the Army Space Journal
A Professional Journal for Army Space Operators
Fall 2004 Vol. 3, No 2
Published by U.S. Army Space and Missile Defense Command

BEYOND BLUE FORCE TRACKING

Enhancing Space for the Warfighter

What you didn't know ...

In reading General Tommy Franks' autobiography "American Soldier," I came across a slice-of-life story that fits. Condoleezza Rice pays General Franks what I think is probably the highest compliment any Soldier — or person, for that matter — could receive in a lifetime. Think about it. In the middle of planning for the war in Iraq, she told the combat veteran that he made his boss a better leader. She added that the boss made Franks a better general.

Talk about a powerful statement. Of course the boss in this case is Secretary of Defense Donald Rumsfeld. The fact that the give-and-take between the two equaled something better in the end than had they not been together is a strong commentary on leadership. It speaks to discipline to allow a subordinate (and senior) to have a positive impact on the bottomline. It speaks to the collective set of personal leadership traits to be able to lead up and, if you're on the upper rung, to allow it from below.

As we put the final read on this edition of the Journal, this compliment of Franks' impact keeps surfacing in my thoughts. Not to get too philosophical about this or sound arrogant, but shouldn't this be the bottomline for all that we do, not just in Space but all aspects of life?

Just an idea or two to think about as you read about our Space Soldiers rolling up their shirt-sleeves, getting dirty and being part of the process of being an Army. These articles are about men and women making a difference in Space by what they do and by their initiatives.

Plenty of news since our last publication. BG Robert Lennox departed the command in June to become the chief of staff for U.S. Army Accessions Command. Lennox was the Deputy Commanding General for Operations from June 2003 to June 2004. The U.S. Senate confirmed on Oct. 8 the nomination of the first FA40 to be selected for promotion to brigadier general — COL (P) Jeffrey Horne took over as deputy commander for operations in June after Lennox departed. We've also had 21 FA40 officers selected for promotion — 12 to major and nine to lieutenant colonel (names are listed on page 10F).

Final thoughts.

The Army Space Journal continues to grow. We're now ending three years of publishing. We heard many positive points from readers about our "upside down backside" that we initiated last edition with what we call "The Flipside." Again in this edition, we hope you find our articles and information in this section helpful. Please feel free to e-mail me with any article ideas you may have: historical perspectives, technology developments, Space in operations and updates from the field.

Speaking of growth and impact — making things better — we've got to mention the latest developments in the lives of two "grandfather" FA40 officers. I've mentioned before how BG Richard Geraci and COL Glenn Collins both contributed to creating the Army Space Journal when they were assigned to SMDC. Collins, by the way, writes our lead article in this edition on Blue Force Tracking. It's his first for us since retiring and going to work for Sparta. In some late breaking news, Geraci plans to retire from the Army Feb. 28, 2005 to become the new Commandant of cadets and deputy superintendent for leadership at New Mexico Military Institute.

Happy reading — You make things better in Space because of your involvement.

— Michael L. Howard
Editor in Chief

Standing from left: MAJ Donald S. Johnson, Army G-2; CPT Jason Conroy, SMD Battle Lab Huntsville; CW2 Randal Johnson, CDR, 33rd EN DET, USFK; MAJ Joseph Carroll, ARSTRAT, 1st Space Bn., ARSST; MAJ Lawrence Robinson, ARSTRAT, 1st Space Bn., ARSST; CPT Gary Harrison, STRATCOM; MAJ Pete Wirth, SMDC G-3; CPT Tim Boraas, STRATCOM; CPT Michael Belton, SMD Battle Lab Huntsville; MAJ Craig Roseberry, JSOC Fort Bragg; MAJ Cliff Hodges, 3rd ID SSE; MAJ Pat Mullin, NORAD; LTC James Gierlach, ARSTRAT; * MAJ George Wingfield, V Corps, G-3 Plans; CPT Andrew Hittner, 101st SSE; **kneeling from left:** MAJ Jean Henderson, STRATCOM; MAJ Jacqueline Patten, ARSTRAT; COL James Pearson, Director, FDIC — Colorado Springs; COL Jeffrey A. Horne, SMDC/ARSTRAT Deputy Commander for Operations; * MAJ Richard Zellmann, ARSTRAT, 1st Space Bn., ARSST; MAJ Charles Campbell, STRATCOM; LTC John Brooks, NORAD/NORTHCOM.
* Distinguished Honor Graduate: The officer who achieved the highest academic score, has a grade point average above 95% and completed 100% of examinable material.

FA40 Class 04-01 Graduates

Space Operations Officer Qualification Course (SOOQC) Class 04-01 was graduated on August 27, in a ceremony at Peterson Air Force Base, Colo. The SOOQC 04-01 program of instruction ran 8-weeks from July 7 to August 27, 2004. The SOOQC operations are evolving to synchronize with the Army's new Intermediate Level Education (ILE) program that will include FA40 students attending a 12-week ILE Common Core of instruction at an extended campus site other than Fort Leavenworth. The second part of ILE is FA40 qualification that will continue to be accomplished in Colorado Springs. As a part of transitioning to the new FA40 ILE program, several new innovations have and will be implemented with SOOQCs 04-01 and the upcoming 04-02 (Sep. 8 - Nov. 19).

SOOQC 04-01 was the first class to experience the first innovation. After the three day introductory Phase I at the FDIC classroom, the 20 Army students were joined by 10 USAF students and they all attended the 4-week USAF Space Operations School Space 200 course. Similar to the first 4-weeks of legacy SOOQCs, Space 200 provides 4-weeks of Space foundational education and training. At Space 200, the students received their initial Space foundational training on Space systems, technologies, organizations, and force enhancement mission areas. Quoting from the class AAR, "The value of Space 200 to the FA40 students cannot be overstated. Even those officers with Space background commented on the relative value to the group." This first pilot use of Space 200 as the first 4-weeks of foundational training has been an outstanding success and will continue with all future SOOQCs. After Space 200, SOOQC students return to the FDIC classroom facilities for Phase III Army focused Space operations training which builds upon Space 200 foundational training.

The second innovation involves the expansion of training time from 8 weeks to 11 weeks with 12-weeks envisioned for summer FY05. SOOQC 04-02 will be the pilot for this new 12-week program of instruction. Lessons garnered from OEF/OIF, ASCC assignment to USSTRATCOM, and the recognized need for increased training all influenced this increased course length. From Sep. 8 - Nov. 19, SOOQC Class 04-02 will experience Space 200, an improved D.C. field trip, new field trips to Kirtland Air Force Base and Vandenberg Air Force Base, technical/hands-on training emphasis in the areas of Blue Force Tracking and Mission Management Center operations, Space Control, and utilization of the Space Operation System (SOS) toolkit. FDIC recently purchased 11 SOS boxes for dedicated use in the SOOQC classroom. The upfront first 10-weeks of training will culminate with a last week of Space Military Decision Making Process with operational application in the course ending CPX.

Leveraging Space for Asymmetrical Advantage

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

By LTG Larry J. Dodgen

It seems like only a few years ago that Space was a thing of imagination and science fiction. Clearly, tremendous accomplishments have been achieved since America launched its first satellite in 1958. Over the past four and a half decades, Space has become increasingly important to our national interests. Advanced systems critical to the Nation's security and economic well-being have been launched into orbit. Stock market transactions, credit card purchases and electronic banking are now completed quickly and precisely with the aid of networks and communications facilitated by satellites. Similarly, digital television, wideband Internet access and cellular telephone conversations are made possible through Space-based satellites.

Today, Space power represents a decisive, asymmetrical advantage for the United States and, in particular, for military and intelligence activities. Space extends the range and capabilities of communications, improves missile early warning and enhances situational awareness beyond any terrestrial capability. Space systems have also brought better intelligence and synchronized combat operations by enabling the collection of new types of data and information. The bottom line is that we can no more imagine a day without the capabilities provided by Space-based products and services than we can imagine a day without on-demand access to water and electricity.

It is Not Just About Tanks Any More

Over the past decade, military operations have moved from being just "supported" by Space assets to being truly "Space enabled." Space technology has dramatically improved since Operation Desert Storm, which is often described as "the first Space war," particularly due to the use of Global Positioning System (GPS) and long haul communications satellites. In comparison, during Operation Iraqi Freedom (OIF), some 50 satellites comprising five types of military satellite constellations were used for surveillance, communications, navigation, intelligence, weather forecasting and missile early warning.

Retaining an asymmetrical advantage in Space is becoming increasingly difficult, and while the U.S. will continue to dominate Space in the coming decade, other nations are no longer content to be bystanders. The United States currently accounts for a far greater percentage of the Western military satellites currently in orbit; however, the number planned in the future is expected to tip in the favor of civilian uses. These additional satellites will increase capacity but also increase risks. Risks will grow as more businesses – private and public – launch satellites into orbit. Countries worldwide continue vigorous Space programs that provide highly accurate imaging, precision navigation and timing, and near-instantaneous global communication. In fact, nearly one-third of all Western satellites that will be launched over the next decade are predicted to belong to countries other than the United States.

The value of U.S. Space assets has not escaped the notice of our adversaries. Indications are that some nations of concern have used available technology in an attempt to control and disrupt communication systems and others types of U.S. equipment.

Services and products available from commercial sources are becoming increasingly more available to potential adversaries, to include non-state actors. Using the Internet, countries, groups and individuals have acquired high quality, Space-based products and services, thereby reaping the operational benefits of Space without the necessity to build their own capabilities. As an example, satellite imagery, some with one meter or better resolution, is available for purchase in the open commercial marketplace.

Actionable Information: Building the Case for Space-Based Systems

The U.S. Army is changing, and in conjunction with our sister services, is incorporating new capabilities at a rate not experienced in our Nation's history. This change is particularly significant in the quantity and quality of data and information being made available to our military leaders.

The bottom line is that we can no more imagine a day without the capabilities provided by Space-based products and services than we can imagine a day without on-demand access to water and electricity.

The information is immensely varied and includes voice, imagery, video and other data to support operational requirements. In the future, the quantity of data and information will continue to grow as more sources and sensors become available.

The challenge for today's commanders is that they are inundated by too much data but not the right information to support military decision-making. It is not just the information that matters, but getting quality, actionable information. Timely, actionable information is the basis for synchronized and precise engagements on the battlefield. It shortens the kill chain and enables Joint Warfighters to engage the right target with the right munitions at the right time with the minimum chance of collateral effects. Properly exploited, actionable information produces knowledge of the environment, the enemy and friendly forces. In the words of General (Retired) Gordon Sullivan, former Chief of Staff, Army, "Information is the currency of victory on the battlefield."

The increased dependence on Space assets in providing actionable information means it is imperative that our military forces have unfettered and unimpeded access to Space-based products and services. Assuring access can also mean denying our adversaries the benefits of Space-based capabilities. Space situational awareness is the first step to protecting our Space assets and the capabilities they provide. It is also the foundation for Space control. The Army does ground-based Space control in coordination with the Air Force.

Contributing as a national resource to America's Space surveillance capabilities, the Ronald Reagan Ballistic Missile Defense Test Site (RTS) at Kwajalein Atoll conducts Space-object identification and provides orbital information on foreign launches. Radars conduct deep Space and near-Earth satellite observations, providing data on some 10,000 objects. Other radars provide high-resolution, near-real-time images of Space objects. As such, RTS fulfills a vital role as part of SMDC/ARSTRAT's support to U.S. Strategic Command.

The high ground of Space provides an unparalleled potential for extending the means of gaining information on enemy forces. To a much greater extent than in the past, this information is being made available in near-real time. Space-based capabilities planned or projected in the future include the Space-Based Surveillance System (SBSS), Space Tracking and Surveillance System (STSS), Space-Based Infrared System High (SBIRS-High) and Space-Based Radar (SBR).

The SBSS is being developed to detect and track objects using optical sensors and an Orbital Deep Space Imager system. Data generated by the SBSS will provide detailed images of space objects, including satellites and orbital debris. The National Aeronautics and Space Administration (NASA) is also expected to use information from the SBSS to assist in debris avoidance for the International Space Station and in support of Space Shuttle missions.

The Space Tracking and Surveillance System (STSS), previously called Space-Based Infrared System – Low, will provide support for missile defense and counter-space situational awareness by tracking ballistic missiles throughout their entire flight, but particularly during the midcourse portion of their trajectories. STSS sensors are being developed to sense extremely dim targets and track and discriminate objects without burning rocket motors. This system will also assist in discriminating between re-entry vehicle warheads and decoys during the midcourse phase of flight and then cue ground-based tracking radars. STSS satellites are currently scheduled to launch in 2008 or 2009.

The Space-Based Infrared System – High (SBIRS – High), scheduled for launch in 2008 or 2009, will consist of four geosynchronous earth orbit satellites and sensor payload on two other host satellites in highly elliptical earth orbits over the North and South poles. SBIRS-High satellites will detect and report missile launches faster and more accurately than the Defense Support Program constellation of early warning satellites. They will also will detect and track shorter-range missiles with greater accuracy. Data from SBIRS-High satellites and sensors will be processed by Multi-Mission Mobile Processors (M3P), which will disseminate missile-warning messages to theater and strategic users. The M3P is the planned replacement for the Army's existing Joint Tactical Ground Stations (JTAGS), which are aging and increasingly difficult to maintain. The initial M3P systems are scheduled for fielding with the 1st Space Brigade in 2005.

Space-Based Radar will be capable of tracking and targeting stationary and moving enemy combatants in near-real time, day and night in all weather conditions over a large portion of the Earth on

(See Leveraging, page 48)

Leveraging ... from Page 5

a near-continuous basis. By combining Surface Moving Target Indication, Synthetic Aperture Radar imaging and High-Resolution Terrain Information data, SBR will be able to provide access to the Earth's surface unreachable by other intelligence, surveillance, and reconnaissance (ISR) sensors. The constellation's near-continuous surveillance capability will also complement other air, ground, sea, and Space-based sensor systems. The constellation is currently scheduled to begin launch in 2012 and ultimately could comprise a mix of Low Elliptical Earth Orbit and Medium Earth Orbit satellites.

Two other capabilities recently demonstrated their extraordinary contributions to enhancing the quality and quantity of information for Joint Warfighters: spectral imagery from Space-based satellites and Blue Force Tracking (BFT). Much has been written about the impact that unclassified imagery, delivered in a timely basis by Army Space Support Teams (ARSST), provided in the planning and conduct of operational missions during OPERATION IRAQI FREEDOM. The benefits of spectral imagery are likely to further increase in the future, especially as Army units conduct operations as part of coalitions. Spectral products derived from commercial sources may be shared with Allied forces, unlike imagery obtained from National Technical Means.

Commanders and Soldiers have long known the importance of having timely and accurate information on their own location, the location of the other friendly forces and the location of the enemy forces. The technology that perhaps gained the most praise for these essential operational requirements was Blue Force Tracking, or BFT, primarily due to its contributions to fratricide prevention and enhancements for situational awareness.

At the start of OIF, Coalition Forces arrived in theater with seven distinct BFT systems. Unfortunately, each of these systems had separate hardware, software, and means of transmissions, from unsecure line-of-sight to the use of encrypted satellite communications (SATCOM). Despite significant workarounds, BFT demonstrated its utility in preventing fratricide, tracking friendly forces and combat identification. The article elsewhere in this edition of the Army Space Journal provides additional information on the various systems and the great work being done to enhance our BFT capabilities.

Connecting the Dots for Enhanced Capabilities

Space is an integral part of the Army's future. In fact, the 2020 White Paper—Space envisions Space empowering Future Force units — Brigade Combat Team Units of Action (UA) and Units of Employment (UEx and UEy) — routinely exploiting "military and civilian Space systems to support decision dominance and decisive victory."

As part of a Joint, Combined, and/or Interagency Team, the Future Force will rapidly deploy formations to conduct entry and shaping operations to facilitate access by other forces, engage enemy forces and establish the conditions for follow-on success. The Future Force will then conduct decisive operations to achieve decisions based on: simultaneous operations, control of the operational tempo, and direct attack of the enemy's decisive points and centers of gravity. This new concept of operations will exploit superior knowledge of the battlefield, the enemy and friendly forces to wage relentless attacks against the enemy in near-simultaneous fashion.

Enabling this synchronized application of combat power will require the development of a secure grid that provides seamless capabilities to Warfighters: the Network. The Network, envisioned as a system-of-systems that encompasses all levels of battle command, will link commanders on-demand with the necessary voice, data, and video communication, command, and intelligence capabilities. Individual Future Combat Systems (FCS) systems and dismounted Soldiers will also be part of the Network.

The Network will be used to gain informational superiority, locate and identify the enemy and kill at a distance before the enemy can engage the FCS systems. The Global Information Grid, or GIG, which is being formed based on networks and communications systems, will provide the means for forces at all levels to achieve situational understanding and establish, maintain and distribute a relevant common operating picture for Joint Warfighters.

Support of this new CONOPS will require expansive increases in bandwidth availability, which is already in great demand. For example, during Operation Noble Anvil, the American component of the NATO action in Kosovo is estimated to have used from two to two and a half times the bandwidth used during Operation Desert Storm (ODS). Operation Enduring Freedom (OEF) in Afghanistan used some seven times the amount used during ODS and OIF used approximately 42 times the amount available during ODS.

In the near-term, bandwidth demand will continue to grow much faster than the available supply, particularly with sensors competing with communications to provide commanders operational information. This situation is not expected to improve in the near-term, and military SATCOM bandwidth will be limited, even with heavy dependence on commercial sources, until the Space-Based Transformational Communications System is operational. In fact, during OIF, U.S. forces relied on leased commercial bandwidth for 70 to 80 percent of the 3.2 gigabytes of bandwidth of SATCOM during the peak fighting. However, several Space-based SATCOM options are being developed to help fill Joint Warfighters' bandwidth requirements.

