking.

This isn't too far from the efforts of our Army friends involved in Space — not that they are up against opposition, but that they bring an outside-the-box capability. Today, six Soldiers from the 1st Space Brigade lined up in front of the American flag for a group photo. They head off soon to Iraq to bring their Space contributions to the fight. We all, like Charlie, will have our quiet moments for these friends and their contributions.

— Michael L. Howard
Editor in Chief

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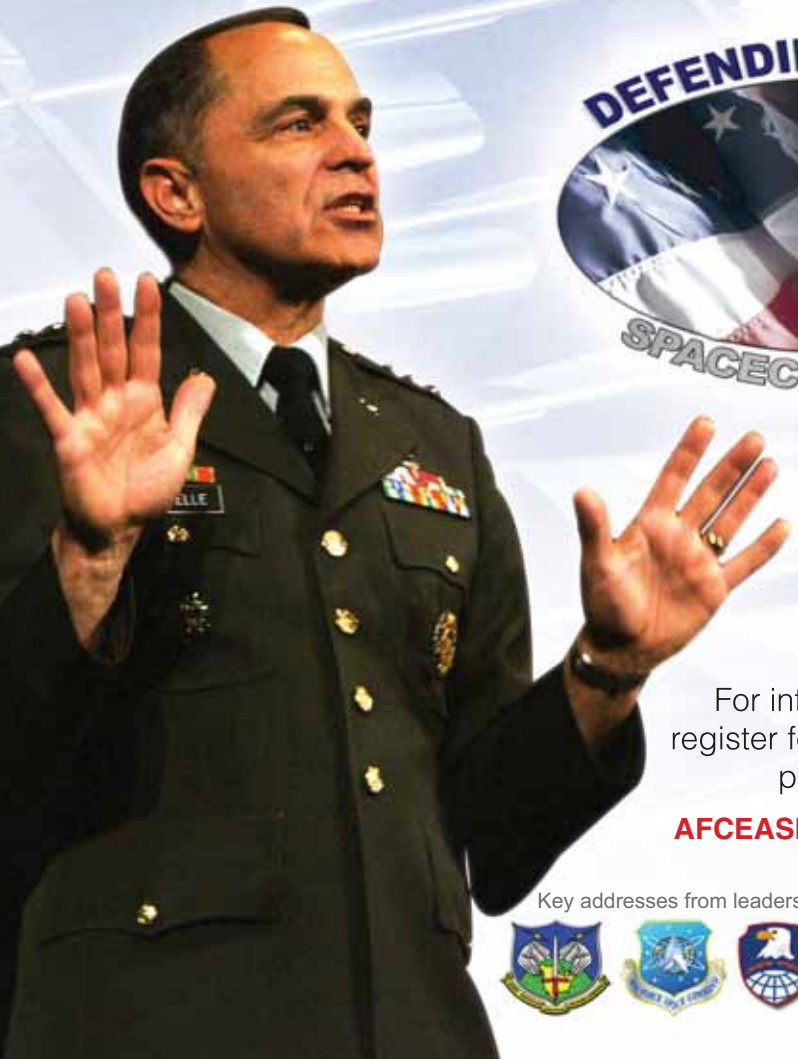

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Key addresses from leaders in these organizations:

Dominating the Battlespace:

Filling Capability Gaps in Support of Joint Warfighters

LTG Larry J. Dodgen
Commanding General,
U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command

By LTG Larry J. Dodgen

The world has changed dramatically in the past decade, and our Nation's military forces have significantly changed in response. Concurrent with supporting joint warfighters engaged in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), our military capabilities are evolving to fight terrorism, meet nontraditional, asymmetric threats, and shape a defense structure better able to support and facilitate transformation. This broader focus, articulated in the recent Quadrennial Defense Review, released in February 2006, also requires capabilities to defend against traditional threats, conduct humanitarian missions at home and abroad, and help our Nation's allies and partners develop their own defense capabilities.[1]

To a degree not envisioned a decade ago, the lessons gained in ongoing combat operations and the impact of transformation have resulted in enhanced capabilities for our Nation's joint warfighters. Speed, power, precision and agility in "dominating the battlespace" have all been enhanced. Space-based capabilities, integrated as systems-of-systems, have been instrumental to this process. Former Vice Commander, Air Force Space Command, LTG Daniel Leaf, said, "Space … makes us more effective, more precise, and limits the tragic destruction that's inevitable in war."[2] Space assets have also enabled the conservation of combat power and saved countless lives. For example, Space assets have supported many of the more than 30 combat search and rescue missions conducted in Iraq.[3]

Once thought of as being restricted to the domains of land, sea and air, the current concept of the battlespace is defined as "the environment, factors and conditions that must be understood to successfully apply combat power, protect the force or complete the mission. This includes the air, land, sea, Space, enemy and friendly forces, facilities, weather, terrain, the electromagnetic spectrum and the information environment within the operational areas and areas of interest."[4] How the enemy perceives his environment and makes decisions based upon those perceptions are also part of the battlespace.

Dominating the battlespace demands superior knowledge and understanding about the battlespace beyond what the adversary knows and understands. The capability to sense, understand, decide and act more quickly than the enemy is fundamental to mission success. This capability enables commanders to make decisions and implement actions faster than an adversary can react, allowing combatant commanders to shape the situation, obtain the desired combat effects, and achieve the stated objectives. Space-based capabilities are critical to providing the relevant and timely information — actionable intelligence — needed to see, shape and dominate the battlespace. LTG Michael Hamel, commander, Space and Missile Systems Center said, "Information-centric warfare is becoming a critical center of gravity and Space has become the medium through which we enable information superiority for expeditionary operations."[5]

The Urgency of Defining the Gaps

Ongoing combat operations in Afghanistan and Iraq require the full range of our technological and tactical capabilities. Varied and powerful improvised explosive devices buried beneath and along roadsides or hidden inside innocu-

The ongoing Global War on Terrorism and continued instability in multiple locations around the world necessitate the responsive delivery of capabilities in support of joint warfighters. Providing relevant support to our warfighters means furnishing capabilities enabling them to pursue the enemy around the clock. The operational requirement for responsiveness is now counted in seconds and minutes, not days, weeks or years.

ous objects and unattended vehicles complicate their early detection. Similarly, tracking individuals and groups of insurgents moving in complex terrain is complicated by their operation in small cells and their attempts to blend in with the local populace. The enemy's creative use of wireless communications combined with extensive use of Internet resources add further challenge to combating these enemies. Concurrently, adversaries attempt to counter our Nation's military strengths by attacking or exploiting perceived weaknesses, especially our dependence on Space-based command, control, communications, and computers, and intelligence, surveillance and reconnaissance capabilities. Requirements for points of access into theater, sustainment bases and transportation assets are also potential enemy targets.

During the early phases of OEF and OIF, satellite communications (SATCOM), early missile warning data, blue force tracking support, timely delivery of commercial imagery, forecasts of Space weather effects on SATCOM, and projections on the health of the global positioning system (GPS) and other satellite constellations were particularly vital. Army Space Support Teams supported the Coalition Force Land Component Commander, V Corps, 1st Marine Expeditionary Force, and the Office of the Coalition Provisional Authority by delivering Space products, services and expertise. The impact of these capabilities was significant, as noted in the following review: "The Nation's Space capabilities directly impacted speed of maneuver, the tempo of the fight and the boldness and lethality of our forces."[6] As an example, considering one area inextricably linked to Space-based capabilities, GPS, there have been more than 4,000 GPS-aided munitions expended in OIF.[7] Use of these munitions clearly has been instrumental in enhancing accuracy and minimizing collateral damage.

In an environment of insurgency, one might believe the value of Space is reduced; however, lessons provided by joint warfighters engaged in the Global War on Terrorism indicate the relevance of Space and its significance continues to grow. Focus, adaptiveness and innovation are required to ensure Space-based systems and products remain relevant to the current fight. Joint warfighters engaged in OEF and OIF require, in particular, robust capabilities in the areas of SATCOM, Intelligence, Surveillance and Reconnaissance, Blue Force Tracking and position navigation data. Space Support Elements, organic in the new Army modular formations, are instrumental to delivering and maximizing the use of these capabilities.

Combatant commanders require actionable intelligence to support military decision-making and operational missions. Battlefield information must be collected, processed into actionable information and rapidly disseminated to commanders who can use it to influence the battlespace. Multiple approaches are currently underway to provide it. A new concept called "Every Soldier is a Sensor," is being deployed to acquire raw on-the-ground data directly from Soldiers and then synthesize this information into a usable format for intelligence databases.[8] Supporting this initiative is the Commander's Digital Assistant, a small, handheld personal digital assistant that makes reporting quick and simple. The Force XXI Battle Command Brigade and Below (FBCB2) system allows Soldiers to digitize reports at the point of origin into a format that can be integrated at all levels. Space-based capabilities support the collection and transmittal of this electronic data. This focus supports the operational planning guidance provided by LTG Thomas Metz, former commander, III Corps, from his experiences in Iraq: "For every zero and one that streams down, think where else it needs to go."[9]

Combat operations conducted in mountainous terrain in Afghanistan and built-up areas in Iraq reduce the effectiveness of line-of-sight communications, which increases the operational demand for SATCOM down to the tactical level. SATCOM also pro-

vides the backbone for several Blue Force Tracking systems and new technologies, including unmanned aerial vehicles.

Over the past couple of years, a variety of unmanned aerial vehicles have been developed and fielded, contributing to the provision of immensely useful and timely battlefield information. However, the more than 750 unmanned aerial vehicles currently operating in Iraq and Afghanistan, of which approximately 700 are used by the Army, create significant bandwidth requirements.[10, 11] The Air Force estimates their fleet of unmanned aerial vehicles alone will triple in 2006, requiring a more than 350 percent growth in bandwidth, up to as much as 1 Gigabyte per second.[12] Viewing this in perspective, during Operation Desert Storm, coalition military forces numbered 542,000 and they had 99 megabits per second of bandwidth available. In OEF/OIF, bandwidth rose to 3,200 megabits per second, although the number of forces was reduced to 350,000.[13]

Operational Responsiveness: Delivering the Right Capability at the Right Time

The ongoing Global War on Terrorism and continued instability in multiple locations around the world necessitate the responsive delivery of capabilities in support of joint warfighters. Providing relevant support to our warfighters means furnishing capabilities enabling them to pursue the enemy around the clock. The operational requirement for responsiveness is now counted in seconds and minutes, not days, weeks or years. In commenting on the criticality of responsiveness, GEN James Cartwright, commander, U.S. Strategic Command noted: "Support must be assured. I need to be able to count on it when I need it. Otherwise, utility goes to zero."[14]

In addition to 24/7 planning cycles, planning windows have been correspondingly reduced. As recently noted by a combatant planner, "When you're after an elusive, high-value target, you've got to make every shot count."[15] Two examples illustrate the manner in which operational responsiveness is enhanced by Space-based capabilities:

- Attack on a Terrorist Safe House. On June 7, 2006, a GBU-38 Joint Direct Attack Munition was used in the air attack of the safe house used by Abu Musab Al-Zarqawi, the leader of al-Qaeda in Iraq and apparent mastermind behind hundreds of bombings, kidnappings and beheadings in Iraq. GPS and SATCOM were instrumental to the success of this mission.[16]
- Attack on a Terrorist Motorcade. In November 2001, a U.S. patrol near Kabul, Afghanistan, observed a motorcade suspected of transporting al-Qaeda fighters. The information was relayed via SATCOM to forces serving with U.S. Central Command. The motorcade was later engaged by U.S. military aircraft and a remotely controlled Unmanned Aerial Vehicles. The airstrike killed approximately 100 Taliban fighters and Mohammed Atef, a close associate of Osama bin Laden and the reported mastermind behind the 9/11 attacks.[17, 18]

Expansive demands for SATCOM and the capabilities that rely on it have led to the necessity of relying on civilian communications satellites to augment military SATCOM. In fact, during the early phases of OIF, approximately 80 percent of military communications were transmitted over commercial satellites. The growth in demand for military SATCOM has fueled significant expansion in the industrial-base Space and satellite market, which is estimated to reach more than $150 billion by 2010.[19] This reliance on commercial SATCOM is expected to continue at least until the Transformational Satellite Communications System comes on-line. The first launch of a Transformational Satellite Communications System satellite is currently scheduled for 2014.

Filling Capability Gaps in an Era of Faster and Leaner

The operational environment for our military forces during the next 20 years is expected to be even more complex than today's environment. The U.S. Joint Forces Command, in its annual review, *The Joint Operational Environment: The World Through 2020 and Beyond*, identified several conditions likely in the future operational environment: [20]

- Urban environments and other complex terrain will increasingly become centers of gravity;
- Potential adversaries will use adaptive responses to counter U.S. conventional military advantages;
- Campaigns and operations will have to account for a much broader battlespace that will extend well beyond the region of conflict. Regional crisis can quickly expand well beyond the boundaries of the affected region or the immediate cause of the conflict;
- Rapidly expanding global and regional information architectures, systems and organizations, both private and public, will have pervasive impacts;
- As the strategic center of gravity, the American Homeland will be increasingly targeted for direct and indirect attack.

As a strategic analysis of the future security environment, the 2006 Quadrennial Defense Review Report sets strategic priorities, identifies areas for needed investment and outlines the mix of forces and capabilities to fulfill the goals and objectives stated in the 2005 National Security Strategy. This comprehensive review also outlines the way ahead for the next 20 years, the period covered by the Joint Forces Command review, as our Nation confronts current and future challenges and our military continues its transformation in the 21st century. The Quadrennial Defense Review also aims to shift military capabilities to fight terror-

ism and meet other nontraditional, asymmetric threats, while shaping a defense structure that best supports and speeds up this reorientation.

Technological advances, increased access to information and globalization are likely to provide potential adversaries the capabilities to apply military force with greater precision, lethality, agility and survivability throughout the expanded battlespace. This expanded battlespace is also likely to be more non-linear than linear, more intangible than tangible, and more non-kinetic than kinetic. Defeating these adversaries will require detecting and tracking down low-signature targets, quickly identifying diverse behavior patterns and enabling timely decisions and actions. Operations will be conducted in a distributed manner over complex terrain and place a premium on integrated Space, air and ground sensors, and communication systems. Greater emphasis on Special Operating Forces capabilities will require more bandwidth and Space-based Joint Blue Force Situational Awareness.

Dominating the battlespace in the future operational environment will demand capabilities that enable high-tempo non-contiguous simultaneous operations, full-spectrum force protection, continuous situational awareness, non-line-of-sight lethality and precision fires. Capabilities in eight areas will be required to support the Future Force:

- Net-centric SATCOM, enabling seamless, integrated, dynamic bandwidth for battle command on the move;
- Assured, accurate, real-time early missile warning and integrated tracking distributed direct to affected forces and battle command systems;
- Responsive, tactically relevant Space control capabilities synchronized and integrated with land, sea, air and information operations;
- Persistent surveillance;
- Robust, precise, redundant jam-resistant position navigation;
- Advanced sensors for timely weather, terrain and environmental monitoring;
- Joint Blue Force Situational Awareness;
- Timely and accurate spectral imagery.

Support of these areas will likely require a mix of air, near-Space and Space-based systems, since no single system will be capable of supporting all mission requirements. However, two capabilities in particular show great promise for the support of Future Force warfighters: near-Space and tactical satellites.

Near-Space, defined as the altitude between 60,000 and 325,000 feet, will support a variety of platforms that will likely augment rather than replace air or Space assets. Platforms expected to operate in near-Space include those that provide capabilities in the areas of SATCOM, early warning, Intelligence, Surveillance and Reconnaissance and integrated fire control.

Once operational, near-Space platforms could also provide much needed persistence and direct support to theater commanders and their joint warfighters. Addressing the value of near-Space for pilots, GEN Lance Lord, former Commander, Air Force Space Command, noted: "At about 65,000 feet, balloons carrying communications receivers and transmitters can relay communications between air controllers on the ground and pilots in the air. The system allows pilots to receive information earlier in the 'kill chain' so they can remain focused on the mission and avoid problems from the ground. Another advantage is persistence over the theater. Near-Space gives warfighters the ability to continue flying over a certain area for a longer period of time."[21] The article by Michael Schexnayder in the Spring 2005 Edition (Volume 4, Issue 2) of **the Army Space Journal** contains an excellent discussion on "Near-Space Missions and Platforms." I encourage your review of this article.

To ensure a global responsiveness and the right mix in capabilities, it is equally important to consider the Space regime in addition to near-Space platforms. It is clear that near-Space capabilities provide the persistence required by tactical warfighters. The tactical Space regime is next in line for further exploration of the military utility to enhance global combat scenarios. Tactical satellites (TacSats) promise to provide capabilities to rapidly augment existing national Space assets, and rapidly deploy Space assets with payloads tailored to specific requirements of combatant commanders. TacSats could significantly increase persistent surveillance, precision targeting, communications, 360 degrees of situational awareness, dynamic tasking/retasking, as well as, direct tactical downlink of processed/actionable information. They will also provide increased persistence over areas of interest, so larger satellites will not need to be diverted from their primary missions.

Developed under the program "Operationally Responsive Space," TacSats will be placed into mission-optimized orbits upon demand in a low-cost manner, thereby delivering capabilities to joint warfighters around the globe faster than currently possible (reducing the time line from combatant commander call-up to on-orbit capability from 3-4 years to 5-7 days). TacSats will break the paradigm of a centralized control, to theater payload management, tasking and direct downlink to the warfighters who need the information within seconds-to-minutes of collection. Operationally Responsive Space also covers the development of launch vehicles, standardization of Space vehicles, modular interoperability, ground-based network integration and other technologies needed to make this vision a reality.[22]

The first tactical satellite, TacSat-1, is ready for launch but has been delayed. The TacSat-1 payload will consist of low-resolution visible and infrared cameras, a radio receiver package and connectivity with the Secret Internet Protocol Router Network (SIPRNet). Once operational, the satellite will be able to link with a variety of intelligence assets and unmanned aerial vehicles.[23]

Follow-on satellites, TacSat-2, -3, -4 and -5, are among a series of experimental Spacecraft designed to demonstrate new technologies and capabilities for providing responsive Space-based support direct to tactical forces.[24] TacSat-2 (a multi-spectral sensor payload) and TacSat-3 (a hyper-spectral sensor payload) are expected to launch, respectively, by November 2006 and September 2007. TacSat-4 has been recently selected as a communications payload that will provide additional communications capacity, data exfiltration and battle command on-the-move.

(See Dominating the Battlespace, page 50)

An Enlisted Space Cadre: A Year of Modest Progress

CSM David Lady
Command Sergeant Major,
U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command

Many of our Space Operations Officers will have the opportunity to lead and rate enlisted Soldiers while serving as commanders and leaders of U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) organizations. Use this information when counseling and advising your Soldiers, especially as they consider whether to remain in SMDC/ARSTRAT or continue their careers in other Army Commands and Army Service Component Commands.

By CSM David Lady

In September 2005, the Army made real progress toward establishing an Army Space Cadre, and with it, an enlisted Space Cadre. The Space Cadre Force Management Analysis General Officer Steering Committee approved the Space Cadre definition and organizational construct and assigned the Army Space Cadre Office to U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command. These recommendations were accepted by the Vice Chief of Staff of the Army in January 2006.

Enlisted positions within the Army Space Cadre are identified as "Space Enablers." These Soldiers assist the Space operations professionals (FA40s) or perform other tasks critical to the Army's Space operations mission (such as satellite control).

There will be no Space Military Occupational Specialty (MOS). Enlisted members of the Space Cadre will be drawn from the Signal, Air Defense Artillery, Military Intelligence and Engineer branches. The Force Management Analysis recognized the need for additional skill indicators, to identify Soldiers serving in Space operations positions (such as ASI "1C" which identifies Satellite Control Specialists within Signal-MOS 25S).

SMDC/ARSTRAT was authorized to recommend additional skill indicators for Soldiers serving in Space Enabler positions and who receive functional training in order to perform Space operations tasks. As of this time, additional skill indicators requests have been submitted for the Soldiers in MOS 14J (ADA: C4I TOC Operations Specialist) who serve in the Theater Missile Warning (JTAGS) detachments.

Preventing other additional skill indicator-initiatives is the lack of formal Space operations training for Soldiers assigned into Army Space Support Teams, Commercial Exploitation Teams and Space Support Elements. These Soldiers receive no recognized and formalized functional training in order to perform these missions. They are trained and certified to operate certain pieces of equipment. Any other skills are picked up on-the-job.

Until the SMDC/ARSTRAT Future Warfare Center specifies the missions of these teams and designs courses to train Soldiers in these missions, there will be no other initiatives to gain additional skill indicators for these Soldiers.

Space Enabler positions will be identified by all the Army Commands and Army Service Component Commands (ASCCs) by Aug. 31. SMDC/ARSTRAT has already identified its Space Enabler positions.

The number of Space Enabler positions in the command will grow over the period 2007-2011. During this period, 27 new Modified Table of Organization and Equipment (MTOE)-organizations will be added to the command (See chart). These units will bring the strength of SMDC/ARSTRAT (minus headquarters staff and civilians) to 1,864. Most of these Soldiers will be Space Enablers.

In addition to these organizations within SMDC/

Modified Table of Organization and Equipment
Unit Activations FY07 - FY11

UNIT ACTIVATIONS	FY06 Current	FY07	FY08	FY09	FY10	FY11	UNIT PERSONNEL TOTALS
1st Space Brigade	114 (AC/RC)						114 (70 AC/44 RC)
1st Space Battalion	28						28 (AC)
1st Space Company (TMWC)	10						10 (AC)
TMW Detachments	6 (96)						96 (AC)
2nd Space Company Headquarters (Support)	7						7 (AC)
ARSST TMs	6 (36)						36 (AC)
CET TM	7						7 (AC)
4th Space Control Company Headquarters (E)	7						7 (AC)
Space Control Detachment	22						22 (AC)
53rd Signal Battalion (SATCON)	342						342 (AC)
New GMD Battalion						1 (204)	204 (AC)
X-Band Radars						4 (252)	252 (AC) AC **
RC Space Company Headquarters (3rd and 5th)		1 (7)	1 (7)				14 (RC)
RC Space Control Detachment (E)			2 (44)	1 (22)			66 (RC)
RC CET Team			2 (14)				14 (RC)
RC ARSST	4 (28)	5 (30)	1 (6)				30 (RC)
TPU	54						54 (NG)
MOB TDA	36						36 (NG)
100th GMD Brigade	90 (NG/AC)						90 (77 NG/13 AC)
49th GMD Battalion	204						204 (NG)
CO Army National Guard Space Support Battalion	51						51 (NG)
NG Space Control Company (CSRS)						1 (8)	8 (NG)
NG Space Control Detachment (CSRS)						4 (88)	88 (NG)
NG Space Companies (100th/217th)	2 (14)						14 (NG)
NG ARSSTs	7 (42)	4 (28)					70 (NG)
TOTAL PERSONNEL BY FISCAL YEAR	625AC 138 RC 388 NG	37 RC 28 NG	71 RC	22 RC		456 AC 96 NG	1094 AC 258 RC 512 NG TOTAL 1864 MIL # in COS 828 MIL

AC = Active Duty
NG = National Guard
RC = Army Reserve

ARSTRAT, 27 Space Support Elements will be assigned to 18 division headquarters (Army Commands and National Guard), three Corps headquarters, and six theater-Army headquarters. The enlisted positions in these elements will be filled with 48 sergeants and staff sergeants, MOS 25S.

When compared to the number of Soldiers performing Space operations missions between 1997 and 2005, this growth is considerable and is a tribute to the success of the Soldiers of SMDC/ARSTRAT when supporting Operations Enduring Freedom and Iraqi Freedom. To their excellence we owe the Army's recognition of the importance of Space capabilities in support of the maneuver force.

Progress was also made in a second area of interest to SMDC/ARSTRAT Soldiers — wearing of the Air Force Space and Missile Badge. By the end of 2005, the commanding general of Air Force Space Command had authorized awarding this badge to all Space operations Soldiers in the command. Previously, this badge had only been awarded to enlisted Soldiers with MOS 25S1C (Satellite Control Specialist).

These badges will be worn by Soldiers even after the badge is retired by the Air Force, however, no new Air Force Space and Missile Badges will be awarded after March 2006, when the badge is retired by the Air Force.

The new Air Force Space Cadre Badge can be awarded to Soldiers; however, the requirements are different from those of the older badge. A Soldier must have formal Introduction to Space Operations training (equivalent to the Air Force Space 100 Course), be placed in a Space Enabler position, and serve successfully in this position for a year before the badge will be awarded. *(See article on page 13F of the Flipside for more information.)*

SMDC/ARSTRAT does not have the resources to send every Soldier to the Air Force Space 100 Course. The Future Warfare Center of the command must design an equivalent course, and this course will have to be delivered through the internet for every command Soldier to have the opportunity to complete it. Discussions toward designing this course have begun, but funding for course design and delivery has not yet been approved.

Some progress has been made in creating a Space Cadre. However, without a Space MOS, our Soldiers must move to other organizations and gain experience in non-Space operations in order to be ready for greater responsibility and promotion in the eyes of their branch managers. For this reason, few Soldiers can serve in SMDC/ARSTRAT for more than five or six consecutive years.

The Space Cadre Proponency Office will gradually expand in order to track enlisted as well as commissioned personnel with Space operations experience. This office will work with the Branch Assignment Managers to bring experienced Space operations NCOs back into SMDC/ARSTRAT. Soldiers who leave the command will be welcomed back after service in other organizations.

The two greatest obstacles remaining along the path toward a strong enlisted Space Cadre are the lack of accessible and specialized courses in Space operations, and the lack of additional skill indicators for most of the enlisted specialties engaged in Space operations. Both must be solved and the solutions will take time, funding and cooperation between the Air Force and Army staffs, SMDC/ARSTRAT and the traditional branches of the Army.

Growing & Evolving: Space Operations

COL Roger F. Mathews
Deputy Commander for Operations, U.S. Army Space and Missile Defense Command/ U.S. Army Forces Strategic Command

By COL Roger F. Mathews

U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ ARSTRAT) has made tremendous leaps forward in the Space operations field. Space professionals have made great strides in growing from five Army Space Support Teams in the late 1990s that habitually supported a designated corps, into the 1st Space Brigade with two Space battalions that support brigade-sized to Army units and joint and combined forces., and a signal battalion that controls the payload of 12 satellites. This growth continues beyond the brigade. Space forces throughout the Army continue to grow and now include Space Support Elements organic to Army divisions and corps. From many of you, the most frequent question I hear is, "What's next?"

To date, Army Space units repeatedly have proven their worth. The 1st Space Brigade and the 1st Space Battalion are now Modified Table of Organization and Equipment units and, through Fiscal Year 2011 will be filling up with Active, Guard and Reserve Soldiers who will be trained how to plan, integrate and weld Space-based capabilities to the supported commander's battle-plan for stronger, more effective military operations. The Colorado Army National Guard Space Support Battalion (formerly the 193rd Space Battalion) is also expanding with approval to add more Space companies.

The 1st Space Brigade has developed a deployable element called an Army Space Coordination Detachment. Upon arrival in theater it is normally OPCON/TACON to the Joint Forces Land Component Commander (JFLCC) or the Army Service Component Commander. The detachment is tailorable and coordinates, integrates and synchronizes the efforts of deployed Space forces into the theater Space concept of operations. The concept of operations is developed by the Joint Force Commander in conjunction with the component that has been designated as the Space Coordinating Authority. The Space Coordination Detachment provides command and control for the execution of in-theater Space missions assigned by the Joint Force Commander/Joint Forces Land Component Command and supported by U.S. Strategic Command. The detachment also integrates Army capabilities in support of joint Space control operations. It coordinates with the Space Support Elements (discussed later in this article) to integrate Army Space support requirements for theater Army Space forces and serves as the principal Army advocate to the Space Coordinating Authority (SCA).

In addition to the brigade's organic Space forces, the Army is manning, equipping and fielding Space Support Elements to each division, corps and Army headquarters to provide Space operations support to tactical-level units. The elements and the Brigade's Space Coordination Detachment/Army Space Support Teams provide complementary capabilities. The Space Support Element concentrates on staff planning within its headquarters, while retaining enough production capability to support those planning efforts. The Army Space Support Teams bring additional production capability while retaining the ability to support critical planning functions.

These teams can augment Space Support Elements with production capacity and additional expertise. Additionally, Army Space Support Teams support units that do not have Space Support Elements, e.g., Combined Joint Special Operations Task Forces and, until they get their Space Support Elements, corps. (I Corps currently has a single FA40 and will see the first Corps Space Support Element in Fiscal Year 2007, followed by III Corps in Fiscal Year 2009 and XVIII Airborne Corps in Fiscal Year 2010. Third (3rd) Army will receive its

Over the next year, the brigade and its subordinate battalions expect to be filled to their full authorization. As they complete this transformation, they will remain fully engaged with their stated priorities: the preparation, deployment and sustainment of Space forces for combat.

Space Support Element this summer. As elements are assigned to these organizations, Army Space Support Teams can be utilized elsewhere.)

Space Support Doctrine

Last Fall, in the Air Defense Artillery magazine article, "*Enhancing Joint Command and Control of Army Space Forces*," BG Jeffrey C. Horne, COL Kurt S. Story and then-MAJ Troy McKeown[1] spelled out the new concept of operations for theater Space forces that seamlessly links Space operators from the strategic level to the tactical level. Since then the brigade has had an opportunity to train and test out the new concept and to refine it.

Let me briefly review the current concept of operations for controlling theater Space forces. During combat operations, the Space Coordinating Authority coordinates Space operations, integrates Space capabilities and has primary responsibility for in-theater joint Space operations planning as defined in Joint Publication 3-14, Joint Doctrine for Space Operations.