The Wideband Gapfiller Satellite (WGS) system, which will augment and eventually replace the Defense Satellite Communications System III (DSCS-III) Service Life Enhancement Program (SLEP) satellites, will provide communications during all levels of conflict short of nuclear war. These

satellites will transmit several gigabytes of data per second, up to ten times the data flow of today's satellites. The first of the WGS satellites is scheduled for launch in 2005.

The Advanced Extremely High Frequency (AEHF) satellite system is currently programmed for launch in 2007. The AEHF system will consist of satellites covering the globe and provide nearly worldwide secure, survivable, and jam-resistant SATCOM. Each of the AEHF satellites will provide a much greater capacity of the 1990s-era MILSTAR (Military Strategic, Tactical & Relay) satellites operating today.

Transformational Communications, which will use laser communications to substantially expand bandwidth and speed data transmissions is envisioned as a constellation of transformational satellites (TSAT) in geosynchronous orbit to support the military's future communications requirements. Envisioned to be many times more powerful than the AEHF, TSAT will revolutionize the U.S. military information networks. With laser cross-links between satellites that will exchange data at the speed of light, TSATs will become the key transport mechanism of the Network. The first satellite is scheduled for launch in 2012.

Turning Capability into Reality

Trained professionals are vital to integrating Space into the Army and leveraging Space as an essential combat capability for our Joint Warfighters. Establishment of Functional Area (FA) 40, formation of the Army's Space Cadre, conduct of the Army's Space Operations Officer Qualification Course and training and deployment of ARSSTs are only a sampling of our — and the Army's — realization of the importance of Space to warfighting. This importance will grow even more in the future as the new UEx, starting with the 3rd Infantry Division, receive their organic Space Support Element (SSE). Articles elsewhere in this edition of the Army Space Journal provide additional discussion on the Army's Space Cadre and details on the composition, equipping, and manning of the SSEs.

Leveraging the new technological capabilities — only a few of which were identified in this article — is entrusted to Space professionals serving as staff officers, members of the ARSSTs, or with the SSEs. Awareness of capabilities and their risks, how the UAs and UExs will fight and expertise in division-level operations are but a few of the essential skills. They must also be proactive, continually informing and training personnel on the value-added benefits that Space can provide to the unit.

Secretary of Defense Donald H. Rumsfeld recently said, "The United States cannot use 20th century thinking to fight in the 21st century; capabilities should not always be equated with numbers — one smart bomb is better than 10 dumb bombs; and, the country must think in 21st century terms." This statement is especially appropriate given the significant capabilities that Space can provide to the Army and our Joint Warfighters. The articles in this edition of the Army Space Journal provide great insights into the work being done to leverage Space for our asymmetrical advantage. I encourage you to read them and share the insights with those you support. Secure the High Ground!

Space Proponency ... from Page 9

determine innovative ways to get technology — wherever it is developed — into the field faster and with supporting TTPs that are agreed to by our joint partners. While this is certainly in its early stages, this is an exciting opportunity for us to shorten deployment timelines of new capabilities in a joint environment. Larry Burger and COL Jim Pierson are personally spearheading this effort. I encourage you to give them a call and share ideas that you may have to make this work.

(4) Expand Program Management and Warfighter Integration — Staying in touch with the warfighter, applying accepted practices, and defining new and different capability sets is crucial. We must understand our capability gaps, work with our partners in TRADOC, coordinate and deconflict developments across programs, and promote multi-faceted solutions that cut across functional boundaries. Solutions will be joint, interdependent, and end-to-end. To make this a reality, an Army Space Program Executive Officer (PEO) capable of integrating across multiple Army and Joint PEOs and an Army Space TRADOC Systems Manager (TSM) are critical.

Switching to another of my roles as SMDC Deputy Commander for Operations, I want to mention an historical event. On October 1, 2004, the ground-based midcourse defense (GMD) began limited defensive operations. While this is not a system that is manned by Space operations officers, I think it is well worth mentioning. This is the first time the nation will have had a shield against ballistic missiles since early 1976 when the Safeguard ballistic missile system was inactivated after only a few months of operations. Bringing the GMD online continues to be a tremendous effort conducted in concert with the Missile Defense Agency, the rest of the Army, the other Services (particularly the Air Force), and industry. Together, we were able to bring the system on line two years ahead of schedule. Kudos to all those who worked to bring this project to fruition.

SMDC/ARSTRAT's charter as the Army Service Component Command to USSTRATCOM brings with it other missions (Information Operations, Global Strike, and C4ISR) which are not inherently Space operations functions, but which depend on Space-based capabilities and concepts of operations to work. Each of those other mission areas has actions that have their own priority within the command and on my plate. None, though, will detract from this command's proponency oversight for Army Space operations and operators, from our ongoing space operations initiatives, programs and technological enhancements to Space support, or from our Space support to warfighters.

These are exciting times and the work you have begun is challenging and meaningful. I am excited and ready to be a part of its continued growth, and I am ready for the challenge.

Technology Development and Transition

Kwajalein complex makes unique contributions

Michael C. Schexnayder
Deputy Commander for Research, Development and Acquisition, U.S. Army Space and Missile Defense Command

By Michael C. Schexnayder

As the new SMDC Deputy to the Commander for Research, Development and Acquisition (RDA), I am excited that our organization is providing world-class Space support to the joint warfighter and national security Space team. Our job is to continue to develop innovative Space and technology solutions and assist technology transition to operational systems.

Space is increasingly critical to the Future Force by providing information and technologies necessary for the warfighters' day-to-day operations. In this article, I will highlight the unique contributions of the United States Army Kwajalein Atoll (USAKA) /Ronald Reagan Ballistic Missile Defense Test Site (RTS).

Space Control

The Army has a heavy and growing reliance on Space-based assets for communications, intelligence gathering, missile warning, navigation, timing, and weather. Unfortunately, this is well understood by our potential adversaries. One could expect the first act of hostilities may be an attempt to deny our forces access to these critical Space-based systems.

The Commission to Assess United States National Security Space Management and Organization[1] concluded, "We know from history that every medium – air, land and sea – has seen conflict. Reality indicates that Space will be no different. Given this virtual certainty, the United States must develop the means to both deter and to defend against hostile acts in and from Space."

Space control is the means by which Space superiority is gained and maintained to assure U.S. and friendly forces can use the Space environment while denying its use to the enemy. Space control relies heavily on its Space situational awareness foundation, which integrates Space surveillance, reconnaissance, intelligence, and environmental data to maintain reliable knowledge of the activities and environment in and through Space.

Within the U.S. Army Space and Missile Defense Command, USAKA/RTS is a unique contributor to the national Space control mission through its Space situational awareness capabilities.

This site is one of the most unusual and dynamic communities within the U.S. Army. It is comprised of nearly 2,500 contract employees, Soldiers and civil servants plus family members. It is located in the Kwajalein Atoll in the Republic of the Marshall Islands (RMI) in the central Pacific Ocean. Kwajalein Atoll lies approximately equidistant from Hawaii, Australia and Japan, just 700 nautical miles north of the equator.

The USAKA/RTS community, along with its international partners from the RMI, work together to maintain a world-class missile test range and a Space surveillance center.

The Kwajalein Space Surveillance Center (KSSC) is the command and control center for the USAKA/RTS Space surveillance mission and capitalizes on the synergy provided by the unique radar sensors that comprise the Kiernan Reentry Measurements Site (KREMS). KREMS is located on the island of Roi-Namur at the northern tip of the Kwajalein Atoll, approximately 54 miles from Kwajalein Island. KREMS is comprised of four instrument-quality radars, which were built over a 20-year period in support of missile defense programs.

The radars are TRADEX (L & S-Band), ALTAIR (VHF & UHF), ALCOR (C-band), and MMW (Ka-Band). These radars maintain their missile defense role but have been used increasingly for Space surveillance activities since the early 1980s.

Our Role in Space Surveillance

KSSC is a contributing site to the global Space Surveillance Network (SSN) and provides data to the

Space control relies heavily on its Space situational awareness foundation, which integrates Space surveillance, reconnaissance, intelligence, and environmental data to maintain reliable knowledge of the activities and environment in and through Space.

U.S. Air Force Space Command (AFSPC) Space Control Center (SCC) and the U.S. Strategic Command (USSTRATCOM) Joint Intelligence Center (JIC) on resident Space objects in support of the USSTRATCOM Space control mission. USAKA/RTS provides an average of 138 hours per week of Space tracking and up to 300 Space object identification image sets annually as tasked by the AFSPC SCC and the USSTRATCOM JIC, respectively.

Catalog Maintenance

USAKA/RTS supports the Space surveillance mission by collecting metric observations (time, range, azimuth, elevation and range rate) on both near Earth and deep Space objects in response to tasking from the SCC. These tracks help maintain the Space surveillance catalog, which currently contains approximately 10,000 objects. Not all forces acting on satellites are well modeled, requiring regular updates to the orbital parameters.

In addition, regular tracking of maneuverable satellites is required for timely detection of orbital changes. Catalog maintenance consumes the majority of the KSSC Space surveillance time, and each year KSSC contributes over 45,000 tracks. In addition, KSSC contributes about 1,000 tracks per year on objects that are determined to pose a threat to the Space Shuttle or International Space Station.

KSSC is often asked to provide re-entry support by confirming an object has decayed into the Earth's atmosphere. Of historical note, USAKA/RTS was the last site in the network to track the Russian MIR Space Station before it re-entered in 2001.

New Foreign Launches

Due to its unique geographic location, KSSC is generally the first site in the SSN to have visibility on Space launches from Asia, including Russia, China and Japan.

KSSC visibility of these launches generally begins just 15 to 20 minutes after launch and, as a result, KSSC maintains a 24-hour, 7 day-per-week sensor recall status to respond to these events. The data from the KREMS radars are critical for launch assessment and providing orbital information for sites in the network with later visibilities.

If USAKA/RTS misses a launch, it is often days until the payload is found and then properly identified and cataloged. KSSC supports more than 40 new launches a year and has achieved the remarkable distinction of a 100 percent success rate in tracking all new foreign launches within its visibility in four out of the last five years.

One of the most notable examples of a recent new foreign launch was the historic Chinese Shenzhou-V manned-Space flight on Oct. 15, 2003. As the first site in the network with visibility, KSSC successfully collected critical metric observations on the principal objects within the complex approximately 20 minutes after its launch from Jiuquan, China, and provided these unique data to the network immediately following the coverage interval.

The timely collection of correctly identified metric data is critical to the Space control mission. Recent experiments that combined the wide beamwidth search and acquisition capabilities of ALTAIR and TRADEX with the wide bandwidth identification capabilities of ALCOR and MMW demonstrated USAKA/RTS has a critical ability to provide correctly identified new foreign launch metric data, especially in regard to complex launch scenarios involving numerous microsatellites.

Critical Coverage of Geosynchronous Orbits

The geosynchronous belt contains the majority of the world's communications satellites. These satellites stay fixed in the sky relative to a ground station. Of the 20 sensor sites that comprise the global Space surveillance network, only four radar sites have the ability to track objects in geosynchronous orbit. Kwajalein is one of the four sites and because of its unique geographical location USAKA/RTS provides the only radar coverage for satellites in one third of the entire geosynchronous belt.

(See Test Site, page 50)

Test Site ... from Page 7

Space Object Identification

Wide bandwidth radar assets are critical to the SSN because they provide critical all weather, day or night imagery with resolution independent of range. The ALCOR and MMW sensors at USAKA/RTS are tasked routinely to collect data for Space Object Identification (SOI). This tasking comes from the USSTRATCOM Joint Intelligence Center and is used extensively for payload determination (size and shape), operation mode (i.e. mission), status monitoring, damage assessment, and motion determination.

Space Environment Studies

The reliable transmission of large amounts of information; the ability to provide wide area Space and ground based surveillance; and the availability of high integrity, high accuracy navigational information are increasingly important to the military as part of its desire for spectrum and information superiority. However, the ionosphere affects all trans-ionospheric radio frequency (RF) communications, surveillance and navigation systems operating at frequencies below 2 GHz.

USAKA/RTS routinely hosts programs that study the Space environment. Current projects include the NASA Equatorial Ionosphere Studies II and the Air Force Research Laboratory's (AFRL) Wideband Ionospheric Distortion Experiment. RTS hosts a ground station of the AFRL Scintillation Detection system which provides worldwide "nowcasting" of ionospheric disturbances that could disrupt communication systems. This site will also help validate the AFRL C/NOFS satellite which will provide forecasts of ionospheric disturbances. These programs are providing important contributions to our understanding of the ionosphere.

USAKA/RTS is clearly a unique and valuable entity. The outstanding government and contractor work force, the unique technologies and capabilities, and continued community support have combined to make USAKA/RTS a true leader in Space surveillance and a critical contributor to the national Space control mission.

[1] *This commission was established in 1999 by an amendment to the FY2000 Defense Authorization Bill and was chaired by Donald Rumsfeld.*

FORMAL ... from Page 25

ing the Army Space cadre within the eight life cycle functions (structure, acquisition, individual training and education, distribution, deployment, sustainment, professional development, and separation).

- Phase IV is a comprehensive analysis of the doctrine, organization, training, materiel, leadership & education, personnel, and facilities (DOTMLPF) domains to develop the final recommended Army Space Cadre Strategy for the Army.

The ASCF culminates with a briefing to the vice chief of staff, Army where recommended strategy and courses of action for implementation are presented and input is provided for resourcing requirements for Fiscal Year 2008-13 POM. The VCSA will decide which ASCF recommendations will be implemented and on what timelines.

An Army Space Cadre provides significant value. Foremost, it fulfills Congressional mandate, implements DoD directive, and meets guidance from the DoD Executive Agent for Space. The Army as a whole will profit from the efficiencies gained as a result of this FORMAL. A core of highly trained professionals will be identified and tracked to fully support the warfighters. This process will also increase the Army's capability to support combatant commanders and improve utilization of Army personnel. In the joint community, this FORMAL will enable the Army to participate in the joint arena on an equal footing and it also enables the Army to compete for joint resources.

The value that the Army gains from conducting a FORMAL cannot be overstated. FORMAL reviews are not intended to be stand-alone assessments. Rather, they are an integral part of the Army's Force Management process. FORMAL reviews provide valuable teaching mechanisms and a forum for horizontal and vertical exchange of information between HQDA and MACOM participants. Through this process the Army will improve management of its Space assets and develop systems to ensure proper education and career development for its Space professionals.

All Army MACOM POCs are encouraged to request access and visit the restricted FORMAL Web site portal at https://smdcspx.smdc.army.mil/sites/FDIC/default.aspx. All messages and correspondence pertaining to the FORMAL will be posted to this site for easy access information. (Requests for access may be addressed to mark.murray@smdc.army.mil.)

Ken Royston supports U.S. Army Space and Missile Defense Command's Force Development and Integration Center in Arlington, Va. He retired from the Army in 2001 as a senior personnel sergeant and has held staff positions in the Army Human Resources Command and 1st Personnel Command Liaison Office and served as 1SG, Headquarters and Headquarters Company Special Activities, Fort Belvoir, Va.

"Space Proponency and our Future"

COL Jeffrey C. Horne
Deputy Commander for Operations, U.S. Army Space and Missile Defense Command/ U.S. Army Forces Strategic Command

By COL Jeffrey C. Horne

It's great to be in Colorado Springs, Colo., the home of our Space warriors as well as one of the most beautiful, militarily supportive towns in America. My family and I are delighted to be here, and proud to be serving the Space community at a time that will one day be regarded as one of the foremost times of strategic and technological change in our history. Just take a look around — we are restructuring our defense department and combatant commands, defining new acquisition paradigms that enable us to respond to warfighting needs in real time, fielding the first global missile defense weapon systems and deploying Army space warfighters to all levels of a newly designed Army. We are serving amongst some of the finest leaders of our time, and most of them are young lieutenants and captains learning their trade in troubling, difficult times that require a sense of agility not seen in the years before them. You are America's Space pioneers, laying out the groundwork for those who follow.

We encourage you to serve with passion, tenacity, and a technical and tactical knowledge that surpasses that of your previous assignments. You are part of a new generation of Army leaders that are learning our craft at the cutting edge in one of our most challenging geo-political and technically complex environments. So, the question is: what are we going to do to set the conditions for your success in the future?

First, we must empower our commanders with deployed, well-trained Space operators who can optimize the full spectrum of our joint Space warfighting capabilities. We must facilitate the operations centers to work across branch-specific solution sets to provide an integrated product that meets the "so-what" test to joint task force commanders. Doing so enables a campaign-quality army that is vital to joint, expeditionary operations.

Second, our leaders and Soldiers in the field deserve the finest solutions we can develop and field in a fraction of the time traditional acquisition processes can deliver. The half-life of automation solutions today is barely over two years. We have to understand what's needed and turn a capability out to the field faster than ever before. How do we do that?

The Chief of Staff-directed Army Space Acquisition Study (we are completing) and the Army Space Master Plan (ASMP) the Force Development and Integration Center (FDIC) is developing lay out key improvements we should make:

(1) Optimize space operations — Deploy Space operators and maximize Space-based capabilities. Space operations are a key aspect of the non-linear battlefield. Sometimes we make it all too hard. We must build Space-based products into the daily routine of Tactical Operations Centers just as we did with emergent capabilities, such as aircraft, tanks, UAV's, and ballistic missile defense. All were new, different, cross-cutting innovations of their time that required new trains of thought to maximize their effects. We're developing global and theater concepts of operations, operations plans, and tactics, techniques, and procedures (TTP) to enable this process. This can't be done in an Army vacuum, but rather it must be done jointly with our partners in the Air Force, Navy, Marines, and with geographic combatant commands. We will therefore coordinate closely with U.S. Strategic Command (USSTRATCOM) and our fellow components.

Employing these new concepts, plans, and tactics requires us to look at our formations and ensure we have Space warfighters deployed along the depth and breadth of the battlefield to maximize our return on investment. Deploying Space operators at the theater, joint task force, land component headquarters, corps, and now at new modular division level is critical to this process. We are deploying Soldiers to the lowest practical level to ensure the commander in contact has all the "real-time" Space force enhancement and Space control capabilities he needs to win decisively. We're in the process of deploying emerging Space Support Elements to our modular division formations to make this happen today. LTC George Andary and his team of

You are part of a new generation of Army leaders that are learning our craft at the cutting edge in one of our most challenging geo-political and technically complex environments. So, the question is: what are we going to do to set the conditions for your success in the future?

professionals in 3d Infantry Division (3ID) are the first Space Support Element and are deploying a Space Support Element Toolset, one of over 60 other new Army capabilities from various program managers to enhance the 3ID's combat power. This concept will be duplicated in every Division in the next three years as the new modularity concept takes shape across the Army. Certainly this will require the Space force to expand both in numbers and importance to the joint warfight. Your agility, technical knowledge, combat arms tactical skills, communications skills and ability to support intelligence operations will be challenged, but make no mistake, you are up to the task.

(2) Recruit, train, and retain people — We mentioned deploying Space forces throughout the joint warfighting spectrum. That requires new and innovative ways to select, train, and retain our forces. The Army's Space Cadre must be defined differently and get larger using a combination of officers, warrants, noncommissioned officers and certified civilian professionals. These folks will design, acquire, operate and sustain our various Space systems and capabilities. The process of assessing and growing the Army Space Cadre is underway with a Department of the Army-directed, TRADOC-supported effort to determine how we can best identify, certify, develop, and manage it. This will continue into the summer of 2005. While it seems a long time in the making, we must do this correctly. We will have to begin increasing our troop strength in FY05 to keep abreast with the deployment demands of the future. This is no simple task in an Army that is defining needs for over 900 new field grade officers to support emerging modular force structures.

So we're in the business of developing warfighters: flexible, adaptive and competent Soldiers with a Warrior Ethos. We must implement the Soldier's Creed so all Soldiers are disciplined, fit, and deployable; all are well-trained and equipped for the mission and the environment; and all are ready to take lives and to save lives. We leaders must focus first on common combat-task training for our Soldiers and then on the technical and functional training required by the Soldier's position. We must put resources, e.g., time, people, money, facilities, against these tasks. We must innovate and ensure that Soldiers go into harm's way prepared and confident.

A final note on training. Clearly, success in this area is a tribute to both the quality of those selected and the training programs we have instituted. We've done well in both categories, but we have to take the next step toward jointness and shared TTPs and doctrinal development with our sister services. We hope to assign five people to the National Space Security Institute (NSSI) this coming year to begin the process of institutionalizing our training programs jointly and alleviating the burden on our Space Brigade and FDIC. We must continue training courses at Command and General Staff College and the senior service colleges of course, but we hope to integrate those into the NSSI curriculum.

Our numbers are growing steadily, and you are performing very well in the field. The 2004 Career Field Designation Board selected 12 promotable captains to join our ranks, and two majors transferred into FA40. In terms of promotions, you are being selected at rates higher than Army averages. This year's lieutenant colonel's selection board saw 88 percent of FA40s selected in the primary zone while the Army average was 79 percent. Senior Service College saw a selection rate of 9.6 percent for FA40's, compared to 7.9 percent for the Army as a whole. Additionally, we're increasing the size and functions of our Proponency Office. LTC Mike Powers, teaming with our new Human Resources Command assignment officer, MAJ Jay Driscoll, will be providing increased services to open communication with you to develop and balance your career across our Army, make the manning process more personal, give long-term predictability of assignments and play a larger role in selecting future paths for you and your family.

(3) Improve Concept Development — Another exciting change we are working our way through is the development of an integrated SMDC Futures Center. This initiative combines the SMD Battle Lab with FDIC into a single entity designed to interface with TRADOC and joint agencies. This effort is not confined to Space development, but will enable a closer link between our Army concept developers and technology insertion efforts supported by our research, acquisition, and development team in Huntsville. Our intent is to better serve TRADOC and the joint Space team supported by the Services and the National Security Space Organization (NSSO). We will be working to

(See Space Proponency, page 49)

satellites will transmit several gigabytes of data per second, up to ten times the data flow of today's satellites. The first of the WGS satellites is scheduled for launch in 2005.

The Advanced Extremely High Frequency (AEHF) satellite system is currently programmed for launch in 2007. The AEHF system will consist of satellites covering the globe and provide nearly worldwide secure, survivable, and jam-resistant SATCOM. Each of the AEHF satellites will provide a much greater capacity of the 1990s-era MILSTAR (Military Strategic, Tactical & Relay) satellites operating today.

Transformational Communications, which will use laser communications to substantially expand bandwidth and speed data transmissions is envisioned as a constellation of transformational satellites (TSAT) in geosynchronous orbit to support the military's future communications requirements. Envisioned to be many times more powerful than the AEHF, TSAT will revolutionize the U.S. military information networks. With laser cross-links between satellites that will exchange data at the speed of light, TSATs will become the key transport mechanism of the Network. The first satellite is scheduled for launch in 2012.

Turning Capability into Reality

Trained professionals are vital to integrating Space into the Army and leveraging Space as an essential combat capability for our Joint Warfighters. Establishment of Functional Area (FA) 40, formation of the Army's Space Cadre, conduct of the Army's Space Operations Officer Qualification Course and training and deployment of ARSSTs are only a sampling of our — and the Army's — realization of the importance of Space to warfighting. This importance will grow even more in the future as the new UEx, starting with the 3rd Infantry Division, receive their organic Space Support Element (SSE). Articles elsewhere in this edition of the Army Space Journal provide additional discussion on the Army's Space Cadre and details on the composition, equipping, and manning of the SSEs.

Leveraging the new technological capabilities — only a few of which were identified in this article — is entrusted to Space professionals serving as staff officers, members of the ARSSTs, or with the SSEs. Awareness of capabilities and their risks, how the UAs and UExs will fight and expertise in division-level operations are but a few of the essential skills. They must also be proactive, continually informing and training personnel on the value-added benefits that Space can provide to the unit.

Secretary of Defense Donald H. Rumsfeld recently said, "The United States cannot use 20th century thinking to fight in the 21st century; capabilities should not always be equated with numbers — one smart bomb is better than 10 dumb bombs; and, the country must think in 21st century terms." This statement is especially appropriate given the significant capabilities that Space can provide to the Army and our Joint Warfighters. The articles in this edition of the Army Space Journal provide great insights into the work being done to leverage Space for our asymmetrical advantage. I encourage you to read them and share the insights with those you support. Secure the High Ground!

Space Proponency ... from Page 9

determine innovative ways to get technology — wherever it is developed — into the field faster and with supporting TTPs that are agreed to by our joint partners. While this is certainly in its early stages, this is an exciting opportunity for us to shorten deployment timelines of new capabilities in a joint environment. Larry Burger and COL Jim Pierson are personally spearheading this effort. I encourage you to give them a call and share ideas that you may have to make this work.

(4) Expand Program Management and Warfighter Integration — Staying in touch with the warfighter, applying accepted practices, and defining new and different capability sets is crucial. We must understand our capability gaps, work with our partners in TRADOC, coordinate and deconflict developments across programs, and promote multi-faceted solutions that cut across functional boundaries. Solutions will be joint, interdependent, and end-to-end. To make this a reality, an Army Space Program Executive Officer (PEO) capable of integrating across multiple Army and Joint PEOs and an Army Space TRADOC Systems Manager (TSM) are critical.

Switching to another of my roles as SMDC Deputy Commander for Operations, I want to mention an historical event. On October 1, 2004, the ground-based midcourse defense (GMD) began limited defensive operations. While this is not a system that is manned by Space operations officers, I think it is well worth mentioning. This is the first time the nation will have had a shield against ballistic missiles since early 1976 when the Safeguard ballistic missile system was inactivated after only a few months of operations. Bringing the GMD online continues to be a tremendous effort conducted in concert with the Missile Defense Agency, the rest of the Army, the other Services (particularly the Air Force), and industry. Together, we were able to bring the system on line two years ahead of schedule. Kudos to all those who worked to bring this project to fruition.

SMDC/ARSTRAT's charter as the Army Service Component Command to USSTRATCOM brings with it other missions (Information Operations, Global Strike, and C4ISR) which are not inherently Space operations functions, but which depend on Space-based capabilities and concepts of operations to work. Each of those other mission areas has actions that have their own priority within the command and on my plate. None, though, will detract from this command's proponency oversight for Army Space operations and operators, from our ongoing space operations initiatives, programs and technological enhancements to Space support, or from our Space support to warfighters.

These are exciting times and the work you have begun is challenging and meaningful. I am excited and ready to be a part of its continued growth, and I am ready for the challenge.

The View From (Army) Space ...

By COL James R. Pierson

By now everyone has recovered from (or heard about) the FA40 training conference held in Southern California in early June. All indicators, and my personal assessment, point to a resounding success. Hats off to the Proponency Office for their planning and execution! Thanks to everyone for their attendance and professional contributions.

The effects of moving the Future Force to the left continues to be felt in many areas across the Army. Our efforts in building and embedding a Space Support Element (SSE) into the Unit of Employment (X), or UEx, are solidifying quickly. A collaborative effort between the Force Development and Integration Center, Battle Lab, many elements of U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command staff and Human Resource Command have kick started the manning, training and equipping of the 3rd Infantry Division (3 ID) SSE. Planning for a 3rd ID certification exercise and then a mission rehearsal exercise is well under way.

Very early indications are extremely positive, especially from the "dog-faced soldier" perspective. Planning for follow-on UEx conversions are also under way. Without a doubt, the manning of these SSEs is creating a certain level of pain across the FA40 community as the fill of these critical UEx assignments is causing near term shortfalls until we can reach an increased accession rate.

The Army and Training and Doctrine Command's modularity focus has shifted to the UEy effort and we are fully integrated in these planning and integration efforts. In all likelihood, we will also have an SSE, with a variance of manning and equipment from the UEx SSE, at the UEy level. Additionally, a revised Operation and Organization for the Unit of Action, now called the Brigade Combat Team, is being drafted that may also have FA40 implications.

Some very significant work by the 1st Space Brigade and FDIC has recently taken place in Joint Expeditionary Force Exercise '04 (JEFX 04) and Ulchi Focus Lens on the development of the theater Space Authority concept. We fully anticipate that this concept will continue to mature based upon current operations in Southwest Asia and future experimentation.

We have kicked off the Space Cadre FORMAL, a force management analysis chartered by the vice chief of staff of the Army, that will address how the Army will expand its current cadre of Space professionals, FA40s and 3Ys, to include our enlisted and civilian force. We are closely examining how the other services are addressing their Space cadre needs and working across the Army to identify potential billets and personnel for inclusion in the Army Space Cadre. The development of a professional Space cadre is clearly an item of interest to Congress, the Government Accounting Office and Department of Defense. The management of this cadre, as well as the training and education implications will be addressed over the coming months.

Speaking of education, we have successfully completed our initial integration of the Air Force's Space 200 course into our Space Operations Officer Qualification Course (SOOQC). This is the first step in the evolution of the multi-service National Security Space Institute. In September 2004 we begin our pilot Intermediate Level Education (ILE) addendum to the SOOQC, causing the course to grow to 10 plus weeks.

Down the road, most likely in the next issue of *the Army Space Journal*, we will introduce some

An important gathering of U.S. Army Space proponents gathered at Long Beach, California earlier in the summer. They toured space related facilities, received briefings on the latest issues in the proponency field and enjoyed a brisk run on the beach. *Photos by Michael L. Howard*

"lightning rod" issues that will be openly debated. Issues like, "Should there be a Space Force?," "Should FA40s command?," "Should near-space be the primary domain of the Army?" or " Should the Army ever be the Theater Space Authority?" will be debated in a pros and cons format. The intent is to generate serious discussion on relevant topics of interest for the Army Space professional. If you have topic ideas, please get them into Rich Burks (Richard. Burks@smdc-cs.army.mil).

With the many changes going on within the Army and the FA40 community, I am constantly reminded that the many and continuous successes that we enjoy are primarily due to the hard work, creativity and professionalism of our FA40s and the numerous Space professionals in the Officer Corps, NCO Corps, enlisted force and civilian force that support the FA40 career field. The Space Operations Officer in today's Army is a highly valued member of the joint warfighting team. We must all strive to strengthen the solid foundation that we have today.

Despite the professional focus of this Journal on Space operations matters, we must not forget that we are all warriors, first and foremost. Have you seen "A Warrior's Ethos" lately? You can view it or download it from the Army Web site (http://www.army.mil/thewayahead/links.html)

CPL Brown crouched alertly behind his Land Warrior Modular Weapon System/Enhanced Crew Served Weapon (ECSW). It was the middle of the night, with Beginning Morning Nautical Twilight still hours away. His teammate, PFC Jones, sat to his left with his ammunition close at hand, absent-mindedly staring into the darkness. Their position on the perimeter of 1-7 Infantry looked down a dirt road that wound into the hills, villages and forests of a country far from home.

The enemy was using a blend of information, unconventional and conventional warfare in attempts to keep U.S. forces off balance and the U.S. population at home discouraged. Brown's Soldier Information System (SIS) was strapped to his body armor. It provided information in both visual and audible forms inside his helmet. The system was based on the hand-held Joint Tactical Radio System. It had an embedded Global Positioning System (GPS) and informed all friendly forces of Brown's position while keeping Brown aware of his buddies' locations.

Earlier, Brown had filled out the series of pull-down menus that ensured his status as an ECSW team was correctly reflected in the Joint Blue Force Situational Awareness, (JBFSA) system that fed the User Defined Operational Picture (UDOP). He had also filled in his information requirements, noting that enemy mechanized forces were his first priority information request. His ECSW had its laser range finder mounted on the weapon. It interfaced with the SIS by a wireless interface. The team also had VIPER binoculars with laser range finder, again using wireless interface to the SIS. When the enemy was spotted, Brown could paint the enemy with his ECSW or the VIPER laser range finder, verify the information in the pre-formatted message in his helmet's heads-up display, and then forward it to headquarters.

The information would be sent automatically to any user that met the location or type of information requirement through the network-fires function. Brown didn't understand how Warrior Information Net-Tactical, or WIN-T, did all this, and didn't care. He just knew he liked knowing what was going on.

Brown stared intently into the dark. Hours earlier, he had received a warning that enemy formations were moving out of a mountainous area 20 kilometers away, heading toward U.S. forces. But at this point, it was not a threat to him. He had indicated in his information request that he was to be notified of any enemy formations within two kilometers of his location. It was this request that now triggered a faint chiming sound in his left ear. Brown activated his heads-up display on his helmet, and received the report that enemy mechanized forces had been scattered by U.S. air forces, aviation and Non Line of Sight (NLOS) fires, and that isolated enemy formations were working their way through compartmented terrain and forests and a small number of enemy infantry fighting vehicles were coming down the road toward him. Brown acknowledged the information, and nudged Jones in the ribs.

Earlier they had used their laser range finder to build their range card in the SIS, as did the other weapon systems on the perimeter. They knew exactly where they could engage, and the networked fires program in the SIS had built a complete picture of the perimeter, covering the dead spaces with NLOS and Beyond Line of Sight (BLOS) fires. This preparation proved valuable as Brown observed three infantry fighting vehicles through his helmet's night-vision device. They stopped at the edge of a gully 400 meters to his front. Brown pointed his ECSW at the enemy vehicles, activated the laser range finder, and observed the GPS one-meter accurate grid of the enemy vehicles, which he transmitted to his headquarters.

Within seconds, through the network-fires function in the SIS, every weapon that could engage the target was cued, slewed onto the target using their laser range finder, and ready to engage. In many cases, ECSW teams could barely see the target. But they knew they were oriented correctly to engage the enemy. The Fire Control System (FCS) crews had already calculated firing coordinates for a BLOS engagement, and a nearby FCS-Cannon section lay onto the grid with Excalibur GPS-guided munitions, ensuring target hit with only a few rounds.

In about two minutes from Brown sending the target, all units and positions that could engage the target had reported ready to fire. The target had been cleared as enemy through JBFSA and the SIS, and company headquarters had designated the firing units to engage the target. On cue, four rounds from FCS simultaneously impacted on the three enemy fighting vehicles, destroying them and their crews. Two FCS-mounted combat systems moved out of the darkness to the left flank of the enemy to finish the engagement. All the ECSW crews on the perimeter saw this on their SIS display, ensuring there was no chance of a friendly fire incident. The SIS (crew) emitted a warning sound and put the weapon on safe any time it was pointed at a grid listed as friendly in the JBFSA system. As the engagement ended, company supply forwarded the consolidated munitions expenditure report, based on the firing counts from each weapon's onboard sensor, to move an exact amount of munitions forward ...

— Glen Collins

BEYOND BLUE FORCE TRACKING

"Every warrior wants to know three simple things … Where am I? Where's my buddy? Where's the enemy?"

— Gen. Gordon Sullivan (USA, Ret.)

BEYOND BLUE FORCE TRACKING ...

PRECISION WARFARE!

By Glen Collins

Joint Blue Force Situational Awareness (note 1) is critical to answering the questions posed by General Sullivan and it provides the means for the information-enabled networked warfare scenario described on the previous page. By providing the "common grid" for all forces, GPS puts the battlefield on a numerical and geometric basis, and allows for efficient operations in virtually any area of military activity.