The Space Coordinating Authority's link to many Space assets is through the newly formed Joint Functional Component Command for Space and Global Strike[2] (JFCC-SGS), as executed by the commander, Joint Space Operations in the Joint Space Operations Center at Vandenberg Air Force Base, Calif.

The relationship between Army Space operations and the Joint Space Operations Center is still in its infancy. This summer (2006) a four-man contingent of Army Space professionals, led by COL Kurt Story, was assigned to the center, expanding Army presence there. They will, no doubt, be able to integrate more Army-specific mission requirements and enhance Space support to the theater land component commander and improve Army Space situational awareness.

Evolving Theater: Space Support Structure From The 1st Space Brigade

As with all new concepts, as requirements and capabilities change, and as experience dictates, SMDC/ARSTRAT will refine the theater Space support structure so that it can best accomplish the mission: to support the Land Component Commander in support of the Joint Force Commander's campaign plan.

Using lessons learned in Ulchi Focus Lens 2005, Sharp Focus, and Terminal Fury Exercises, as well as deployments to Iraq and Afghanistan in support of Operations Iraqi Freedom and Enduring Freedom, the 1st Space Brigade has replaced non-doctrinal terms with those familiar to the warfighting community, and has modified its support to the joint force and ground force commanders.

The brigade and battalion will tailor their support element(s) based on the make-up of forces in theater. One scenario would place a Space Coordination Detachment from the brigade (which is still a developmental concept, not doctrine) with the Land Component Commander and deploy another detachment to the component that retains Space Coordinating Authority, historically the Air Component Commander. This will allow strategic and operational planners to integrate Space requirements into the initial planning phases and into the higher headquarters' battle rhythm.

The division and corps Space Support Elements will coordinate their actions, priorities and requests for effects through the Army-level Space Support Element (normally at the Land Component Command), who will then coordinate the Land Component Commander's consolidated and deconflicted priorities with the brigade Space Coordination Detachment located at the Air Component Command, i.e., the Space Coordinating Authority's headquarters.

The CONOPS in Action

The 1st Space Brigade participated in RSO&I 06 (Reception, Staging, Onward Movement and Integration) on the Korean Peninsula in early 2006. Even though the concept of operations outlined how Space Coordination Detachments/Army Space Support Teams coordinate with Space Support Elements, that concept could not be tested because Space Support Elements had not

(See Mathews, page 51)

The View From (Army) Space ...

By Terry Nelson

Change — it is the environment in which we operate. We are challenged by it all the time. Change in the Directorate of Combat Development (DCD) means we are continuing to refine and improve our requirements to better support the warfighters. Change impacts us now as we turn over our Director. COL Tim Coffin, has just moved on and taken command of the 1st Space Brigade. He will be missed, but none are better qualified for the position of Space Brigade commander. Although his time with us was short, his efforts resulted in significant advances for the Space community. I am sure that those efforts will continue and both the Space Brigade and the Space community as a whole will benefit from them. We applaud the change.

COL Bruce Smith, our new director, comes to us from the Army War College, and is in the process of getting his feet on the ground. He has a strong Space background and will be invaluable to us. He has many challenges facing him, not the least of which are some reorganization issues brought about by the Base Realignment and Closure. Part of our organization is moving from the Washington, D.C. area to Huntsville, Ala. And this is happening while we are fighting the war on terrorism and trying to bring better Space enhancement tools to the hands of our warfighters. The Army Space Cadre, changes to both Space and missile defense organizations, revision of JP 3-14 and requirements for the Space Support Element Toolset are just a few of his projects. Did I say that change can be challenging?

We are always trying to improve **the Army Space Journal**, and as we pursue a more supportive product, we are inevitably involved in change. We hope it is for the best, but we must rely on feedback from you, our target audience, to substantiate our efforts. As always, we solicit your comments and insights. You have a direct impact on the product and we value your opinion. This is your journal and we are dedicated to changing it to fit your needs in the field.

In this issue we are highlighting the article on command and control of Space by MAJ Rob Reiss. It is insightful, controversial and timely since it is setting the stage for the anticipated update of Joint Space doctrine (JP 3-14) later this year. Let us know if it is on the mark or a little wide of the target. We (the Army) are trying to come to grips with a solid position on how we view our role in Space, and your input will directly impact that view. In the next issue we hope to present some long anticipated comments on successes we have had. The Army Space Master Plan (ASMP), for example, has been completed and is soon to be published. We will have an overview article for your consumption. We are also planning to institute a column that captures feedback and good ideas from our returning FA40s that served in Space Support Element positions.

We in DCD are responsible for building Space organizations, educating and training their Soldiers, developing the doctrine plus many other related activities. To do it right, we need your feedback to help us in our role of supporting these requirements. We need answers to questions like: Is your equipment right? What improvements would you like? What is the best mix of manpower in these units? How does the Space doctrine need to change — or does it need to change? What Army Space fundamentals need to be embedded in Joint Space doctrine? How does the Space training need to change based on so many FA40s and Army Space Support Teams returning from deployments? Change to members of DCD means you have told us your requirements and we are making the changes to better support the field.

(LEFT TO RIGHT) Back row: MAJ Keith Costello, MSG Denny Skiles, MAJ Dave Price, LTC Michael Patrocky, SSG Gabriel Cardenas, MAJ Jamica Powell, MAJ Joseph Guzman, MAJ Rob Gray. Second Row: MAJ Scott Heise, CPT Jennifer Fischer, MAJ John Fontana, MAJ Steve Kent, CPT Michael Owings, MAJ Tim Tubergen, 1LT Matthew Pollock. Third Row: CPT Michael Hillman (USAF), CPT Patrick Brennan, MAJ Chris Crawford, MAJ Jennifer Adams-Buckhouse, LTC Robert Nieves, MAJ Gregory Butler (USAF), CPT Tammy Aguilar, MAJ Joseph Thomas. Front: COL Roger Mathews
(Not shown in photo – CPT James French, MAJ Tim Haynie, CPT Matthew Morton)

Director Combat Development

COL Bruce Smith graduated from the United States Military Academy in 1983 and was commissioned as an Armor Officer. Upon completion of the Armor Officer Basic Course he entered Initial Entry Rotary Wing Training at Fort Rucker, Ala., where he qualified in the UH-1 and CH-47 aircraft. COL Smith's initial assignment was a Flight Section Leader in the 101st Airborne Division (Air Assault), beginning in 1984. Subsequently, he became a company Flight Operations Officer then an Executive Officer of a medium lift helicopter company. In October 1988 COL Smith was assigned to 1-228th Aviation at Fort Kobbe, Panama. He served for one year as a Battalion Flight Operations Officer then became the Battalion S-1. In 1990 he took command of Charlie Company 1-228th Aviation, a CH-47 helicopter company. In 1992, COL Smith was assigned to the 24th Aviation Brigade at Hunter Army Airfield where he served as an assistant S-3 for a year. Following promotion to Major, he took command of Bravo Company 159th Aviation from February 1994 to January 1996. Subsequently he served as the Brigade S-1 in 2nd Brigade, 24th Infantry Division. Following graduation from Command and General Staff College he was assigned to U.S. Space Command for three years as a plans officer. In June 2000, COL Smith was assigned to Combined Forces Command where he worked as a ground forces officer and as the Deputy Chief of Operations, in the Current Operations Division. Upon his return from Korea, he was assigned to the Objective Force Task Force as the Space and Aviation System Integrator. In January 2004 he was reassigned to the Army Staff to work in the Space and Missile Defense Division of the deputy, chief of staff for operations. COL Smith was assigned as the Director, Combat Development, SMDC in July 2006.

COL Smith's military education includes the Command and General Staff College, Armed Forces Staff College and the Army War College. In addition he holds a Master's Degree in Business Administration from Benedictine College.

His awards include the Defense Meritorious Service Medal, Meritorious Service Medal, Army Commendation Medal, Joint Service Achievement Medal, Master Aviator Badge, Space Badge, Air Assault Badge and Parachutist Badge.

THE C2 PUZZLE

Space Authority and the Operational Level of War

By MAJ Robert J. Reiss Jr, USAF

Who commands Space? Who controls Space? Who provides Space support? Who is the lucky warfighter that gains so much support from Space? These pointed questions lie at the heart of the issue of Space power advocates and operational commanders, as they try to decipher the conundrum known as "Space." Commanders will ask, "What can Space do for me?" and ideally, the advocates can answer, "Space can do this for you, and this and this …" However, as with most heavily debated topics, the answers clearly depend upon whom you ask. The national agency advocate (i.e. National Reconnaissance Office or National Security Agency) might say, "I can provide you this, but only at certain times and under certain conditions." The joint force advocate might say, "I can provide you anything, unless they were previously requested by someone else." The military service advocate might say, "I can give you anything my satellites provide, but I need the request to come from my boss, not directly from you."

In place command and control (C2) constructs and force development clearly shows U.S. Space control and capabilities were originally intended and operated for strategic purposes. Space supported strategic nuclear forces, reconnaissance, National Command Authority (Presidential/Secretary of Defense) communications and other high-level national needs.

Satellites were not anticipated for operational/tactical applications, hence the creation of the programs such as Tactical Exploitation of National Capabilities (TENCAP).

Although TENCAP was highly successful in accomplishing the spreading of Space power benefits to all military forces, it has also diluted the knowledge base of Space power appreciation of how these capabilities came to be. The blowback from this has inadvertently caused arrogance among all non-Space recipients of TENCAP and similar programs since end-users (the warfighters) remain unaware of the true origin of the provided information. Uninformed users therefore hold firm beliefs that a few select U.S. Air Force Space units regulate Space hardware in orbit and they can otherwise perform their mission unimpeded without "Space."

In a brief moment of clarity, this Nation's Space leaders task organized their Space assets with a combatant command, U.S. Strategic Command, after dismantling U.S. Space Command in 2002. However, with just as much rapidity, the vision lost focus with the creation and dubious implementation of the Joint Space Operations Center and the Director of Space Forces in 2005. With this major action, terms such as Space control authority and command and control became muddled, and the clear and concise flow of information and control from the combatant commander to the warfighter changed from a straight, clear road to a curvy path with roadblocks.

To maintain, or even increase, the force multiplying effect Space has on the battlefield, ideas such as the Joint Space Operation Center need correct implementation. By correctly using these constructs, ideas on how Space can, should and will be used to maximum effect will affect institutionalized Space thought, also known as doctrine, for the better. At a minimum, corresponding joint and service Space doctrine should reflect changes in technology and capabilities for Space assets, not just merely mirror another medium's doctrine (i.e. air, naval or Marine). When this mirror imaging occurs, ideas such as the Director of Space Forces are confused in scope and responsibility with their better-defined counterparts such as the Joint Force Air Component Commander or the Commander, Air Force Forces.

Space C2: A Historical Quandary

"American leadership will make no mistakes, the enemy offer no surprises and the situation proffer no unexpected opportunities."
— Frederick Kagan

The United States' current C2 structure for Space systems can be traced back to the budget and planning decisions made in the early 1980s. Decisions originating in the Carter Administration were later sustained and expanded during the Reagan Administration. These systems were designed and purchased

Selected U.S. Agencies		
U.S. Air Force	National Security Agency	Department of State
U.S. Navy	National Reconnaissance Office	Department of Commerce
U.S. Army	Central Intelligence Agency	National Aeronautics and Space Administration
U.S. Marine Corps	Defense Information Systems Agency	National Oceanographic and Atmospheric Administration

Table 1

to render a sufficient network for nuclear warfare command and control at the strategic/presidential level. Some of the systems for this complex nuclear command and control network include the Defense Support Program missile warning satellites, the Nuclear Detection System aboard Global Positioning System satellites, the Defense Satellite Communication System, the Military Strategic Tactical and Relay Satellite Communications System and Fleet Satellite Communication System communication satellites. These programs and many others were central to the global command and control structure that was required by the National Command Authority during nuclear conflict. During the late 1980s and throughout the 1990s, military planners believed the influence of command and control dominance on the planned nuclear and conventional battlefields spilled over to shape Space forces at the operational level; the reality today is command and control dominance is integral upon being dominant in Space first. This view was not always the case …

During the dawn of the Space Age, inherent divisions were created, separating and duplicating efforts without a common goal in mind. From the outset, there were multiple duplicative efforts by the Navy, Army and Army Air Corps involving captured German V-2 rockets. To a lesser extent, the civilian National Advisory Committee for Aeronautics (NACA) and its successor, the National Aeronautics and Space Administration (NASA) performed additional efforts in research. The rivalry and splitting of focus within the U.S. government is evident in many early Space projects:

- RAND Corp's 1946 study on a "world circling spaceship"
- U.S. Army's Redstone medium-lift boosters
- U.S. Navy's Aerobee and Viking research rockets
- U.S. Air Force intercontinental ballistic missile (ICBM) research

Even America's first foray into Space showed signs of rivalry, pitting the U.S. Navy's Project Vanguard against a more experienced U.S. Army rocket team. Project Vanguard was chosen for its use of "civilian" research rockets (Aerobee and Viking), instead of modified military missiles as the booster. The failure of Project Vanguard's first two attempts pushed the Army's plan into action, successfully orbiting the Explorer I satellite in 1958. Until the late 1950s, no service had taken great interest in Space: the Army viewed missiles as an extension of artillery, the Air Force focused its attention on its manned bomber fleet and the Navy supported freedom of all services to develop missiles in response to their own internal needs.

Everything changed on Oct. 4, 1957, with the launch of the Soviet's Sputnik; with underlying tones of worldwide reach by Communism, Space became a national priority for the United States. Creation of coordinating agencies for Space programs came fast and furious. The Department of Defense created the Advanced Research Projects Agency, controlling both military and civilian programs until NASA took the civilian portion in 1958. The creation of NASA took resources from the now-defunct NACA and also raided the Navy and Army programs nearly completely. This left the Air Force as the dominant military player in Space. However, even operations with Discoverer/CORONA left the lines of command and control blurred during the joint Central Intelligence Agency/U.S. Air Force effort.

More fragmentation occurred in 1961, with the creation of the National Reconnaissance Office (NRO), causing the opposite effect from an agency's creation that was to control all overhead intelligence gathering. The office took control of all reconnaissance satellites as directed by Undersecretary of the Air Force (a.k.a. the NRO Director), but excluded any control or participation directed from headquarters U.S. Air Force. From these brief examples, it is evident that this multipolar slicing of national Space power early in the Space Race and the vacuum of joint cooperation has brought U.S. Space forces to the point where we are today. This jumble might have been bearable for U.S. forces to operate this way in conflict and peacetime, if not for one missing component: Doctrine.

Doctrine: The Glue that Holds it Together?

Fifty years and many agencies later, Space doctrine has not kept pace with technological developments or political constraints pertaining to Space and the battlefield. New developments are taking place faster than the traditional five-year doctrinal writing cycle structure (submissions, write/rewrite, approve, publish/distribute, submission). Doctrinal terms that were relevant in the past (operational vs. support) have now become blurred or outright obsolete depending on the situation and platform used. What term adequately describes a situation where one unit's "support" came from someone else's "operation?" For the vast majority of Space assets, and for the sake of simplicity,

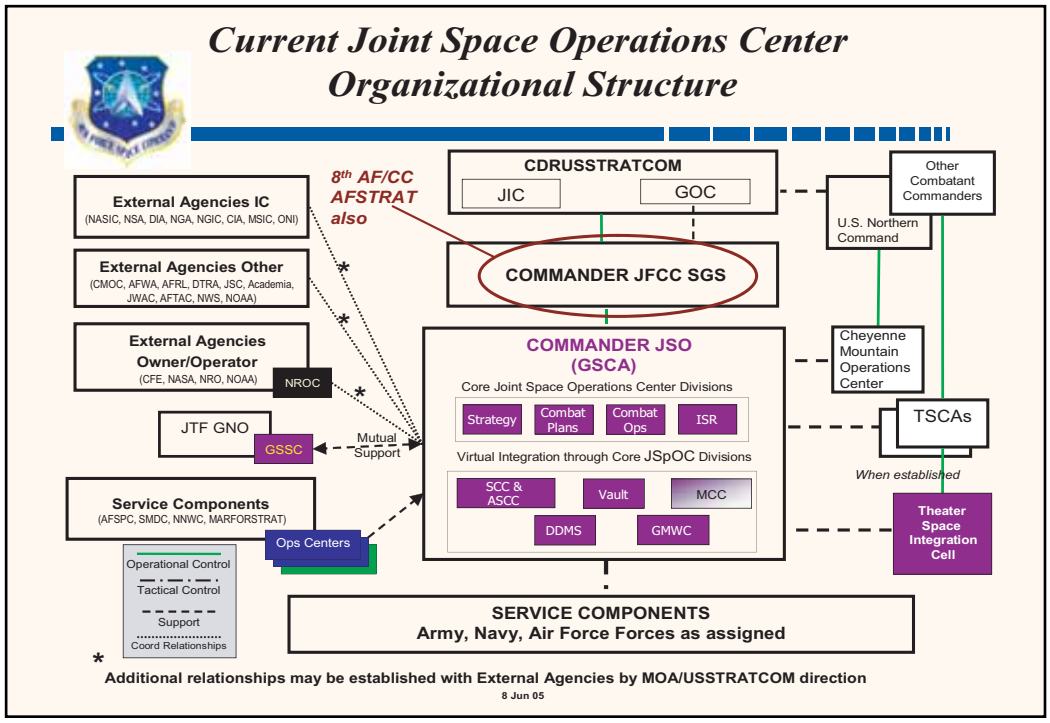

Figure 1

their assistance is rendered in the form of "support" to "operational" warfighters.

If the concept of support is to remain a common thread throughout the Space forces, another underlying concern is "who's in charge?" or "who's in control?" A clear example of the muddled chain-of-command intertwining multiple agencies and missions can be found in the Defense Meteorological Support Program (DMSP), the Department of Defense's primary weather satellite:

"DMSP weather satellites, provided specifically by and for Department of Defense and limited national-level operations, (currently fall under the combatant command of U.S. Strategic Command), but are controlled on a daily basis by the National Oceanographic and Atmospheric Administration under the Department of Commerce. Yet, requirements for onboard sensor tasking are provided by the Air Force Weather Agency, a direct reporting unit to the Chief of Staff, U.S. Air Force."

As stated above, Air Force Doctrine Document (AFDD) 2-2 uses DMSP as a positive example of how multiple agencies, missions and functions can be rolled up into one satellite program while still performing its duties at a high level of confidence. While great for a textbook level analysis, this example is not a true representation of the Space arena and all of its "power" players and their competing interests. Table 1 on page 15 shows just a small number of the U.S. government agencies that have a vested interest in Space.

While Space provides a significant percentage of the global command and control infrastructure, Table 1 shows the U.S. Air Force is not the sole provider in this domain. Can existing military doctrine bridge gaps between military and civil systems (i.e. DMSP and Global Positioning System) or military and 'national' systems such as the National Reconnaissance Officer and the National Security Agency, when each agency has its own way of doing things? The answer is no. Governmental Space doctrine (joint, service and multiservice) must catch up to the near-term, encompassing civil, military, commercial and national systems and its command and control aspects before a "stressed" environment (war, conflict, crisis, natural disaster, etc.) exposes its flaws at the cost of human lives. Fixing the doctrine problem is a step in the right direction, however, without wholehearted agency support from all involved players, fragmentation of Space asset control will continue to exist.

The Conundrum: U.S. Strategic Command, JSOC and Director Space Forces

With the demise of U.S. Space Command in 2002, it seemed that hand-off of Space responsibilities to U.S. Strategic Command would be seamless and a huge force-multiplier for combat forces. In the years immediately following the transition, no major changes to Space force command and control were announced, until Air Force-wide changes forced units to "operationalize" Space. In mid-2005, military leaders unveiled a new plan to unify Space as a weapon system with "centralized" command and control in order to increase (presumably deployed) joint force operational effectiveness and efficiency. This Space command and control structure plan draws from the agency currently responsible for Space (U.S. Strategic Command), a proposed "focal point" of Space activity (Joint Space Operations Center), and administratively controlling entities (U.S. Air Force's 8th and 14th Air Forces), and introduces a new construct, the Director of Space Forces. This plan seems simple when summarized as above, but becomes a bit murky when laid out graphically and with some narrative dialog as seen in Figure 1.

Joint Confusion Center?

Part of this new Space command and control plan, outlined in a memorandum from the commander, Joint Forces Component Command Space & Global Strike (JFCC SGS), to the commander, Joint Space Operations, established the Joint Space Operations Center. Its official purpose is to "ensure unity of command and unity of effort" for Space forces.

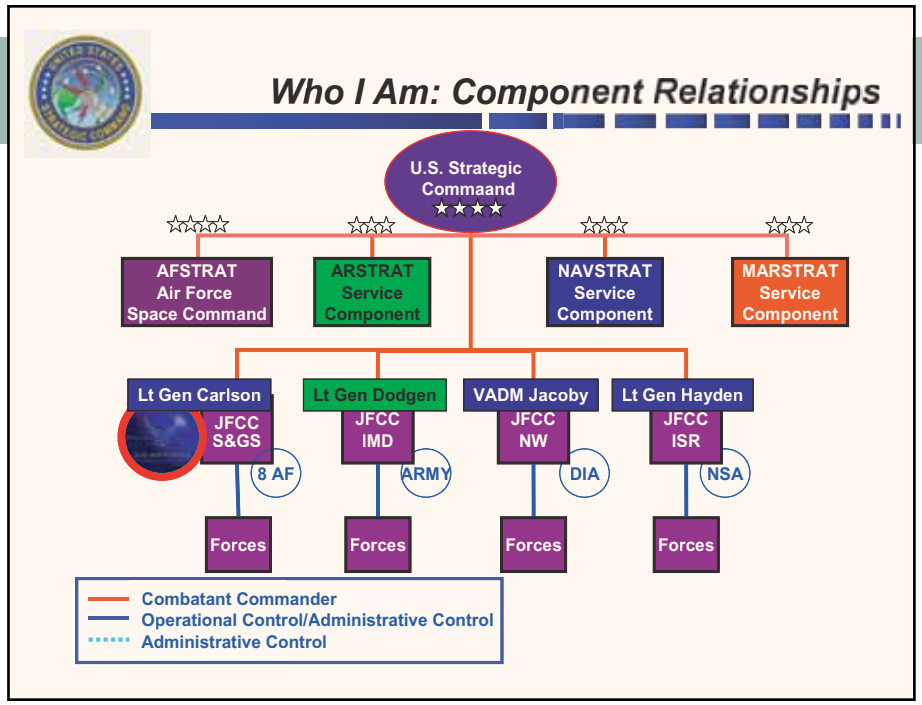

Figure 2

It should be noted, the commander, Joint Space Operations is also the 14th Air Force commander, Vandenberg Air Force Base is his stomping ground, and the commander, Space & Global Strike is the 8th Air Force commander and Barksdale Air Force Base is his home — neither location directly controls Space assets, aside from occasional launch vehicles at Vandenberg.

The Joint Space Operations Center lies directly between the service components and U.S. Strategic Command. Its divisions are similar to an Air Operations Center (AOC) layout, with plans, operations and strategy divisions. One main difference with the Joint Space Operation Center is, it is part of a "virtual AOC" planned to be one of many distributed facilities (Barksdale's Air Force Global Strike, and "other" Air Force AOCs to be determined). A huge failing in the "mirroring" of its air counterpart is the reality that the Joint Space Operation Center cannot directly control any Space assets (i.e. sensor tasking and orbital maneuvers).

With the inclusion of Joint Space Operation Center, the command (Aerospace Defense Command, Combatant Command, Tactical Command) chain gets very complex. This new Space command and control design, seen through the Joint Space Operation Center organizational chart in Figure 1, involves two U.S. Air Force major commands and two U.S. Air Force numbered air forces, all under the mantle of U.S. Strategic Command, a unified combatant command. At first glance, it seems there are new positions to clarify the chain of command from the "satellite driver" to the combatant commander, however, when delving a little deeper, it is evident that the positions listed just become additional job titles for existing commanders.

Who Am I Today? Command Responsibility in Space Command and Control

In adding to the pre-existing command and control structure, the powers-that-be compounded the responsibility hierarchy. Here is a summary of the people and titles involved in these new changes:

The Air Force Space Command commander is the Air Force liaison to Strategic Command (Air Forces Strategic Command) and the commander, Air Force Forces for U.S. Strategic Command unless the Air Force Space Combatant Commander delegates Air Force Strategic Command as the Air Force Warfighting Headquarters; in which case responsibility would fall to 8th Air Force Combatant Commander (under the Air Combat Command). In addition to the above relationships, 14th Air Force Combatant Commander (belonging to Air Force Space Command) also holds the position of Deputy Commander for Air Force Strategic Command.

This position-shifting and wearing multiple "hats" is quite surprising, especially within Air Force Space Command, since one recommendation of the Space Commission of 2000 was separating very large job responsibilities to individual positions. Taking the multiple positions of supreme importance (for example the Joint Space Operation Center commander) and stacking them with one person (i.e. 14th Air Force Combatant Commander) seems to be going against the Space Commission recommendations and against common sense. Even outside of the Space arena, multiple job titles for commanders seem to be the norm. For example, the commander, JFCC SGS is quadruple-hatted: they are also the 8th Air Force combatant commander, Air Force Strategic Command and Air Force Network Operations combatant command.

With the multiple job titles, the flow of command authority is just as unclear. In the Air Force Strategic Command/8th Air Force combatant commander reports to Air Force Space Command's combatant commander (as the commander, Air Force Forces) for U.S. Strategic Command. The operational chain (combatant command, operational command, tactical command, support) runs from the commander U.S. Strategic Command (Offutt Air Force Base), to Air Force Strategic Command commander JFCC SGS (Barksdale) then commander Joint Service Office (Vandenberg), to the warfighter. Even the proposed center of operations, the Air Force Strategic Command Air and Space Operations Center is the "virtual" AOC broken into three pieces at distanced locations: Barksdale for Air Force Global Strike, Vandenberg for Air Force Space Operations (Joint Space Operation Center) and "other" Air Force AOCs yet to be determined.

Somehow, the Air Force Strategic Command AOC will have the capability to provide command and control for U.S. Air Force Forces assigned or attached to U.S. Strategic Command and be able to serve as the "one stop shop" for all military Space power, provided "vir-

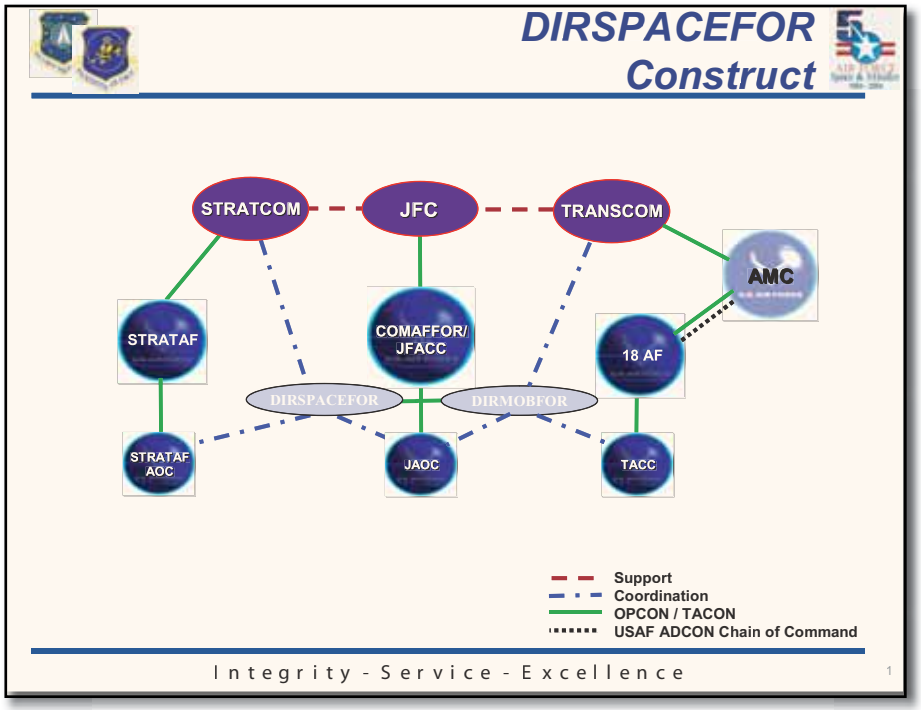

Figure 3

tual link" communications do not break down between these distanced facilities. If this does not sound dubious enough, imagine the hands-on command and control required for the number of military and National satellites on orbit. The Air Force Association's Space Almanac states as of May 31, 2004 there were 2,884 satellites in orbit, in varying states of operation (fully and partially operational, dead and in check-out). In the Dec. 7, 2005 issue of the Washington Post, journalist Katherine Shrader states:

"Currently, 43 countries own satellites and there are 413 United States and 382 other operational satellites in orbit."

Discounting the civil and commercial satellites, even the sanest individual could not convincingly believe that the Joint Space Operation Center could command, control and disseminate the products from most, if not all, military and National Space systems.

Blast from the Past? SAC Lives!

"Senior commanders making decisions about operations, combined with subordinates free to exercise initiative in executing those decisions, make up the heart of C2 — centralized control and decentralized execution."

— Air Force Doctrine Document 2-8, Command and Control

These command and control changes are a bit different than another plan described in a memo by GEN John P. Jumper as Chief of Staff, U.S. Air Force to ADM James O. Ellis Jr., then U.S. Strategic Command combatant commander dated Feb. 23, 2004. That memorandum stated that three separate numbered air force headquarters, 8th Air Force (Bombers), 14th Air Force (Space) and 20th Air Force (ICBMs) would combine to form Air Force Strategic Command. The combination of these three numbered air forces into Air Force Strategic Command, on the surface, appears to reconstitute a large portion of Strategic Air Command from the days of the Cold War. Under the Strategic Air Command, the headquarters at Offutt Air Force Base controlled these numbered air forces, just as U.S. Strategic Command does today. While Strategic Air Command did a wonderful job against its programmed threat, resurrecting it in similar forms may not constitute the best command and control example for Space assets in the 21st century.

A Conductor with No Orchestra: Director of Space Forces

Another area of focus has been in the designation of Space "coordinating" authority and creation of a position on the Combined/Joint Forces Air Component Commander staff called the Director of Space Forces. As shown in Figure 3, the name and position is similar to the Director of Mobility Forces, another function within the AOC, with a key difference. This staff position is supposed to bridge the gap between strategic, operational and tactical application of Space power. The Director of Space Forces' role seems to exist at the operational level, but reality shows that misconception is due to their position's location at the Combined AOC. All support provided is actually tactical. In a similar vein, the Joint Space Operation Center is also tactically orientated because it cannot actually "control" the strategic assets it monitors on ownership rights alone. Table 2

The Director of Space Forces is a relatively new concept, assigned to support the Combined Forces Air Component Command (CFACC) at the operational level of war. The Director's central role is the senior Space expert on the CFACC staff, and accordingly has a complement of eight to 12 per-

Positions and their Level of War

Agency	Level of War	Level of Command	Space Forces
USSTRATCOM	Strategic/Operational	COCOM	All military
AFSPC	N/A	OPCON/ADCON	Air Force
JFCC SGS	Operational	TACON (?)	Air Force
JSpOC	Operational (?)	*	Air Force (Navy?)
DirSpaceFor/DS4	Operational/Tactical	*	(?)

* Space Control Authority, not direct command

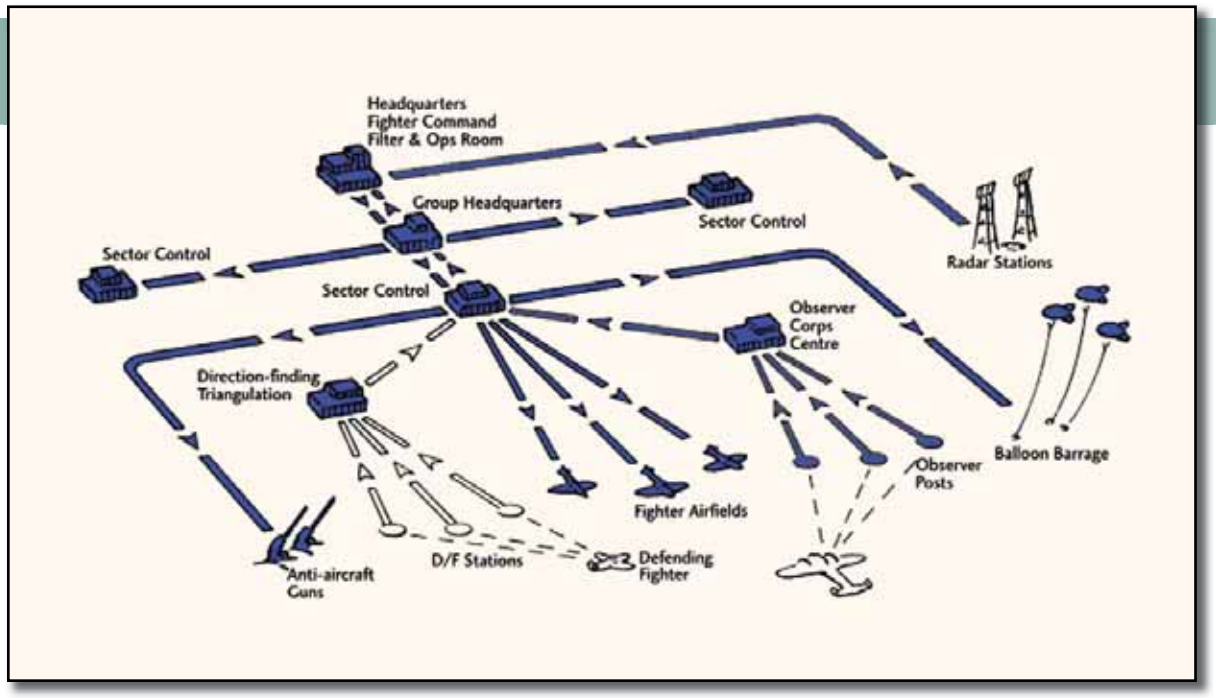

Figure 4

sonnel including Space weapons officers (W13S). The Director's job description requires delegated Space coordinating authority obtained by the CFACC, who in turn received it from the Combined Forces Commander. Before the creation of the Director of Space Forces, a Space support team performed advisory and support functions; there was no existing concept of Space Control Authority. One important fact to note is Director of Space Forces offers only coordination, via the Space Control Authority, not command and control of any forces. This is the key difference between the Director of Mobility Forces and the Director of Space Forces — the Director of Mobility Forces can actually control taskings for inter- and intra-theater assets (in this case, mobility assets like cargo, tanker and personnel transport aircraft).

Adherence to joint military doctrine gives clear messages about the transferability of command authority. Joint Pub 3-14, Joint Doctrine for Space Operations, dated Aug. 9, 2002, discusses "Space authority" to the Joint Force Commander for coordinating Space operations, integrating Space capabilities, and responsibility for in-theater joint Space operations planning. What does joint doctrine discuss about coordinating authority? Nothing, as it exists in the minds of Air Force doctrine writers alone. Stated by AFDD 1-1, coordinating authority is:

(1) The authority delegated to a commander or individual for coordinating specific functions and activities involving forces of two or more military departments or two or more forces of the same Service.
(2) The commander can require consultation between the agencies involved but does not have the authority to compel agreement.
(3) More applicable to planning and similar activities than to operations.
(4) May be exercised by commanders or individuals at any echelon at or below the level of combatant command.
(5) A consultation relationship between commanders, not an authority by which command may be exercised.
(6) Not a command authority.

On the surface, Director of Space Forces appears to be a good centralizing solution on bringing Space power and capabilities to the warfighter. However, with the Director being located in the AOC as part of the commander, Joint Force Air Component Command's staff, their view of Space is limited to the tactical level as part of air operations. What about support for the combined forces land and maritime component commanders of the joint fight? Where is the coordination and command and control for them in the Space picture? The Director does not have much visibility outside the theater (except through reachback to the Joint Space Operation Center), and has very little visibility within theater outside the AOC.

Providing the Director with his information flow, the Joint Space Operation Center offers the same problem but on a larger scale: it is supposed to operate at all levels of war (strategic, operational and tactical). But in its current form as a non-joint entity, Joint Space Operation Center does not carry enough weight to authoritatively deal with all agencies required. The head of the Joint Space Operation Center has Global Space Coordinating Authority, which amounts to little for the joint fighting force and has no influence beyond Air Force Space assets, equaling the uselessness provided by the Director of Space Forces but on a global scale. Coordination authority has no teeth; it is only a short-term solution.

Concerning Air Force Space Forces, Space Control Authority is the wrong focus. Coordination and cooperation between varying entities is not leadership. The Director of Space Forces position provides neither command nor control; during a fast paced campaign, the coordinating process could waste valuable time and effort. Seen from an operational sense, Space Control Authority and Global Space Coordinating Authority provide unnecessary bureaucratic layers. This current setup fits outdated and outmoded doctrine, which is outpaced by new events constantly. The Director of Space Forces responsibility does not solve any fundamental issues (i.e. "Who controls Space?") or pave the way for future flexibility. This current structure of Space Control Authority may suffice in the short term provided the system is not stressed due to intense adversary action. How long will this situation continue?

Concerns

One mantra is always preached throughout U.S. Air Force doctrine and power point briefings: centralized decision-making, decentralized execution. Yet, the current structure of Space is a thinly spread

polyglot of Space power using products and services that are in high demand by everyone (military and civilian). At best, what we currently have is fragmented, compartmentalized decision-making and very little decentralized execution, if any. That only covers the U.S. military. The situation becomes much worse when we introduce the headaches involving information sharing with other U.S. government agencies.

Raising the complexity of the problem is sharing information with coalition partners. In a combined operations center (i.e. the Combined AOC), the information dissemination problem poses many questions: Who decides what information needs to be shared and how much? Who else has indigenous Space capabilities? What do primary allies and/or host nations need to know and what is their usage or level of understanding? Do we include end user products like Global Positioning System, weather data and imagery?

Regardless of the answers, history has shown that allies usually equate to short-term fair weather friends, in most cases. Usually, their strategic concerns are usually not on par with the United States'. Even in rare cases when they are, sometimes governments are one election or revolution away from change. Historical evidence of recent events in Spain and Pakistan, and the 1979 overthrow of the Shah in Iran show the likelihood of this. What happens when the U.S. embraces those countries, sharing knowledge of our full capabilities in Space and then they go bad?

Historical Case Study: The Royal Air Force and the Battle of Britain

In 1940, Britain's Royal Air Force had the most modern air defense system, while the Germans had the most modern air force. The Royal Air Force had a command and control system with outstanding fighters, ground controllers and new overlapping radar with centralized control. In comparison, the Luftwaffe was the only air force in the world technologically and operationally prepared for a strategic bombing campaign. They possessed capable bombers, long-range fighters and had "blind" bombing and navigation systems for guiding planes to targets. Intelligence, however, was not their forte. Estimates issued just prior to the Battle of Britain inflated German superiority and underplayed British strengths, including a lack of mention on the Royal Air Force radar system plus a condescending opinion on Fighter Command's command and control:

"inflexible, formations are rigidly attached to their home bases . . . command at low level is generally energetic but lacks tactical skill."

A single German Luftflotte (unity of command) controlled both fighters and bombers in combined operations, contrasting the Royal Air Force with separate command chains for the two tasks. In July 1940, the Royal Air Force had a total strength of 640 fighters, against more than 2600 Luftwaffe bombers and fighters. To employ effective economy of force and mass the limited fighter strength, Britain had a simplistic command and control defense system that maximized all the weapons available. Each group was split into sectors with Royal Air Force stations in each, one of which was the Sector Control Station, the lowest level of command and control in the system yet it seemed to perform the operational level of war. All the Sector Control Stations reported to the Group Headquarters, and they in turn reported to Fighter Command Headquarters. This headquarters acted as a filter and communications center. See Figure 4 on page 19.

Central to situational awareness were coastal radar stations, which had sufficient range to detect formations while still over France. Contacts were reported to Fighter Command Headquarters where it was plotted on a large map (the 'big board') while simultaneously passed to the Group Headquarters, who passed it down to the Sector Control affected by the plot. Observer posts reported the formation once they had crossed the coast and were behind the radar. They reported to Observer Corps Centers, who passed the information on to their Sector Control, then to Group Headquarters, who in turn sent it to Fighter Command Headquarters and the plot of the raid was kept up to date.

All information was passed up or down to the Sector Control, giving them accurate situational awareness and they directly controlled the defenses: balloons, anti-aircraft guns and fighters. Without this vital system, resources (time and fuel) would have been wasted in constant airborne patrolling of the coast; the full effect of limited resources would not have been brought to bear and air raids could have made it to their targets with little to no warning at all. All information was transmitted to every sector to keep situational awareness spread throughout the command system. By doing this, the loss of a single Sector Control room did not limit the elastic, effective defense.

How many U.S. intelligence estimates reflect the exact same words and attitude toward our potential opponents? Cumbersome and technologically superior based command and control does not necessarily equate to victory over a simplistic, streamlined command and control organization fighting for survival.

An In-Place Solution: U.S. Strategic Command

What is the best solution? One need not look further than the foundation U.S. Strategic Command provides, and then expand on the basics: firm command and control by U.S. Strategic Command of all military Space and direct linkage to other government agencies with Space assets with tasking authority and setting priorities, with appropriate levels of assumable authority in time of war for other assets. The in-place structure of U.S. Strategic Command offers an excellent framework in which to build. Since U.S. Strategic Command already has a combatant command for strategic forces and should not have anything below it concerning Space forces, any lesser level of command (Operation Control or Tactical Control) hampers their ability to provide true unity of joint Space power. Only U.S. Strategic Command has, with com-

batant command, the authority for relations with Department of Defense agencies and weight to deal with other agencies.

In addition, Joint Space Operation Center should exist as an organic unit to U.S. Strategic Command, not a "for-hire" unit ran by a Service-specific level of command (i.e. U.S. Air Force numbered air force). Since the Air Force firmly believes in the centralization of air power, allowing it to dominate the entire theater operating area (in the form of the CFACC), the Joint Space Operation Center concept goes against that belief on the joint force level. When the Air Force deploys forces, they become part of a geographic combatant command. Can't natural centralization evolve by joint Space power through U.S. Strategic Command?

A model similar to the Royal Air Force Fighter Command in 1940 would have a central command and control node physically located at Offutt Air Force Base in Nebraska or Cheyenne Mountain in Colorado (or have one back up another). The primary location is not important as long as the chain of command is directly from the commander U.S. Strategic Command to the command and control node. The Space command and control system can be further streamlined from the Royal Air Force model, eliminating "multiple sector control centers" and "Group Headquarters," which only served to centralize and consolidate sector controls. Unless the Joint Space Operation Center takes the place of "Group Headquarters" and the sector control centers are the actual units that deal directly with Space assets, the Joint Space Operation Center should have actual control of all military Space assets (Army, Navy & Air Force) with assigned liaisons from all agencies/departments of the government with Space assets. An incredibly critical component to maximizing Space power, those liaisons also must have a level of authority to enact command and control decision making and implementation. To do otherwise, leaves the system with an ineffective, inelastic "message taking board" and not a dynamic, flexible, responsive command and control to fight our future wars.

What is Best for the Future?

Distributed warfare equals a coordination nightmare and that's at the tactical level. Until we develop uninterruptable instantaneous communications, the system currently in place will not be sufficiently responsive to rapidly changing battlefields. Self-imposed vulnerabilities in the form of critical communication nodes (i.e. Director of Space Forces reachback to Joint Space Operation Center, distributed "virtual" AOCs) hamper our ability to utilize our technologically superior assets to either mass or perform economy of force. Modern successful joint maneuver warfare depends upon speed of command. While there are plenty of supporting agencies and partners in existence, their distributed nature will have an inherent flaw that needs to be resolved through an appropriate command and control scheme or we will have severe gaps. Without precision guidance, there can be no precision weapons. Without robust, reliable communication, there can be no reachback. Without a clear, dominant command and control of forces, there can be no assurance of victory.

Once the military side of the house is brought into order with this clear command and control scheme, the other U.S. government agencies with Space assets will naturally follow suit. Evolution of U.S. Space assets into a solid, unified Space power is a natural progression. Taking from the adversary's point of view, we are already unified: they do not care if they send the 14th Air Force Joint Space Operation Center into crisis mode or if their attack is directed towards a 2nd Space Operations Squadron satellite or 1st Space Battalion crew. A U.S. satellite or Space capability is seen as just that: a U.S. asset to be attacked. The more we complicate the command and control process, the slower our response becomes and greater the effect on our warfighters.

Mullen, R. "Dearth of Reserves Threatens U.S., Expert Says", Defense Today, Aug. 19, 2005, pg 1

Joint Publication JP 1-02, DOD Dictionary of Military and Associated Terms: Command and Control (C2): "The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. C2 functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission."

Coakley, T. (1992). Command and Control for War and Peace. NDU Press, pgs 60-63

Spires, D. (2 Beyond Horizons chapter 1

Ibid.

AFDD 2-2 page 23

'Satellite driver' is a generic term for the person or unit who operates a Space system.

United States Strategic Command Command Relationships,

AFSPC Public Affairs, Key Events in AFSPC History, http://www.peterson.af.mil/hqafspc/history/chronology.htm, Accessed on 19 January 2006

Report of the Commission to Assess United States National Security Space Management and Organization, http://space.au.af.mil/space_commission/

E-mail message traffic between author and Captain Ray Fernandez, HQ AFDC/DR, USAF Doctrine Center, Maxwell, AFB, Nov. 15-16, 2005

Air Force Association, Space Almanac 2004, Air Force Magazine, May 31, 2004, pg 28.

Director of Space Forces Briefing, Apr. 13, 2005

Joint Publication JP 1-02, DOD Dictionary of Military and Associated Terms: Operational Level of War: "the level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or Space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives."

"How Did 'The Few' Win"

Battle of Britain homepage, UK Ministry of Defence, http://www.raf.mod.uk/bob1940/bobhome.html

Joint Publication 3-0, page II-6: Combatant Command: "COCOM is the command authority over assigned forces vested only in the commanders of combatant commands by title 10, USC, section 164, or as directed by the President in the UCP, and cannot be delegated or transferred."

Selected agencies include: NASIC/AIA, NSA, DIA, DISA, NGA, CIA, AFWA, DTRA, JSC, AFTAC, NOAA, NASA

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EXCALIBUR

PRECISION ACCURACY AT EXTENDED RANGES

"When I would tell my targeteers to take out a specific building (in Iraq), they would ask me, 'Sir, do you want the rubble in the front yard or back yard?' Now that's 'precision.'"

— LTG Thomas Metz, CG III Corps

By MAJ Annette C. Merfalen

Since Operation Desert Storm, the United States military forces have been revolutionizing their operational concepts, shifting from being weapons dependent to effects-based planning and operations. Procedures shifted from planning for the number of sorties required to destroy a single target, to planning the number of targets that can be destroyed with a single sortie and the combined effect from that attack. During Operation Iraqi Freedom, approximately 66 percent of U.S. munitions used were precision-aided, either by Global Positioning System (GPS), by laser or both. The development of new tactics to find, fix, track, engage and assess targets resulted in Space operations being better integrated into operational planning and mission execution. The Army's most recent operations have reinforced the need for responsive precision attack of critical point targets, to include those in urban environments or restrictive terrain and under all weather conditions, all while minimizing collateral damage.

U.S. troops in Iraq and Afghanistan could have a significantly more accurate howitzer-fired munition by the end of Fiscal Year 2006, according to officials. The Excalibur XM982 155mm Howitzer round, developed by Raytheon and Bofors Defense, is the next generation family of projectiles for the U.S. Army and U.S. Marine Corps Artillery. Excalibur will be the Army's first precision, satellite guided, fire-and-forget indirect-fire family of munitions. Excalibur will be used in Army and Marine Corps howitzers, to include the M109A6 Paladin, the M777 Lightweight 155 Howitzer and the Future Combat Systems' Non-Line-of-Sight-Cannon (NLOS-C). Using the M777 155 mm howitzer, a two-man crew can fire one round every ten seconds, maintaining a sustained rate of six rounds per minute, out to a range of 30 kilometers.

Numerous live fire tests at Yuma Proving Grounds, Ariz., had Excalibur firing munitions at targets out to 20 kilometers. During a September live fire demonstration, an Excalibur hit a target 15 kilometers away, detonating within seven meters of the target. "Excalibur will reduce collateral damage, increase survivability of friendly troops and accomplish the mission more efficiently," according to COL Ole Knudson, the project manager for Army combat ammunition systems. Excalibur is accurate to within 10 meters circular error probable at any range in its operational sequence. This indicates a significant improvement over existing munitions, reducing collateral damage and permitting its use close to friendly units, thus increasing employment flexibility as well as reducing the number of rounds required to perform any lethal artillery mission. The table on page 23 illustrates the capability of Excalibur to use fewer rounds against various point targets as compared to the M549 155mm Rocket-Assisted Projectile and M107 155mm HE projectile (both fired from the M198 howitzer).

Excalibur's fragmenting steel warhead, combined with a near-vertical terminal trajectory enables the round to achieve greater lethality than current HE rounds. Excalibur uses three fuse settings — airburst, point detonation and delay. The airburst or height of burst fuze setting will enable Soldiers and Marines in contact to engage enemy forces on rooftops and

The development of new tactics to find, fix, track, engage and assess targets resulted in Space operations being better integrated into operational planning and mission execution. The Army's most recent operations have reinforced the need for responsive precision attack of critical point targets, to include those in urban environments or restrictive terrain and under all weather conditions, all while minimizing collateral damage.

The "Round" Table

	Excalibur 155mm Unitary (At any range out to 40 Km)	M549 155mm RAP (20 Km Range to Target)	M107 155mm HE (15 Km Range to Target)
Infantry Platoon	3 rounds	25 rounds	43 rounds
Radar	1 round	10 rounds	11 rounds
Command Post	6 rounds	54 rounds	78 rounds
Structure	3 rounds	147 rounds	110 rounds

in windows. The delay fuse will be ideal for penetrating structures and command posts. The point-detonating fuse will be effective against personnel and light materiel targets, such as dismounted troops and weapons crews, air defense systems, radars, and light armor and wheeled vehicles.

GPS navigation and guidance provides an effective, low cost means for aiding precision targeting. The Excalibur unitary round contains a GPS receiver and Inertial Measurement Unit which monitors the weapon's locations and altitude to adjust its flight path to accurately impact on the target. Once fired, spinning base fins deploy to stabilize the round. Horizontal stabilizers, or canards, deploy reducing the round's roll-rate or spin. This allows the round to orient its GPS antennas toward the satellite constellation for rapid acquisition of the GPS signals, enabling the round to maneuver to the target. Excalibur's GPS receivers and guidance components make corrections along the guided portion of the firing trajectory, optimizing its range. GPS position coordinates are updated throughout the round's flight, steering the round to the target. In the event the GPS signal is jammed during the flight, the Inertial Measurement Unit will use the last GPS data received to guide the round to the target. As it nears the target, the round will orient itself to an almost perpendicular angle of attack to the target, optimizing the blast effects. The fuse will function according to the option selected, detonating the round on the target.

The Army is well down the path of transforming its operational concepts to more efficiently and effectively deny the enemy safe haven. Excalibur's responsiveness to timely, precision engagements for use in an urban setting will change the dynamics of today's contemporary operating environment, allowing commanders the flexibility to engage the enemy at a time and place of their choosing, with greater accuracy all the while limiting collateral damage.

Information contained in this article is derived from multiple sources, including the Excalibur Project Manager, TSM Canon, the Field Artillery Journal, Army News Service Online and the Defense Update-International Online Magazine.

MAJ Annette C. Merfalen is a Space Operations Officer with Army Space and Missile Defense Command's Directorate of Combat Development Tactical Space Tiger Team in Colorado Springs, Colo. She is a graduate of the Command and General Staff College and the Space Operations Officer Qualification Course. Merfalen has served in numerous command and leadership positions, including Army Space Support Team Leader and Space Control Company Commander.

Recognizing What is Useful

All military laws and military theories which are in the nature of principles are the experience of past wars ... We should seriously study these lessons ... We should put these conclusions to the test of our own experience, assimilating what is useful, rejecting what is useless, and adding what is specifically our own.

— Mao Tse-tung, Selected Military Writings

By LTC Joseph S. Dreiling

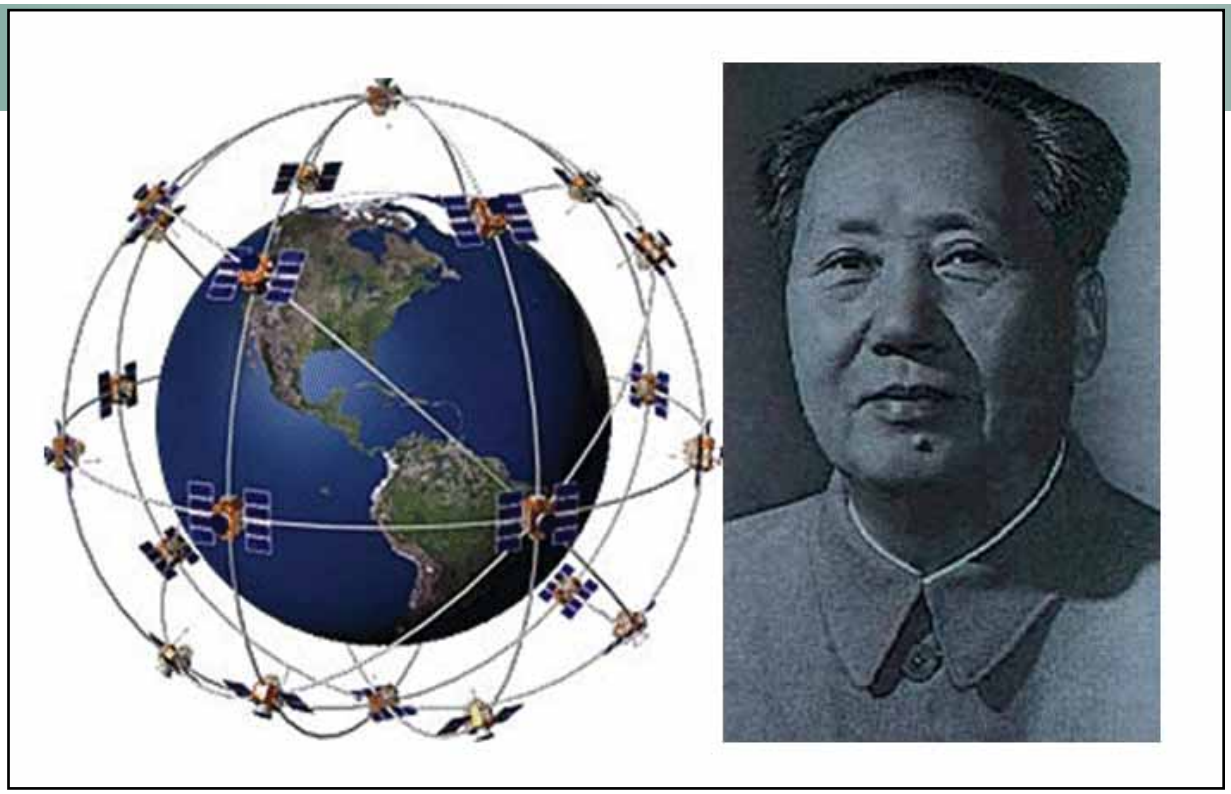
Mao Tse-tung made a great point with the above statement. We, the U.S. military, used Space extensively in battle for the first time during the first Gulf war, and in it, we learned how Space might be used, but we have yet to learn all of how it can be used. I base my statement on the continuing debate over whether Space is a medium, a mission or both. Space can be a great enabler to many missions. Foremost among those I believe to be Information Operations. When we learn how to coordinate Space capabilities with Information Operations we may be able to move beyond a leap to armed conflict in world relations or at the very least mitigate the damage resulting from relationships that lead to strife.

Theories concerning international relationships, like sand on the beach, are based on an ever changing slate of causes and effects requiring constant re-evaluation of our conclusions. If in the future we as a nation are to be successful in our goal to provide safety and security for our citizens we must recognize the changes and challenges now taking place and not merely react to those changes but actively work to forge ahead of events in order to shape them. The nature of warfare does not change. New advances in technology or developments in organizational structure still have the same goal; defense of the nation. However, advancements in technology and mutations of social organization do play important roles on the battlefield.

At the beginning of the Industrial age, America was still fielding armies with pre-Industrial age field formations. We had clearly not kept pace with technology and we paid with heavy losses in our own Civil War. The United States fought a Napoleonic style war with emerging Industrial age weaponry. With the advent of the automated information age we must be aware of necessary changes needed to meet emerging challenges on the battlefield.

Every transformation in technology has led to a requisite increase in the speed of warfare and the lethality of the weapons used. Lethality reached its destructive climax with the use of nuclear weapons against Japan. The drive now is toward maximum target effect with that absolute minimum of collateral damage, or "effects based warfare." But even in this we must not forget that the effect we seek is meant to inflict pain upon an enemy to dissuade him from a course of action contrary to our own self interest. With this in mind we must be aware of the collateral damage we inflict upon ourselves in the media; again Information Operations comes into play. If we continue our leadership in the creative use of Space and near-Space in support of Information Operations we will have the advantage of mitigating damage inflicted in the world of public perception. In most cases it is not the event that does the damage but the perception of the event.

World War I witnessed the advent of armored support to the ground forces, submarines to the navy and airpower which added a third dimension to the battlefield. These advances provided combatant states with the ability to reach into enemy territory much deeper then had been possible and bring warfare to the home front. World War II witnessed the fielding of aircraft carriers, long range bombers, jets and atomic weapons, all of which pushed combat effects just that much further up the destructive scale. All improvements since then have been based upon these devices, save one, the computer, which has heralded the



emergence of the automated information age. Information has always been a battlefield weapon, but it is only since the introduction of the computer that speed of information application has been a direct result of technology. Moving information through Space allows us now to put that information anywhere on the globe that we need it, when we need it, in most cases.

From room sized relatively low powered computers such as UNIVAC, to the desktop PC … computing power has increased exponentially. Decision making and communications have become increasingly faster, but some might argue not more efficiently. The more powerful information transfer and sharing becomes, the more lethal the battlefield will be. Information control and computing power has also added an element of pinpoint destruction far to the rear of what was once thought of as the front. Add to this the dimension of Space and the front really has no meaning, especially when applied to combat against non-state adversaries. When it becomes necessary to combat non-state actors, an awareness of state borders is still paramount. For that reason, battle using Space as the medium, will many times be confined to the sensor and information control field of battle. As sensors become more refined and information concerning an enemy becomes broader we will be capable of either cutting off funding to non-state enemies or coordinating special operations actions with a state within which a non-state enemy may be basing.

With the emergence of the "shared" information age we cannot afford to fight our present and future enemies using "pre-shared information age thinking." Our new enemies may not be tied to a past bureaucratic history nor have a military rooted in massive force-on-force power projections. We must recognize the speed of the shared and automated information age and apply not only new weapon systems, but new organizations designed to fight in this new automated world. These contemporary organizations have begun to take shape with the "plug and play" military units that are presently being fielded. But do these new unit organizations fully address the present changes? Will these changes and improvements also have the necessary foundations to address the cultures we must confront completely?