The system shares friendly locations provided by GPS with other elements, answering the questions of "Where am I?," and "Where's my buddy?" When the system's location is extended through the use of a laser range finder or other accurate sensor, then GPS-accurate Red-force Tracking is able to answer the third question, "Where's the enemy?"

A JBFSA system consists of four components:

1. A device for providing location (Global Positioning System)
2. A communications system to move grid locations back and forth (Joint Tactical Radio System)
3. Databases to store the locations
4. A display system — Global Command and Control System (GSSC) User Defined Operational Picture (UDOP)

The technology that provides these elements is not new. The location is provided by the GPS. With the fielding of GPS III circa 2010, pinpoint accuracies are to be expected. Communications can be provided by any communications pathway. However, the joint tactical radio system will have a GPS receiver and will move communications through terrestrial or Space links as needed.

The database software (e.g. Microsoft Access or Oracle) that stores user locations and information is also well established. Much of the work in implementing JBFSA rests in the fusion of the different systems' information into the UDOP. Currently, the Air Force has fielded the Hook-112 and tested the Combat Survivor Evader Locator, and the Army has fielded the FBCB2, the Grenadier Brat/MTX and the Movement Tracking System.

There are also several commercial systems used by the services (Figure 2). None of these systems feed directly into the UDOP, although some can be manually integrated. Without Joint Blue Force Situational Awareness (JBFSA), a joint UDOP is not possible.

Today's JBFSA technologies provide some limitations that future technologies will improve. GPS II's three to five meter Spherical Error Probability (SEP) provided today will be reduced to one meter with the fielding of GPS III.

The communications architecture in the Global Information Grid, or GIG, which includes the Warfighter Information Network-Tactical (WIN-T) and Joint Tactical Radio System, will provide seamless movement of data anywhere on the battlefield or wherever needed, giving a seamless JBFSA system.

The database and UDOP are mature technologies able to deliver full capabilities for a JBFSA system. Finally, the basic terrain data used to populate the UDOP and upon which we track our forces is currently at Digital Terrain Elevation Data (DTED) three or four. With the fielding of the Space-Based Radar constellation in 2012, the UDOP will use DTED level-5, giving high-resolution terrain data to one-meter accuracy. This is important to tactical operations and fire control calculations. These technological advances are not necessary to implement a JBFSA system, but they do improve it. There are currently no technical limitations to implementing JBFSA and Precision Warfare in the services.

The U.S. Army Space and Missile Defense Command's Battle Lab in Colorado Springs, Colo., is currently conducting the JBFSA Advanced Concept Technology

Rather than refighting the last great war … we should instead ask, "Given an emerging technology, how can we fight war more rationally?"

— J.F.C. Fuller

Demonstration (ACTD) under the charter of U.S. Joint Forces Command, the lead for JBFSA and U.S. Strategic Command. The Battle Lab is also working in close coordination with the Army G-6.

The primary purpose of this effort is to demonstrate the ability to fuse together the various Blue-Force Tracking (BFT) systems currently fielded into the UDOP. It appears the most challenging aspect of achieving JBFSA is fusing the "stove-pipe" systems used today to provide the UDOP, and designing an efficient database system that makes information available efficiently and effectively to conserve precious bandwidth in order to enhance battlefield victory. As this work progresses, the question that U.S Joint Forces Command must now ask is, "Now that we have achieved JBFSA, how will our joint and service CONOPS be affected?"

What does JBFSA enable? Precision … in everything we do. The JBFSA basis is a grid. This series of numbers provides an exact location of any asset, and gives insights on activities based on movement and terrain. The range and direction from one grid to another is easily calculated by any computer or calculator, and is based on simple geometry, the Pythagorean Theorem.

- The difference between two grid locations is calculated by using the Pythagorean Theorem A2 + B2 = C2

Knowing exactly where things are allows us to manage forces, fires, information, and logistics in a much improved manner.

Any review of military history and the battles fought will uncover numerous examples where maneuver forces were in the wrong place, losing valuable time to continue their mission, incurred friendly fire casualties from both direct or indirect fires, or where forces were incorrectly massed (too much or too little) to achieve the effects we desired. To compensate for this lack of precise understanding of our location and as well the enemy location, we devised complicated maneuver graphics, such as boundaries, fire support coordination measures, and free-fire zones — all for the purpose of ensuring that we didn't kill each other, and that we had sufficient forces to control terrain and defeat the enemy.

With JBFSA, maneuver and fire support graphics will be less necessary, as we will know exactly where forces are located. Once the enemy is located, and since all sensors in the battlespace will provide precise "common grid" locations, we can better calculate the fires and forces required to defeat that enemy. The information acquired by any one sensor can then be delivered to users based on precise locations and Requests for Information, enabling decision superiority.

Finally, as forces move in the battlespace and consume classes of supply, logistics requirements can be better calculated, and delivered to the right user at the right time and location. The integration of GPS-delivered precision into maneuver, fires, information and logistics is the basis for future precision warfare.

Thesis: Given we know exactly where each of our assets are located (due to JBFSA), how will that knowledge change the manner in which we conduct military operations?

Precision Maneuver

The Army has developed a pathway to achieve an objective Future Army. Enabled by decision superiority over the enemy, the Future Army will not use maneuver graphics as in the past, and will not "maneuver to contact" but rather "maneuver out of contact" and engage the enemy at a time and place of our choosing with effects from the FCS and stand-off joint fires. JBFSA is essential to the conduct of non-contiguous distributed operations as is currently being done in Iraq and Afghanistan, and planned routinely for the Future Army of 2010.

Precision Maneuver is a major change from the movement and placement of forces used in past wars. Army forces in Operation Iraqi Freedom used JBFSA and non-contiguous operations on a limited basis. Over the last year, the Army patched together a JBFSA system using Force XXI Battle Command

(See Blue Force, page 18)

Beyond JBFSA ...
Joint CONOPS

Knowing where your forces are located is only the beginning.
Now that you know … what can you do better?

Precision Maneuver

– Basis of network-centric warfare
– Based on JBFSA and DTED-5 digital terrain
– More agile movement in the battlespace
– Enables more efficient massing and economy of force decisions
– Increased situational understanding of Joint and coalition force dispositions and enhanced combat ID
– Better focus of engagement, information, and logistics support
– The right force … at the right time … at the right place!

Precision Engagement

– "Common Grid" and basis of networked-fires and network-centric warfare
– Based on JBFSA and DTED-5, combined with an integrated laser-range finder (LRF), embedded into weapons and platforms
– Accurate to one meter with fielding of GPS III
– LRF extends grid location to distant objects (terrain and blue/red forces)
– Precision networked agnostic sensors allow target engagement at any range
– Combat ID accomplished by querying JBFSA database (reduced incidence of fratricide)
– Air and missile attack capability established
– Enables networking of direct fire weapons
– The right effect … at the right time … on the right target!

Precision Information

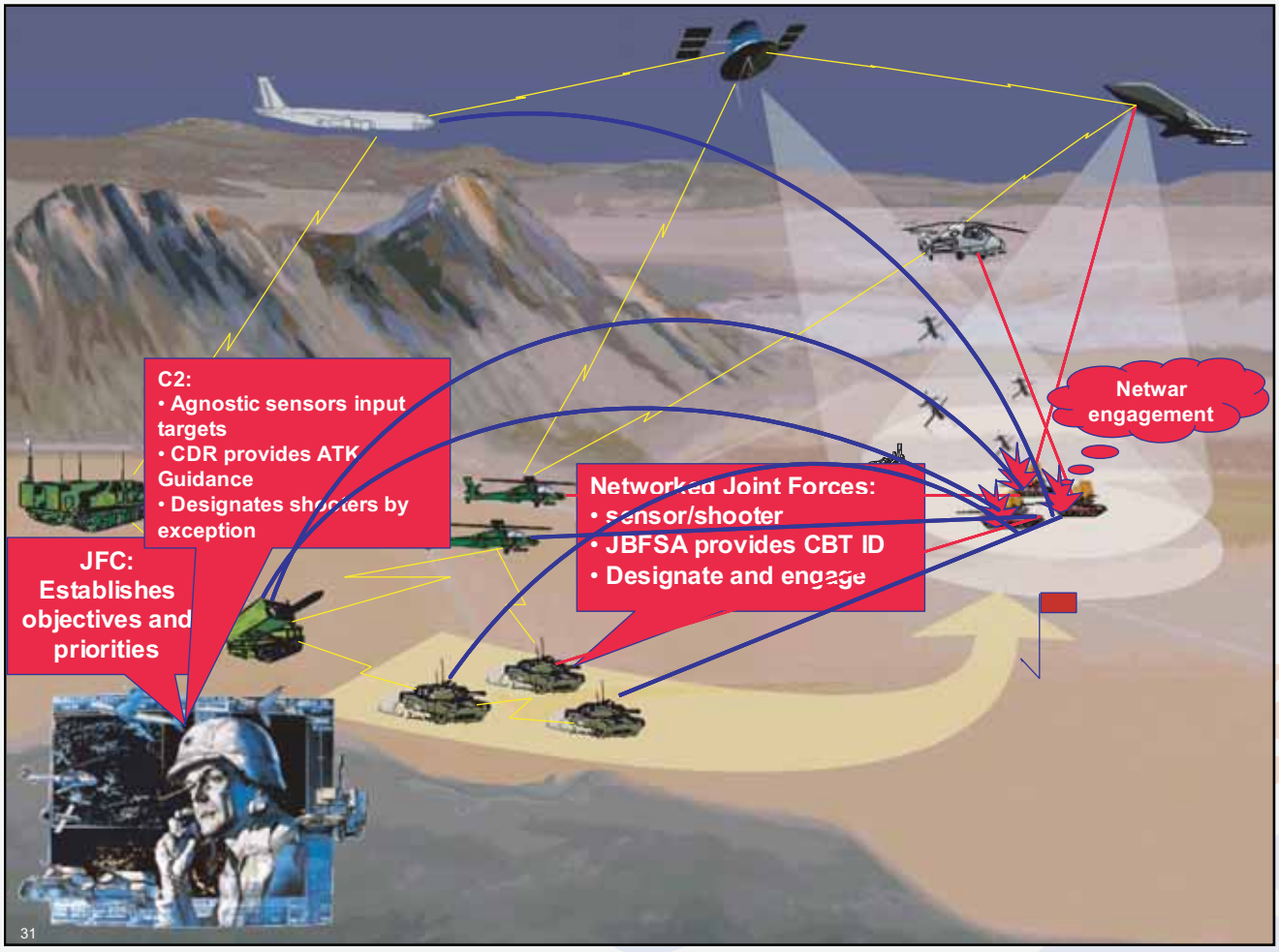
– Basis of network-centric warfare
– Based on JBFSA and DTED-5 digital terrain, stored in a distributed network of databases (based on NGA databases)
– Users (at every level to the individual combat platform) define their information needs in the JBFSA databases
– Every piece of information (blue and red) is "pushed" to users based upon the grid location and user-defined information requirements
– The right information … at the right time … to the right customer!

Precision Logistics

– Basis of network-centric warfare
– Based on JBFSA and DTED-5 digital terrain combined with barcode tagging of supplies
– Option of embedded logistics or user-defined logistic requests
– Logistics forces tracked same as maneuver
– Lesser requirement for LPI/LPD and secure comms
– The right support … at the right time … to the right customer!

Precision Warfare

– Basis of network-centric warfare
– Enabled by JBFSA + DTED-5 digital terrain + LRF
– A "revolution in military affairs?"



Blue Force ... from Page 15

Brigade and Below (FBCB2) and commercial satellite communication that allowed commanders at brigade and higher levels to know exactly where maneuver formations were located, allowing for more efficient integration of fires, information and logistics.

This early JBFSA system did not incorporate JBFSA to the lowest levels of all Army forces, and did not tie together fires, information and logistics into an integrated precision warfare C2 system.

Precision Engagement

The Army has always understood the importance of precision direct fires. Well aimed, semi-automatic fire and near sniper-quality marksmanship is a trademark of today's American soldier. The M1 Abrams tank is the best in history with first-round kill at ranges of just over three kilometers.

The Army also knows that the majority of missed targets for indirect fires are attributable to the simple fact that historically our observers often do not know exactly where they are, and therefore can't locate the enemy any better.

Air Force and Navy aviation have also discovered the efficiency of precision bombing. Starting with laser-guided bombs in Vietnam and building to today's GPS guided bombs and cruise missiles, single-round effects on target have allowed significant improvements in the number of targets that can be engaged from a single platform, and greatly improved logistic support.

The Army is beginning this move to precision engagement in its indirect fire systems with SADARM, Excalibur, and GPS-guided MLRS rockets.

The basis of precision fires is extremely simple. First, GPS provides the "common grid" for all fires. The observer/sensor and the firing platform are precisely located through GPS, and the locations shared in the C2 system through the JBFSA system. The observer/sensor locates a target, and either through the sensor technology or LRF, transfers the GPS grid onto the target, using a polar-plot method (range and deflection).

The target grid is then sent to the firing platform, which calculates the firing data for dumb munitions, and/or enters the target grid into the missile or round for smart munitions.

In the case of smart munitions, they must receive GPS updates while in flight, and using these updates they simply guide themselves onto the target grid. This process is range independent for smart munitions.

The least controllable variable in the ballistic equation is meteorological variables such as air density and winds, which can be accounted for by a single-round observed registration where the observer uses the LRF to determine the "did hit" data of the observation round, allowing second round fire-for-effect engagement, but not precision, even with dumb rounds. This is true for any

sort of delivered munitions, air or ground, direct or indirect.

Networked fires — direct and indirect

JBFSA is also the critical enabler of networked fires. Knowing precisely where each firing unit is in relation to the enemy allows for the C2 system and decision makers to efficiently determine which assets should engage a target, with the potential for all systems within range to have firing solutions calculated and ready to engage within moments, and with a minimum of commands.

By combining LRFs with JBFSA, and integrated into the firing platform, we can designate, cue and slew a firing system on a target without the need for human involvement during engagement. The firing platform knows where it is. The target grid is sent to the platform (cue), a range and deflection are calculated, and the firing device is oriented on to the target (slew).

The LRF engages the target to determine if the direct line to the target is clear (using the range function) and orients upward over the target to clear the ballistic pathway of the munition (direct fire). The target is engaged, and re-engaged with the LRF to determine movement.

If not moving, the sensor that acquired the target or sensors on the firing platform determines BDA, and the need for further engagement. This system would allow for robotic firing platforms, allowing a single human to control "swarms" of firing platforms.

Potential for long-range missile engagement

JBFSA, combined with global networks of ground, air, and Space sensors, provides the opportunity for a revolution in military affairs through engagement of an enemy by long-range fires delivered through the air, sea and Space.

Once a sensor acquires a target, accurate to GPS and inherent sensor error, a missile can guide itself on to the target independent of the range. The only limitation in range to a target is the amount of fuel in the missile, meaning there is no limitation.

The USAF is currently developing long-range attack systems, such as conventional ballistic missiles and the Common Aerospace Vehicle (CAV), which launch from the United States and can engage a target anywhere on earth in a matter of minutes to hours. This portends significant changes in future force structure, bringing into question the need for long-range bombers and Carrier Battle Groups for the attack of many types of fixed targets.

Precision Information

Today we use a push-pull information system that is often criticized for failures in both dynamics. Users forward Requests For Information (RFI) and Priority Intelligence Requirements (PIR) which are often vague, represent an amalgamation of numerous subordinate users, and are generally not precise by type information, location or timeliness.

The intelligence community does its best to push information forward to the customer using a process called TPED, or Tasking, Processing, Exploitation, and Dissemination that too often gets the wrong information to the wrong user. Using the JBFSA location tag, with database oriented RFI and PIR we can precisely deliver the right information at the right time to the right customer. It requires the communications bandwidth to move the information, and the databases to populate with information.

The user starts the process by logging into the JBFSA database(s), and through pull-down menus annotates the type information he needs by type, location, and timeliness. From then on, any time a piece of information is developed it is checked against these criteria and sent automatically to the user.

The only challenge in the delivery of Precision Information is the design of the database architecture to ensure redundancy of information storage, and efficient movement of information.

Precision Logistics

Although most of this discussion of JBFSA has focused on battlespace forces, the efficiency gained by logisticians knowing exactly where supply items are located is no less profound. The logistics community has already begun implementation of JBFSA of logistics operations through In-transit Visibility and Movement Tracking systems. All the same, principals and components of JBFSA discussed above apply to logistics.

Using bar code technology linked to a JBFSA system, logisticians are able to accurately plan production and movement of supplies, ensuring with a greater certitude the delivery of the right stuff to the right place at the right time. JBFSA, combined with the overall command and control system, gives the ability to compile supply usage more efficiently, to include calculating fuel use based on movement.

On-board sensors built into the Future Combat System and other new combat systems will provide automatic updates of maintenance status and supply usage, using the same communications paths, databases and displays as described earlier.

Summary

The services have engaged to make JBFSA a reality, and to varying degrees have accomplished answering the questions of "Where am I?" and "Where's my buddy?" Now is the time to ask the next question "What's beyond JBFSA?" which will enable the answer to "Where's the enemy?" and lead us down the path to Precision Warfare.

Notes:

1. Joint Blue Force Situational Awareness (JBFSA) is the "Knowledge of the position and status of our own forces (including a Space, air, ground and sea picture/track) to smartly employ them and/or protect them from hostile attack or fratricide"

Glen Collins left 26 years of Army service as a colonel in December 2003, and was one of the first FA40, Army Space Operations Officers. His last positions were as SMDC's Director of the Force Development and Integration Center, and served in Operation IRAQI FREEDOM from March to August 2003.