If we had a better understanding of cultures and how they work we would understand how to better posture ourselves in relation to them. Many times our posture toward them could spell the difference between "saber rattling" and armed conflict. We can use our Space assets to convey an Information Operation message and send the necessary position that will defuse a situation. In this area, the business world is far beyond governmental institutions in its understanding of other cultures. Examples of this approach to the world are present in the advertising used by multi-national corporations. Because business today is no longer confined to state drawn borders, it is now incumbent that they understand other cultures. Meetings that used to entail weeks of travel and coordination now take place in minutes with little or no travel involved.

In the case where conflict becomes inevitable, the military will become involved. In those instances, understanding an enemy's belief system will enhance our ability to carry out defined, well directed conflict resolution. Directing those operations with speed and precision will require the use of Space assets and Space enhancement to ground operations.

Space is bound to be a medium and a mission that will support and enhance all operations. We must recognize that emerging technologies will create Space related missions that would, at present, be labeled as a non-traditional Space mission. The speed of progress dictates that this must happen and we must creatively leverage each advancement. We must use those developments to support our maneuver and get ahead of our opposition.

(See Recognizing Useful, page 52)

The Army's Interest in Space Control

By Charlotte Scharer
and MAJ Brian Moore

The Army is critically dependent on Space capabilities to enable and enhance land warfare. Virtually every Army operation uses Space capabilities to some degree. Today, we use Space largely for its ability to enhance the effectiveness of our combat forces. We can communicate; navigate; target, find, and fix the enemy; anticipate weather; and protect our forces based on combat and support assets available from Space. We also strive to control Space so adversaries cannot overcome our asymmetrical advantages in Space. Space provides tremendous leverage to the Army's land warfare capability.

The Army views Space as a vertical extension of the battlefield and an integral part of the battlespace, one that has been especially instrumental during the ongoing Global War on Terrorism. The Army's transformation also integrates Space into all phases of planning and operations as a core element of that process. The Army's future force, serving as part of the joint force, will be even more adaptable and lethal, leveraging the capabilities of the ultimate high ground. The nature of warfighting is changing rapidly, and the Army's strategic role in Space is evolving as a result.

Our dependence on Space will increase in the future as Space-based capabilities enable the future force concepts of information superiority, enhanced situational awareness and high-tempo, non-contiguous operations. Space use will increase as technology propels us toward more flexible and less expensive access, and development of more comprehensive Space warfighting tools. History and the march of technology tell us that the time will come when we use Space not only to enhance land warfighting capabilities, but also for direct combat, in other words, force application from Space.

However, U.S. dominance in Space is not guaranteed. The rapid growth in commercial Space capabilities increases our adversaries' ability to monitor our forces and potentially negate our advantages in Space. Numerous nations have Space programs, and the proliferation of commercial Space systems continues. Many of those systems have potential military utility, such as targeting, intelligence and communications. Our enemies might probe our Space systems for vulnerabilities or alter the Space environment to disrupt or deny our Space operations. They might gain access to our systems and corrupt or exploit data for hostile purposes.

Virtually any terrorist with a credit card can purchase Space support. Adversaries no longer need to develop their own Space capabilities or programs. These worldwide changes in the availability of Space capabilities have unacceptable consequences for our land forces. Consequently, the Army, in conjunction with the Department of Defense, is implementing a broad campaign to protect our vested interest in Space by contributing to the U.S. capability for Space control.

The Army's approach to engaging in Space control activities holds that Space control is a joint mission. Space control operations ensure freedom of action in Space for the United States and its allies and, when directed, deny an adversary freedom of action in Space. Space control includes offensive and defen-

The Army views Space as a vertical extension of the battlefield and an integral part of the battlespace, one that has been especially instrumental during the ongoing global war on terrorism. The Army's transformation also integrates Space into all phases of planning and operations as a core element of that process.

sive operations by friendly forces to gain and maintain Space superiority and situational awareness of events that impact land warfare operations. Space control involves five interrelated objectives:

- Surveillance of Space to be aware of the presence of Space assets and understand real-time satellite mission operations.
- Protect U.S. and friendly Space systems from hostile actions.
- Prevent unauthorized access to, and exploitation of, Space systems.
- Negate hostile Space systems that place U.S. interests at risk.
- Directly support battle management, command, control, communications and intelligence.

The Army's concept of operations for Space control in support of the future force consists of the following essential tasks:

- Enable continuous information and decision superiority.
- Protect the force during all phases of the operation.
- Support precision maneuver, fires, sustainment and information.
- Achieve situational understanding "off the ramp" during entry operations.
- Support increased deployability and reduced theater footprint.

The Army participates in development of these operational elements by directing its limited Space resources to initiatives addressing specific land force needs or leveraging the Army's traditional competencies in ground-based operations to support joint needs. A two-pronged approach to Space control has emerged:

- Army investment in selected multi-agency or joint Space control initiatives.
- Development of Army capabilities into Space control capable systems.

Bottom line: Space control is Army business. The Army has a vested interest in Space superiority, just as it has in other areas critical to mission accomplishment. Future battles for Space superiority will be intertwined with information warfare and often fought from the ground. Accordingly, the Army's interest and contributions to Space control are numerous and continue to grow. Based on this assessment of the Space control environment, the Army is pushing hard to help secure and maintain U.S. dominance in the vertical extension of the battlefield.

Charlotte Scharer serves as the Space branch general engineer for the Future Warfare Center. She has had the opportunity to participate in many Space and Space control efforts and has successfully performed as a key government technical contributor on a broad spectrum of force development and integration topics. She is responsible for developing Army Space requirements for the capabilities development division.

MAJ Brian Moore is assigned to the Space and Missile Defense Division, Headquarters Department of the Army G-3/G-5/G-7. Moore's previous Space experience includes studies at the Naval Postgraduate School and working as a Combat Developer in the U.S. Army Space And Missile Defense Command's Future Warfare Center. Moore is a former Military Intelligence officer with experience in electronic warfare and tactical all-source intelligence.

WAR GAMING: SPACE PERSPECTIVE

"Those who refuse to learn from history are doomed to repeat it."

— American philosopher George Santayana

By Jeff Miller

I'd like to discuss WAR GAMES, no, not that movie with Mathew Broderick where the super computer asks, "Would you like to play a game?" No, I want to talk about modern day real war games and how we use them to better prepare ourselves for the future. As the above quote suggests by asking the right questions today, we may prevent mistakes from being made in the future.

When a request for war game support comes into your office what is the initial reaction? Enthusiasm? Probably not. More likely dread, frustration, coupled with reluctance and consternation. A number of participants, especially active duty military get picked at the last minute and therefore they don't feel fully prepared in advance for the war game and thus do not easily integrate into the war game process. When they arrive at the event they sometimes find themselves in a group or section that they feel doesn't best utilize their expertise … or they may feel completely under utilized. If you have felt this way let me remind you of something, "It's not all about you!" In fact if you are not being utilized to your full potential then you are missing out, big time. If you find yourself surrounded by people from many varied backgrounds and incredible levels of expertise … Talk to them! This is an amazing learning opportunity for you. You may be there to represent your flag. You may be there to "take notes" or sit quietly in the back until your boss turns to you for your expertise. No matter, just by being there you are privy to an experience that few in our country, or the world for that matter, have an opportunity to go see and learn from.

Ok, now that I have vented, let's back up a minute and define just "what is a war game" and "what makes it different from an exercise or an experiment?" From there we can talk about how Army Space prepares for them. An exercise is a military maneuver or simulated wartime operation involving planning, preparation and execution. It is carried out for the purpose of training and evaluation. It may be multinational, joint, or a single service exercise, depending on participating organizations.

Exercises are the "now," using existing capabilities and procedures. People play in the event the same manner they do as their regular jobs with the same equipment, per se, same concept of operations and checklists. The emphasis is on proficiency. Examples include Global Guardian, Terminal Fury, Roving Sands, Nimble Titan and Ulchi Focus Lens.

Experiments are discrete, single events or progressive, iterative simulations (constructive, virtual or live) that assess the military utility/potential for a new or revised doctrine, organizations, training, leader development, materiel, personnel and facilities concept or new technology to satisfy user needs. Data is gathered through a designed event or through a data collection effort subordinate to a field/training exercise involving field units and Soldiers. Experiments are conducted using the team approach. The focus is on a specific capability or technology opportunity. The experimentation process consists of conceptualization, planning and reviews, approval, execution, decision and possibly exploitation. Whether conducting experiments or designing experiments to be done elsewhere, Battle Labs are the central focus for all experiments and this leads to requirements within their battlefield dynamic area. Experiments where the focus is five to 10 years out use some future but "in the works" tools/assets. Notice I didn't say POMed. Examples include Joint Project Optic Windmill, Joint Expeditionary Force Experiment , Total Defender and Northern Edge.

A war game is a simulation, by whatever means, of a military operation involving two or more opposing forces using rules, data and procedures designed to depict an actual or assumed real life situation. War games are 15-20 years out and use future concepts to face a "near-peer" op-

Images like the one at left give a visual depiction of how systems are supposed to work in conflict situations. Notional systems are often used in war games to give the players experience on what may lie ahead for them. War games also provide the capability to validate current and future organizations, equipment sets, concept of operations and missions within the construct of what the future Army and joint forces structures will be. This strengthens the command's ability to exercise and visualize new concepts and ideas.

ponent. In today's war games we are allowed to utilize "notional" systems, such as the airborne laser, the F/A-22, the High Altitude Airship and others. By "gaming" these future systems we can look at issues such as employment, command and control, support and integration in a joint environment. Examples include Schriever III, Unified Quest and Sea Viking.

The war games team of the Frontiers Division element of U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command's Futures Warfare Center is run by LTC Joseph Dreiling, a former artillery officer and former watch commander in the SMDC Operations Center, who explains the mission of the War Gaming Space Division this way:

"We participate in war games to observe new concepts and emerging doctrine in simulated tactical, operational and strategic venues. Our mission is also to validate current and future organizations, equipment sets, concept of operations and missions within the construct of future Army and joint forces thereby strengthening the command's ability to exercise and visualize new concepts and ideas. This improves command situational awareness and influence, and avoids unnecessary and redundant war gaming investments."

The Space division is focused on examining Space capabilities within emerging joint transformational concepts focusing on the Joint Task Force's ability to achieve decision superiority, create coherent effects and support distributed operations.

Take the High Altitude Airship or some other near-Space platform. These are future concepts, some still on the drawing board, but through war gaming we can answer some of the, who, what and how questions that ensure we field a product that meets the Army's needs. War gaming can and will increase confidence that critical issues address prior to IDO as well as obtain hard data to push the Missile Defense Agency and Joint Program Office on important issues and achieve critical first steps in influencing Integrated Missile Defense.

Post IDO, these findings lead to developing quantifiable Joint Universal Lessons Learned System inputs, increased ability to track combat developer issues and an increased ability to influence Integrated Missile Defense and Integrated Air and Missile Defense development. In this way the Futures Warfare Center serves as the force developer and single integrator for the Army Space and missile defense operational concepts and requirements, ensuring the development of doctrine, organizations, training, leader development, materiel, personnel and facilities solutions that support both the warfighter and successful development and fielding of Space and missile defense capabilities.

With limited resources Dreiling's team can't attend every event on the calendar thus they "rack and stack" in order to plan, coordinate, participate in and assess those events which will achieve the following:

- Allow data collection to examine the effects of future counter communications and counter EO systems and concepts on the warfighter.
- Allow data collection to determine critical Space-based needs and future acquisitions in order for the SMDC commanding general and chief of staff of the Army to engage with the joint community.
- Determine the necessity and potential future configurations of an Army Space Authority, Space Support Element and Army Space Support Team.
- Provide a venue to integrate Space and Missile Defense Battle Lab limited objective experiments based on objectives.
- Minimize obstacles such as classification level, knowledge base of players, sim/modeling and scope.

"Our goal here in Army Space," says Dreiling, "is to provide world-class Space support to the joint warfighter and national security Space team. To meet that, we have a process by which we detail an evaluation/assessment plan to facilitate quality results. We don't respond well to last minute, "Hey you!" type taskings, then just show up to an event and take notes. That's no way to answer

(See War Gaming, page 52)

DEVELOPING DOCTRINE FOR THE 1ST SPACE BRIGADE

By MAJ Robert Zaza

Birth of the Space Brigade and Codification into Doctrine

The 1st Space Brigade is a relatively new organization, but its predecessors and component parts have been providing Space support to Army and joint operations since before Operation Desert Storm. While the U.S. Air Force Space Command history would assert that Desert Storm was "truly the first Space War,"[1] the increasing reliance of tactical forces upon strategic and commercial Space capabilities in Operations Enduring Freedom and Iraqi Freedom sparked the conception and creation of a Space Brigade headquarter that could provide command and control (C2) of Space forces; coordination, deconfliction and prioritization of Space effects; and Space force enhancement support.

The existence of the brigade finds its origin in February 2002, when an ad-hoc group of Space and Missile Defense Command staff officers provided command and control for the 1st Space Battalion, 193rd Space Battalion and 53rd Signal Battalion (SATCON) (then known as the 1st Satellite Control Battalion). Because of the increasing demand on Army Space Forces for support to military operations overseas, Homeland Security and the commander, U.S. Strategic Command's desire for in-theater command and control of Space forces, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command found it vital during Force Design Update Cycle 02-2 to have a brigade headquarters that could centrally plan and coordinate actions necessary for Joint Task Forces, Joint Forces Land Component Commanders, Corps and Marine Expeditionary Forces to exploit the capabilities of tactical Army Space Forces. The activation of the 1st Space Brigade (Provisional) in 2003, and the subsequent activation of the brigade as a Table of Organization and Equipment (MTOE) unit in 2005, have enabled Army Space professionals to develop new tactics, techniques and procedures (TTPs) for planning, coordinating, executing and assessing Space support to Army and joint operations.

Over the last three years, the 1st Space Brigade has tested concepts for fighting the 1st Space Brigade qua Brigade, and the 1st Space Battalion and 193rd Space Battalions qua battalion, primarily in the U.S. Forces Korea milieu of Ulchi Focus Lens and RSOI (Reception, Staging, Onward-movement and Integration). The 1st Space Brigade not only offers the capability to provide satellite control, Space Force Enhancement support, and Missile Warning support as before; but also the Army Space Coordination Detachments and Army Space Coordination Elements that plan, coordinate and synchronize Space capabilities, forces and effects, to the benefit of the Land Component, Joint Task Force and theater commanders. The presence of Army Space Coordination Detachments and Army Space Coordination Elements will influence and shape how commanders use Space capabilities by taking advantage of knowledge, skills and core abilities of trained Space professionals who are also experienced in land warfare. Until now, the 1st Space Brigade has relied on unpublished concepts developed internally, as well as on Joint Publication 3-14 and Field Manual 3-14 for doctrinal guidance. While the published doctrinal manuals are good for broad doctrinal guidance and as Space tutorials, the time has come for the Space Brigade to have a doctrinal manual that befits its important status as a unique MTOE brigade. Now the Future Warfare Center Directorate of Combat Development and the commander, the staff of the 1st Space Brigade, and other subject matter experts, are engaged in codifying the Army Space Coordination Detachment, the Commercial

The activation of the 1st Space Brigade (Provisional) in 2003, and the subsequent activation of the brigade as a Table of Organization and Equipment (MTOE) unit in 2005, have enabled Army Space professionals to develop new tactics, techniques and procedures (TTPs) for planning, coordinating, executing and assessing Space support to Army and joint operations.

Exploitation Team and new TTPs into Field Manual (FM) 3-14.10, Space Brigade Operations.

What's Inside and When Do We Get It?

FM 3-14.10 is in the initial draft stage. When complete, it will define Space Brigade and subordinate unit missions, command and control relationships, coordination relationships, organizations, capabilities, and TTPs for operations and sustainment covering the full spectrum of Army operations and support to joint operations. Publication of the final product is expected in February 2007. Terms such as Army Space Coordination Detachment may be different by then. What will not change is the dedication to establishing doctrine for the Space Brigade to provide planning, coordination and subject matter experts at the Joint Forces Land Component Command, and a robust capacity for day-to-day staff support to the Space Authority, whether that authority resides with the Joint Force Air Component Command or the Joint Force Land Component Command.

The staffing process will involve internal coordination and command adjudication as well as external. The Army G-2 is likely to be extremely interested in what this manual has to say. The Marine Corps is interested in the FM and will get a vote on it through the Information Operations and Space Integration branch, Plans Policies and Operations Department, Headquarters, U.S. Marine Corps. Depending on the amount of detail afforded to Army Space Support Team TTPs, FM 3-14.10, or a future incarnation, could aspire to Multiservice TTP status under the aegis of the Air Land Sea Application Center.

Army Space organizations have broken a sweat trying to keep up with advances in technology, which themselves struggle to outpace lessons learned from combat operations in Afghanistan and Iraq. Challenges are spawning from the rapid pace of development in military Space operations. The first of these is to simply review and update doctrine in a timely manner. The normal Training and Doctrine Command template of five years to update doctrine cannot apply — the time to update Space Brigade doctrine will be two-and-a-half to three years. The second challenge is how Space Brigade doctrine, and Army Space doctrine as a whole, will synchronize with joint and Air Force Space doctrine, and with such Air Force command and control (I use the term command and control loosely) concepts as the Director of Space Forces, which has yet to be codified into Air Force Doctrine Document 2-2, Space Operations. The solution will be, as with technological advances, to develop Space Brigade doctrine in a "spiral" fashion. Caution and audacity will be two sides of the same coin as we develop new doctrine. We must take care to synchronize Space Brigade doctrine with Joint Publication 3-14, FM 3-0, the Army Theater Space Concept, the Joint Space Warfighting Concept, and Army and Division Space Support Elements, while advocating for improved doctrine at the joint level and protecting Army Space interests. Emerging doctrine must be descriptive rather than prescriptive, and must be broad enough to support the Army and Marine Corps as services and the joint warfighter fighting full spectrum offensive and defensive warfare, synchronizing exploitation of strategic and tactical Space capabilities to support operational objectives across diverse theaters.

Desert Storm: The First Space War, retrieved from http://www.peterson.af.mil/hqafspc/history/Heritage-Desert%20Storm.htm on Feb. 2, 2006.

MAJ Robert N. Zaza, Military Intelligence, U.S. Army Reserve, served on a temporary tour of Active Duty to write the initial draft of FM 3-14.10 for the U.S. Army Space and Missile Defense Future Warfare Center, Colorado Springs, Colo. He received a Bachelor of Arts from the College of William and Mary, Va., is a graduate of the U.S. Army Space Operations Officer Qualification Course, and is seeking his Master of Science in Space Systems Operation Management at Webster University. He has served in various leadership and staff positions in the continental United States, Korea, Panama and Afghanistan, including Army Space Support Team leader, Combined Joint Task Force 180, Bagram Air Base, Afghanistan; S-2, 4th Brigade, 4th Infantry Division, Fort Hood, Texas; and Antiterrorism and Force Protection Officer, U.S. Southern Command, Quarry Heights, Panama. In civilian life, he is employed by ARINC Engineering Services, LLC, in Colorado Springs, Colo.

PSCCE to RSCCE Transition

Production Satellite Configuration Control Equipment

Replacement Satellite Configuration Control Equipment

By SGT Joshua W. Pierce

As satellite communications has evolved over the last 25 years, so has the Army's 53rd Signal Battalion (SATCON). The latest example in the Army's evolution of satellite command and control is the transition from the Production Satellite Configuration Control Element (PSCCE) built by Lockheed Martin to the Replacement Satellite Configuration Control Element (RSCCE) built by ITT Industries.

The purpose of the PSCCE and RSCCE are to provide monitoring and payload control of the Defense Satellite Communications System (DSCS) Phase III satellites. Although the equipment is changing, the mission is still the same:

Monitor telemetry to continuously verify health and well being of the satellite, command and reconfigure the communication subsystem of each satellite as directed by the Defense Information System Agency, report satellite operating data, configure data, anomalies and requested information to Defense Information System Agency, the Air Force at Falcon Mission Control and other authorities as directed.

The U.S. Army fielded the PSCCE in the 1980's. The PSCCE utilizes both software and manually controlled equipment, to continuously monitor telemetry for two satellites, while actively commanding one satellite. The PSCCE provides continuous telemetry updates to the operator for both satellites on two of the alphanumeric Cathode Ray Tube displays, commanding and timing data is executed/displayed via the third alphanumeric tube. The command Cathode Ray Tube is dedicated to satellite commanding/verification and ground equipment configuration. The operator can also access a number of predetermined reports via two graphical Cathode Ray Tube's. The PSCCE modular computer will configure predetermined calibrated and non-calibrated data reports. These reports are used by the operator to verify the satellite configuration and welfare, and to perform trend analysis. Due to the limited capabilities of the PSCCE software, reports are largely text based and require careful analysis.

The PSCCE equipment is comprised of four functional sub-systems: control, display, computer and peripheral subsystem; the telemetry and command sub-system; the Earth terminal interface and test sub-system; and the checkout, calibration and test equipment subsystem.

The computer and peripheral sub-system provides the computational and processing capability, memory, data storage and data archival required to run the three PSCCE software programs: System Request Executive, Communications Configuration Program, Improved Jammer Location Electronics Software and the Telemetry and Command Program.

The Telemetry and Command sub-system contains all equipment required to control and monitor the uplink command, downlink telemetry and Single Channel Transponder telemetry flow. The PSCCE requires the following equipment to accomplish both telemetry downlink and command uplink per satellite.

- Single Channel Transponder Decommutator/ Correlator
- Ground Operating Equipment Cryptographic device
- Phase Shift Keying Demodulator
- Telemetry Processing Unit
- Tracking, Telemetry & Commanding Bit Sync
- Time Code Generator
- Single Channel Transponder Bit Sync
- Event Buffer
- Signal Multiplexer
- Phase Shift Keying Demodulator
- Computer Interface Unit
- Command Up-converter.

The Earth Terminal Interface sub-system contains the

hardware devices that link the DSCS Earth terminal radio frequency equipment to the PSCCE telemetry and command subsystem, which includes the Beacon Down-converter and the Beacon Receiver and demodulator. Altogether the PSCCE contains six functional equipment racks, six alphanumeric Cathode Ray Tube's, three graphical Cathode Ray Tube's, six laser jet printers, one dot matrix printer and three computer peripheral racks.

The RSCCE was first conceived in 1994 to replace the PSCCE due to aging hardware/software and to take advantage of DSCS satellite improvements not supported by the PSCCE. The RSCCE is designed to monitor and command a single DSCS satellite and is capable of storing numerous DSCS satellite databases for quick handover and monitoring capabilities, a considerable increase from the PSCCE. This capability enables the Wideband Satellite Operations Center to quickly monitor and restore control of all satellites within the DSCS constellation with minimal downtime.

The RSCCE design utilizes more modern computer technology in the form of an X-window protocol allowing a windowing Man-Machine Interface on the Objective DSCS Operational Control Software workstation. The Windows-based software supports enhanced graphical reports and color-coded displays for each of the satellite sub-systems. Versus the PSCCE's Subsystem Display and SETS reports, the RSCCE compiles a total of 66 reports divided by satellite sub-system all containing calibrated data, all accessible with the click of the mouse. The System Request Executive software utilized by PSCCE requires the operator to enter in string commands to access reports on the graphical Cathode Ray Tube's. The RSCCE reports are easily understood and accessible to even the most inexperienced operator.

The RSCCE equipment design has incorporated multiple processes into one unit, such as the Modulator/Demodulator Unit, which accomplishes the job of the Phase Shift Keying demodulator, TT&C Bit Synchronizer, Signal Channel Transponder Bit Synchronizer and the Signal Multiplexer used by the PSCCE. This drastically cut the total area of the RSCCE to three functional racks versus PSCCE with nine functional racks. The Telemetry Control Subsytem red/black rack controls the Command uplink, Telemetry downlink, and Automatic Fault isolation Loop Back Tests. The computer and peripheral sub-system utilizes commercial-off-the-shelf software such as Open VMS 7.1-2, Oracle CODASYL DBMS V7.0, Oracle RDB V6.1, Oracle CDD V6.1, BE AmessageQ 4.0A RP36, and SL-GMS V6.0 for open VMS.

Automatic fault isolation of ground equipment has been incorporated in the form of software controlled simulated data loop backs, allowing the operator to quickly resolve hardware issues. The PSCCE downlink simulator does provide loop back capabilities, but has proven difficult to program and time consuming when troubleshooting equipment problems. The RSCCE equipment has improved on the PSCCE design by streamlining the equipment to a single lowest replaceable unit, user friendly software displays and reports, automatic fault isolation and software controlled.

The Army's Newest RSCCE Operators

By SSG Woody Scott

LANDSTUHL, Germany — One of the most significant challenges facing the satellite network control operating environment is the dwindling number of Soldiers certified to work the control payload (CPC) position. The CPC is responsible for monitoring the commanding of Defense Satellite Communications Systems (DSCS) satellites which is one of the most crucial functions performed by a Wideband Satellite Operations Center (WSOC).

With the retirement of Elmer Lu Frazier, the operation of the Production Satellite Configuration Control Element (PSCCE) was no longer being taught. This meant that every PCS or ETS that took a CPC certified Soldier out of the unit adversely impacted the ability of the unit to perform its mission.

Each squad felt the burden of maintaining their CPC qualified operators. When scheduling leaves or passes, Squad Leaders had to maintain the minimum number of workers certified to operate the OC floor as well as the minimum number of CPC certified workers.

For Charlie Company, 53rd Signal Battalion (SATCON), the first signs of relief came in the form of a course called the RSCCE (Replacement Satellite Configuration Control Element) course. Charlie Company recently sent ten Soldiers to the RSCCE course. The four-week course taught by Josh Bonesz and Chris Savaglio from ITT Industries gave the Soldiers the skills and fundamentals of the RSCCE system with an emphasis on hands-on practical application. Much of their daily class time was spent on the actual RSCCE equipment in real world scenarios allowing for realistic and effective training.

The new payload controllers of Charlie Company, 53rd Signal Battalion (SATCON) are SGT Patrick Mann (Distinguished Honor Graduate), SPC Shane Hillstead (Honor Graduate), SPC Charles Keller, SPC Quentin Kendall, SPC Brandon Hayman, SPC Ryan Morgan, SPC Ryan Petersen, SPC Michael McIntyre, SPC Konrad Neid, and SPC Michael Simpson.

The four week course impacted the mission in the same way that having ten Soldiers on leave at one time does. The added strain and pressure on the operations floor manifested in shift schedule changes and extra hours for some Soldiers and leaders. However, the difficulty should prove well worth the added burden. Just as an uphill bicycle climb leads to a smooth downhill run, Charlie Company is slowly reaching the crest of the CPC hill and looks forward to a long downhill run of certified operators ahead.

2006 NCO and Soldier of the Year Announced

By Ed White

From left to right, COL Roger F. Mathews, deputy commander for operations, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command with the SMDC/ARSTRAT 2006 NCO of the Year, SGT Stacy-Lyn De La Hoz, the 2006 Soldier of the Year, SGT Patrick Mann, and SMDC/ARSTRAT CSM David Lady. *Photo by Dennis Plummer*

PETERSON AIR FORCE BASE, Colo. – Four candidates up for U. S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) Soldier of the Year and four candidates up for SMDC/ARSTRAT NCO of the Year vied with each other over a ten day period in June to see who would go on to represent SMDC/ARSTRAT as Soldier and NCO of the year at the Department of the Army level competition to be conducted at Fort Lee, Va., Oct. 2-6. They came from around the world, communicators, early warning specialists and missileers alike, the best of the best in their home units.

They each gave all they had and in the end SGT Stacy-Lyn De La Hoz of Bravo Company, 53rd Signal Battalion (SATCON), Fort Meade, Md., was named NCO of the Year and Soldier of the Year was SGT Patrick Mann of Charlie Company, 53rd Signal Battalion (SATCON) in Landstuhl, Germany.

For the ten days of competition, the candidates ranged over Peterson Air Force Base and Fort Carson, doing preparatory training, getting a basic issue of field equipment and demonstrating their basic Soldier skills in a variety of venues. They were issued, zeroed and fired M16s. They ran day and night land navigation courses. They were tested on warrior skills during STX (Situational Training Exercise) lanes, they took an Army Physical Fitness Test, and finally they went before a board composed of six command sergeants major. The board tested their abilities under pressure and their abilities to lead.

De La Hoz, who joined the Army from New York State, said her favorite event was, "the night land navigation. I have used night optical devices before, but this was the longest amount of time I've been able to use them. And that was probably the most fun I've had in a while."

De La Hoz added, "The NCOs who put this competition together were outstanding. It was a very challenging competition, very realistic."

Mann gave his opinion on the quality of the events. "I was blown away by this competition. And the support they (the NCOs who ran the competition) gave us was phenomenal! The STX lanes, the weapons, the land nav, everything was challenging."

The conduct of the board was the final hurdle in the competition. The way the command's top NCOs handled it clearly demonstrated both the value and the mission of the NCO leadership.

The six sergeants major represented about 150 years of military service. They asked the competitors questions on subjects ranging from military history, drill and ceremonies, administrative requirements for leading Soldiers, knowledge of weapons and the ability to teach skills to their Soldiers … things the competitors need to know at their level of leadership to conduct the everyday business of being a Soldier.

The sergeants major also critiqued everything from leadership skills, leaders books, paperwork requirements, knowledge of regulations, how to counsel their Soldiers and the candidate's military appearance in a strong and corrective way. They were using the board itself to continue to train and teach these Soldiers a variety of lessons.

"Training and developing leaders is our business," SMDC/ARSTRAT's most senior NCO, CSM David Lady said of the competition. "Every Soldier and NCO who competed here is a winner. Two will go on to the next level of competition, but every competitor gave it everything they had. And what has been accomplished here is going to benefit teams of Soldiers deploying in support of warfighters and teams of Soldiers on the OC floors throughout the world enabling strategic communications. Their teams are going to be better. The competitors are better. Mission accomplishment will be better," Lady concluded.

> *"Training and developing leaders is our business!"*
>
> — CSM David Lady, SMDC/ARSTRAT

Others competing for the titles were for NCO of the Year: Western Region NCO of the Year, SGT Robert Adanitsh, Headquarters and Headquarters Company, 53rd Signal Battalion (SATCON); European Region NCO of the Year, SSG Donald Amos, Charlie Company, 53rd Signal Battalion (SATCON); Pacific Region NCO of the Year, SGT Heidi Jugovic, Charlie Detachment, 1st Space Company (TMW). For Soldier of the Year: Eastern Region Soldier of the Year, SGT Levi Ingersoll, Bravo Company, 53rd Signal Battalion (SATCON); Pacific Region Soldier of the Year, SGT Jeanette Padgett, Headquarters and Headquarters Battery, 49th Missile Defense Battalion (GMD); Western Region Soldier of the Year, SGT Regina Sierra, Headquarters and Headquarters Company, 1st Space Brigade.

Ed White has 21 years experience in military public affairs and is currently an editorial assistant working for the Future Warfare Center Directorate of Combat Development to help produce the **Army Space Journal**.

Tip of the Sphere

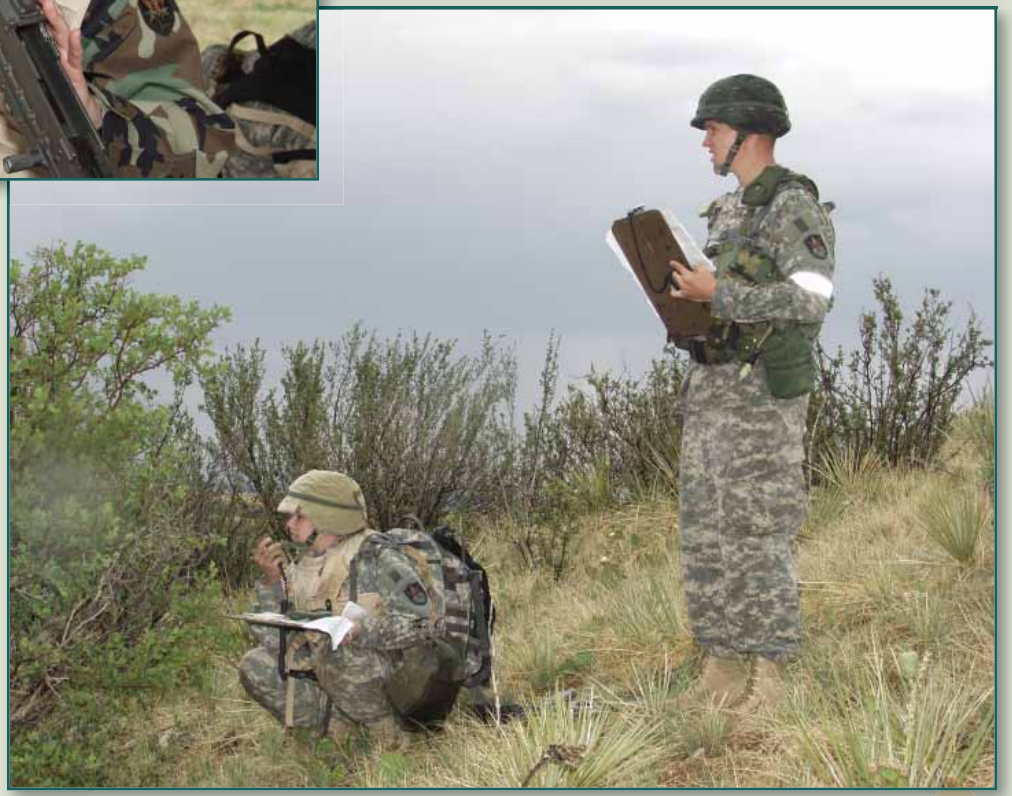
Photo by Sharon L. Hartman

Photo by Ed White

Photo by Ed White

Photo by Sharon L. Hartman

Clockwise from top: SGT Jeanette Padgett, 49th Missile Defense Battalion, camouflages her helmet during a Situational Training Exercise (STX); SGT Levi Ingersoll, Bravo Company, 53rd Signal Battalion, reassembles a weapon demonstrating his weapons proficiency; SGT Patrick Mann, Charlie Company, 53rd Signal Battalion, plots his coordinates for his next point during land navigation; SGT Robert Adanitsh, Headquarters and Headquarters Company, 53rd Signal Battalion, prepares to call in a 9-line medevac for a "wounded" comrade as part of the STX.



Clockwise from top left: SGT Regina Sierra, Headquarters and Headquarters Company, 1st Space Brigade, shows a veteran smile after completing the STX; SSG Donald Amos, Charlie Company, 53rd Signal Battalion, gets in the starting position to perform push-ups for physical training; SGT Stacy-Lyn De La Hoz, left, Bravo Company, 53rd Signal Battalion, calls in for indirect fire on the enemy, as last year's SMDC/ARSTRAT Soldier of the Year, SGT Mathew Funk grades her during the STX; SGT Heidi Jugovic, Charlie Detachment, 1st Space Company (TMW) reassembles a weapon during the weapons proficiency portion of the competition.

Photos by Sharon L. Hartman

1st Space Battalion

Home on the range

By Sharon L. Hartman

FORT CARSON, Colo. — Weapons ranges are nothing new to the Army. Soldiers, officers and enlisted alike, are required to qualify on their primary weapon bi-annually. In order to ensure Soldiers have a greater opportunity to get familiarized and more comfortable with their weapons, the 1st Space Battalion "Space Warriors," have begun to conduct quarterly range weeks. The most recent range week carried out by the battalion was July 12-17, and a behind the scenes look at the event brought to the surface the intricacies of running a successful range.

Tactical Operation Center (TOC)

The range was more than just a battalion event in that members of the 1st Space Brigade headquarters, members of the 53rd Signal Battalion (SATCON) and battalion Reservists joined in with the Space Warriors to fire. To keep up with the large turnout of firers and multiple ranges, the 1st Space Battalion deployed a TOC to the range field. "We've not done that before," said LTC Lee Gizzi, commander, 1st Space Battalion. "It was challenging because we had up to three ranges running at one time, plus we were shooting outside units, but the battalion did a great job."

The members of the TOC, predominantly staff members of the battalion, worked day and night to ensure that the range ran smoothly. CPT Windy Waldrep, the assistant S-3 worked with the battalion S-3, MAJ Gary Prater in developing the warning order and subsequent fragmentary orders. "They put out the order based on the commander's intent. So with him giving his intent, that's when the staff started making preparations for the range," said CPT Erich Atkins, the battalion S-4. "The S-6, Captain Yu, was in charge of communications, command and signal, the S-1, Lieutenant (Brandy) Morris was in charge of personnel, as the S-4, I was in charge of supplies and logistics, the S-2, Captain (Scott) Weaver was in charge of security of the TOC and also worked with weather and operational issues."

An additional challenge for the host battalion was getting their Soldiers who were running the ranges qualified as well. "Now you have to coordinate to move those personnel off the ranges to go qualify and send someone to go backfill, and you have all these different moving pieces that have to be taken into consideration," added Atkins.

Gizzi supported Atkins' comments saying, "You look at 4th Space Company who ran the zero range for the first couple of days. All their Soldiers were out there as safeties, helping score, helping coach, running the tower, running ammo for three days and then they had to go out and shoot and qualify, so nobody was exempt from range detail. HHC ran a range that was on the opposite side of the impact area, but they were also our support company, so when ammo had to be moved, you had to find Staff Sergeant Fowler, who's our ammo NCO, and say get ammo from here to there. We needed to move food, water; that was the S-4 shop. They were out there trying to shoot and move coffee and get Kool-Aid out to the ranges and back to the mess halls and get it the next day. All that stuff happens in the TOC under the nerve center there for range week. Everybody knows what battalion TOCs do in combat; well for us it was

A 1st Space Battalion safety displays a white paddle signaling to the tower that the firers' are ready to proceed. *Photo by Ed White*

a little different. It's tracking the current fight — being able to adjust as the situation changes."

Ammunition

Obviously an important part of any weapons range is the ammunition, but working the ammunition detail requires more than just handing out rounds to firers. According to SGT Taurus Jones who was on Ammo detail, "We could have anywhere from three to seven people working ammunition. You have one who signs for it and mainly keeps track of what you have. We get the ammo from a place called the AHA (Ammunition Holding Area). It's like the central point and we fill out paperwork to get the ammo. We'll go to AHA and tell them how many firers we have and how much ammo we need. We have Soldiers who help load the ammunition into magazines based on the tables being fired."

Once the magazines are loaded, the ammunition detail keeps track of the magazines going out to the firers and coming back in and also keep track of the number of firers out on the range. One of the most important pieces of working the ammo detail is keeping track of the ammunition distributed and fired. "We keep track of the number of rounds they fired and didn't fire and then use up whatever is leftover to give the Soldiers more practice," added Jones.

Safety

Safety is a critical piece of any range. Each range has a safety detail headed by the range safety officer. These personnel are responsible for ensuring the well-being of all personnel on the range. Without this precaution, serious injury or even death can occur.

"Part of our job as safeties is to make sure these guys keep their weapons down in a safe position in the low ready. When they finish shooting we make sure they put the weapons on safe, drop their magazines and clear any rounds from the chamber that may be left in there. We just watch for overall unsafe acts. If we get an unsafe act, we'll signal the tower with a red paddle and they'll call a cease fire and stop the range from firing," said SSG Michael Hardin, a safety on the 9mm range.

Tower Control

The range "Tower" may sound menacing, and rightfully so. The voice in each range tower controls the flow of the entire range. No one fires unless the voice in the tower tells them they can. Pretty much nothing happens without a go-ahead from the voice. The person behind the voice at this 9mm range was 1SG John Bruce, the range NCOIC, but prior to the range going hot, Bruce had a few other details to take care of with other members of the range detail. The detail had to arrive at the range approximately two hours prior to the firers to get the range ready. "When we first got here we had to set up the tables and flick the switches to pop up the targets," said SGT Paul Lizer, a member of the 9mm range detail. "The first sergeant then went out to each lane and punched the targets to see if they would fall down. The ones that didn't work properly were annotated and five or six targets needed to be fixed. Range control came out and fixed them because the range was degrading with the weather we've had over the course of the past few days," added Lizer. "We went from all ten lanes working to six last night which was not good because we can't run as many people with fewer lanes so it takes longer." After the lanes and targets were inspected, a safety briefing was given and then the tower called in a cold time to

Tip of the Sphere

Clockwise from top: SGT Paul Lizer, a 1st Space Battalion, Army Space Support Team member, enters data into a program he developed to track the statistics of the range. The program tracks the performance of each firer and tracks the used and unused ammunition.

Members of the 1st Space Battalion man the ammunition point during a recent range put on by the 1st Space Battalion "Space Warriors."

CPT Erich Atkins, 1st Space Battalion S-4, right, briefs Battalion Commander, LTC Lee Gizzi in the Tactical Operations Center (TOC) set up for the range. This is the first time the battalion has deployed a TOC in support of a range.
Photos by Ed White

range control and waited for a go before putting up the red flag and calling in a hot status.

Lizer also had the responsibility of keeping track of the firers on the range, the amount of ammunition being expended and the scores of each firer. On his own initiative, Lizer developed an Excel program that made this process flow in a much easier fashion.

"The last range they had they were trying to figure out a way to track everything and they figured something electronic would be really cool, so on Monday, I sat down and made this program," Lizer said.

"I got the name of everyone who came out on the range, the detail of what unit they're with, like the battalion or the brigade and the 53rd. As they come on, we put them in the firing order and it adds them up." Lizer entered whether they were firing on pop-up or paper targets and that changed the way the scoring system worked. "Say we enter the score and they get 23, it'll show what that shows up as, and if it's paper, it's a different scoring system."

There were two Soldiers out on each lane, the firer and the coach. The coach was actually taking the score down then would run the sheets up to the tower where everything would be entered into the program and tallied. The program also kept track of how many rounds each firer took out on their lanes and added up how many rounds were fired. It then subtracted the amount fired from the total amount of ammunition they had, so it showed how many rounds they had remaining.

"It kept track of all the Soldiers on the range according to the brigade and battalion, how many fired, how many were marksmen, sharpshooter or expert, and ones that got a 'no go.' It breaks down how many got a 'go' or a 'no go' per company and brigade or battalion. They same goes with NBC night fire. It shows a pie chart and the total for the week. It just makes it visually easy and is an attractive way to view this," added Lizer.

The tower also had to perform hourly checks with range control to ensure they had communications, "because if we lose comms we have to shut down the range," concluded Lizer.

Kudos

With other units participating in the range hosted by the 1st Space Battalion, the exercise could have been a lot more complicated, but the planning and execution by the battalion brought about a successful conclusion. They did a lot of things out there that week. They trained reservists and counterparts; they spent the week in about 90 degrees plus temperature just about every day. Those out on the night fire M16 range had some rain and lightning, but they stayed out there and supported and trained.

"This was an excellent range. I really appreciate the way 1st Space Battalion coordinated it," said SSG Robert Lewis. "It was smooth. Not a lot of hiccups and not a lot of wasted time. We thought the weather was going to be a factor, but it really wasn't. It's warm out here. Obviously the wind is blowing but it was a very well coordinated, well run range. We're very pleased with it. Everybody has nothing but good things to say about how the range went.

Why We Do It

The minimum in order to get individuals qualified is according to STRAC standards, but the 1st Space Battalion has upped their standards. "We have ranges quarterly so the perishable skills that come with Soldiers and their weapons are not forgotten so readily," said 1st Space Battalion CSM Kevin McGovern. "We also incorporate a lot more familiarization fires, stress fires, reflective fires as well as close quarters marksmanship. Then we bring them out to zero and they go ahead and do the qualification, so you're not going into it cold … we try to do it quarterly and give them several hundred rounds through the other associated tables and firings that they would see in a combat situation."

Added Gizzi, "We shoot four times a year because marksmanship is that important to me. It's going to make a difference when you go down range. If you can't hit what you're shooting at, they'll hit you. That's the mentality we put into this. We go out and we qualify in the first and third quarters of the year. That's the program we're setting up. The second and fourth quarters, we're going to do advanced rifle marksmanship. We're going to do reflexive fires, we're going to continue to work on entering a building, clear a room, the convoy operations … the skills that they need when they go down range, because everybody leaves here. That's the thing. It'd be one thing if you were in one infantry battalion moving to another infantry battalion. Here, you're in a Space battalion. You're going to leave here because most of these folks as a battalion will not deploy to combat. Teams will, but as a battalion they probably won't, but when they leave here and find themselves back in a provisional or brigade size unit and that unit going to war, if I haven't trained them before they go, I've put them at risk. We're not willing to assume that kind of risk. As leaders you cannot afford that."

Sharon L. Hartman is a Department of Defense Contractor with COLSA Corporation and has served the U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command Public Affairs Office at Peterson Air Force Base, Colo., for six and a half years. She is the senior editor and technical director of the **Army Space Journal** and is the managing editor of SMDC/ARSTRAT's worldwide stringer program.

Changing of the "Guard"

By Sharon L. Hartman

PETERSON AIR FORCE BASE, Colo. – The 2nd Space Company, 1st Space Battalion bade farewell to members of their Commercial Exploitation Team (CET) in a ceremony on Peterson Air Force Base, Colo., Feb. 27. The team, comprised of seven members; MAJ James T. Bushong, CPT John Yungbluth, SSG Timothy Drye, SGT John J. Scott, SGT Charles Chestnut, SPC Travian R. Debruce and SPC Brandon J. Rambo, deployed to Bahrain to replace the 193rd Space Battalion, Colorado Army National Guard (COARNG) CET who were deployed there for the past year.

The CET provides immediate and direct support to the joint military community through imagery collections from a variety of commercial satellite. The CET also works with the Measurement and Signal Intelligence-Advanced Geospatial Intelligence (MASINT-AGI) Node, formerly the Spectral Operations Resource Center (SORC), in Colorado Springs to provide classified imagery and analysis to other U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command forward deployed teams.

Organized under Headquarters and Headquarters Company, 1st Space Battalion, the team was transferred to the 2nd Space Company last April, and was reorganized with the new team members and trained up for this mission.

"You have some pretty big shoes to fill when you get there," said LTC Lee Gizzi, 1st Space Battalion commander. "The 193rd team has been doing an excellent job performing their mission for CENTCOM, and I know that you will also do a great job."

Several weeks after the farewell ceremony, a heroes welcome awaited the eight COARNG members of the 193rd Space Battalion CET, as they returned from their yearlong deployment on March 22. Excited spouses and children held welcome home signs and balloons, and bystanders at the Colorado Springs Airport erupted in cheers as the members of the team ran into the outstretched arms of family and friends.

The returning members of the CET were CPT Matthew Bowes, 1LT Matthew Pollock, MSG John Fennern, SSG Brett Mills, SGT Brian Singmaster, SGT Nicole Bogenschutz, SGT Molly Patterson and SPC Brian Fitzgerald.

Opposite page, LTC Lee Gizzi, commander, 1st Space Battalion bestows advice to the members of the battalion's Commercial Exploitation Team as they prepared to depart on a one-year deployment. *Photo by MSG Dennis Beebe* **Clockwise starting top, 1LT Matthew Pollock greets wife Missy and son Alex upon returning from a yearlong deployment in Bahrain. Pollock was able to be home for Alex's birth during his mid-tour leave in October 2005; SSG Brett Mills kisses his wife Ramona, CPT Matthew Bowes gets help from his son Dillon, MSG John Fennern holds his wife Tracie.** *Photos by Sharon L. Hartman*

Army's 1st Space Brigade gets new commander

By Ed White

PETERSON AIR FORCE BASE, Colo. — COL Timothy R. Coffin assumed command of the 1st Space Brigade from the unit's outgoing commander, COL Kurt S. Story as COL Roger F. Mathews passed the brigade's colors to the new commander during a July 27 ceremony.

"Since November, 2002 units of the brigade have been deployed continuously in Afghanistan and Iraq," said Mathews. "The Army Space Support Teams, Commercial Exploitation Teams, and JTAGS (Joint Tactical Ground Station) crews have rotated Soldiers but the units have remained. And Soldiers have returned to these locations after short stays in the United States between rotations. This continuous record of excellence could only have been accomplished by a team of seasoned, well-trained warriors who live the Army values and epitomize the Warrior Ethos."

"The 1st Space Brigade stands before you a combat proven force that has met and continues to meet every mission. This brigade is as it is because of the great dedication from an exceptional team led by Colonel Kurt Story," Mathews added. Mathews, deputy commander for operations, U. S. Army Space and Missile Defense Command/U.S. Army Forces Command (SMDC/ARSTRAT) hosted the ceremony for the 1st Space Brigade, which is the operational element of SMDC/ARSTRAT.

"Over the last two years the Soldiers of the 1st Space Brigade have exemplified these words (contained in John F. Kennedy's inaugural speech) in their continued outstanding support to the Global War on Terrorism. In addition to its fixed-base, 24/7 operations, the brigade supported numerous combatant commander exercises and maintained a continuous forward deployed presence in the CENTCOM (U.S. Central Command) AOR (Area of Responsibility) providing direct support to the 'boots on the ground' warfighter."

The quote from JFK's 1961 inaugural address reads, "we shall pay any price, bear any burden, meet any hardship, support any friend, oppose any foe to assure the survival and the success of liberty."

In his remarks Coffin said, "The 1st Space Brigade mission remains unchanged. It is to conduct continuous Space force enhancement, Space support, and Space control operations supporting U.S. Strategic Command and supported combatant commanders, enabling and shaping decisive operations."

The 1st Space Brigade has three one of a kind battalions, the 53rd Signal Battalion (Satellite Control), the 1st Space Battalion and the Colorado Army National Guard Space Support Battalion. The 53rd Signal Battalion has the mission of providing dependable, secure, long haul satellite communications to U.S. warfighting forces around the world and a variety of government agencies. This battalion provides 80 percent of the in-theater satellite communications for Operation Iraqi Freedom and Operation Enduring Freedom in Afghanistan.

The 1st Space Battalion has had a continued presence in Iraq since the beginning of the war. The deployed Soldiers have provided Space products that enhance both planning and operations for all forces within the region. The Colorado Army National Guard Space Support Battalion is also unique in that it is a National Guard element also with Soldiers deployed to the Middle East and supporting warfighters with products and capabilities from Space. One of the unique features of this brigade is that it is composed of Active Duty, National Guard and Army Reserve Soldiers.

Products provided by the brigade to the warfighting commands include: Space weather and its constantly changing effects on satellites, communications and Global Positioning System accuracy; satellite imagery in the form of maps and 3-dimensional fly-throughs of terrain; early warning of missile attacks and satellite communications in a seamless grid allowing all levels of command to talk to each other whenever necessary. Under Story's leadership the brigade has grown from about 450 Soldiers in 2004 to nearly 600 today and the brigade will reach its full compliment of personnel at over 1,300 in 2011.

Missile Defense Brigade's first command change

By MAJ Laura Kenney, 100th Missile Defense Brigade (GMD)

COL Michael L. Yowell, new commander of the 100th Missile Defense Brigade (Ground-based Midcourse Defense) received the unit's colors from brigade CSM Daniel Marques, right. The Assistant Adjutant General of the Colorado Army National Guard, BG Thomas D. Mills, left, hosted the ceremony, charging the new leader with the responsibilities of command by the passing of the colors. *Photo by Dennis Plummer*

PETERSON AIR FORCE BASE, Colo. — The nation's only missile defense brigade, headquartered here, underwent its first change of top leadership Tuesday, as COL Gary W. Baumann relinquished command to COL Michael L. Yowell.

The 100th Missile Defense Brigade (Ground-based Midcourse Defense), U.S. Space and Missile Defense Command/Army Forces Strategic Command is at the forefront of the nation's emerging missile defense technology. The brigade, a multi-component unit, falls under the overall direction of Northern Command during an operational mission.

The Assistant Adjutant General of the Colorado Army National Guard, BG Thomas D. Mills, hosted the ceremony. Baumann, first commander of the brigade, assisted in its formation prior to its activation here Oct. 16, 2003, in response to presidential directive. Baumann was awarded the Legion of Merit for his role in establishing the historic unit. Yowell assumed command in a traditional flag-passing ceremony held in the Air Force Space Command Auditorium

The 100th MDB, largely composed of Colorado Army National Guardsmen operating in their time-honored mission of defending the homeland, has interceptors located in Alaska and California. The brigade oversees the Soldiers operating the ground-based midcourse portion of the nation's emerging missile defense capability.

Baumann said, "It's going to be hard to stop thinking, 'missile defense,' 24/7, but at least I can sleep easily at night knowing that the unit has passed into the more than capable hands of its new commander. It was a true pleasure to be a part of bringing something so important to the American people. It's not every day one can say, 'I (the unit) protect(s) almost 300 million people.'"

Yowell approached the new challenge with enthusiasm. "We've come a long way since the days of Paul Revere awakening fellow citizens to the threat facing them," said Yowell. "With today's technology, we can now defend against a threat not even imaginable then. The unit will build on the outstanding formation that Colonel Baumann has ensured, and I'm glad that I will assist it in doing so."

Missile Defense System goes operational during Korean missile crisis

By MAJ Laura Kenney, 100th Missile Defense Brigade (GMD)

COLORADO SPRINGS, Colo.— The 100th Missile Defense Brigade (Ground-based Midcourse Defense) headquartered here was brought to operational level by U.S. Northern Command in response to the recent Korean missile crisis.

With interceptors located in Alaska and California, the unit, which had previously been maintained in test mode, was moved for the first time to operational status. Composed of full-time Colorado National Guardsmen and a contingent of active Army Soldiers in Colorado, and manned exclusively by active Alaska National Guardsmen in Alaska, the 100th MDB remained at high alert status for the duration of the crisis.

The crisis culminated in North Korea's multiple test launches July 4. It was determined quickly that none posed a threat to the United States or its territories. All seven (six July 4, one early the next morning) landed in the Sea of Japan. The long-range Taepodong-2 failed in the early stages of its launch.

Members of the brigade and its battalion, the 49th Missile Defense Battalion (Ground-based Midcourse Defense) in Alaska, rose to the heightened mission requirements with great spirit. Although vacations and military schooling had to be canceled, no complaints or grumbling were heard. This was the mission all training had been focused on for years.

A Soldier who'd been enroute to Hawaii for leave with a spouse prior to the spouse's departure for an Iraqi deployment was called back. Cruises left for exotic locations with family members aboard, the Soldier reporting back to headquarters for duty.

The mood throughout the crisis was of taut readiness to do whatever was required.

"As we saw this play out over a span of weeks, every single Soldier wanted to be on the crew that would respond in defense of the nation. We weren't called upon to do so, but we were ready," said brigade commander, COL Michael Yowell.

Intelligence from multiple sources kept the crews informed and on their toes.

"We had excellent situational awareness," said the brigade's intelligence officer, MAJ Porter Grant. "From the initial preparations to the day the North Koreans fired, our Soldiers knew what they needed to know to perform their mission."

On the day of the actual launch, Echo crew was on duty.

1LT Scott Slaughter, battle analyst for Echo crew at the Fire Direction Center in Alaska, said, "We've always understood how important our mission was; that the primary reason for our existence as a unit is defense of our nation. That day, if possible, we understood it even more clearly. As a student of history, I can say that both we and the North Koreans will learn a lot from what happened. Before and during the incident, I (we) had complete confidence in the system and our training. After the actual launches, we continued scanning the horizon, because you can never let your guard down."

The FDC director on duty July 4 was CPT Chad Haman, dual certified as a battle analyst and director.

"The real world intelligence made all the difference in the world. In the five years I've been with the system, there were never any doubts but that we would be ready. After all the building, practicing and rehearsing, and then the additional build-up to this particular event, we were ready for anything. Afterwards, we were able to capture excellent lessons learned," said Haman.

Battalion commander, LTC Ted Hildreth, who took command May 8 of this year, said that on the big day, there were no surprises.

"Between all the communication and activity from Missile Defense Element and Cheyenne Mountain, we were trained, prepared and rehearsed for any possible contingency that North Korea could throw at us. I was there in the node the day they launched, and our response was exactly the same as had been trained for. This one just happened to be real."

In Colorado Springs, MAJ Ron Hoard and his crew came on duty at the Missile Defense Element shortly after the first two short-range missiles had been fired. The MDE and FDC crews mirror each other, with MDE having a larger command and control role, and FDC taking the lead tactically, although they can act interchangeably.

Hoard said the prior launches had everyone in an immediately heightened state of awareness.

"Very shortly after we assumed duty, the Taepodong-2 was launched. It failed almost immediately, and we were informed pretty close to instantaneously of that failure. The crew reacted magnificently, exactly as we'd trained, going into crisis action mode without the slightest hesitation."

The GMD System, while not utilized in response to any of the launches, was available when needed to defend the United States and its allies. Trained and ready missile defense crews were at their stations on systems prepared to respond as necessary. USNORTHCOM had the primary responsibility to direct missile defense operations to protect the homeland, allies, friends and other national interests from potentially hostile acts.

MAJ Laura Kenney is an Active Guard Reservist serving as the public affairs officer for the U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command's 100th Missile Defense Brigade (GMD) in Colorado Springs, Colo. She served five years active duty as an enlisted journalist with Air Defense Command in Germany. As a commissioned Reserve officer, she performed public affairs in the Gulf War theater, and served as deputy public affairs officer for the American sector in Kosovo in 2001. She volunteered for active duty after September 11, 2001 and served three years in the SMDC/ARSTRAT public affairs office before moving to the 100th MDB.

JTAGS Schoolhouse relocates

By Ed White

COLORADO SPRINGS, Colo. – The Joint Tactical Ground Station Soldiers have a very stressful and important job. Their mission is nothing less than to protect and support the warfighter around the world. Since 1999, the school where Soldiers and Sailors are taught the skills necessary to do the job has been in El Paso, Texas, but a recent move had brought the JTAGS schoolhouse to Colorado Springs, Colo.

"The move from Texas is good for the unit," said SFC Todd Avery, chief instructor. "It puts us closer to the company and battalion assets that we can use to support the course."

The course is a seven week program that is open to Soldiers and Sailors. It teaches the fundamentals of the system and gives the students practice in scenarios that mimic real-world events. Soldiers and Sailors who complete the course can expect to be put to work in Asia, Europe, the Middle East or Colorado Springs.

"Currently we have six Army and two Navy students in this first class in the new location," Avery said. "Every move has hassles, but we took care of our Soldiers and their families and we are up and running smoothly again.

"The small staff of six instructors teaching the craft of early warning to a slow but steady stream of students has ensured that Joint and coalition forces around the globe have the capability to defend themselves against enemy missile launches. With the move to Colorado Springs, the capability, the education and the tradition continues.

The JTAGS system (right) now resides in Colorado Springs and the classroom instruction takes place in trailers designed for that purpose. *Photo by Ed White*

Bravo Company welcomes five new members to NCO ranks

SFC Lamar Lauderdale

FORT MEADE, Md. – It was a great day for the Corps of Noncommissioned Officers, especially those from Bravo Company, 53rd Signal Battalion on Aug. 1. On this day, Soldiers and family members converged unto the Fort Meade Museum to welcome five outstanding Warriors into the proud corps of NCOs.

SGT Joshua Crandall, SGT Luis De La Hoz, SGT Christopher Ford, SGT Bryce Howe and SGT Ferdinand Placer assumed the rank, "where the rubber meets the road," inside the museum that preserves an important part of the Army's tradition and rich history. CPT Jermaine Sutton, commander of Bravo Company, was on hand to promote the Soldiers to NCO.

Traditionally, the duties of a sergeant have a greater impact on the junior enlisted Soldier than any other NCO rank. It is this rank that a junior enlisted first looks to for hands-on guidance, mentorship and direction. Soldiers choosing to assume this rank must be aware of this and accept this vital responsibility. The five leaders who were promoted to this all important rank have proven that they have what it takes to get the job done.