Developing Space Doctrine

By Ed Zehner

"In all environments, the initiative of Army leaders, agility of Army units, depth of Army resources, and versatility of Army Soldiers combine to allow Army forces to conduct decisive full spectrum operations … Space capabilities are thoroughly integrated into the force structure in order to enable all of these Army operations, and are essential for mission accomplishment." FM 3-14.00

Space support to Army operations is a critical element of the continuing success of Army land warfighting dominance. It is so pervasive it seems awkward to use one term, Space support, to describe all that is going on. Space-based capabilities support literally every Army operation because we have learned to take advantage of the impact Space can bring. The pages of this and every issue of *the Army Space Journal* testify to the many applications and undeniable utility of Space capabilities to terrestrial warfare. It would take volumes to document the many contributions Space makes to Army operations, and of course the work could never be finished.

Voluminous or not, and finished or not, significant portions of this information must be captured and distilled into doctrine. The Army runs on doctrine, and for good reason. The wise recording of what we know gives us an avenue to remind ourselves so lessons aren't lost, and to teach those who don't yet know.

Since writing and teaching everything about Space would hamper rather than help most Soldiers, we distill the knowledge into doctrine. (Not a listing of the basic facts about Space, or even checklists providing detailed procedures for the Space user.) Read a step, do a step, eat a banana. In other words, doctrine is intended to inform the Soldier not what to think (information) but how to think about Space. Tactics, techniques, and procedures go a step deeper in detail, laying out how to employ forces, methods of employing equipment and personnel, and how Soldiers perform tasks. This is much more than simple descriptions of Space capabilities, and is the purpose of FM 3-14.00, Space Support to Army Operations.

FM 3-14.00 is the Army implementation of Joint Publication (JP) 3-14, Joint Doctrine for Space Operations, 9 August 2002. The field manual is consistent with JP 3-14. For example, joint Space operations are divided into four areas: force enhancement, Space control, Space force support, and force application. Army doctrine adopts that structure. In addition, FM 3-14.00 is entirely consistent with higher level Army doctrine in FM 1 and FM 3-0. Army Space operations are carefully doctrinally integrated into other Army operations, they never serve their own purpose (Space for the sake of Space) nor is it intended for Space to be a separate entity which is then stovepiped into other operations.

Finally, FM 3-14.00 is informed by Air Force doctrine, AFDD 2-2, and other writings. Army terminology sometimes differs from that of the Air Force, but the general principles are the same. For example, the Air Force describes Space control in terms of offensive and defensive counterspace, which makes it consistent with air superiority doctrine. We use the term Space control consisting of protection, prevention, negation and surveillance.

"Army Space power is the ability to control and exploit Space assets to contribute to U.S. land warfighting dominance. Army Space power is a terrestrial entity and is land warfare centric. These two primary functions – control and exploit Space — form the basis for leveraging Space capabilities to enhance Army operations." FM 3-14.00

FM 3-14.00 is organized similarly to other Army doctrine manuals. Part I is principles, Part II is tactics, techniques and procedures, and there are several informative appendices which are neither doctrine nor TTP per se, but are very useful in describing what the Army is about in Space. According to Training and Doctrine Command Regulation 25-36, "Doctrine is the fundamental principles by which military forces or elements thereof guide their actions in support of national objectives. These principles reflect the Army's collective wisdom regarding past, present and future operations. They focus on how to think about operations, not what to think." Therefore, Part I of FM 3-14.00 lays out the required foundations of Space capabilities such as information on satellite orbits and basic terms and organizations involved in

Army Space, and then explains the Space based capabilities the Army uses (force enhancement) and the rationale for controlling Space.

The doctrinal principle of controlling and exploiting Space for Army purposes is then established. "Exploiting Space" is broken down to its parts, and the direct connection between Space capabilities and Army operations is made, although only in general terms and citing representative examples, again because it would require volumes to chronicle all the ways Space contributes to Army land warfighting dominance. Other principles are developed in similar fashion.

Part II is traditional TTP, but if you think TTP are simply lists of helpful steps to get it right, you will be disappointed. TR 25-36 relates that tactics are "descriptive" and require "the application of judgment." Techniques, methods of employment, are more detailed but will still "At times … require the application of judgment."

Unfortunately, just when a theme was developing we have procedures, detailed courses of action, which "may not require the application of judgment." Overall, however, the intent of TTP is not to provide mindless checklists allowing the Soldier to employ Space capabilities without thinking, and in fact that is not what you get from this FM's TTP either.

This article does not tell you *what* to think about Army Space Doctrine, it tells you

how

to think about it.

This TTP is written from the standpoint of the unit G-3. When they crack open their Operational Plan, as the battlefield takes shape and the commander decides how best to respond to the situation, the many combinations of potential maneuvers and weapon systems are considered. Space capabilities are among them. As specific objectives materialize and courses of action are weighed, the G-3 evaluates which Space capabilities could be employed. It follows the Army operations process of; plan, prepare, execute and assess. Again, it is not a checklist on how U.S. Army Space and Missile Defense Command goes to war, it is a process which the Army field command can use to factor targeted Space capabilities in to its operation.

Finally, the FM includes seven informative appendices. The first details the process used for the Space contribution to the commander's IPB. This is a unique piece of work not yet documented in general IPB doctrine and so is very valuable. The second appendix covers the following Army Space capabilities: U.S. Space and Missile Defense Command Operations Center, Blue Force Tracking Mission Management Center, Satellite Communications and SATCOM Support Centers, Wideband SATCOM Operations Center, Spectral Operations Resource Center, Commercial Exploitation Team, and Theater Missile Warning. Each section generally describes the capability, command and control arrangements if applicable, and how the capability is tasked. The next appendix details employment of Army Space Support Teams and is followed in the next appendix by a description of Space operation officer tasks when supporting an Army unit. The next appendix outlines Space support to the unit of employment – this is the Space Support Element. Then a set of diagrams showing SMDC Space organizations is given for information, and finally there is an appendix on normalizing, operationalizing and institutionalizing Space. This last appendix includes a section on the Army Space Master Plan.

The FM successfully underwent the Army-wide review process, and will be published this fall. Look for it on the SMDC Web site and the Reimer Digital Library Web site. We will spread the word when it is available.

As for the road ahead, since there are a number of important issues that are at a very dynamic stage right now, FDIC plans to post the first revision to the FM within about a year. The fact is, this was a difficult version to produce because Space capabilities are so ubiquitous in their contribution to the Army, and they are not "owned" by SMDC or any single major command. There are multiple competing interests that are difficult to reconcile in this document, but the common drive for U.S. Army land warfighting dominance provides a unifying forum from which to progress.

Effectively establishing and communicating doctrinal principles and TTP for all of Army Space is a fast-moving objective requiring impatient persistence, and persist we will. If you have doctrinal issues you believe should be included, please give Richard Burks at FDIC at richard.burks@smdc-cs.army.mil an outline of your thoughts, or send them to the FDIC doctrine email which is annotated in the FM's preface, fdiccd@smdc.army.mil.

"Global power brings global responsibilities to our nation and the Army. Among its array of formidable capabilities designed to fulfill those responsibilities, the Army's Space reach is global, with assets and operations literally around the world." FM 3-14.00

Ed Zehner supports the Space and Missile Defense Command Force Development and Integration Center in Colorado Springs, Colo. He retired from the Air Force in 2001 after a tour on the Joint Staff. He commanded two launch squadrons at Vandenberg Air Force Base, Calif., was a satellite operator at Falcon Air Force Base, Colo., and a Minuteman III ICBM launch officer at F.E. Warren Air Force Base, Wyo.

Army Space Master Plan

By LTC Rob King

As proven in Operations Enduring Freedom and Iraqi Freedom, today's battlefield extends vertically into Space, the ultimate high ground. As a Space-empowered force, the Army now and more so in the Future Force will exploit Space capabilities to enable future force concepts and the concepts of network-centric warfare.

Robust Space capabilities enhance information superiority and situational awareness, permitting high-tempo, noncontiguous, simultaneous distributed operations. If the Army is to best exploit Space for 21st century land warfare, joint Space capabilities must be shaped and influenced to provide those key enablers most beneficial to the Army. If you work in the Space "field," the aforementioned is well known. However, to many in the Army, the capabilities from Space are taken for granted.

Turn on your hand held GPS device and you get your location, turn on your television and you get 200 channels, plug in your satellite radio and you talk to the world. We all know these capabilities don't just happen, there needs to be a plan or roadmap to retain these capabilities while building new or future capabilities or systems.

The Army Space Master Plan (ASMP) is the roadmap for the Army's use of Space. It proposes a vision of Space as a key enabler of multispectrum capabilities to the Army and joint force commander. The latest version, currently awaiting signature, is the follow-on to the first ASMP published in 1998. Using The Army Plan as the baseline, Joint Operating Concepts (JOpsCs), Joint Functional Concepts, Army Concepts, and the Army Transformation Roadmap (ATR), the ASMP defines the nine key Space functional areas and provides a roadmap to address each of the concepts and capabilities required to support the warfighter in the near term (2006-2011), mid-term (2012-2020), and far term (2021-2030). It identifies Doctrine, Organizations, Training, Materiel, Leadership and education, Personnel, and Facilities (DOTMLPF) solutions to Space mission needs, and it assists the technical community by providing guidance for their science and technology plans.

The ASMP provides the links between Army prioritized needed capabilities and proposed Space solutions and identifies the most important Space-related tasks the Army must perform. These required capabilities are documented and reflected within the U.S. Army Training and Doctrine Command's (TRADOC's) Capability Needs Assessment (2005-2011) and driven further by the Space needs of the Future Force, global architecture interfaces (network-centric warfare), obtaining decision superiority, and the Army's overall transformation to a knowledge-based community. It considers all Department of Defense (DoD) and agency solutions to Army Space shortfalls and serves as a vehicle to document Army needs for support to the DoD executive agent for Space. Ultimately, it presents an integrated assessment of all Space functional areas.

Throughout the analytic and staffing process of the ASMP, the following key conclusions emerged about the role of Space in the Army's prosecution of land warfare:

- The Army's primary interest in Space is its role as an enabler of 21st century land warfare. Advanced technology will make available throughout the mid- and far-term planning periods both improved and new capabilities that will enable the information dominance essential to the transformed Army land force envisioned for the 2021-2030 time period. The aim is to hold and improve the asymmetrical advantages that Space capabilities bring to the joint fight.
- The most important Space tasks that the Army must perform relate to reconnaissance and surveillance, satellite communications, navigation, missile warning, Space control, and other Future Force applications from Space. These tasks contribute directly to the paradigm of information dominance and network centric warfare that is the cornerstone of future joint warfighting. The most important component of these tasks is the integration of Space enablers into overall Army command, control, communications, computers, intelligence, reconnaissance, and surveillance (C4ISR) capabilities.
- The highest priority shortfalls in performing Space tasks are in areas such as satellite communications (SATCOM) on the move; intelligence, surveillance, and

The most important Space tasks that the Army must perform relate to reconnaissance and surveillance, satellite communications, navigation, missile warning, Space control, and other Future Force applications from Space.

reconnaissance (ISR); terrain monitoring; missile warning against certain threats; and Space science and technology (S&T) and research and development (R&D) for Army-specific applications. Small improvements in these areas can have large impacts in the overall military utility of Space to land combat.

- The solutions that are prioritized as high across all three planning periods are those that contribute the most military utility to the most important Army tasks for Transformation and the Future Force (e.g., SATCOM, ISR, Space control, and navigation).
- Those solutions that rank low in relative priority, including exercise play, doctrine, Space education and training tend to be more narrowly focused or provide less direct overall military utility than those ranked above them, but are still important to maximize the contributions that Space makes. Several provide the DOTMLPF foundation required for the Army to best exploit Space.
- As Space-based capabilities take on roles in enabling joint warfare, protection of U.S. Space assets from adversaries and the ability to deny the benefits of Space to those adversaries become increasingly important. Space control is becoming a far more significant issue as potential adversaries gain the technology to threaten our asymmetrical advantage in Space.
- Force application from and through Space will likely emerge in the mid- and far-terms as a revolutionary joint force capability. Additional S&T and R&D are required to identify the specific technologies that will be applied in operational lethal and non-lethal Space force application solutions. Additionally, policy issues regarding Space force application must be resolved.

To accomplish Army Space goals and maintain its position as the world's dominant land force, the Army must follow a strategy that maximizes the benefits of the following key Space enablers.

- Continue to demand that the on-orbit capabilities provided by DoD, the other services, and government agencies meet Army needs.
- Continually and forcefully advocate the Space capabilities that the Army needs. Space capabilities are now defined in an inherently joint process that is largely controlled by the DoD Executive Agent for Space. Strong efforts are needed to press for new capabilities, assess compatibility with the Army information architecture, maintain program synchronization, and advocate Army interests in assured launch, replenishment, and control of on-orbit assets.
- Concentrate Army resources on exploiting the key aspects of Space that enable the Future Force and Army Transformation. Emphasize integration of Space-based and Space-enabled products into Army C4ISR, the common operational picture (COP), and force and logistics tracking. Focus on the people and tools to exploit Space such as terminals, ground exploitation systems, and the DOTMLPF components of Space enablers.
- Field organic joint or interoperable Space capabilities such as theater Space control assets that directly contribute to the land warfare mission.
- Continue to build a cadre of Space professionals with the depth and breadth of training, education, and experience to identify and refine Army needs for Space-based enablers and to bring the benefits of new Space-related capabilities to land warfare.

Most of the solutions presented in the integrated roadmap depend to a large degree on other services or agencies to field the basic Space capability (Joint Interoperability). The underlying assumption in this plan is that the Army recognizes its dependence on Space enablers to fight the joint war of the Future Force and will find the resources to exploit and defend Space.

What is next for the ASMP? The Space planning process used to develop the latest draft ASMP is a lengthy process. It took the mission area teams a full year to derive their final conclusions and to complete worldwide staffing. The intent for subsequent ASMPs is to publish it biennially. The next version will utilize the Army Campaign Plan and Joint Operating Concepts to a greater extent as the baseline. Expect to see more DOTMLPF solutions rather than having a heavy Materiel (M) focus as well as a format change that is more in line with the Joint Capabilities Integration and Development System.

Synchronization of our effort will also include involvement with the TRADOC Futures Center Capability Gap and Functional Needs Assessment as well as including the other services in the Space planning process and vice versa. We have already begun work with the Air Force on developing their Strategic Master Plan.

LTC Rob King currently serves as the U.S. Army Space and Missile Defense Command Liaison Officer to Training and Doctrine Command. LTC King would like to credit Gene Pheffer for portions of the article.

The Army Space Cadre FORMAL

By Ken Royston

The Army recognized its need for a core of professional Space operations and it created the Space Operations Career Field (FA40) — a dedicated career field of Space experts, trained and managed to function as dedicated Army assets for general Space-related operations. We continue to recognize the need to mature the process of identifying its Space smart professionals for proper tracking and management.

To that end, the Army has embarked on a Force Management Analysis (FORMAL) process to define its cadre of Space professionals and develop a comprehensive strategy for their education, training and development to meet mission requirements. This undertaking is a result of the recommendations by the Commission to Access United States National Security Space Management and Organization (known as the Space Commission), and directives published in subsequent Department of Defense (DoD) directives and legislation.

As stated in the DoD Space Human Capital Resources Strategy, people are central to our success in Space. Meeting the serious challenges of the future in Space requires competent people who are skilled in the operational demands of the Space medium, the tactical environment they support, the technical requirements of the vehicles that operate in it, the acquisition of Space systems, Space-related research and development, Space unique tactics, techniques and procedures, the needs of the many and varied end-users of Space capabilities, and in the ability to formulate and articulate new Space doctrine to fully control and exploit the medium of Space in support of our nation's security objectives. The strategy must also ensure that it supports the Army's unique mission requirements.

Agent of Change

In January 2001, the congressionally chartered Space Commission reported that the DoD lacked the senior level focus and accountability to provide guidance and oversight for national security Space operations. The commission, initially chaired by the Honorable Donald H. Rumsfeld (who left the commission in December 2000 after being nominated to become the secretary of defense), cited several shortcomings. They included a weak Space culture resulting in unfocused career development, education and training; lack of depth within the Space specialty; unqualified leaders serving short tour lengths; poor retention resulting in a shortage of scientist and engineers; and a shortage of personnel with both operations and acquisition experience.

In order to comply with the commission's recommendations, in June 2003, DoD published Directive 5101.2, designating the Secretary of the Air Force as the DoD executive agent for Space. Later this responsibility was delegated to the undersecretary of the Air Force. This was followed by the Fiscal Year 2004 National Defense Authorization Act, which required the secretary of defense to develop a strategy for DoD that would promote the development of Space personnel career fields within each of the military departments, and ensure that the Space personnel career fields developed by the military departments are integrated to the maximum extent practicable. It also required DoD to report its progress starting in February 2004 and provide a statement of the Space strategy. Congress also instructed the Government Accountability Office to review and report by June 15, 2004, on the effectiveness of the DoD strategy and of the services' efforts to develop Space personnel career fields.

Space is truly a joint and coalition capability as seen in this photo. Right SPC Daniel Coggins along with two unidentified British Soldiers set up a satellite link during Operation Iraqi Freedom.
SMDC Photo

In January 2004, the executive agent for Space was given guidance on the implementation plan for DoD Directive 5101.2, which required action in 11 specific areas.

- National Security Space (NSS) Plan
- NSS Planning and Programming Recommendations
- NSS Program Assessment
- Virtual Major Force Program (vMFP) for Space
- Space Acquisition
- Space Science and Technology
- Space Test and Evaluation
- NSS Best Practices
- Space Industrial Base Capability
- Space Capability Needs and Architectures
- Space Professional Cadre

All 11 functional areas have been or are in the process of being fully implemented by the military departments.

The FORMAL

In order to comply with DoD direction and GAO recommendations, Headquarters Department of the Army (HQDA) G-3 decided to utilize the FORMAL process to accomplish the requirement to establish a professional Space cadre.