The Soldiers being promoted stood side by side between two massive tank displays as the narrator announced each Soldier's name individually. As each Soldier was called to take the most important step of their young professional careers, they were met by Sutton and a family member of their choice to receive their promotion.

"I worked hard to prove that I am deserving of this promotion and I can't wait to make things happen as an NCO" said Crandall. "It was also nice getting promoted with a good group of guys."

1st Space Battalion Soldiers Just Say No

CPT Alyssa Aarhaus, HHC, 1st Space Battalion

PETERSON AIR FORCE BASE, Colo. — With an Alcoholics Anonymous speaker and specific drug awareness presentations, Headquarters and Headquarters Company (HHC), 1st Space Battalion in Colorado Springs devoted an entire morning to the value of drug prevention. SGT Tasha McNeal, the Company Training Noncommissioned Officer (NCO) and organizer of the event, gave an in-depth informational brief on drug prevention for children. McNeal stressed the significance of her class, "As a mother of one small child, I believe in the importance of parental awareness for drug prevention. Stopping drug abuse starts with our children."

SPC Corey Sinnott informed Soldiers with a detailed presentation on marijuana titled, "How Much of a Gamble?" His briefing incorporated facts about marijuana users and the detrimental affects on their immune systems and higher rates of cancer compared to non-users. He also provided information on the hormonal effects of marijuana usage, lower testosterone levels for men, and disrupted hormone production for women. SPC Michael Easley led discussions on the use and production of methamphetamines. SSG Alicia Scott, the Human Resources NCOIC for 1st Space Battalion, referred to her personal experience during the discussion, "I tried to purchase cold medicine at Walgreens and had to provide my ID card for verification of my age. I also learned that certain medications can only be purchased in limited quantities." Colorado Springs restricts cold medication purchases, a key ingredient to methamphetamine production.

In the last class, SPC Jason Cotto educated Soldiers on the abuse of ecstasy. Cotto cautioned, "Even a small amount of ecstasy can be toxic enough to poison the nervous system and cause irreparable damage." Soldiers were surprised to learn that ecstasy is sometimes mixed with substances such as rat poison and can trigger death with causes ranging from dehydration and exhaustion to heart attacks.

After a brief discussion on the definition of alcoholism and alcohol abuse by SGT Tonya Castorena, a speaker from the Alcoholics Anonymous organization shared his story. His abuse started with casual drinking at his home, work, social settings, and progressed in a downward spiral to significant alcohol abuse. "Alcohol abuse affects not only the abuser, but their families. It also greatly affects unit efficiency," the speaker warned. 1SG Allen Kirkpatrick identified with the speaker's candid remarks, "Our Soldiers need to understand that drinking can lead to unstable family relations, health issues, lack of progression for their careers, and, at worst, dismissal from the Army." Upon the completion of the class, McNeal presented the speaker with a 1st Space Battalion coin and a Company Certificate of Appreciation.

By the end of the morning, Soldiers held a better understanding of drug prevention and alcohol abuse. SFC John Pitzen commented, "The training was very beneficial for Soldiers. The Alcoholics Anonymous speaker provided an especially sincere and informative brief." As a parting gift and reminder, McNeal handed out key chains sporting a cartoon animal with the slogan, "Don't Monkey with Drugs!" The presentations and discussions, however, served as the lasting impression for Headquarters and Headquarters Company Soldiers.

Dominating the Battlespace ... from page 7

Army Space Professionals at the Crossroads of Space

In 1921, General Giulio Douhet, the Italian air-power theorist, wrote: "Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur."[25] This insightful quote provides profound guidance for Space professionals engaged in ensuring Space-based capabilities are available in a responsive and reliable manner for joint warfighters.

Warfighters' operational requirements evolve over time and identifying how Space-based capabilities can support them is a continuous process. The law of unintended consequences holds that almost all actions have at least one unintended consequence. In other words, each cause has more than one effect, including unforeseen effects. Our reliance on technology may result in new vulnerabilities that we cannot currently envision. As we increase our technological strength, integrate systems, and build systems-of-systems, we must ask whether new vulnerabilities are being created. We may find it is significantly less complicated to field new technologies than to figure out what a determined enemy may do to survive its employment. As a result, we must ensure our strength cannot be neutralized by an enemy able to make it irrelevant on the battlefield. Our broader challenge is to ensure the focus remains on areas that support combatant commanders' operational requirements to dominate the battlespace.

As you read the articles in this issue of the Army Space Journal, I challenge you to focus on what can and should be done to leverage Space-based capabilities in support of our joint warfighters. As noted recently by General Peter Schoomaker, Chief of Staff, Army, "We now must cover a broader piece of the entire spectrum of operations, and because we have a force that is going to face challenges that will be dynamic and will move across the various challenges on the spectrum, we'll need people that are learning and adaptive."[26]

Secure the High Ground!

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Mathews ... from page 11

been fielded to units participating in this exercise. The brigade, however, had incorporated their lessons learned from previous exercises, e.g., developing smaller, tailored Space Coordination Detachments and imbedding them with appropriate organizations and using processes and terms familiar to the supported warfighter and tested them.

One Brigade Space Coordination Detachment was integrated with the Land Component Command's Fires and Effects Coordination Cell to determine and plan the commander's Space requirements. Another Space Coordination Detachment was placed with the Air Component Command's Battlefield Coordination Detachment to plan and execute the commander's Space requirements through the Space Coordinating Authority, typically designated as the Air Component Command Commander. This enabled the brigade to capture the Land Component Commander's Space requirements and to synchronize and support the Land Component Command Commander's objectives.

Using the application tool Info Workspace (IWS)[3], the two Space Coordination Detachments were able to collaborate daily through effects synchronization briefings and planning sessions. The IWS software enabled the detachments to seamlessly pass information requirements, synchronize desired effects, and integrate them into the battle rhythms of the Air Component Command and Land Component Command.

Working with processes already familiar to the warfighter and established in-theater, the brigade Space Coordination Detachments used the theater kinetic and non-kinetic targeting process to nominate Space related targets. This represented the first successful integration and synchronization of Space targets within the Korean Theater of Operations.

One of the lessons learned in RSO&I was that Space professionals need to be ready to educate warfighters on how to integrate Space-based capabilities into their plans and operations. In this case, the brigade Space Coordination Detachment realized that the Air Component Command was not using Joint Blue Force Situational Awareness (JBFSA) and did not understand how it could enable them to have a better understanding or picture of what the operational forces were doing. Partnering with the 8th Army FA40s, Majors Rich Lewis and Jim Crossley, who were the resident experts, and the Mission Management Center at SMDC/ARSTRAT in Colorado Springs, Colo., the Space Coordination Detachment began an education process to ensure a common understanding of JBFSA. The Air Component Command's detachment pulled up "live" JBFSA data and displayed it on the SIPR and GCCS-K Common Operating Picture. At the beginning of RSO&I 06, very few individuals at the Air Component Command understood its power, its architecture, or how to troubleshoot problems. This exercise helped the Air Component Command team identify the JBFSA's full capabilities as well as its constraints. As a result of this "lesson," the brigade has added JBFSA architecture as a focus area for UFL 06 and will reachback directly to the Mission Management Center.

Where to from Here?

You may be wondering why I want to write about and discuss these brigade-level operations. I bring them up as an example of how we must all examine what it is we do in the Space operations world regardless of the operational level at which we work. The ability to identify and implement changes and improvements to how we support the warfighter is essential to the maturation of the mission area. It also brings me to another point I want to make: it is our responsibility to our Soldiers to provide them with realistic training based on sound doctrine.

As the Space Brigade has evolved and grown, its leaders have aggressively trained Soldiers in both their Space operations skills and their Soldier skills. Where no doctrine existed, they created it to establish standards, e.g., their unique qualification tables. Their example of initiative and personal involvement sets the standard for a successful future in which the Army can fully integrate Space-based capabilities towards a common objective — victory.

Over the next year, the brigade and its subordinate battalions expect to be filled to their full authorization. As they complete this transformation, they will remain fully engaged with their stated priorities: the preparation, deployment and sustainment of Space forces for combat. The brigade will continue to integrate training, plans and operations with other services' Space forces, the Joint Space Operations Center, and supported theaters in order to refine and validate the Concept for Army Theater Space Support to Joint Operations. Stay tuned for updates.

Let's not let this progress lull us into complacency. We all know that the Army — any service for that matter — exists to serve the Nation and, when called upon, to fight and win its wars. It follows that all Army units must be ready and relevant in today's' environment and continuing war on terrorism. It stands to reason that if we're not, the Army will take that force structure and use it where support is needed. Space professionals throughout the Army must continue to assess how Space operations are supporting the war effort, judge how Space Operations doctrine and concepts of operations work during exercises, and provide honest feedback through the chain of command. With that, we — the commanders, the doctrine developers and the Space operations professionals — can discuss and implement the changes that need to be made to improve our doctrine and support to the warfighters.

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1. At the publication of the referenced article, BG Horne was deputy commanding general for operations, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command; COL Story was 1st Space Brigade commander; and now LTC McKeown was brigade executive officer.
2. At the writing of this article USSTRATCOM has considering splitting JFCC-Space and Global Strike into JFCC-Space and JFCC-Global Strike. The JFCC-SGS is US Strategic Command's (USSTRATCOM) mechanism for planning, executing and synchronizing Space capabilities.
3. Info Workspace or IWS is a software package on the Space Operations System used by both SSEs and ARSSTs, as well as the brigade. IWS is a distributed, synchronous, collaboration tool that provides chat, file sharing, and simultaneous collaborative presentations and discussions.

War gaming ... from page 29

the mail and support the warfighter. If you did business like that you could easily get distracted by "something shiny" and miss a truly valuable learning point."

George Luker, or Luke, a contractor supporting Dreiling, feels the planning process has allowed the Futures Warfare Center to maximize their level of participation, "At the last UQ05 we had a major in the Red Cell, two lieutenant colonels in Blue, a contractor in the Request For Information cell and a contractor in the Assessment cell all focusing on "Space." It was a quality spread that allowed us to see all sides of an issue." He goes on to explain his observation/analysis process this way;

1. Observe/collect based on collection plan
2. Input findings into database
3. Analysts review and conduct the "So What!" test
4. Analysts go back to the observer for follow up questions/issues
5. Team makes final resolution of finding
6. Findings are forwarded

These findings are the critical piece that will lead to changes in the way we will do business in the future, but how do they get back to the warfighter?

Following the collection plan and unsolicited observations we draft an Initial Impression Report followed by After Action Reports. This leads to a report in the Center for Army Lessons Learned system (Fort Leavenworth). From there the actionable items go to Training and Doctrine Command Schools, Combat Training Centers and are distributed to Army forces worldwide to execute.

In the past year, I have attended several war games and experiments and in doing so, I have learned about things outside the Space realm like Intel, Information Operations. Psychological Operations and even non-lethal weapons. In addition I have made many contacts at these events so that when my boss asks if I know about a certain development or future system I can say, "No, but I know someone who does."

I hope this helps and that now, that you see the process and that your inputs are important, so the next time a tasker comes across your desk with the heading of "WAR GAME," you won't groan. I hope that you will look on these events as I do, a great opportunity to learn and be a participant in a great experience that helps build a better Army tomorrow.

Jeff Miller is a former Marine LTC currently working for U.S. Army Forces Strategic Command as a contractor in the Space and Missile Defense Battle Lab, War Gaming Division. His military experience includes eight years each as a CH-46 pilot and as an Air Defense Control Officer before moving into the Space field. He has served in a variety of command, staff and joint assignments from Bosnia to Cheyenne Mountain and is a graduate of the National Security Space Institute Space 200 course. He is currently working on his Master's in Space Operations.

Recognizing Useful ... from page 25

The speed of change will aid creativity in our quest to outmaneuver our adversaries wherever they may be, but we must consider non-traditional Space and what that could entail at some time in the future. We must examine concepts of non-traditional Space that is as divorced from present thinking as to be unthinkable. I am speaking of ideas that with present technology are cost ineffective or considered science fiction. It could also be so simple and low cost, that it has not been seriously considered. In addition; non-traditional Space will be that Space not covered by present international Space treaty. These changes and advances will make the jobs of our limited cadre of Space lawyers that much more important.

With the constantly changing elements of warfare the military must and will change to meet the need. Many of those changes have already taken place or are in the evolutionary process. We now have military elements tailored to meet the threat and the path of an officer's career has also begun to change. The branch system which has been in place since the late 19th century has now been supplemented by functional area designations, which indicate an officer's additional specialized training beyond the branch he or she might has been assigned at commissioning. Those functional areas highlight what have developed into important areas of expertise. The Information Operation community has its FA30 and the Space community's FA40. Space is and will continue to be a growing area of importance for the Army as will near-Space.

With the advent of near-Space and SMDC's prepotency for the mission we have the perfect medium for the application of the Information Operation mission. It is far more flexible than Space and more cost effective. Because of the new emphasis on doing more with even less, the coordination of Space and Information Operation will become more important and more effective in the field.

LTC Joseph S. Dreiling is a mobilized reservist assigned to the Space and Missile Defense Battle Lab. His Space related assignments include duty with J1 and J3 in U.S. Space Command/NORAD from 1992-99 and SMDC from 2002 to the present. He is presently chief of the Frontiers Division which encompasses the Futures and War games teams. He was first published in 1988 and has been published a number of times since in historical journals and literary publications.

European Space Agency (ESA) Astronaut Thomas Reiter (left), Expedition 13 flight engineer; Cosmonaut Pavel V. Vinogradov, commander representing Russia's Federal Space Agency; and Astronaut Jeffrey N. Williams, NASA space station science officer and flight engineer, join Chef Emeril Lagasse for a special call in the Destiny laboratory of the International Space Station. Earlier the crew tasted several of his gourmet creations, delivered to the station by the Space Shuttle Discovery in July.

for Expedition 12, back in early April and their scheduled video teleconference with the Army's Chief of Staff, GEN Peter Schoomaker. This event was the first time the Army, in conjunction with NASA, had provided a live-stream video broadcast world-wide over its Army's Media Player from the ISS much less Space.

Other memorable moments included a Memorial Day Message from Williams and his participation in the Army's "Call to Duty – Boots on the Ground" campaign during the Army's 231st Birthday celebration on June 14 where he said, "I am honored to be called a Soldier and to serve our country with you. Your professionalism and competence has made our Army the best yet since my dog tags were issued nearly 30 years ago."

Fun times have also included "BAM!" gourmet cuisine tasting opportunity during a recent down-link session with the renowned Chef Emeril Lagasse as the crew sampled several gourmet creations sent up on the shuttle Discovery.

Williams told Lagasse, "We sampled the food and especially enjoyed the jambalaya and the kicked up mashed potatoes … in particular, the extra spiciness."

One of the many ISS onboard duties Williams has enjoyed is the photography portion or what he calls "Earth observation."

"You can never tire of looking at the part of God's creation we call Earth. Traveling around the globe every 90 minutes provides lots of opportunity to view the geography, oceans, cloud formations, sunrises and sunsets, thunderstorms, city lights and many other things in vivid detail."

Images, which now exceed 248,000 to include those from past ISS missions, are provided by the Crew Earth Observations experiment and the Image Science and Analysis Group at the Johnson Space Center (JSC) in Houston. The International Space Station Program supports the laboratory to help astronauts take pictures that will be of the greatest value to scientists and the public, and to make those images freely available on the Internet. Additional images taken by astronauts and cosmonauts can be viewed at the NASA/JSC Gateway to Astronaut Photography of Earth.

Williams and the crew hold the record for the greatest number of Earth images taken by any station mission.

The focus now for Williams and crew is the arrival of STS-115. The crew of the Atlantis will deliver the new P3/P4 Truss for installation onto the ISS. He will assist astronaut Steve MacLean with the assembly operation of this important piece for the station.

As the time approaches for the end of Expedition 13 with a return back to Earth on Sept. 24, Williams can look back on a successful mission to the ISS. He even had the honor of announcing America's next generation of human Spacecraft — Orion.

During a pre-flight interview back in February Williams was asked how he came to the decision of becoming an astronaut.

"It wasn't until later on, after high school when I went to the military academy at West Point, and I got introduced to Army aviation and read Tom Wolfe's book, "The Right Stuff," that I realized it could be possible and set it as a goal."

After West Point and his first operational assignment he began putting his applications together.

"It was 1985, when I wrote the first application. I interviewed in 1987; but wasn't selected. I kept applying, and interviewed again in '92. I wasn't selected; kept applying, and finally, interviewed again in '96 and I finally wore 'em down."

His advice to those in the Army wanting to become astronauts or having any goal in mind is to be persistent.

"In fact, any major goal that somebody has in life — I encourage them to be persistent. Don't give up; take the disappointments, learn from them, drive on and continue working toward that goal."

Army Astronaut kicks ISS up a notch...BAM!

Orbiting at 220 miles above the Earth's surface in a 404,069 pound, 15,000 cubic foot environment is the Army's first active duty Soldier to serve on the International Space Station. COL Jeffrey N. Williams, head of the Army's NASA Astronaut Detachment, is fast completing his six-month tour of duty onboard the craft. Williams has been keeping busy as the station's primary flight engineer and science officer as part of Expedition 13, since his arrival back in March of this year.

The native of Winter, Wis., has been kept busy as part of a two-man crew with Russian Cosmonaut Pavel Vinogradov, commander of Expedition 13, on board the ISS. Now with German astronaut Thomas Reiter, second flight engineer, brought on board during July's Shuttle Discovery mission, the ISS is back up to its normal three-person crew.

During these past five months, Williams has been kept busy on board the ISS with major accomplishments that have included two space walks.

The first occurred with Vinogradov on June 1 as they repaired a station's oxygen-producing Elektron unit and retrieved a number of scientific experiments during a six-hour and 31-minute spacewalk – just 13 minutes shy of Williams' first space walk during the STS 101 mission back in May 2000.

The second extravehicular activity (EVA) came on Aug. 3 when he and Reiter performed a number of tasks outside the space station, again focusing on repairs and retrieval of scientific experiments.

The procedures were so successful that Mission Control came up with more tasks for Williams and Reiter to perform during their five-hour and 54-minute venture. This marked the third EVA for both astronauts.

But EVAs are only part of the mission for Williams.

An ordinary day on board for this Soldier is scripted at best. Take for example Aug. 17.

The day began with the morning inspection, then breakfast followed by a work preparation assessment. Next was a set up of video equipment for a scheduled Dust and Aerosol Measurement Feasibility Test session. However a broken HEPA filter was discovered and the DAFT operations for the day were cancelled.

Williams then moved on to some troubleshooting of the Anomalous Long-Term Effects on Astronaut experiment and a noise level measurement prior to installation of new noise suppression equipment before performing one of two physical exercise routines for the day totaling two and a half hours.

After transferring the data from the crew's exercise sessions Williams took part in a live interactive televised event with students from Wright Middle School for the Boys & Girls Clubs of Middle Tennessee, Nashville, Tenn.

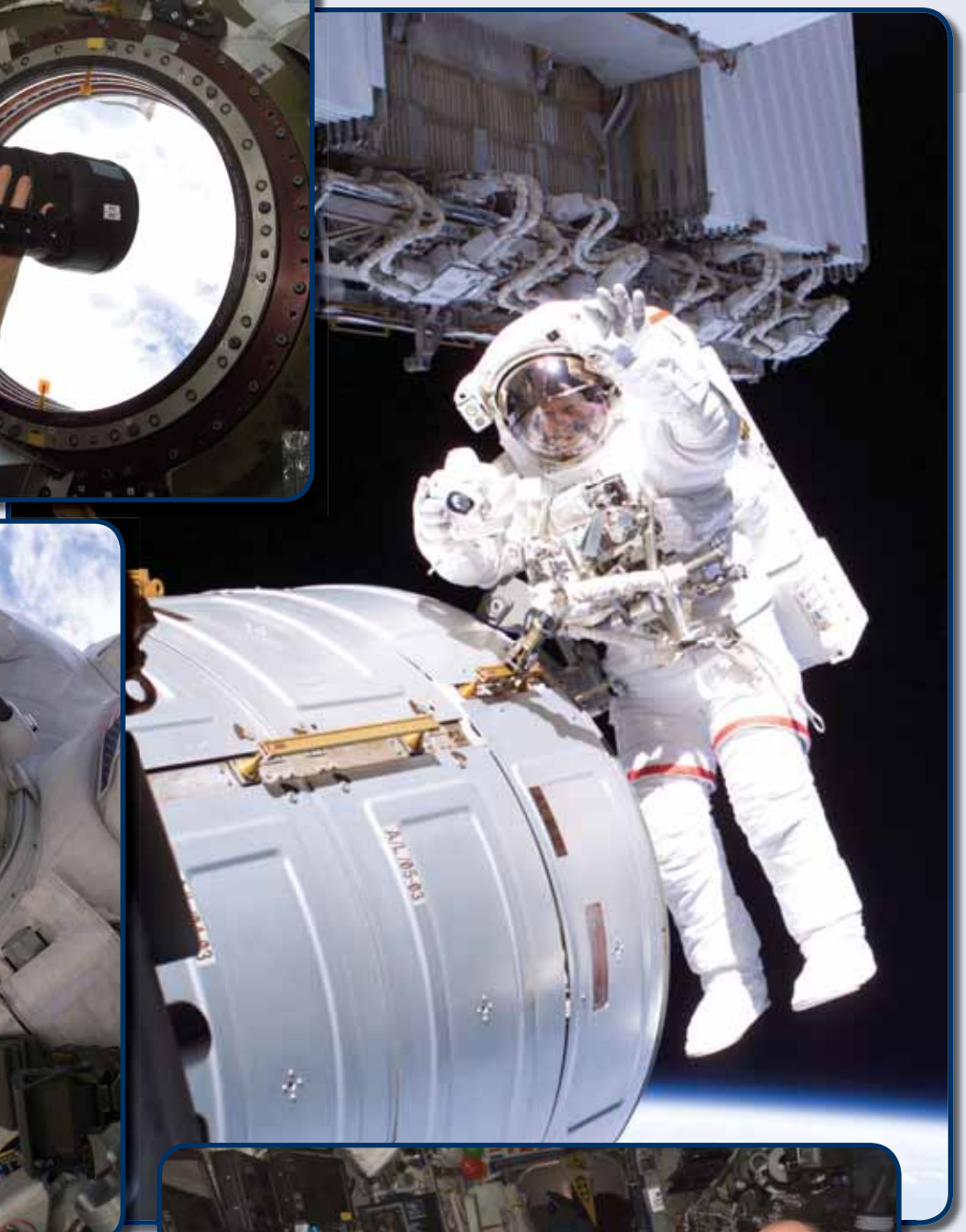
Following this the crew had lunch and Williams restored the onboard video configuration in the Lab before moving on to performing a scheduled lens change on the Earth Knowledge Acquired by Middle School Students (EarthKAM) system at the Lab science window.

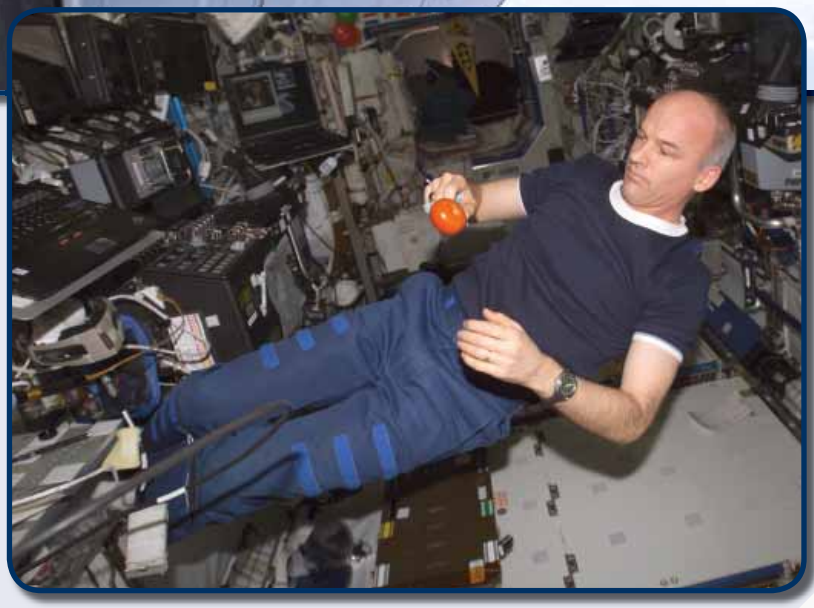
Oh, forgot to mention, there was the replacement of three hoses on a water processing system performed by Williams. This was followed by a questionnaire and journal entry on behavioral issues associated with isolation and confinement then onto the afternoon physical exercise session. With evening coming on it was show time again but this time for the entire crew of Williams, Reiter and Vinogradov as they offered their salute and best wishes on the 60th anniversary of the S.P. Korolev Rocket & Space Corporation Energia via a live televised broadcast followed by dinner, pre-sleep, and of course sleep.

As Williams put it in an early side journal after arriving on board, "There is little routine about the daily 'routine' on ISS.

"Every day is different with different challenges. The planners have estimated that it takes almost three people just to run and maintain the station. I now believe it."

There have been memorable moments to include his arrival to the station and spending several days with fellow astronaut retired Army COL Bill McArthur, commander





Clockwise from top left, Astronaut Jeffrey N. Williams, Expedition 13 NASA space station science officer and flight engineer, uses a camera to photograph the topography of a point on Earth from the nadir window in the Destiny laboratory of the International Space Station; Williams is photographed during an individualized portion of a productive 5-hour, 54-minute excursion, which he shared with European Space Agency Astronaut Thomas Reiter (out of frame). For part of the spacewalk, the pair worked closely in tandem, and then worked separately, getting ahead of their timeline, thus enabling the two to tack on extra tasks; Williams watches a tomato float freely in the Destiny laboratory of the International Space Station; A close up of Williams, during the 5-hour, 54-minute spacewalk.

Left, SGT Tobias Mitchell prints off a satellite imagery map for use by planners. Providing hard copy imagery is only one aspect of the total capability the SSE brings to the Divisions; below, SGT Tobias Mitchell and SSG Ron Anglin monitor a Division equipment set. Though relatively small in size and manpower, the SSE provides a tremendous capability to support both planners and operators.

Army and Corps Space Support Elements

3rd Army (USARCENT) will be the first Army headquarters to receive an SSE in June 2006. Fielding of SSEs to Armies will continue with 5th Army (USARNORTH) and 6th Army (USARSOUTH) in FY 2007 and 8th Army (USARPAC) and 7th Army (USAREUR) in Fiscal Year 2008. The Army level Space Support Element consists of six Soldiers — one colonel, two lieutenant colonels, two majors, and one staff sergeant — equipped with the two dismounted Space Support Enhancement Toolsets. The Army Space Support Element when fielded trained and equipped is capable of supporting the Army Service Component Command as well as extending Space planning and integration support to operational headquarters the Army may stand up. Although the Effective Dates are still pending, each Corps will eventually replace its lone Space Operation Officer with a Space Support Element consisting of five Soldiers — one lieutenant colonel, two majors, and two staff sergeants. This change will not only increase the capabilities of the Corps Space operations effort, but will also align the rank structure to be on par with the other Corps staff. Corps Space Support Elements are scheduled to receive mounted Space Support Enhancement Toolsets to match the mobility requirements of the headquarters.

Fires Brigades

As the Army converts to the Fires Brigade concept, each Fires Brigade will receive a Space Operations Officer in the grade of major. The Fires Brigade Space Operations Officer is the central Space planner who integrates Space mission areas and effects into Fires Brigade plans, orders, and operations and advises the commander, staff, and subordinate units on Space support to Joint Effects — precision lethal engagement and non-lethal effects — across the full spectrum of operations. Currently, the 4th Fires Brigade at Fort Hood, Texas, has a Space Operations Officer who is deployed in support of Operation Iraqi Freedom. Five Active Component Fires Brigades remain to receive their Space Operations Officer; two in Fiscal Year 2006 and three in Fiscal Year 2007. Seven Army National Guard Fires Brigades activations are scheduled for Fiscal Year 2008.

Training Programs and Tactics, Techniques and Procedures Development

Current training programs over watched by the Tactical Space Tiger Team include the pilot version of the Tactical Space Operations Course, the Tactical Space Warfighter's Conference, and Space Support Enhancement Toolset New Equipment Training. The Tiger Team conducted the week long Tactical Space Operations Course most recently in December 2005; the course is designed to teach Space Operations Officers, Army Space Support Team members, Space Support Element members, and other Army Space Soldiers skills pertinent to providing Space support to military operations at the tactical level. The Tactical Space Warfighter's Conference is transforming from annual week-long conference to a quarterly half-day conference in which Space Soldiers meet to exchange lessons learned, which then can rapidly flow into doctrine and Tactics, Techniques and Procedures to be broadcast to all the Army Space Forces. Increasing Tactical Space Warfighter's Conferences to quarterly will substantially increase the velocity of gathering and learning lessons and expedite the cross-fertilization of those changes to Army Space professionals in SMDC/ARSTRAT and throughout the Army.

The SSE Team in the photo to the left is assigned to the 101st Airborne Division. They provide direct Space support to the division commander and his staff.

The Tactical Space Tiger Team developed Draft Division Space Operations Tactics, Techniques and Procedures, designed mainly for Division Space Support Elements in 2005 and the document is available at the team's Army Knowledge Online Knowledge and Collaboration Center along with numerous supporting documents and related briefing materials. The aforementioned Tactics, Techniques and Procedures document is valuable to the Fires Brigade Space Operations Officers, and any Soldier assigned to a Division or Brigade Combat Team. This spring, the Tactical Space Tiger Team will develop Tactics, Techniques and Procedures for the Army Headquarter Space Support Elements, and anticipates the document being ready in draft form in June for immediate use and validation by the new 3rd Army Space Support Element. Future efforts will include development of Mission Training Plans, Critical Task Lists, and Tactics, Techniques and Procedures for Corps Space Support Elements, Army Space Support Teams, and Commercial Exploitation Teams.

The Way Ahead

The vision for the way ahead is for the Tactical Space Tiger Team is to become TRADOC Systems Manager Tactical Space. To do this, it must become permanent, and acquire sufficient personnel with the required skill sets to be able to accomplish all TRADOC Systems Manager tasks in support of all tactical Space forces: Division, Corps, and Army Space Support Elements and the Corps and Army Space Operations Officers remaining through the transition period; 1st Space Brigade forces including Army Space Support Teams and Commercial Exploitation Teams; and Fires Brigade Space Operations Officers. In the meantime, Tactical Space Tiger Team will continue to educate, train, field, and sustain Army Space professionals throughout the Army.

1. According to TRADOC Regulation 71-12, TSMs "provide intensive management beyond the scope of the normal management resources available to the proponent for … a materiel system, a family or a group of closely related/interdependent materiel systems that are being developed", or "Non-system training devices or training systems." Additionally, TSMs provide intensive, centralized, total system management and integration of all Doctrine, Organizations, Training, Leader Development, Materiel, Personnel and Facilities (DOTLMPF) considerations.

LTC Jim Rozzi is a Space Operations Officer with the U.S. Army Space and Missile Defense Future Warfare Center. He received a B.A from Washington and Jefferson College, and an M.S. from The Joint Military Intelligence College. He is a graduate of Command and General Staff College and the U.S. Army Space Operation Officer Qualifications Course. He has served in numerous command and staff positions, including TACSPACE Tiger Team Chief, Colorado Springs, Colo.; 3rd Infantry Division SSE Deputy Team Chief, Fort Stewart, Ga., and Iraq; Army Space Program Office Advanced Plans and Fielding Officer; ARSST Leader, CJTF 180, Afghanistan; Missile Defense War games, Joint National Integration Center; Executive Officer, Directorate of Intelligence, U.S. Space Command; and Combined Intelligence Watch Commander, Cheyenne Mountain Operations Center.

MAJ Robert Zaza is a Senior Military Analyst with ARINC Engineering Services, LLC, and has been a member of the TACSPACE Tiger Team since February 2005. A MAJ (P) in the U.S. Army Reserve, he wrote the initial draft of FM 3-14.10 for the U.S. Army Space and Missile Defense Future Warfare Center. He received a B.A. from the College of William and Mary, is a graduate of SOOQC, and is pursuing an M.S. in Space Systems Operation Management at Webster University. He has served in various leadership and staff positions, including ARSST Leader, CJTF 180, Afghanistan; S-2, 4th Brigade, 4th Infantry Division, Fort. Hood, Texas; Observer/Controller, 1st Brigade, 91st Division, Denver, Colorado; and Antiterrorism and Force Protection Officer, J2, U.S. Southern Command, Quarry Heights, Panama.

THE TACTICAL SPACE TIGER TEAM: PAST, CURRENT AND FUTURE

By LTC James E. Rozzi and Robert N. Zaza

Since 2004, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) has had the responsibility to train, field, equip and sustain the Space Support Elements of the Modular Divisions. In response to Chief of Staff of the Army, GEN Peter Schoomaker's decision to begin transformation to Modular Divisions earlier than originally planned, SMDC/ARSTRAT formed the Space Support Element Tiger Team in March 2004 from elements of the Future Warfare Center Directorate of Combat Developments and the Space and Missile Defense Battle Lab — West. First led by LTC Richard Dow, the Space Support Element Tiger Team fielded Space Support Enhancement Toolsets (SSETs) to four Active Component Divisions, trained four Active Component Space Support Elements, and trained the element leader for the 35th Infantry Division (Kansas Army National Guard).

In March 2006, the Space Support Element Tiger Team evolved into the Tactical Space Tiger Team, and it has sought to improve and diversify Tactical Space training opportunities and open them not only to the Space Support Elements and Corps Space Operations Officers, but to the Army Space Support Teams and other formations organic to SMDC/ARSTRAT as well. In the future, the Tactical Space Tiger Team looks to take on many of the roles of a Training and Doctrine Command (TRADOC) Systems Manager for Tactical Space; in other words, it will encompass and represent the "Army Space Forces" that include Army Space Support Teams, Commercial Exploitation Teams, Fires Brigade Space Operations Officers, and Space Support Elements at Division, Corps and Army Headquarters. Assuming the Army Campaign Plan remains on schedule, the Tactical Space Tiger Team can anticipate fielding a total of 81 Tactical Space elements and teams, by the end of Fiscal Year 2009. This includes thirteen Space Operations Officers at Active Component and National Guard Fires Brigades.

Tactical Space Tiger Team Missions

Currently the Tactical Space Tiger Team focuses primarily on the Tactical Space Operations Course, the Tactical Space Warfighter's Conference, training support to Space Support Elements in Mission Rehearsal Exercises and Command Post Exercises including Space Support Enhancement Toolset New Equipment Training, and proponency visits to units. This is mainly due to the tight original focus of the Space Support Element Tiger Team on rapidly fielding Divisional Space Support Elements, and partly due to the size of the Team. The Tiger Team currently consists of one lieutenant colonel, one GS-13, and two contractors, but the composition varies over time and they draw on the expertise of the entire Tactical Space community.

The emerging missions of the Tactical Space Tiger Team are expansive, potentially encompassing much of Army Space Forces training and doctrine development as a whole. While the Tactical Space Tiger Team will not be involved with Satellite Control, Space Control or Joint Tactical Ground Station (JTAGS) interests, it will expand its scope to include the Doctrine, Organizations, Training, Leader Development, Materiel, Personnel and Facilities representation of all user requirements of not only Space Support Elements, but also Fires Brigade Space Operations Officers, Army Space Support Teams and eventually Commercial Exploitation Teams. The Tactical Space Tiger Team's expanded scope is similar to that of

Space Support Elements are small and yet very powerful tools that help the combatant commander better understand the battlespace.

a TRADOC Systems Manager. It will include but not be limited to the following areas: representing force structure and organizational issues; assessing combat lessons; developing doctrine and Tactics, Techniques, and Procedures; developing training requirements for both initial and sustainment training; developing and evolving materiel requirements; developing and evolving Leader Education requirements; developing and refining personnel requirements; and assisting other organizations with developing and refining reachback facilities. Material requirements will include the Space Support Enhancement Toolset, Eagle Vision II, and the Space Operations System. Training development will include contributions to Space training at Command and General Staff College and TRADOC centers and schools, Space training requirements at the Combat Training Centers, and a formal Tactical Space Operations Course. Personnel development will include Military Occupational Specialty (MOS) quantity and mix for Space forces, possible new Space Additional Skill Indicators, and potential requirements for a Space MOS. Facilities development will include assisting facilities such as the SMDC/ARSTRAT Operations Center to refine their capabilities and requirements to support Army Space cadre both within SMDC/ARSTRAT and across the Army.

Fielding Space Support Elements — Active Component Divisions

To date, the Tactical Space Tiger Team has fielded SSEs to the following Active Component Divisions: 3rd Infantry Division, 4th Infantry Division, 101st Airborne Division (AASLT), and 10th Mountain Division (L), which were fielded from late Fiscal Year 2004 through Fiscal Year 2005. Thus far every Space Support Element has served a rotation in Operation Iraqi Freedom, except for 10th Mountain Division (L), which is serving with the Joint Task Force headquarters in Afghanistan in Operation Enduring Freedom.

These Space Support Elements are bringing valuable lessons learned back to the Tactical Space Tiger Team. These lessons are being captured, digested, and taught to other Space professionals through the Space Operations Officer Qualification Course, the Tactical Space Operations Course, the Tactical Space Warfighter's Conference, and by integration into concepts and doctrine. The Team is currently in the process of fielding 1st Cavalry Division and 25th Infantry Division (L). The next Divisions to be fielded in order are 82nd Airborne Division, 2nd Infantry Division, 1st Armored Division, and 1st Infantry Division.

Fielding Space Support Elements — National Guard Divisions

The Army National Guard is a key player in Army's Transformation to the Modular construct. The 34th Infantry Division (Minnesota Army National Guard) and 35th Infantry Division (Kansas Army National Guard) have begun fielding their Space Support Element organizations with one officer each assigned, and should receive their Space Support Enhancement Toolsets in 2007. LTC Kim Knur has been identified as the Space Support Element Leader for the 29th Infantry Division (Virginia Army National Guard). Both the 29th Infantry Division and the 42nd Infantry Division (New York Army National Guard) are scheduled for Space Support Element fielding in Fiscal Year 2006. When Space Support Element fielding to the 42nd Infantry Division commences, the Division will have recently returned from an Operation Iraqi Freedom rotation. National Guard Divisions remaining to transform and receive Space Support Elements are the 28th Infantry Division (Pennsylvania Army National Guard), the 40th Infantry Division in Fiscal Year 2007, the 38th Infantry Division (Indiana Army National Guard) and the 36th Infantry Division (Texas Army National Guard) in Fiscal Year 2008.

Enabling the FA40 Career Field for Success

with National and Joint Internships

By J. Dave Price, MAJ, AV, FA40

"We are not here to make you Space experts." Those were some of the first words we heard as Space Operations Officers Qualifications Course (SOOQC) 06-01 began. U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) Directorate of Combat Development (DCD) runs the 10 week and two day qualification (Q) course at Building 20K (Battle Lab) in Colorado Springs, Colo. Well if we weren't there to become Space experts, what were we doing in the course? Don't get me wrong, between DCD and the cooperative efforts of the National Security Space Institute, we FA40 (Functional Area-40), some newly designated and some experienced have seen the alpha and omega of Space organizations, Space equipment, products and charts, electro-magnetic spectrum graphs, and so on. Well you get the idea. But somewhere along the way, we realized that they weren't kidding, they were not going to make us Space experts. As a matter of fact, to quote one briefer in the course, "subject matter experts develop 98 percent of their expertise on their own in self-study, hard work and research." Well, I believe the path to developing expertise can best be met with professional internships in the right National agencies and Joint Space organizations. The point is that the training of the professional Army Space cadre does not live up to the expectations of the new Space Operations Officer.

FA40 officers are Space officers. Unfortunately, Division and Corps commanders are expecting to get Space experts, even Space warriors when the FA40 reports for duty. They aren't expecting to get officers who are coming to learn their jobs on the job with only 10 weeks of Space familiarization. Space officers, experts and warriors were 'created' to bring Space to the warfighters. We did visit multiple national, joint and fellow sister organizations to see how they function, are organized and how they can contribute to the Space fight, by providing this Space expertise and products to the warfighter. Space is a highly technical field, but yet we are just beginning to learn about Space in the Q course. We are an inch deep and a meter wide, when we need to be a meter deep in Space. There have been lots of great things done to get the profession where it is today, but we need to get into afterburner or we will continue poking around the J2/J6/J3/Information Operations/Electronic Warfare desks looking for work in the field. A Space Operations Officer needs to have a greater technical education and training experience if they are going to help the Division and Corps Commanders understand Space, special technical operations and leverage National Space assets. A Space Operations Officer is in effect, a 'wrangler,' someone who can assist commanders and the operations officers by resolving battlefield challenges through an asymmetrical view of the battlespace, beginning with X (Space) until it intersects Y (the battle).

Let's take a look at some of the training that other functional area experts get. If you are an FA48, Foreign Area Officer (FAO), you spend six to 14 months in language training, at least 12 months getting a Master's in International Relations, and six to 12 months conducting In-country Training, where you attend another country's military school, work with the Defense Attaché in that country and travel throughout your area of interest before they let you work as an FAO professional. What if you were in the Army Acquisition Corps, you would spend at least three months in basic and intermediate acquisition training, and have a 50 percent chance of going to Advance Civil Schooling (ACS). Many of the other functional areas are more mature and have the same type of training programs and ACS opportunities. But how can you compare another functional area to an FA40? A Force Modernization officer might be trained in 10 weeks, because they aren't expected to understand or devise Space or special technical solutions, break down a satellite problem within a constellation, leverage

Space Operations Officer Qualifications Course students listen to a briefing during a class in 2004. There are approximately 180 FA40s in the field today. *Photo by Sharon L. Hartman*

national technical means, understand data distribution systems, collar solar effects, SATCOM gaps, Sun conjunctions, ground telemetry and control effects, and then brief the Joint Force Command/Task Force commander on their impacts on operations. These officers can rely on their own experiences in the Divisional and tactical Army when necessary. A new Space Operations Officer has little practical experience in this highly technical realm.

DCD is basically giving us the tools and a license to learn our jobs. There is a strong belief in the Space community that we can learn a majority of this technical field on our own. We are told to go out and determine where we can best support the Joint warfighters and combatant commanders, whether it brings Space effects or not. One of the advantages of the Q course is that you can get 12 credit hours towards a Master's of Science in Space from Webster's University. The hard part is finding the time in command, in a Space Support Element or an Army Space Support Team to get the other 24 hours completed. In other words, we need to find a way to get more than two FA40 students in Advanced Civil Schooling a year. Many other functional areas have 20 to 100 percent getting a Masters' degree to support their own highly technical areas of expertise.

Of course, we can't send every officer to three years of training like the FAO gets. We don't think every officer needs or deserves ACS or Training with Industry to be successful, but it is important to provide as many officers as possible each year in Space the opportunity for an internship-like program. We would need to place the right officers in the right internships, but here are a couple of examples. I recommend we should find at least 10 slots a year. Send every new Space officer to a six month PCS (permanent change of station) internship to the National Security Agency, National Reconnaissance Office, National Geospatial-Intelligence Agency, Defense Intelligence Agency, ADF, Missile Defense Agency, Joint Functional Component Command-Space, or like organization to start to develop this core of Space expertise. Select three to four of these officers annually and send them to the U.S. Air Force Space Weapons School, a Joint, Navy or Army IO/EW course, a Combined or Joint Air and Space Operations Center tour, or to a National Space collection management office to learn these processes and systems. This will enhance corps of professional expertise and create long term effects on Army Space expertise. These newly interned officers will move our profession forward, not incrementally, but exponentially. Our community can no longer continue to accept less than what the warfighter deserves in a trained FA40.

There have been many Army Space officers, and senior folks in the Army Space community, past and present, working to build the profession to where it is today. The Space Operations Officer Qualifications Course has significantly improved with each and every new course. There are many organizations and services who would like to get a billet filled with an experienced FA40. However, we have departed from what is necessary and accepted the minimum standard to develop a professional corps, and must transition to what the Space calling is in Divisions, Corps and echelons above. Even if mo' money isn't out there, it doesn't reduce the requirements. Just like the force couldn't wait six years to get a Space Support Element in Divisions, Corps and Army headquarters. We can't get wait six years to get the professional development of the FA40 right.

It isn't that a Space Operations Officer deserves more, but the warfighters deserve Space experts that bring real expertise in Space to the field. We have accepted that this is the best we can do, but this leadership challenge must be met head on. Today the weight is on the Space Soldiers in the field, but we owe it to them and the Space community to fix it now – not later. Internships in National and Joint organizations is a right answer in the right direction. We must invest the appropriate time and money in Space Officers today so we can make a greater difference tomorrow.

MAJ J. Dave Price graduated Space Operations Qualifications Course 06-01 in August 2006, but previously served as the Joint Tactical Ground Station (JTAGS) and Theater Missile Warning (1st Space Company Commander) for two years in the 1st Space Brigade. He is currently reporting into U.S. Strategic Command Joint Functional Component Command-Space with duty at the Joint Space Operations Center in Vandenberg Air Force Base, Calif., and can be reached at john.price1@us.army.mil for comment.

TRANSFORMING THE OFFICER PERSONNEL MANAGEMENT SYSTEM:

HRC responds to the challenge to grow adaptive leaders

By LTC Maura A. Gillen

WASHINGTON (Army News Service, September 5, 2006) — The Army announced today a revision of the Officer Personnel Management System, aligning branches and functional areas under three Functional Categories in a revised OPMS design.

"We're building on a proven system," said COL Pat Stallings, chief of the OPMS Task Force, U.S. Army Human Resources Command, "but adapting to the emerging realities of the 21st century security environment and the capabilities required of a campaign-quality, joint and expeditionary Army."

The OPMS Functional Design, announced via an All Army Active message, is effective today, but most officers will not see an impact until the Spring, said Stallings. Human Resources Command assignment officers will begin to identify a small number of officers for broader assignment next Summer, with notifications beginning as early as January. The lieutenant colonel selection board that convenes in February will be the first to use the Functional Categories as promotion categories. Human Resources Command will announce procedural changes for Officer Evaluation Reports and Functional Designation boards via Military Personnel messages.

"The current OPMS was designed to be responsive and adaptive," said Stallings. "The Task Force re-established the periodic review process to recommend changes required for management and development of the Officer Corps to develop skills required, today and tomorrow, and group skills functionally to meet Army requirements."

The revised OPMS design, he said, is better aligned to the critical Joint functions required of the Army than the four Career Fields of OPMS 3, and provides for broader officer development. "This design directly supports the Army's strategy of growing adaptive leaders," he stated.

"We are not changing the core features of the OPMS system that make it so good today," noted Stallings. "We will continue to develop and promote functional specialists, and we will maintain our absolute focus on developing an officer's warfighting skills in their branch.

"We've always had multi-skilled officers," he said, "but are now seeking to develop them in a more deliberate way. OPMS improvements provide the framework to build future senior leaders who are multi-skilled and better prepared to operate as part of the Joint and Interagency Team."

The new Functional Categories are: Maneuver, Fires and Effects; Operations Support; and Force Sustainment, which includes the special branches. Functional Categories are further divided into Functional Groups that link branches and functional areas with similar battlefield functions. The lists of branches and functional areas by Functional Group and Functional Category are on the Human Resources Command-Alexandria Web site (www.hrc.army.mil); follow the link to Officer Personnel Management Directorate. Stallings also noted that there is no longer a "3" or "III" after "OPMS;" it's an evolutionary system, without numbered versions.

The senior leaders of the U.S. Army Reserve and Army National Guard are committed to the same objectives for growing 21st century officers, said Stallings, and are reviewing the functionally aligned OPMS design to determine applicability within the personnel management systems of the reserve component.

(Editor's note: LTC Maura A. Gillen is a public affairs officer with the U.S. Army Human Resources Command.)

IT'S OFFICIAL!

Qualified Army Personnel authorized to wear Air Force Space Badge

Notifications were initiated to award the Air Force Space Badge (AFSB) to Army personnel on Sept. 1, 2006. This culminated almost a year of work. On Nov. 1, 2005, the Air Force retired and ceased awarding the Air Force Space & Missile Badge. At that time the new Space Badge was officially established. Negotiations were conducted with the Air Force Space Command, Space Professional Management Office (managers of the Air Force Space Badge) to gain authority to award the badge to Army personnel. On Feb. 22, 2006, LTG Larry Dodgen, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command commanding general, received notice from GEN Lance W. Lord granting approval for the Army to award the badge to Army personnel. Efforts began immediately to obtain Army authority for acceptance and wear of the badge on the Army uniform. This approval was granted on Aug. 22, 2006.

The Air Force determined award of the Air Force Space Badge must adhere to rigorous criteria and be representative of uniform Space cadre training, experience, and expertise. Criteria approved for Army personnel reflects this rigor.

A key factor in this criteria is membership and experience in the Army Space Cadre. On Sept. 1, 2006, award notifications were made to the only officially confirmed members of the Army Space Cadre at that time, Functional Area 40, Space Operators and Space Professionals. This initial award had 10 at the Master level, 61 at the Senior level and 50 at the Basic level.

As additional groups are confirmed as members of the Army Space Cadre, announcement will be published for potential candidates to apply for award of the Air Force Space Badge.

For additional information send e-mails to:
FA40-SPACE@smdc.army.mil.

BASIC BADGE

(a) complete one of these stand alone courses: Space Operation Officer Qualifications Course (SOOQC); Satellite Systems/Network Coordinators Course (1C); Command and General Staff College (CGSC) Space Elective; Space 100 or Army equivalent; Space 200; Space Fundamentals or Space Operation Course*;
**These National Security Space Institute courses evolved from earlier courses with the possible titles: Basic Space Fundamentals, Interservice Space Fundamentals and Basic Space Operations. All titles are acceptable.*
(b) and complete at least a 12 consecutive month assignment in an Army Space cadre coded position(s).

SENIOR BADGE

(a) complete one of these courses: SOOQC; Space 200; Satellite Systems/Network Coordinators Course (1C);
(b) and complete a cumulative 48 month period in an Army Space cadre coded position(s).

MASTER BADGE

(a) complete Space 300;
(b) complete a cumulative 84 month period in an Army Space cadre coded position(s).
(Minor variations may occur for some groups such as the Reserve Components.)

Training Insights

by Larry Mize

Larry Mize graduated from Xavier University with a Bachelors of Science in Mathematics in 1973. He entered active service in the United States Navy serving a career specializing in Naval Intelligence, Aircraft Carrier Operations, Naval Special Warfare (SEALs), and Space Operations. Mize attended French language training at the Defense Language Institute and subsequently served as U.S. Navy Liaison Officer to the Commander French Forces Indian Ocean/French Foreign Legion/Commandos Marine in Djibouti. He attended the Naval Postgraduate School and was awarded a MS in Space Systems in 1986, subsequently serving at U.S. Space Command and U.S. Strategic Command. Mize is currently Chief of Space and Global Missile Defense Education and Training.

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Instructors: clifton.pingrey@afspc.af.mil (719) 593-8794 Ext 125 / patrick.obrien@afspc.af.mil (719) 593-8794 Ext 369
FWC DCD Training Branch and NSSI Web sites: For more information or to answer your training questions go to:
-FWC DCD: http://www.smdc.army.mil/FWC/Training/Training.html
-NSSI: https://halfway.peterson.af.mil/nssi/(2bpgiiuljf10ytyk3v5w5y2l)/index.aspx

2006 FA40 Space Operations Officer Qualification Courses (SOOQC)

SOOQC 06-01 graduated Aug. 17 with 25 students.
SOOQC 06-02 runs Sept. 07 Nov. 17, 2006 with a POI that includes:
- incorporation of National Security Space Institute (NSSI) four-week Space 200 course as the space fundamentals phase
- five-days of SAP-level Space Control training to include incorporation of the formal Counterspace Planning and Integration Course
- emphasized space planning process with integrated end-of-course Command Post Exercise during last two weeks
- enhanced field experience trips to complement in class instruction (Buckley AFB, Digital Globe Inc., White Sands and HELSTF, VAFB/14 AF/JSPoC, Boeing/Northrop Los Angeles, D.C.: SMDC/ARSTRAT HQs and CG social, NSSO, NRO, NGIC, NSA, DEFSMAC, ASPO, TEC, INSCOM/1st IOC.
For more information contact: Larry Mize, chief of training, FWC DCD: larry.mize@smdc-cs.army.mil (719) 554-4545

National Security Space Institute (NSSI) Courses

Following is a synopsis of Space courses available at National Security Space Institute. For more detailed info visit the NSSI Web site: https://halfway.peterson.af.mil/nssi/

Advanced Course Missile Warning: 13 weeks of in-depth education on missile warning and defense with a focus on Space-based warning assets. Topics include sensor physics, enemy threat systems, warning architectures; air/land/sea/Space-based sensors, missile warning, and missile defense operations centers, warning processes and tactics.

Advanced Course NAVOPS: A three-month course preparing students to employ Space-based navigation systems across the full spectrum of warfare. Students graduate with the expertise to lead unit training functions, develop tactics, techniques and procedures (TTP), and influence future systems acquisition. Requirements include written exams, class presentation evaluations, scenario exercises and a research paper.

Counterspace Planning and Integration Course: A three-day advanced education course, which provides a comprehensive look into the Space control mission area.

Director of Space Forces Course: A five-day course designed to provide selected senior leaders education and training in preparation to serve as the senior Space advisors in theater.

Space 200 Course: A four-week course with an emphasis on warfighter integration of Space power, and significant technical, nuclear and acquisition content. The target audience is Department of Defense civilians and military at the mid-career eight to 10 year point. *NOTE: All Army Quotas Managed by Future Warfare Center Directorate of Combat Development. Contact: larry.mize@smdc-cs.army.mil*

Space 300 Course: Designed for Space professionals at the 13-15 year point, Space 300 is a "thinker's course," primarily using guided discussion techniques to teach tomorrow's senior Space leaders to solve problems of Space bearing on national security. Space 300 expands the purview established within Space 200 to encompass a truly National perspective, to include considerations of Joint, National, Civil, Commercial and even Foreign Space. *NOTE: All Army Quotas Managed by Space and Missile Defense Command Proponency Officer. Contact: Clay.Scherer@smdc.army.mil*

Space Fundamentals Course: A two-week familiarization course for all branches of service designed for all military and civilian personnel (O-6 and below and civilian equivalents) that provides an educational and training bridge for new Space support personnel or those within operations with little space exposure. It is designed to introduce the student in the areas of doctrine, orbital dynamics, environment, Space law, physical science aspects of space systems and force applications.

NSSI COURSES (continued)

Space in the Air and Space Operations Center Course: A 10-day course designed to prepare Space professionals to effectively augment theater Air Operations Centers during exercise and real-world contingencies. This course provides both academic instruction and hands-on equipment training needed to prepare graduates to integrate air and Space power in support of theater commanders globally. Graduation from Space Operations Course, Space 200 or FA40 is a prerequisite requirement to attend Space in the Air and Space Operations Center Course.

Space Operations Course: A two-week course providing a common picture of Space operations to Department of Defense personnel from diverse backgrounds, services and agencies. This course highlights capabilities, limitations, vulnerabilities, applications and employment considerations of the numerous Space systems integrating Space power into military operations. Space Operations Course replaces the Advanced Space Operations Course (ASOC) and the Interservice Space Intelligence Operations Course (ISIOC).

Space Operations Executive Level Course: Designed for senior staff personnel, commanders, senior-ranking individuals new to the Space operations career field, or those requiring a refresher course in the capabilities, limitations, vulnerabilities of critical Department of Defense, National, civil and commercial Space systems.

Increased Army Presence Enhances Courses at The National Security Space Institute

LTC Richard Wolfe, USA, Army Liaison, National Security Space Institute

In 2001, the Space Commission published their report assessing U.S. National Security Space management and organization. The report contained five directives necessary to ensure the nation has the means necessary to advance its interests in Space. One of these directives put in motion the task to create and sustain a cadre of Space professionals. Military Space professionals look to the National Security Space Institute (NSSI) in Colorado Springs, Colo., to build upon their Space warfighting knowledge and skills. Officially activated in October 2004, by Air Force Space Command (AFSPC), the NSSI is an outgrowth of the Space Warfare Center's former Space Operation School (SOPSC) and serves as the National Security Space Community's main hub for space education and training. Commonly referred to as the "Space school house," the NSSI predominately fills its classrooms with Air Force Space Command personnel, but includes members from throughout Department of Defense and National Agencies that make up National Security Space. As a result, the Army, Navy, Marines, National Reconnaissance Office and even NASA send its Space Cadre to the NSSI.

The NSSI was recently re-organized under a new rank structure featuring a two-star "Chancellor" billet and three O-6 positions (Air Force, Army, Navy). The new structure will match the expected growth and "Jointness" of the NSSI. The Chancellor, U.S. Air Force MG Erika Steuterman is a reservist, dual-hatted as the Individual Mobilization Augmentee (IMA) to the AFSPC Vice-Commander. The Air Force and the Navy and Army have already arranged for officers to fill the O-6 Liaison positions added to the NSSI leadership structure.

The Army has assigned LTC Richard Wolfe to the Army Liaison position to provide direct Army representation to the command in addition to instructional duties. LTC Jorge Rangel continues as Chief of the Army Detachment and instructor in Joint Space Operations Center, Joint Functional Land Component Command, and Information Operations. Rounding out the team are MAJ Tod Pingrey (recently returned from Baghdad as Army Space Support Team Chief) and MAJ Patrick O'Brien (bringing West Point instructional and Missile Defense Association experience). This increased Army presence further solidified the partnership that has always been at the heart of the NSSI's approach to Space education. In addition, the Army instructors provide valuable theater perspectives across the full spectrum of NSSI courses.

One of the major educational resources available to the NSSI is the Space Power Lab. It is a $1.4M state-of-the-art modeling and simulation facility. This 2,000 square foot facility features the full set of computer applications used in Air and Space Operations Centers (AOCs) worldwide. The exercises conducted in the Space Power Lab give students an appreciation for the complexity of war planning, the situational dynamics involved with executing these plans, and the importance of integrating Space capabilities. The Lab accommodates 30 students at a time and provides an interactive training environment via a classified internal network. Students receive high-fidelity, hands-on training covering every aspect of their duties as Air and Space Operations Center augmentees during exercise and real-world contingencies. There is a plan to add Space Power Lab-based exercises to numerous Space professional development courses.

Distance Learning — For Space professional courses, class size has been limited to 30 students due in part to facility limitations, but mainly because it is necessary to ensure the courses remain interactive with labs, war games and guided discussions. As a result, not all Air Force Space operators and acquirers are afforded the opportunity to attend SP200. The same can be expected for SP300 — especially as more students from sister services and government agencies are brought in to enhance the overall education experience.

Given this limitation, there are a few options. One solution might be to buy more classroom space, hire more instructors and offer SP200 and SP300 more often. The other option is to develop Distance Learning versions of the courses much like there are for traditional Professional Military Education (PME). As the program moves down the road to a day when Space roles are filled only by those with proper credentials, it is necessary to ensure all Space professionals have an opportunity to attain those credentials. AFSPC will need to conduct a study to determine whether upfront Distance Learning development costs will outweigh the long term costs of additional instructors and leased floor space.