The FORMAL was selected for several reasons. First, as the capstone force management tool, the FORMAL review provides intensive management forums to facilitate Army-wide integration of all activities required to produce and sustain mission capable units to perform Army missions. Secondly, FORMAL reviews allow senior Army leaders to resolve issues that effect the execution of short- and mid-range plans and programs. Finally, it provides a valuable forum for horizontal and vertical integration between HQDA, Major Commands (MACOMs), and all other stakeholders involved in a specific issue.

The FORMAL review process focuses on the Army's ability to maintain the readiness and the force capability required to support combatant commander requirements and other Army missions, while continuing to execute a coherent force modernization program across the Program Objective Memorandum (POM) years. The bottom line is: whereas a study includes a designated portion of the Army, the FORMAL is a mechanism that involves the entire Army.

To facilitate the process, the Army G3 designated the Army Space and Missile Defense Command — the Army's specified proponent for Space — to take the lead in the conduct of the Army Space Cadre FORMAL (ASCF). The guidance from the Army G-3 was to define the Army cadre of Space professionals, provide for professional military education to stress the application of Space systems in combat operations, and maintain a sufficient Space cadre with the capability to develop, plan, program and acquire Space systems uniquely required to support the Army's missions.

The ASCF officially kicked off July 23, 2004, in Arlington, Va. During the initial meeting, the office of the DoD executive agent provided an overview, and representatives from the Air Force and Navy outlined their efforts to define their Space cadre, key terminology and proposed Space education. The ASCF lead action officer outlined the rules of engagement concerning the conduct of the FORMAL and provided an overview of critical timelines, actions and requirements.

The ASCF comprises four phases:

- Phase I will establish an Army-unique definition for the Army Space Cadre for use in the remaining three phases.
- Phase II is a vertical analysis of all Army structure conducted by all elements of the Army to identify roles, missions, organizations, functions and personnel based on the approved Phase I Space Cadre definition.
- Phase III is a functional review which reviews and develops, comprehensive Department of the Army policies support-

(See FORMAL, page 50)

Test Site ... from Page 7

Space Object Identification

Wide bandwidth radar assets are critical to the SSN because they provide critical all weather, day or night imagery with resolution independent of range. The ALCOR and MMW sensors at USAKA/RTS are tasked routinely to collect data for Space Object Identification (SOI). This tasking comes from the USSTRATCOM Joint Intelligence Center and is used extensively for payload determination (size and shape), operation mode (i.e. mission), status monitoring, damage assessment, and motion determination.

Space Environment Studies

The reliable transmission of large amounts of information; the ability to provide wide area Space and ground based surveillance; and the availability of high integrity, high accuracy navigational information are increasingly important to the military as part of its desire for spectrum and information superiority. However, the ionosphere affects all trans-ionospheric radio frequency (RF) communications, surveillance and navigation systems operating at frequencies below 2 GHz.

USAKA/RTS routinely hosts programs that study the Space environment. Current projects include the NASA Equatorial Ionosphere Studies II and the Air Force Research Laboratory's (AFRL) Wideband Ionospheric Distortion Experiment. RTS hosts a ground station of the AFRL Scintillation Detection system which provides worldwide "nowcasting" of ionospheric disturbances that could disrupt communication systems. This site will also help validate the AFRL C/NOFS satellite which will provide forecasts of ionospheric disturbances. These programs are providing important contributions to our understanding of the ionosphere.

USAKA/RTS is clearly a unique and valuable entity. The outstanding government and contractor work force, the unique technologies and capabilities, and continued community support have combined to make USAKA/RTS a true leader in Space surveillance and a critical contributor to the national Space control mission.

[1] *This commission was established in 1999 by an amendment to the FY2000 Defense Authorization Bill and was chaired by Donald Rumsfeld.*

FORMAL ... from Page 25

ing the Army Space cadre within the eight life cycle functions (structure, acquisition, individual training and education, distribution, deployment, sustainment, professional development, and separation).

- Phase IV is a comprehensive analysis of the doctrine, organization, training, materiel, leadership & education, personnel, and facilities (DOTMLPF) domains to develop the final recommended Army Space Cadre Strategy for the Army.

The ASCF culminates with a briefing to the vice chief of staff, Army where recommended strategy and courses of action for implementation are presented and input is provided for resourcing requirements for Fiscal Year 2008-13 POM. The VCSA will decide which ASCF recommendations will be implemented and on what timelines.

An Army Space Cadre provides significant value. Foremost, it fulfills Congressional mandate, implements DoD directive, and meets guidance from the DoD Executive Agent for Space. The Army as a whole will profit from the efficiencies gained as a result of this FORMAL. A core of highly trained professionals will be identified and tracked to fully support the warfighters. This process will also increase the Army's capability to support combatant commanders and improve utilization of Army personnel. In the joint community, this FORMAL will enable the Army to participate in the joint arena on an equal footing and it also enables the Army to compete for joint resources.

The value that the Army gains from conducting a FORMAL cannot be overstated. FORMAL reviews are not intended to be stand-alone assessments. Rather, they are an integral part of the Army's Force Management process. FORMAL reviews provide valuable teaching mechanisms and a forum for horizontal and vertical exchange of information between HQDA and MACOM participants. Through this process the Army will improve management of its Space assets and develop systems to ensure proper education and career development for its Space professionals.

All Army MACOM POCs are encouraged to request access and visit the restricted FORMAL Web site portal at https://smdcspx.smdc.army.mil/sites/FDIC/default.aspx. All messages and correspondence pertaining to the FORMAL will be posted to this site for easy access information. (Requests for access may be addressed to mark.murray@smdc.army.mil.)

Ken Royston supports U.S. Army Space and Missile Defense Command's Force Development and Integration Center in Arlington, Va. He retired from the Army in 2001 as a senior personnel sergeant and has held staff positions in the Army Human Resources Command and 1st Personnel Command Liaison Office and served as 1SG, Headquarters and Headquarters Company Special Activities, Fort Belvoir, Va.

Tactical Space Support Elements (SSE)

By LTC Richard Dow

For more than four decades our Army's use of and dependence on Space has been continuously growing, as have the corresponding vulnerabilities. At the beginning, our limited military Space capabilities resided exclusively at the national and strategic levels with Space-based communications and imagery capabilities. Today our Army has embedded the world's most sophisticated Space capabilities throughout all echelons to include individual weapons platforms and foot Soldiers. This decades old effort to enable our Army with Space capabilities has "normalized Space" capabilities in that Space equipment has been fielded, trained, integrated and sustained throughout the force.

The Army's next phase is to tactically "operationalize Space" by successfully integrating all Space capabilities and operations into planning, exercises, training and all phases of combat operations. The tactical operationalization of Space begins with the introduction of Space Support Elements (SSE) into each of the Army's reorganizing "modular" divisions (Unit of Employment x (UEx)). Each tactical SSE will serve as the focal point for fully integrating Space operations (planning, integration and coordination) and capabilities into division and brigade level plans and operations.

Over the past few years SMDC has supported both the Combined Arms Center and Training and Doctrine Command with the development of concepts for UExs and tactical Space support. As a result of these doctrinal and conceptual efforts, TRADOC approved TRADOC Pamphlet (TP) 525-3-14, The United States Army Concept for Space Operations in Support of the Objective Force in April 2003. In part, this TP states;

"Army Space Support Element (SSE), composed of qualified Space operations officers (FA40s) will be located throughout the Objective Force and will be the primary focal point for leveraging Space capabilities.

The SSE integrates and synchronizes Space assets in support of operations; coordinates the enhanced access to joint, national, civil and commercial Space systems; provides Space input and recommendations to UE planning activities; and coordinates the protection of friendly Space capabilities and the negation of enemy Space capabilities. As a special staff element, the SSE maintains active communications and data links with several Space-related organizations within the theater or Joint Operational Area ."

The SSE

An SSE at a division/UEx level consists of four FA40 Space Operations Officers and two MOS 31S NCOs. These six Soldiers will serve in the Force Applications Cell at each of the two Tactical Command Posts and the Plans Cell of the MAIN Command Post.

SSE Mission

The SSE ensures the planning, integration and coordination of the Space mission areas into UEx plans, orders and operations. The SSE;

- Provides the commander and staff expertise, experience, and professional knowledge to ensure the

Left: Jamie Dunlap (left) and Robert O'Connell unpack the 1.8-meter dish, part of the equipment set of the vehicle-mounted-shelter for the Space Support Element. Right: Jamie Dunlap of Battle Lab Experiments Division, grinds a part to fit that will hold an important piece of equipment in the vehicle-mounted-shelter that will provide coordination of friendly Space capabilities and deny the enemy Space operations capabilities.

Space portion of the battlespace is fully understood.

- Provides assured access to all available Space-based products and services to support current and future operations.

- Ensures full use of Space-based capabilities for intelligence, focused surveillance, area reconnaissance, communications, early warning/battlespace characterization, position, velocity, navigation, time, Blue Force Tracking (BFT), combat identification and precision engagement), integrated tactical warning and attack assessment, environmental monitoring, and dynamic tasking and retasking of Space platforms with direct downlinks to enhance the warfighting effectiveness of combatant commanders.

- Facilitates augmentation by specialized Space forces when required and ensures reachback to all supporting Space forces and organizations.

- Supports UEx operations in conjunction with joint, interagency and multinational organizations and Non-Governmental Organizations (NGO) across the full spectrum of operations.

SSE Unique Tasks

The SSE is the focal point to maximize the use of Space related capabilities across all battlefield functional areas. In this capacity, the SSE provides the staff with certain unique skill sets, training, experience and enabling technologies to perform a number of tasks. Some of these unique tasks include, but are not limited to:

Space Intelligence Preparation of the Battlefield

- Friendly, commercial, enemy Space systems and capabilities.
- Friendly force Space units, organizations, forces, assets, tasking, processing, posting, updating, command and control relationships, "Where," "How," "Why" and "When" friendly Space supports tactical commanders.
- Analysis regarding how Space systems will impact the commander's battlespace, (i.e. enemy overflight activity).

Space Weather Analysis

- Impact on satellite and terrestrial communications, intelligence, surveillance and recognition, navigation, missile warning and battlespace characterization.
- Assist in fault isolating satellite system problems.

GPS Analysis — Support to Blue Force Tracking and Precision Engagement

- Impacts on BFT, status of forces, history, trouble-shooting.
- Impacts on employment of GPS aided munitions and target acquisition devices.
- Predictions on navigational accuracy.
- Analysis of BFT device vulnerabilities, reliability and capabilities.

Theater & Global Reach to Space Forces, Products, Analysis

- Access to worldwide Space forces, organizations, databases, broadcasts, analysis, "Who," "Where" and "What" is available to support tactical commanders.
- Assures access to and optimizes all available Space-based products and services.
- Facilitates augmentation by specialized Space forces when required.

(See SSE, page 51)

SSE ... from Page 27

Development of Space-Related Targets

- Space control-negation (satellites, ground stations, links).

The SSET

The SSETv2 is a "proven prototype," non-type classified commercial off-the-shelf/government off-the-shelf-based system, which has been under development, testing and experimentation since 1997, and which has also been combat tested in Operation Iraqi Freedom and Operation Enduring Freedom. Each SSET consists of an M1113 High Mobility Multipurpose Wheeled Vehicle mounted Rigid Walled Shelter v5 and is configured with one Second-Generation Anti-Jam Tactical UHF Radio for NATO (SATURN) communications suite (includes IRIDIUM, International Maritime Satellite, and a commercial Internet Protocol-based SATCOM terminal), four Space Operations System workstations and a tactical server. Each SSE will receive this new system.

The Road Ahead

Army Campaign Plan

From FY2004 to FY2007 the Army Campaign Plan calls for each of the Army's 10 Active Component divisions to reorganize. These 10 SSEs, will be comprised of 40 Space Operations Officers (27 percent of the current FA40 population) and 20 Non-Commissioned Officers.

Given the current environment of the Global War on Terror and the CSA decision to accelerate the pace of transformation, this effort will involve a significant impact in terms of Army Space personnel and equipment. Future plans involve assigning one FA40 Space Operations Officer at each Brigade/Unit of Action, and a Space Support Element at the Corps/Unit of Employment y level. SMDC is working to address the emerging challenges of personnel and equipment resourcing, technical and procedural integration, doctrine development and the related assessment requirements implicit in this effort.

U.S. 3rd Infantry Division

The 3rd ID, will deploy to Iraq beginning in FY05. 3rd ID SSE will support the Space needs of their division and subordinate Units of Action (UA) and Brigade Combat Teams. Analytical efforts, led by SMDC, with a focus on the 3rd ID's SSE, will serve to provide our Army the full doctrine, organization, training, materiel, leadership, personnel and facilities, insights, lessons and requirements needed to further the operationalization of Space at the tactical level.

Space and Missile Defense Command

The U.S. Army SMDC will continue to "institutionalize Space" by making Space a part of the way the Army doctrinally thinks and fights. This effort also includes building organizations to deal with Space, providing Space education and developing Space literacy throughout the Army, growing a cadre of Space professionals, publishing Space doctrine and maintaining a vision and roadmap of how the Army can best exploit Space now and in the future. Some near-term (FY04-05) SMDC efforts include:

- Developing requirements for a Program Manager and TRADOC Systems Manager "Tactical Space."
- Refinement of SSET design and capabilities.
- Establishment of an SSE Qualification Course.
- Updating FM 3-14, refinement of tasks, reachback, staff support.
- Updating the UE(x) SSE TTP.
- Conducting a comprehensive SSE assessment.

The activation of numerous tactical SSEs is occurring during the Global War on Terrorism (GWOT), a war that will involve years of continuous operations in a Phase IV (Stability and Support Operations) environment. Essential to the successful operationalization of Army Space by the SSEs in a Phase IV/GWOT environment will be the ability to refine the doctrinal requirements of how Space supports the various threats against U.S. forces in this current environment, such as, small arms attack on dismounted patrols, improvised explosive devices/vehicle borne improvised explosive devices/grenade/rapid propelled grenade attacks against convoys, mounted patrols, U.S. compounds, NGOs, VIPs, mortar attack against U.S. compounds, sabotage of pipeline and trains, Man-Portable Air Defense attacks against U.S. aircraft, ambushes, weapons smuggling through checkpoints, surveillance of U.S. installations, troop movements along country borders and infiltration of foreign fighters over borders.

The experiences of 3rd ID's SSE in OIF will set the conditions for follow-on SSE's integration and operationalization, and will provide the necessary insights to fully develop the doctrine and techniques, tactics and procedures to ensure that SSEs will provide useful, relevant and focused Space capability to tactical Forces.

In the end, Army SSEs will operationalize Space and empower tactical commanders and warfighters with America's Space power to more effectively and efficiently conduct military operations, now and into the future.

LTC Rick Dow is an FA40 officer assigned to the U.S. Army Space and Missile Defense Command, Force Development and Integration Center and serves as the SMDC/ARSTRAT "Trail Boss" command lead for Space Support Element fielding. His previous SMDC assignment was the Intelligence, Surveillance and Reconnaissance team leader, FDIC, SMDC/ARSTRAT. His professional experience includes 15 years as a Military Intelligence officer, having served in various tactical intelligence command and staff positions, as well as a combat development tour working Tactical Exploitation of National Capabilities requirements and concepts. He is a graduate of the Space Operations Qualification Course and recently graduated from Webster University with a master's degree in Space Systems Operations and Management.

Virtual Mission Operations Center

By SSG Dale Schoenfelt

Getting information directly from Space platforms to troops in the field has always been a complicated process. The idea of troops in the field actually controlling on orbit assets to support their operations is viewed as purely science fiction. Not anymore. Thanks to a joint team working on an operationally responsive Space initiative, commanders, as well as mission controllers and Space operations officers, will soon have the capability to command and control Space and near-space platforms and sensors, introducing new possibilities in dynamic Space support.

This next-generation Space capability uses Internet Protocols (IP), and a concept known as the Virtual Mission Operations Center (VMOC), to support command and control of platforms and sensors from nearly anywhere on Earth. Future Spacecraft, also using the concept of open IP standards, will become nodes in the Global Information Grid. Thus, the future of Space support consists of rapid accessibility from any point on the Internet, and VMOC will provide the means to control that access.

According to Steve Groves, the VMOC project director for Army Space and Missile Defense Battle Lab, this project will advance military and NASA air and Space core competencies by laying the groundwork for the use of IP and graphical user interfaces throughout Space communications, leading the way to a single, robust, responsive network for terrestrial and Space operations.

Groves strongly believes in the virtual mission operations concept but says he is a realist and understands that the entire experiment may not go exactly as planned or that the results will all be as expected. However, he said the only failed experiments are those not conducted with true scientific methodology and that the purpose of the Battle Lab is not to push a product but to prove or disprove the utility of new equipment and new concepts to the warfighter.

This concept is an initial proof-of-concept for the Office of the Secretary of Defense Rapid Acquisition Incentive – Net Centricity (RAI-NC) pilot program. It is executed as a collaborative experiment between the Air Force Space Battlelab (AFSB), Army Space and Missile Defense Battle Lab (SMDBL) and NASA's Glen Research Center. This concept was originally developed in 1999 during a NASA technical investigation and General Dynamics proposal; other industry partners in this endeavor include Cisco Systems, Western DataCom and Segovia.

The VMOC system will provide all of the functionality of a typical mission control center from a standard desktop or laptop computer. Users will be linked via the Internet to a server that will in turn be linked to databases, ground stations, Space and near-space platforms and sensors. This system will query and direct resources on the network to provide users with information or to carry out tasks in response to the users' specified needs. For instance, a theater commander will be able to request images of force positions on the battlefield and further specify that the images be no more than 12 hours old. If the requested images already exist and were taken within the specified time frame, they are immediately retrieved and delivered to the commander. If no suitable images exist, the system will automatically determine if the image can be taken from existing satellites, schedule the satellite to take the image, notify the commander when the image will be available, and transmit the image to the commander as soon as it is.