Advanced Space Training — Thus far, NSSI course development has emphasized the Space Commission's directive covering education breadth: Tomorrow's Space professionals need a broader understanding of operations across the range of Space mission areas and the size of the Space cadre will need to grow, as Space becomes increasingly important to military operations. Perhaps more than other areas, Space benefits from a unique and close relationship among research, development, acquisition and operations …

The NSSI is focused on a path for developing credentialed Department of Defense Space professionals who will lead the design, acquisition, operation, integration and sustainment of current, emerging and future Space systems. The NSSI has a strong and improving curriculum that addresses the needs not only of those Space operators who will deploy in support of Operations Enduring Freedom & Iraqi Freedom, but also the directives of the Space Commission, which stated, "… in-depth Space-related science, engineering, application, theory and doctrine curricula should be developed and its study required for all military and government civilian Space personnel…" The men and women of the NSSI have made tremendous progress in our short history, but we have only just begun to develop the advanced academics future Space leaders will require. Through investment across the Department of Defense, the NSSI will continue on a growth path that will make us a household word inextricably connected to the development of Space professionals.

Space Professional Personnel Update

by LTC Clay Scherer

LTC Clay Scherer is an FA40 officer serving as the Chief, FA40 Personnel Proponent Office. LTC Scherer served previously with U.S. Army Space and Missile Defense Command in the Space Division of the Force Development and Integration Center where he worked on Space Control requirements development. His previous tour was at the Naval Post Graduate School where he completed a Masters of Science in Space Systems Operations. He served as a Field Artillery Officer prior to entering the Space Operations Career Field in 2001.

An outstanding annual training conference was held in Long Beach May 30-31. There were 88 military personnel plus government civilians present. We greatly appreciate the support and assistance from everyone in preparing this event. The presentations provided quality information and promoted beneficial discussions. We have received a great deal of input requesting to rotate the FA40 Conference site. Recommended locales include Colorado Springs, Colo.; Huntsville, Ala.; Omaha, Neb.; Washington, D.C.; and Las Vegas, Nev. These options will be provided to the Command leadership for consideration and we anticipate the next conference to be held in the Colorado Springs area. Some other focus areas for the FA40 Proponent Office include:

Accessions

The ranks of FA40 officers continues to grow with Year Group 96 officers designated late Fiscal Year 2005 and three year groups designated in Fiscal Year 2006 (Year Group 97 and Year Group 98 results were released this July and August; Year Group 99 designation board meets this September).

A warm welcome goes out to our newest members.

Year Group 96: MAJ Michael Belton, MAJ Oscar Delgado, MAJ Sean Duncan, MAJ Mindy Kimball, MAJ Luke Koerschner, MAJ Aaron Luck, MAJ William Moncrief, MAJ Christopher Oxendine, MAJ William Riley, MAJ Gregory Sharpe and MAJ Dillard Young.

Year Group 97: CPT (P) Craig Blando, CPT (P) Alexander Braszko, CPT (P) Bill Eldridge, CPT (P) Lawrence Fields, CPT (P) Martin Lally, CPT (P) Louis Lancon, CPT (P) Jason Lange, CPT (P) Steven Moseley, CPT (P) Thomas Pugsley, CPT (P) Jeff Sheehan and CPT (P) Jonathan Taylor.

Year Group 98: CPT Wade Birdwell, CPT Brandon Harris, CPT Glen Hees, CPT Jeff Kacala, CPT Neill Macleod, CPT Christopher Ortiona, CPT Matthew Schreiber, CPT Bryan Shrank, CPT William Starr, CPT Mark Stone, and CPT Bill Symolon. Beginning with Year Group 99, designation will occur at the seven year mark with the board meeting in September.

The branch transfer process into functional areas is much more efficient than in the past and seems to be favoring the officer's desires as long as the losing branch is not short inventory and the gaining branch needs inventory. The FA40 ranks have recently added five officers through this process and we extend a warm welcome to MAJ Tim Dalton, MAJ Jeffrey Groskopf, MAJ Kenneth Klock, MAJ Kevin Laughlin and MAJ David Reid. Another successful FA40 recruiting effort is the Call to Active Duty Program which enables Reserve and National Guard officers to join the Active Duty ranks. Please welcome the following officers who have recently joined our ranks through this program: LTC Robert Nieves, MAJ Chris Crawford and CPT Anthony Tingle. Please contact the FA40 Career Manager, MAJ Jerome Driscoll if you have questions about the branch transfer process or the Call to Active Duty program. MAJ Driscoll can be reached at jerome.driscoll@hoffman.army.mil

FA40 Authorization Growth

The FA40 authorization based on Fiscal Year 2007 Army documents is for 170 FA40A/Cs, in comparison with an authorization of 165 in Fiscal Year 2006 and 159 in Fiscal Year 2005. The majority of growth continues to be at the tactical level with Space Support Elements now established in eight of the 10 active Divisions as of 2006. The 1st Infantry Division and 1st Artillery Division Space Support Elements will be established and manned in Fiscal Year 2007 to complete divisional fielding. Army and Corps SSEs standup will follow in the out years. We will also have FA40s in the six Fires Brigades by the summer of 2007.

Air Force Space Badge

The Air Force approved the award of the new Air Force Space Badge to Army Soldiers. Aug. 22 the Army approved the acceptance and wear of this badge on Army uniform. The old Air Force Space and Missile Badge was retired by the Air Force and will no longer be awarded. The new Space Badge has much more rigorous qualification criteria based on training/education and experience. The Space Badge will now be awarded only to Army personnel who are serving in validated Space Cadre positions. This is a change from the award criteria for the old Space and Missile Badge. Although everyone who was awarded the Space and Missile Badge will not qualify for the Space Badge, the Space and Missile Badge can continue to be worn by Soldiers who received it prior to the new Space Badge. Both badges cannot be worn at the same time. See the article on page 13F.

Army Space Cadre

The Vice Chief of Staff of the Army approved the results of the Army Space Cadre Force Management Analysis (FORMAL) and Way Ahead plan in January 2006. The lead for execution of the Army Space Cadre phased-implementation plan will remain with the Future Warfare Center, Directorate of Combat Developments (DCD). The Army Space Cadre currently consists of only the FA40s, Space professionals, but in April 2007, an update to The Army Authorizations Document System (TADDS) is expected to document for the first time an Army Space Cadre that includes officers, NCOs, enlisted and Department of the Army civilians as Space Enablers. The expected number of Army Space Cadre billets is between 1500-2000 Space professionals (FA40s) and Space Enablers. Additional information about the Cadre status will be provided in future Space Journal updates.

Promotions

FA40 promotion numbers continue to meet or exceed Army averages. The last O-6 promotion board selected three of our FA40s. Congratulations to COL Michael Postma, COL Thomas Quintero and COL Patrick Frakes on their selection. Their success speaks highly of the quality of our senior leadership and continues a trend of strong showings by FA40s in promotion and Senior Service College selection boards. Three officers were selected for Senior Service College: LTC Rick Dow, LTC Jim Meisinger and LTC Tom James.

Likewise, FA40 officers fared very well in the recently released LTC promotion board. Congratulations to MAJ Joe Carroll, MAJ Steve Choi, MAJ Jay Curry, MAJ Jay Driscoll, MAJ Rich Lewis, MAJ Chris Livingstone, MAJ Tori Miralda, MAJ Jim Patterson, MAJ Larry Roberts, MAJ Sam Russ and MAJ Lem Williams.

OPMS III Review

The OPMS review continues via an ongoing series of Action Officer-level workgroups, Councils of Colonels and General Officer Steering Committees. The most obvious change is the Functional Realignment of the basic branches and the functional areas. OPMS XXI grouped the branches and functional areas into four Career Fields — Operations, Information Operations (FA40), Operations Support and Institutional Support. The OPMS design has realigned the branches and functional areas into three Functional Groupings — Maneuver, Fires and Effects; Operations Support; and Force Sustainment. Within the Operations Support Grouping, FA40 is organized with the Signal Corps basic branch, the Information Systems Management (FA53) functional area and the Telecommunications (FA24) functional area in a sub-grouping called Network and Space Operations. A key aspect of the OPMS review is the opportunity for basic branch officers to occupy functional area billets through a "shared access billet." This process would enable a non-FA40 officer to occupy an FA40 position with prerequisite training (FA40 Space Operation Officer Qualifications Course). This system will also enable FA40s to occupy non-FA40 billets in such areas as Information Operations in the Maneuver, Fires and Effects grouping. One of the goals of the OPMS review is to increase Joint Inter-Agency, Inter-Governmental, Multi-National (JIIM) experience to develop multifunctional leaders. The FA40s have a great deal of JIIM experience and billet access due to the Joint nature of the Space mission area and the multitude of Space stakeholders with whom we interact. The functional areas and basic branches will identify from 10-20 percent of their authorized billets for shared access opportunities. The OPMS development will also reviews all 01A and 02A billets (branch immaterial and branch specific) for recoding to functional areas and branch specific positions. This is important for FA40s because the functional designation process assesses Captains at the seven-year mark, we will need FA40 billets to provide them experience. Many of the captain billets in the 1st Space Brigade and 1st Space Battalion are 01A billets that may be recoded to FA40.

Geographical Information System

Operationalizing for Use in Domestic Consequence Management

By Roy Hawkins,
Deputy Director of Intelligence
Joint Task Force Civil Support

Whether your organization is involved in emergency planning, response, or mitigation, the use of an effective geographical information system (GIS) that draws upon satellite imagery can greatly enhance all phases of consequence management to support the security of the homeland.

The Joint Task Force Civil Support is a joint military organization that leverages the power of geographical information system to support the Federal Government in planning for and potentially responding to a full range of high consequence management events in the United States.

Joint Task Force Civil Support is a deployable component of U.S. Northern Command and is chartered to rapidly respond with life-saving support in the event of a chemical, biological, radiological, nuclear or high-yield explosive (CBRNE) incident in the continental United States and its territories and possessions. A joint planning augmentation cell was deployed to New Orleans in support of Joint Task Force-Katrina.

Although Joint Task Force Civil Support brings a variety of unique capabilities to the fight, the focus of this article highlights the use of geographical information system to support the full spectrum of the command's CBRNE consequence management mission. Joint Task Force Civil Support continues to develop and employ a robust set of geographical information system capabilities, such as ArcGIS with ArcPublisher and ArcReader, Spatial Analyst and StreetMap extensions, ArcIMS, Keyhole and other Web-based tools.

These capabilities play a critical role in all aspects of pre-incident planning. As a tool, geographical information system can provide a comprehensive view of an operational environment to Joint Task Force Civil Support prior to a CBRNE event occurring. With the help of the National Geospatial-Intelligence Agency and other Federal Interagency partners, Joint Task Force Civil Support has compiled, organized and warehoused an extensive database of geospatial information for the U.S.

This comprehensive geospatial database includes nationwide information on chemical industry and hazardous material facilities, nuclear power plants, first responder and medical service assets, and other critical infrastructure sectors and key asset categories. With this information, key questions can be addressed such as: the number and types of hospital beds available in an area; the location, types, and quantities of toxic industrial chemicals stored in the area; the location of high-capacity venues; and the location of emergency shelters and emergency operation centers.

This geospatial information can be used to

Rich Burch of the Measurement and Signals Intelligence/Advanced Geospatial Intelligence - Node, formerly the Spectral Resource Operations Center, goes door-to-door in New Orleans with police who are using satellite map overlay products produced by the MASINT Node in support of Joint Task Force - Katrina. *Photo courtesy Measurement and Signatures Intelligence/Advanced Geospatial Intelligence - Node*

provide the commander of Joint Task Force Civil Support and his staff with a quick assessment of "what if" scenarios that involve the potential effects of a CBRNE event on a specific U.S. metropolitan area or region. With this understanding and knowledge, the Joint Task Force Civil Support commander and staff are able to quickly observe, orient, decide and act in response to a wide range of potential threats across the homeland. These tools and capabilities allow Joint Task Force Civil Support to rapidly begin its mission planning and provide its higher headquarters, U.S. Northern Command, an initial assessment of a CBRNE event, either before or after the incident.

In the unfortunate event of a CBRNE incident, geographical information system tools can be used to track and visualize an incident or hazard area in order to determine its potential impact on nearby population centers and infrastructure. For example, using ArcGIS, analysts can rapidly display both manmade and natural hazard models along with other relevant data (e.g., population densities, first responder assets, schools, medical facilities and lines of communication) to provide situational awareness of what has occurred, where it happened and what is in the affected area. This initial effects assessment is used to support the military decision making process and gives the commander the critical information he needs to make important operational decisions. It is an iterative process.

Another vital geographical information system capability employed by Joint Task Force Civil Support is its Consequence Management Interactive Mapping Service. This service is an interactive tool that leverages the power of geographical information system Web technology. It is a user-friendly, Web-based tool that further supports the command's CBRNE mission.

With its Consequence Management Interactive Mapping Service, Joint Task Force Civil Support is able to deliver dynamic maps and CBRNE Consequence Management-relevant data to its higher headquarters, subordinate units, and Federal Interagency partners via the Web. Users are able to query, analyze and create a customized geospatial view with information based on their preferences. The command's geographical information system analysts are able to quickly and seamlessly integrate analytical outputs from separate stand-alone ArcGIS systems and then post Consequence Management-relevant information to the Consequence Management Interactive Mapping Service. The Web site enables vital information sharing among other Department of Defense and Federal Consequence Management stakeholders.

If a CBRNE event occurs in the homeland, the geographical information system capabilities resident at Joint Task Force Civil Support will ensure that our Nation's decision makers have the right information at the right time in the right format to speed the Government's response to the incident and mitigate its effects.

This was a devastating hurricane and the subsequent mudslides killed hundreds in Central America. The Remote Sensing Branch provided imagery to show traffic ability of roads, last known locations of villages and towns and changes in the coastline. The imagery that was provided to JTF-7 proved to be highly valuable to the rescue and rebuilding efforts in the aftermath of the storm. This was the first time that this kind of imagery was produced to help in the recovery efforts of a civil disaster.

In the meantime, the Remote Sensing Branch supported the ARSST deployed during operations in Haiti. Over these years, the node also provided imagery in support of forest firefighting efforts in Arizona, Utah, Wyoming and Colorado. Infrared imagery is capable of showing hotspots that need to be addressed to prevent flare ups of the fire. Providing daily updates enhanced the ability of the firefighters to more quickly and effectively contain and control the fires.

The Remote Sensing Branch received many calls during emergency operations from the Department of Defense. After local news did a story on the branch and its capabilities, calls would occasionally come in from local police departments wanting the node to find stolen cars, bodies and caches of drugs. "We were not capable of that," said Ward. "We had to turn those calls down."

But when tribal violence erupted in Africa, the Remote Sensing Branch went into high gear and had imagery maps ready and in the hands of the U.S. Central Command team sent in to evaluate any response that might be required. The team had the images in their hands within 36 hours.

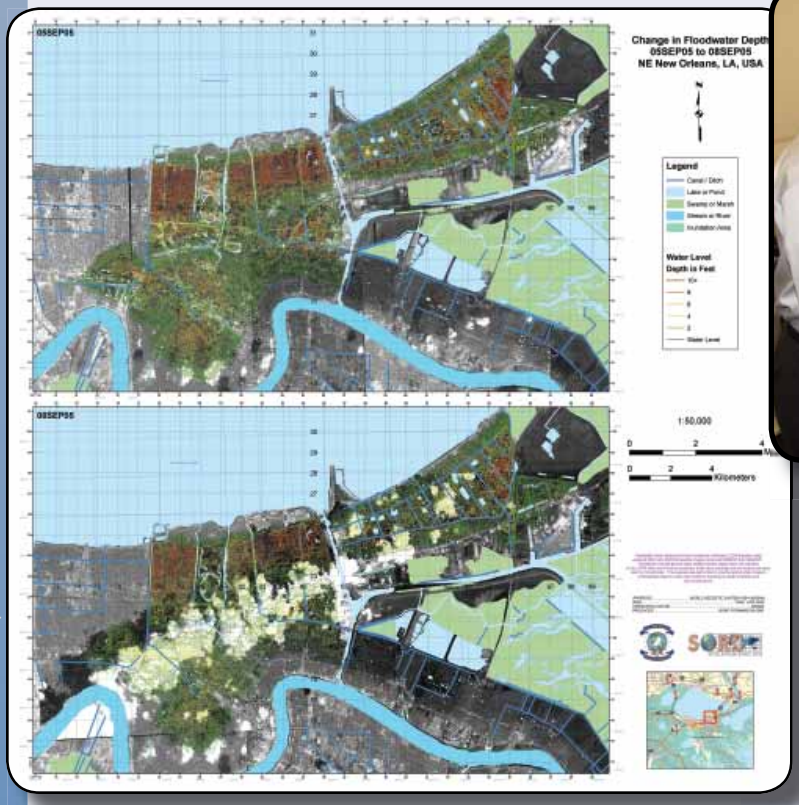
"That is how responsive we can be," Ward added.

The Remote Sensing Branch grew from an original crew of three analysts and an Officer-In- Charge in the mid 1990s to the 13 analysts and five administrative staffers onsite today. And whether it has been known as the Remote Sensing Branch, the Spectral Operations Resource Center or the now Measurements and Signatures Intelligence-Advanced Geospatial Intelligence Node, the products are still aimed at helping Soldiers win decisively on the battlefield.

From an original array of two satellites to about eight available to the node today, the types of information and sophistication of analysis have only increased. They have gone from 10 meter resolution to less than one meter. They have gone from black and white images to color ones. They have depicted oil fields burning in Baghdad during both gulf wars and detected mass graves in Bosnia and Iraq, allowing loved ones the closure of burying their dead with honor.

"What we do here is important work," Ward said. "We save lives and time and resources so the warfighter can more effectively conduct the fight."

Brian Plaisted serves as a Senior Engineer supporting U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command's Measurement and Signatures Intelligence-Advanced Geospatial Intelligence Node in the areas of long and short range planning as well as general staff support. He has supported U.S. Army Space and Missile Defense Command/ U.S. Army Forces Strategic Command for the past five years to include overseeing the upgrade of the Eagle Vision II van and training for Commercial Exploitation Team (CET) deployments. He is a retired Army Engineer Officer with 20 years of service. He served three and a half years as the Chief, Remote Sensing Branch (predecessor to the MASINT-AGI Node) with Army Space Command working to incorporate commercial satellite imagery with operational forces. This included Army Space Exploitation and Demonstration Program (ASEDP) initiatives such as the Multi-Spectral Imagery Processor.



Roger Ward, (right) Dave Christiansen, and Bill Bach examine a map of the flooded areas of New Orleans that was printed by the Measurement and Signatures Intelligence/Advanced Geospatial Intelligence Node. *Photo by Ed White*

The images to the left show the floodwater depth changes in New Orleans from Sept. 5 to Sept. 8. Commercial satellite images were acquired from DigitalGlobe. These source images were manipulated by the Spectral Operations Resource Center to show water depth and can then be compared to previous images to determine the change in floodwater depth. *Image courtesy of the Measurement and Signals Intelligence/Advanced Geospatial Intelligence Node and Digital Globe*

Space Support on the Home Front

In the wake of Hurricane Katrina, U.S. Northern Command called on members of U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) to provide critical Space support to Joint Task Force – Katrina. One of the elements of the command — the Spectral Operations Resource Center [now the U.S. Strategic Command Measurement and Signatures Intelligence/Advanced Geospatial Intelligence (MASINT-AGI) Node] — supported relief efforts by providing a variety of satellite and airborne imagery products.

On Sept. 2, members of the MASINT-AGI Node deployed to Camp Shelby, Miss., to provide key planning support in the form of commercial and spectral imagery products, to Joint Task Force-Katrina, the task force responsible for relief and recovery efforts in the Gulf Coast region.

A five-person team from the Node took data from commercial imaging satellites and turned the data into a variety of imagery analysis products. The products included "before" and "after" views of areas to reveal the extent of damage. Analysts also analyzed images to identify what roads were passable and which areas were under water.

"The MASINT Node created immediate disaster response products that they provided to forces conducting search and recovery missions," said Brian Plaisted, an operations planner who supports the MASINT/AGI Node. "Their products included current image maps of New Orleans with the individual streets identified. As the rescuers were doing the search and rescue, they had a product they could look at and say 'okay, here are the street names' and know where they were." These maps were critical because search and rescue teams were not from the flood-affected areas and were not familiar with road names or neighborhood streets.

The path to providing this critical support began after SMDC/ARSTRAT submitted a list of capabilities to U.S. Northern Command's crisis action team. On Sept. 1, SMDC/ARSTRAT received a Request For Forces specifically calling for 24-hour imagery assistance in support of relief forces operating in the disaster area. The following morning, team leader and Joint Task Force-Katrina liaison, LTC Mike Foss along with four other SMDC members deployed with equipment and supplies to Camp Shelby. By Sept. 4, the team was up and running and producing valuable planning and operational imagery products for the rescue and recovery operations.

While the forward team provided on the ground support to Joint Task Force-Katrina, the rest of the MASINT-AGI Node also was busy. A MASINT-AGI Node analyst was a member of a joint team composed of analysts from the Defense Intelligence Agency and the National Ground Intelligence Center to help with analysis of data from an airborne hyper-spectral sensor. The sensor was flown to identify environmental hazards that posed a threat to relief personnel. The team's first priority was gas stations and superfund sites that were inundated with water. Their goal was to determine which tanks may be leaking fuel into the water, so that responders could focus their containment efforts and prevent greater environmental problems.

The remainder of the MASINT personnel provided reachback support for the forward deployed Joint Task Force-Katrina team, as well as direct support to U.S. Northern Command and other organizations such as the National Guard Bureau.

To address one request for support from U.S. Northern Command, the MASINT-AGI Node analyzed elevation data and current imagery to identify helicopter landing zones in Mississippi. The analyst used current imagery to identify areas covered with standing water and the vegetation cover of the land. Combining this information with elevation data to identify relatively flat areas, the analyst then identified areas where helicopters could safely land.

The multitude of products provided by the MASINT-AGI away team assisted users with planning support to determine where to focus their efforts and potentially save lives. The MASINT-AGI Node has also assisted in other disaster relief situations to include fighting wildfires and earthquakes, and tsunami relief efforts.

Although the MASINT/AGI node provides assistance for Defense Support to Civilian Authorities missions when requested, its primary mission remains providing Space support to the warfighter. The MASINT/AGI Node continues the former Spectral Operations Resource Center mission of providing products to Space forces to include Army Space Support Teams, the Commercial Exploitation Teams, Space Operations Officers (FA40s) and Space Support Elements in the new modular divisions. The Spectral Operation Resource Center's primary focus was exploitation of commercial and spectral imagery. The MASINT/AGI Node continues this support and has added Radar exploitation. The MASINT/AGI Node will also act as a conduit to the remainder of the Army MASINT National to Theater program for the other MASINT disciplines to include Thermal and Overhead Non-Imaging Radar products.

The split image shown on the cover and on this page display the improvements made in Satellite Imagery over the past 10 years.

Cover - The left image is from the LANDSAT5 TM sensor taken in 1996 and the right image is from the QuickBird satellite taken in 2005.

Behind - The top half of the image is from the LANDSAT5 TM sensor, RGB composite (bands 3,2,1) pan-sharpened to 10 meter resolution. Image date: 3/26/1996. The bottom half is from the QuickBird imagery is RGB composite (bands 3,2,1) pan-sharpened to 1 meter resolution. Image date: 7/22/2005.

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A Sharper Image

Improving the view From Space

By Ed White

Thirty years ago the only locational data available to a Soldier in the field was a map. The problem with most maps was that they were old, the cultural information was outdated and, in many cases, just plain wrong. When satellite imagery came along, our government leapt on the new technology. The U.S. government built satellites and put them in orbit and they produced excellent imagery products that people within the various governmental departments could use. Problem solved, right?

Wrong. The images were so highly classified that a Soldier in the field never saw the images. In other words, the people who may arguably have had the most need for the geospatial products were denied access because they did not have the security classifications required to view the images.

"Those early images were head and shoulders above what a map could provide," said Roger Ward, a Multi-Spectral Imagery veteran since 1994. "A map is essentially a conceptual drawing with cultural information like churches, homes, schools, roads and airports annotated to give the map user a good idea of what actually exists on the ground. Most maps are printed, and then they are updated every five years or even longer. A satellite image gives the user an actual photo image of what is on the ground. The maps can be updated every day if necessary and using the digital format, a huge amount of ancillary information can be gained from the image," Ward added.

"The difference in the quality of commercial imagery from the early nineties until now is that currently we have a much better resolution quality because we have a much greater number of newer generation satellites to pass us information," said Ward. "We get much better spectral, spatial, radiometric, and temporal information, all of which can be applied to making better, more accurate and tailored products. It is like night and day from ten years ago," he added.

Army Space Command had built a program in the late 1980s and early 1990s called the Army Space Exploitation and Demonstration Program (ASEDP). It was headed by a forward thinking former Soldier named Bill Whelan. The purpose of the program was to take, commercial-off-the-shelf Space products and capabilities, analyze them and determine if they had any value to the Soldier. If the Soldier response was favorable, the technologies were given to the Soldier. The ASEDP team members would train them on how to use the technology and provide support as the particular capability went forward with the warfighter. Notable successes of this program were the introduction of the Global Positioning System (GPS) location device, the Portable Lightweight GPS Receiver, during Operation Desert Shield/Desert Storm, and a family of suitcase-to-briefcase sized portable satellite communications devices using the INMARSAT constellation for worldwide communications capabilities.

Whelan's team saw the value of imagery to the warfighter and they began to look into purchasing commercial imagery to support warfighter operations. The primary reason for this interest was that there were no security classifications, and all you had to do was get a purchasing agreement from one of the two primary companies that had satellites in orbit. The companies were LANDSAT (U.S.) and SPOT (French). The imagery was not as good as what the national satellite systems could provide. SPOT was 10 meter imagery, meaning that every visible pixel on the map represented 10 square meters on the ground. Still, this was a vast improvement over the old maps.

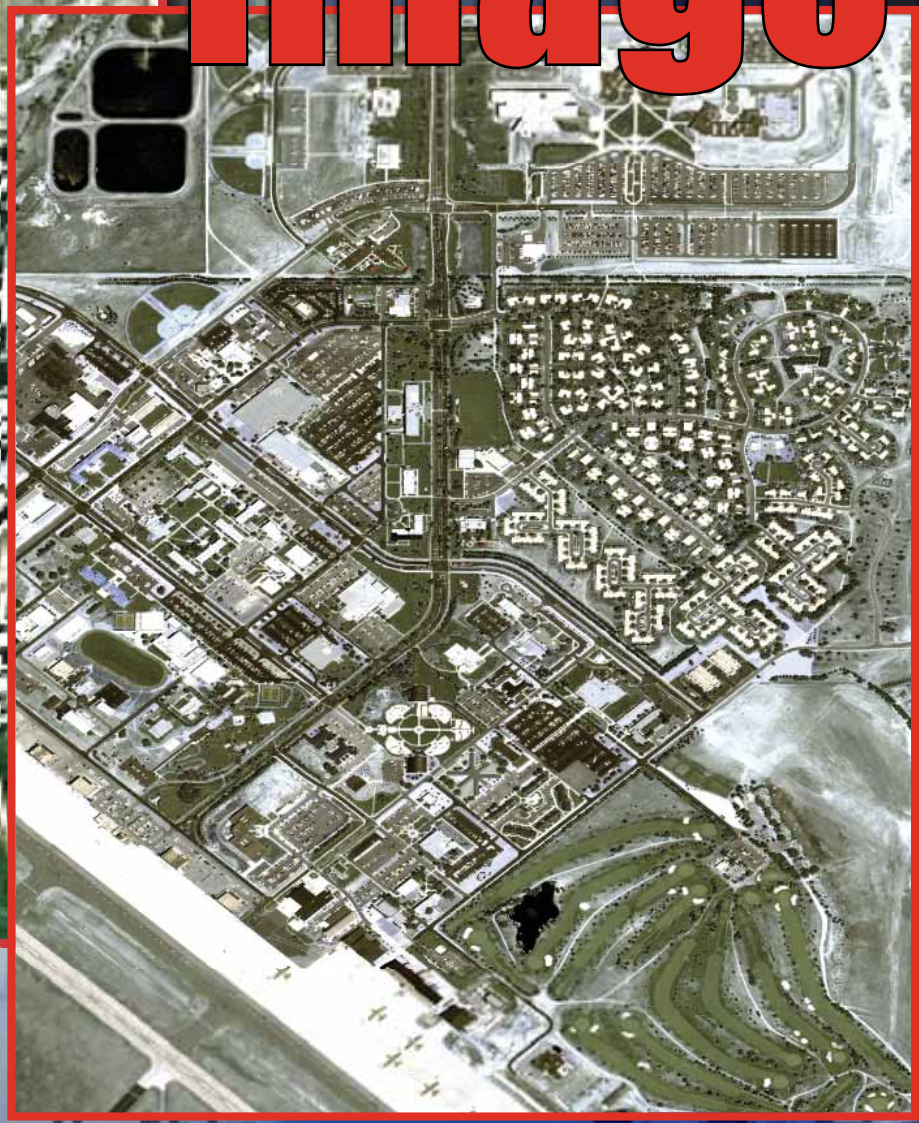
What grew out of this ASEDP effort was the Remote Sensing Branch. The ASEDP introduced the Army Space Support Team (ARSST) concept to the Army and the Remote Sensing Branch was born to support the ARSST. The branch began collecting a library of satellite images of potential hotspots in the world and would provide them to warfighters as they deployed. Well, news of a good thing spreads quickly. Pretty soon the branch was receiving requests from Corps and Divisional terrain teams looking for imagery that they could use for both planning and operational requirements.

A pivotal request for support came in 1998 from Joint Task Force-7 working the emergency response efforts around Hurricane Mitch.

The Flipside

A section dedicated to Space Operations

A Sharper Image



Improving the view from Space