Army SMDBL is deploying equipment and personnel to Vandenberg Air Force Base, Calif., for initial experimentation of the VMOC capabilities in June. The contractor developed an application which will reside on servers and will provide the virtual mission operations environment. The two VMOC servers will operate in a "pilot" and "co-pilot" mode with one functioning as the prime controller and the other shadowing operations so a rapid handoff can be made in the event of a malfunction. The primary VMOC server is located at the Center for Research Support (CERES) on Schriever Air Force Base, Colo., with

SGT Tara Tomasino prepares for a live telemetry pass from UK-DMC satellite through the Virtual Mission Operations Center.

the "co-pilot" server located at NASA's Glenn Research Center in Cleveland, Ohio.

The testing site will be configured similar to a typical deployment location including two Base-X tents and a HMMWV with a mounted shelter. Inside the shelter, the team has a mobile, self-contained Space operations node called the Space Support Element Toolset (SSET). This node includes computers with Space operations analysis and visualization software, in addition to the standard suite of office software, an IP satellite system, encryption devices and power supplies.

Using the SSET, the deployed users will access the Internet and log into the VMOC system, providing them direct access to a micro-satellite. The satellite is one of the United Kingdom — Disaster Monitoring Constellation satellites, built and controlled by Surrey Satellite Technologies Limited. This satellite was successfully launched Sept. 27, 2003. Onboard this satellite, which is also part of NASA's Cisco Router in Low Earth Orbit (CLEO) project, is the world's first Mobile IP router in Space.

CLEO is a joint demonstration, with the Air Force Space Battlelab, Army SMDBL, NASA, Cisco, Western DataCom, Surrey Satellite Technologies Limited, and General Dynamics. The demonstration uses a miniature router, aboard the micro-satellite, that is controlled with an Internet Protocol-based command and control application — VMOC.

Accounts created in the VMOC system will provide the appropriate levels of access to different users, from those authorized to only query online databases, all the way up to individuals authorized to command and control the Space or near-space assets. When users log in, the VMOC authenticates the identity of the users, determines what level of access each user has, and enables them to see and control only their own authorized elements. Since multiple users can simultaneously access the system, it will also handle scheduling and contention control of conflicting requests. Since this test will access an actual on-orbit platform that has a primary mission, limited satellite commands will be sent for command and control in conjunction with the Surrey Satellite Technologies Limited's ground station.

(See VMOC, page 52)

In simpler terms ...

Virtual Mission Operations Center: Leading us into the future.

By SGT Tara Tomasino

Have you ever wondered what it would be like to make history? To actually do something that has never been done before? That's what members of the Space and Missile Defense Battle Lab did when they deployed to Vandenberg Air Force Base, Calif., in June.

For the first time in history, the open Internet was used to communicate with a satellite in Space using a newly developed concept known as the Virtual Mission Operations Center (VMOC). The VMOC is designed to use Internet Protocols (IP) to control both satellites and their payloads. This is accomplished by a series of communications with a satellite via the Internet to various ground stations.

"Last Wednesday (June 10, 2004) we made history for the first time by being in a standard Web environment talking to a commercial mobile router in Space," Said Capt. Brett Conner from the Air Force Space Battlelab. "That was completely new. That shows a different way of doing business than what we're doing now in Space systems."

What this means is, for the first time, users will be able to request needed information directly from a satellite. Users can do all this from any computer with an Internet browser. "What's astounding about this is, with the same ease of use [as navigating through a typical Web page], these guys are able to task satellite platforms and get the information requirements — the pictures that they need," said Steve Groves from the Army's Space and Missile Defense Battle Lab. "It's not high tech at the user end."

When the requested information is made available, the user is notified that the information is ready for download. This is called a "smart pull." According to SSG Dale Shoenfelt also from the Army's Space and Missile Defense Battle Lab, "The Soldier on the ground can decide what they need and go out and retrieve it, instead of having tons of information pushed at them that they then must sort through."

However, since the VMOC is designed to maximize our use of the information gained from Space, the VMOC allows the user to search existing databases for the information the user needs. In the situation where the warfighter needs images of the battlefield that do not currently exist, VMOC will then take the additional steps to task an on orbit sensor to take the necessary pictures.

"Because the VMOC searches the information that is available before tasking the satellite, this prevents the waste of satellite time and access, which will save us money." SSG Shoenfelt said. "This is some cool [stuff]."

VMOC ... from Page 29

This experiment will help answer several key questions:

- Can VMOC provide secure operations over the Internet?
- Can VMOC validate multiple users and perform contention control?
- Can VMOC schedule access time to the satellite in relation to users' priority and precedence?
- Can users obtain real time data from the satellite?
- Can VMOC identify the appropriate ground station for routing commands?
- Will fail over from one server to the other be seamless and transparent to the operator?

All traffic, in and out of the system, will be monitored and outside agents will conduct active intrusion testing to prove system security. The combination of operations and security testing will help determine if Internet Protocols are appropriate for these tasks. When asked why this concept was so important, Groves replied that Space communications and operations must rapidly adapt to keep up with the changing needs of the military.

With the current state of satellite operations, each satellite has its own dedicated architecture, stovepiped command, control and communications systems, and a highly asymmetric data flow. Each constellation is a standalone system and requires entirely new software applications for testing, training and operating, all at enormous costs for each new system.

According to a DoD chief information officer document entitled Net-Centric Checklist, Version 2.1, "The Transport Infrastructure is a foundation for Net-Centric transformation in DoD and the Intelligence Community (IC)." To realize the vision of a Global Information Grid, ASD/NII has called for a dependable, reliable and ubiquitous network that eliminates stovepipes and responds to the dynamics of the operational scenario – bringing Power to the Edge. To construct the Transport Infrastructure DoD will:

- Follow the Internet Model
- Create the GIG from smaller component building blocks
- Design with interoperability, evolvability and simplicity in mind

The new Transformational Communications Architecture will utilize Internet Protocols to ensure interoperability between terrestrial and Space-based systems. DoD networks currently use IPv4 and the DoD CIO's stated goal is to "Enterprise-wide deployment of IPv6" by FY2008. New satellite systems will be net centric and have dual purpose. They will continue primary missions of communications or collection of data but they will also operate as nodes on the network and will provide connectivity for other systems in the shared infrastructure.

VMOC will be an integral part of the whole system by providing security and management for all users throughout the system.

Virtual Mission Operations will also provide significant cost savings by allowing "test before you fly" of satellites. A not uncommon problem is finding out late in satellite integration that some parts will not work with others, or simply do not work at all. This means months or years of delay and additional expenditures to the satellite program as well as programs dependent on that satellite. If the problem is serious, the satellite may have to be disassembled and returned to the various facilities to determine what went wrong and make corrections.

When satellite components are designed with common interfaces and protocols, integration testing of the components can be conducted while the components are still "on the bench." It will be a simple matter of connecting the components via the network regardless of where they are in the country. Problems that would prevent integration can be detected long before the first physical integration. The Virtual Mission Operations Center will provide a controlled, secure testing environment and is a vital part of that scenario

Space systems will become integrated with the global communications infrastructure. In the same way the different terrestrial systems created to carry voice, data and video are merging into one network, Space systems will merge with the terrestrial network. By applying open standards and machine-to-machine tasking, a user on one system will be able to request information from another system without having to learn the specific commands of that distant system or wait for human intervention. Virtual mission operations will provide users, especially at the "last tactical mile," the ability to operate systems and get the information they need to accomplish their mission.

SSG Dale S. Shoenfelt is the Space and Missile Defense Battle Lab Virtual Mission Operations Center (VMOC) NCOIC. Shoenfelt has been assigned to SMDBL since August of 2003. He has worked on various projects such as LEOPARD, the Multi-use Ground Station and the Virtual Mission Operations Center. Shoenfelt has traveled to many states within the continental U.S. in support of Net Centric Command and Control (NCC2), to include Vandenberg Air Force Base, Calif., for the initial VMOC experiment and demonstration.

SGT Tara R. Tomasino is the Space and Missile Defense Battle Lab Near-Space NCOIC. Tomasino has been assigned to the SMDBL since August of 2003. She has worked on various projects such as Blue-force Tracking, the Space Operating System, the Space Support Element Toolset, Near-Space initiatives and the Virtual Mission Operations Center. Tomasino has traveled to many states within the continental U.S. in support of Net Centric Command and Control (NCC2), to include Vandenberg Air Force Base, for the initial VMOC experiment and demonstration.

Top: The Virtual Mission Operations Center team stands in front of the Air Force Space Command missile at Vandenberg Air Force Base, Calif.

Bottom: The Virtual Mission Operation Center experiment set-up and location.

Inset: SSG Dale Shoenfelt and Air Force Maj. Hawkins watch live telemetry updates from UK-DMC satellite

Joint Manning and Merging Missions with the M3P

"So in the Libyan fable it is told that once an Eagle, stricken with a dart, said when he saw the fashion of the shaft, 'With our own feathers, not by others' hands, are we now smitten."
— Aeschylus

By MAJ J. Dave Price

The Multi-Mobile Mission Processor (M3P) is a Pre-Planned Product Improvement (P3I) for the Army JTAGS (Joint Tactical Ground Stations), but was originally conceptualized to also replace the Air Force's Mobile Ground System, Mobile Ground Terminals (MGT) at a cost savings of over $100 million. JTAGS is operated by U.S. Army Forces Strategic Command and the 1st Space Brigade headquartered at Peterson Air Force Base, Colo. The 1st Space Company (Theater Missile Warning) commands and controls three detachments and six sections deployed throughout the Contintental U.S., European Command, Pacific Command and Central Command.

The Mobile Ground System is operated by the 137th Space Warning Squadron in Greeley, Colo., by the Colorado Air National Guard and provides up to six deployable units worldwide in support of a strategic global mission. The U.S. Navy and the Naval Network Space Operations Center supports JTAGS operations from Detachment E in Germany by providing 16 JTAGS operators and 1 OIC (JTAGS-PACOM Detachment Commander) to OCONUS sections at any given time. The Navy provided some of the original cadre of personnel to Germany and implemented the communications interfaces and message formats (Tactical Electronic Intelligence) which remain in use today.

Currently the 1st Space Company is fielding five M3P systems to replace the JTAGS shelters. This effort will be complete by FY06. JTAGS sections will remain in operation until the fielding is complete. The M3P system is a ground based SBIRS (Space based IR satellite) system that was designed to remain viable with the Defense Support Program, or DSP constellation until the SBIRS constellation (with Highly Elliptical Earth Orbit/Geosynchronous Earth Orbit launches) has been fully implemented. This increment two system is called the DM3P (or DSP capable M3P) and the Army will field the first five M3P systems as DM3P. The M3P was originally designed to perform the theater and strategic event processing to cover the spectrum of global missions. The Air Force has elected to continue using the MGT until fixes are in place and the SBIRS constellation is operational and is waiting for GM3P, or Geosynchronous Earth Orbit (SBIRS) capable M3P, before it replaces this system.

The MGT will remain operational until global strategic mission requirements can be met. Global strategic mission requirements will be met initially by a combination of DSP and Highly Elliptical Earth Orbit/Geosynchronous Earth Orbit satellites.

The tenth and last shelter (which will be the first Army GM3P) will not be fielded until 2012 at which time, the Army will upgrade and reconfigure the first five DM3P systems into GM3P. There is a historical and on-going initiative to work out a plan to cross-pollinate and merge missions across the Space community. U.S. Strategic Command is taking the lead in this endeavor.

The preplanned product improvement for JTAGS is designed to provide combatant commanders with a system that is relevant, decisive, and eventually integrated into Limited Defensive Operations (LDO) and Ballistic Missile Defense Systems (BMDS) as an early alerting and queuing system.

SBIRS sensors will have faster scan rates and greater sensitivity. This provides commanders with a continuous, assured, ballistic missile early warning and BMDS queuing system in theater. It is both an insurance policy and force multiplier by supporting all tenants of global missile defense; attack operations, active defense, passive defense and BMC4I. In-theater missile defense remains viable today and will be for the next 10-15 years as a major contributor to Centimetric Early Warning and LDO-BMDS. After this, the M3P will become eclipsed by other theater event systems unless Space Tracking and Surveillance (STS) enhancements are added. The DM3P currently is projected to have capabilities gaps in dollars but steps are being taken now by ARSTRAT and the PEO-ASMD to close most of these gaps in FY 07.

The Defense Support Program Multi-Mobile Mission Processor shelter undergoes testing to ensure support to desert operations. ***SMDC Photo***

As well, the Army still has a requirement for a sixth GM3P shelter that is currently unfunded through FYO9.

There is no current plan to overlap training and manning of the M3P systems jointly even though it has been discussed for 5-10 years. One of the problems is that the Army still needs to provide Space soldiers who have an military occupational specialty (MOS) or additional skill identifier (ASI) that allows him/her to develop JTAGS and Space expertise. Until this time, there is not an enlisted Space Soldier that can be assigned worldwide in ballistic missile warning and defense positions or other Army Space billets in varying commands.

The Navy has manned and supported the JTAGS shelters since inception in 1991 and currently plans to support M3P operations according to a long term memorandum of agreement (MOA) between the sister services. However, there are many other advantages to joint manning and training. 1st Space Company operates its individual qualification training at Fort Bliss, Texas internally and provides trained JTAGS operators and sailors to the field. There is an institutional trainer funded by the Army for the M3P but this current shortfall will not be fixed until FY07. However, the logical theme would be to make the institutional trainer available to the joint force, regardless of who is the proponent.

With the fielding of the M3P, the Force Development and Integration Center will pick up the training mission from the 1st Space Brigade. However, for a GM3P capable of meeting both joint global mission requirements, it makes sense to develop a POI that will meet the requirements of the Air Force and Army and possibly resource instructors from both of these organizations. The Navy already provides a contractor liaison to the individual qualification-training course at Fort Bliss. Unfortunately for joint operations, the Air Force and Colorado Air National Guard will continue to sustain, man and operate the MGT until a replacement (such as the GM3P) is capable of meeting the assigned global strategic mission set.

Additionally, when it comes to manning there are a lot of areas that the services can capitalize on. In example, the Navy sends reservists to the JTAGS individual qualification training and periodically in the summer, they support JTAGS forward units with these sailors during their annual training. In a paradigm shift, the 193rd Space Battalion could be called upon to provide a section or five crews of M3P operators to the force structure. They also happen to be Colorado Army Guardsmen, which would make it easier to perform training and execute an MOA with the Colorado Air National Guardsmen who will eventually get the M3P. The problem of having equipment to work and train on during weekend drills could be overcome with the cooperative effort of joint manning and training between these organizations. There are multiple areas that the Space community can overlap manning and training between National Guard, Reserves and active service components.

It is important to realize that JTAGS and MGT have distinctive missions that are not currently overlapping and that the M3P does not yet meet important Army or Air Force mission requirements and operational capabilities. The GM3P is capable of processing most or all of the data that is common to both. This includes strategic and tactical ballistic missile warning for Centimetric Early Warning, survivable and endurable missions, support of LDO and BMDS, and the strategic or global OCONUS relay missions.

The same tactical and MILSTAR communications systems capability would still need to be provided to all of the fielded systems. Once the GM3P provides the Air Force a MGT replacement capable of meeting mission requirements we will be able to achieve net savings in resources and manpower. With the global USSTRATCOM mission today, it is even more important to take advantage of combining missions through jointly manning these systems with a great opportunity to get a bigger bang for our stretched buck. With a little effort by all the services and good program management, we can make this a reality. In our own fable, let us not be the Eagle smitten, but the one who soars above individual service bureaucracy and desires in this truly joint Space and global mission-focused community.

MAJ J. Dave Price is the 1st Space Company Commander (Theatre Missile Warning) in Colorado Springs, Colo. He commands three Detachment Commands with two JTAGS sections each and is resposible for fielding and replacing the JTAGS sections with the M3P. He recently served with the 3rd Armored Cavalry Regiment during OIF I and is a graduate of the Greek Command and Staff College in Thessaloniki, Greece.

Tip of the Sphere

Above: Vice President Dick Cheney, GEN Ralph E. "Ed" Eberhart, U.S. Northern Command commander, and Lynne Cheney share the stage before hearing the vice president thank the Soldiers, civilians and contractors who do so much for the homeland defense effort.
Right: Vice President Cheney addresses the troops at Peterson Air Force Base, Colo. *Photos by Ed White*

CHENEY PRAISES MILITARY COMMAND FOR HOMELAND DEFENSE EFFORTS

By Ed White

PETERSON AIR FORCE BASE, Colo. — Amid a din of cheers and chants of "USA, USA, USA," about 1,200 military and civilian employees listened to the message that Vice President Dick Cheney brought during his Aug.. 2, visit to the mountain base. The stated purpose of his visit was to express his appreciation to the military and civilian force that constitutes and supports the U. S. Northern Command.

"Your mission here is nothing less than the defense of America's land, sea and air space. In our vast, open nation that is a heavy responsibility and you meet it every day," Cheney said. "The terrorists will fail because men and women like you stand in their way."

The vice president's message was not lost on his audience. Many have served either in Afghanistan, Iraq or both. He said, "The enemy is perfectly prepared to slaughter anyone, man, woman or child, to advance its cause. This is not a foe we can reason with or negotiate with or appease. This is, to put it simply, an enemy we must vanquish. And we will vanquish this enemy."

In describing the administration's policy on handling the terror threat he said, "President Bush is determined to remove threats before they arise instead of simply waiting for another attack on our country."

The homeland has become a battleground Cheney noted and added, "That is why NORTHCOM is such a critical addition to our military strategy."

Citing NORTHCOM's and U.S. Army Space and Missile Defense Command's efforts he noted, "We have made extraordinary progress toward deploying a National Missile Defense system. And that is one of the great contributions to national security over the last three years."

Cheney also outlined the administration's goals in support of the military. "Our job is to provide you with the best possible equipment to do your missions, to make sure you receive the end pay you deserve and to support military families at home. We have made that commitment to you, and we will keep it," he stated.

He made special mention of the importance of the military family in support of their service members.

"At bases around the world, from here at Peterson, to Camp Pendleton, to Yongsan Garrison in South Korea, my wife, Lynne and I have witnessed the selfless devotion and courage of our military families," he said. "America is enormously proud of our military families."

He also thanked the active, reserve and National Guard component members for their service to the nation.

"In their courage and sacrifice, America's Guardsmen and Reservists have earned the respect and gratitude of the entire nation."

The vice president's final message was clearly stated.

"We understand the threats before us and we have the resources, the strength and the moral courage to overcome them."

Ed White has 18 years experience in military public affairs and is currently an editorial assistant working for the FDIC to help produce the Army Space Journal.

Colorado Springs welcomes new deputy commander for operations

By Ed White

PETERSON AIR FORCE BASE, Colo. — COL Jeffrey C. Horne became the new deputy commander for operations of U.S. Army Space and Missile Defense Command and U.S. Army Forces Strategic Command (SMDC/ARSTRAT) in a welcome ceremony in Colorado Springs, Colo., June 30.

"What a great opportunity to be here and to serve our Soldiers," Horne said. "This is the fulfillment of a Soldier's dream, and I'm incredibly excited to join such a distinguished, combat-ready, battle-proven warfighting team."

Addressing the members of SMDC/ARSTRAT, Horne said, "I commend your incredible success. You have the greatest, most operationally experienced military, civilian work force and industry support team I've seen. Together you have sent Soldiers to war, performed beyond expectations in all tasks, gotten every Soldier home safely to his or her family and continue to support Space Soldiers. All this was done while simultaneously converting to our role as the Army component to U.S. Strategic Command. This is an incredible set of feats for any fighting force."

LTG Larry J. Dodgen, left, commanding general, U.S. Army Space and Missile Defense Command and U.S. Army Forces Strategic Command welcomes COL Jeffrey Horne, the command's new deputy commander for operations. *Photo by Dennis Plummer*

In looking to the future of the Space cadre and the command, Horne stressed the fact that "this business is about people." He commended the growth of the command, and the expanded direction of the Space cadre to include noncommissioned officers and civilians. He praised the ongoing joint educational efforts with the Air Force Space Command and highlighted the importance of the Ground-based Midcourse Defense program and the Global Ballistic Missile Defense System.

"The Missile Defense Agency, USSTRATCOM, Northern Command, SMDC/ARSTRAT and Air Force Space Command have spearheaded this effort together for several years, and now amazingly enough, we are only days away from putting missiles on alert in defense of our nation, our allies and troops deployed abroad," Horne said.

Horne is a native of Columbus, Ohio, and graduated from Ohio State University with a bachelor's degree in marketing and economics. He holds a master's degree from the Naval Post Graduate School, with a focus on computer science and electrical engineering. He is a graduate of the Army Command and General Staff College and the Army War College.

"We welcome a great Soldier to Colorado Springs as your new deputy commander," said LTG Larry J. Dodgen, commanding general, SMDC/ARSTRAT, during his introduction of Horne. "Col. Horne will do the right thing for the mission of SMDC. There's a lot of momentum here and a lot of support for the warfighter," Dodgen continued.

Horne's most recent assignment was as the TRADOC System Manager for Ground-based Midcourse Defense. He represented the Army, the commander of SMDC, and the commander of the U. S. Army Training and Doctrine Command in their combined role as the Department of Defense lead service for the GMD program.

Horne's past assignments include commander, 1st Battalion, 62nd Air Defense Artillery, 25th Infantry Division (Light), and assistant executive officer and chief of operations for the deputy commanding general (Futures), Training and Doctrine Command.

As the Army Service Component Command to U.S. Strategic Command, SMDC conducts Space operations and provides planning, integration, control and coordination of Army Space forces and capabilities; acts as a proponent for Space and Ground-based Midcourse Defense; is the Army operational integrator for Global Missile Defense; conducts mission-related research and development; and is the focal point for desired characteristics and capabilities in support of USSTRATCOM missions.

Missile Defense Agency dedicates GMD site at Fort Greely, Alaska

By MAJ Laura Kenney

MG John W. Holly, right, Missile Defense Agency's program director for the Ground-based Midcourse Defense program, and Diane Hutchinson, special assistant to the Honorable Ted Stevens, U.S. Senator, Alaska, unveil a monument dedicating the missile field complex at Fort Greely, Alaska. The ceremony marked the end of the initial construction phase of the complex.

FORT GREELY, Alaska — A ceremony July 3 signified a milestone in the nation's emerging missile defense program.

Maj. Gen John W. Holly, program director for the Missile Defense Agency's Ground-based Midcourse Defense program, presided over a dedication ceremony that marked the end of the initial construction phase of the missile field complex here.

A monument commemorating the event and dedicating the site was unveiled by Holly and Diane Hutchinson, special assistant to Alaska's U.S. Sen. Ted Stevens. The monument is crafted of native Alaskan stone and features a bronze plaque with the words "Forging America's Shield" against the Big Dipper constellation and North Star of the State flag.

The site will operate and maintain interceptor missiles and related support facilities to provide a limited defensive capability against a limited long-range missile attack against the United States. The system will be operated by the 49th Missile Defense Battalion, 100th Missile Defense Brigade (GMD), U.S. Army Space and Missile Defense Command, in concert with sister services.

"This is a great day, an historic one in the path to defend our nation, our families and our neighbors," Holly said. "Although the missile defense system will span eight time zones, from the Yorkshire moors to the Kwajalein Atoll, the centerpiece is clearly here, at Fort Greely. Its unique position allows us to defend against enemies from both East and West."

"The accomplishment represented here is testimony to the ingenuity and determination of a collection of Americans working together for America's defense. The combined efforts of industry and the military were vital to our success. All was done to the highest standards — which is the only standard good enough when we talk about defending our families. In the very near future, we will have that capability."

Since the June 15, 2002, ground breaking here, the government's prime contractor, Boeing, and the U.S. Army Corps of Engineers along with subcontractors representing numerous Alaskan firms, worked in often-extreme conditions to construct the site.

Construction involved clearing more than 500 acres of land, building 11 new facilities and renovating 25 others, pouring more than 35,000 cubic yards of concrete, installing more than 3 miles of fence and more than 2.5 miles of utilidors — underground concrete utilities conduits that allow for maintenance even during extreme weather conditions.

MAJ Laura Kenney is an Active Guard Reservist serving as the Public Affairs Officer for the SMDC/ARSTRAT 100th Missile Defense Brigade 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 in public affairs in the Gulf War theater, and served as deputy public affairs officer for the American sector in Kosovo in 2001.

Battle Lab systems evolving to meet warfighters' needs

By Debra Valine

COLORADO SPRINGS, Colo. — The Space and Missile Defense Battle Lab is using advanced technology and lessons learned to upgrade a Space support system that has proven its value to warfighters during OPERATION ENDURING FREEDOM AND OPERATION IRAQI FREEDOM.

Twenty-five Soldiers from across the command trained on the Army Space Support Team—Tactical Set (Dismounted) (ARSST-TS (D)), in June during the 2nd Space Company ARSST-TS (D) new equipment training. The company is part of 1st Space Battalion, 1st Space Brigade. At the completion of training, the ARSST-TS (D) became the property of the 2nd Space Company and will become part of their Modified Table of Organization and Equipment.

The ARSST-TS (D) is the upgraded version of the Space Support Element Toolset-Light (SSET-L). The SSET-L evolved as a portable version of the Space Support Element Toolset that was validated during the Army Transformation Experiment, MILLENNIUM CHALLENGE in July 2002. It was subsequently deployed on short notice to support warfighters in OEF/OIF. The system improved battlespace awareness, Space analysis and commercial satellite communications capabilities for forward deployed Space operations officers and their teams. Its capabilities aided in timely and relevant Space products (e.g. commercial and spectral imagery) and services (e.g., analysis, estimates, intelligence preparation for the battlespace, etc.) at operational and tactical levels.

"The first version was a huge success," said MAJ Philip Speth, chief, Army Space Exploitation Demonstration Program. "The capabilities of the SSET-L were so great that it was used differently in almost every situation. It was very versatile."

Because the ARSSTs deployed on short notice with different customers, each team developed a way to use the SSET-L that best fit the mission at the time. Lessons captured from those first missions shaped this newest version.

"We learned it was too big," Speth said. "And it was too slow. We did some testing and made the upgrades."

The ARSST-TS (D) is made up of two Space Operation System (SOS) workstations, one Space Operations System Imagery (SOS-I) workstation, and one Space Application Technology User Reachback Node (SATURN) communication suite.

"The SOS is a portable computer system designed for Space analysis and situational awareness and limited imagery analysis," said LTC David Hotop, chief, Experiments Division. "It runs a Windows-Intel operating system for ease of use and training, and is accredited to operate in unclassified and classified environments. Additionally, it is compatible with Global Command and Control System and allows Space operators to conduct Space analysis and develop products and services for supported units."

"The SOS box is now 78 percent faster than the first version," Speth said. "We have doubled the internal storage with hard drives and we have upgraded the video card. We have taken away the redundant software, and by having three SOS boxes, we have streamlined the system. They all operate off the same operating system and the repair parts are interchangeable."

SATURN version two is a triple redundant Space-based communications suite. It provides improved cabling for ease of use, added a firewall and switches for communications security, and was redesigned for better cooling, Hotop said.

"It is a more portable and deployable system composed of two transit cases: one for classified and one for unclassified transmissions," Speth said. "The SATURN is now equipped to operate globally from any power source rated between 90-250 Volts and 50-60 Hertz."

"SATURN allows the ARSST to reach back to their home station and get imagery products, Internet access and telephone communications without having to rely on the host unit," said Dave Stockton, a contractor with SY Coleman.

"Normally, ARSSTs do not go out on their own; they go out to support a division or corps," Stockton said. "They provide Space and spectral imagery products. These product files are very big. File transmission will overload a tactical network — essentially, they kill the network. This way, they do not interfere with their host's communications system.

"It is a selling point. Not only to they have their own commo, they can share because there is enough bandwidth," Stockton said. "Traditionally, the ARSST would show up with the image processors and ask to work in. Now they do not have to."

Above: SPC Eric Tollefson, SSG Jay Stephenson and SPC Scott Duke, 1st Space Battalion, 2nd Space Detachment, Peterson Air Force Base, Colo., set up the base for a satellite antenna. Below: SPC Scott Duke at the terminal. *Photos by Debra Valine*

Debra Valine is a public affairs specialist in the U.S. Army Space and Missile Defense Command and functions as the editor of The Eagle. She retired from the Army in 1997 after a tour as the chief of Army newspapers at the Pentagon. Following retirement, she worked for three years as the editor of the only weekly newspaper in NASA before accepting her current position in SMDC.

New colors, new era for 1st Space Battalion

By Karen Butler

PETERSON AIR FORCE BASE, Colo. — In an early morning ceremony July 8, the 1st Space Battalion officially unfurled its new battalion colors after casing the colors of yesterday. Additionally, the officers and Soldiers of 1st Space Battalion replaced their unit crests of old with gleaming new ones.

"This is a significant milestone for Army Space Forces. We've come a long way in the last year in manning, equipping and fighting the battalion," said LTC Jeffrey Farnsworth, battalion commander.

"The guidons and the battalion colors are a fitting tribute to that effort and accomplishment. This is a new chapter in the organization, so it's fitting that our Space Warriors have a new set of colors and guidons as they advance forward to secure the high ground," he said.

The "new chapter" Farnsworth speaks of is the changeover from a TDA- (Table of Distribution and Allowances) type organization to a full-fledged "go to war" MTOE (Modified Table of Organization and Equipment) organization.

The TDA organization was first activated Dec. 15, 1999. The battalion's existence signified an important commitment by the Army to fully embrace Space operations as a core competency for the force. The battalion was formed to provide an operational headquarters for command and control of the Army Space Forces.

Its original mission was to provide existing and emerging Space support to U.S. Forces and to provide in-theater, tactical ballistic missile warning. It accomplished its mission through the Army Space Support Company, the Theater Missile Warning Company, and a Headquarters Company.

The mission expanded to include conducting Space control operations in support of the United States and Allied Forces with the addition of the Space Control Detachment as a subordinate unit of the battalion in April 2001.

The MTOE-organized 1st Space Battalion has a proud, if relatively short, history. The organizational transformation, however, has been transparent in completing the mission. Constituted May 23, 2003, as 1st Space Battalion and activated Oct. 16, 2003, the 1st Space Battalion is comprised of four subordinate companies — Headquarters and Headquarters Company (HHC), 1st Space Company (Theater Missile Warning) and 2nd Space Company (Army Space Support). Additionally, a provisional company was formed and designated as 3rd Space Company (Provisional).

HHC, 1st Space Battalion is responsible for deploying and redeploying the battalion's command and control element (ASCE) and standing up the rear detachment support operations (HSOC) in support of national crises, major deployments or contingency operations.

The HHC staff is also responsible for conducting administrative, intelligence, operational, logistical and signal support to its subordinate companies and detachments deployed and

Commanders of the 1st Space Battalion stand in front of their new colors. *Photo by SSG Kipp Wilson*

assigned to the Central Command (CENTCOM), European Command (EUCOM), Pacific Command (PACOM) and Northern Command (NORTHCOM) areas of operation.

1st Space Company (Theater Missile Warning) consists of three detachments and six Joint Tactical Ground Stations/Multiple-Mission Mobile Processor (JTAGS/M3P) sections located in Qatar, Korea, Germany, two each at Fort Bliss, Texas, and one in Colorado Springs, Colo.

The forward deployed sections in Qatar, Germany and Korea provide 24-hour theater missile warning to CENTCOM, EUCOM and PACOM. JTAGS-CENT and JTAGS-EUR both provided missile warning and other Space-based infrared support to coalition forces during OPERATION IRAQI FREEDOM. One section in Texas and one in Colorado Springs serve as contingency forces ready to deploy as needed. Additionally, the JTAGS section in Texas is responsible for training all JTAGS operators via the Individual Qualification Training Course.

The recently enacted M3P section is tasked with the initial training and testing of what will be the JTAGS replacement system, the Multi-Mission Mobile Processor which is due to begin fielding during the first quarter of FY06.

2nd Space Company (Army Space Support) has five active-duty and four reserve Space support teams. Every Army Space Support Team (ARSST) has deployed in support of OPERATIONS ENDURING AND IRAQI FREEDOM. Missions included support of the Combined Forces Land Component Commander, V Corps, 4th Infantry Division, 1st Marine Expeditionary Force and the Joint Special Operations Task Force-North. The ARSST also supports numerous exercises spanning the globe.

3rd Space Company (Provisional) was created Dec. 1, 2003, as a provisional organization based on a future Space Control (electronic) company to be activated Oct. 1, 2005. 3rd Space Company's mission is to deploy globally in support of Space control and information operations by providing ground mobile surveillance and assessment of Space systems, as well as airborne test and evaluation of command, control and information systems.

The company's predecessor has deployed in support of OIF/OEF, conducting Space control missions from October 2001 to March 2003. 3rd Space Company has supported and continues to support numerous joint exercises. The company will begin fielding its interim Space control system in November.

To conclude the ceremony, Space Warriors of 1st Space Battalion, removed the old crest from their berets and replaced it with the new unit crest. Unit crests are designed specifically to represent the mission of an organization.

"It was certainly an honor to take part in the ceremony," said MAJ Annette Merfalen, commander, of the 3rd Space Company (Provisional). "It served as a motivational event in that it reminded those present of our historical background and the significance of unit colors. It also served as a reminder for us to recognize that it takes a team to succeed, and that a team ought to stand together, unified by our colors."

This event has its roots in the earliest of times, when warriors used banners to identify specific units and to serve as rallying points for troops. In medieval days, the banner was used to signal a general assault, which was generated by the command "advance your banners." 1st Space Battalion's colors and company guidons represent the start of a new era of tradition and service for this unit and its future Soldiers.

MAJ Annette Merfalen, commander 3rd Space Company and 1SG Robert Miller, unfurl their new colors. ***Photo by SSG Kipp Wilson***

Karen Butler is the S-1 for 1st Space Battalion. She has been a Department of the Army Civilian for 10 years working with the 510th Personnel Services Battalion in Mannheim, Germany, the 2/91st Division at Fort Carson, Colo., and has been with SMDC/ARSTRAT for a year.

Eagle Vision II upgraded, ready for duty

By MAJ Tim Haynie

COLORADO SPRINGS, Colo. — With a new paint job and almost $2 million in state-of-the-art improvements, Eagle Vision II is ready to take on its new mission: providing commercial imagery support to the Coalition Joint Task Force-7 and Central Command.

Less than six months ago, EVII was just an empty shell on wheels and the Commercial Exploitation Team, 1st Satellite Control Battalion, consisted of only two deployable Soldiers. In the coming months, the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command staff and the 1st Space Battalion would transform the CET into a cohesive, deployable team ready to begin a highly complex and challenging mission set to improve Space support to the warfighter.

Two years ago, Army Space Command anticipated taking delivery of the EVII commercial imagery direct downlink ground station and designed a team to man the system, the CET. Manning and delivery of the system to Colorado Springs began in the fall of 2003. SMDC/ARSTRAT then set to work locating Soldiers and funding to begin the process of breathing life back into the EVII program. To make matters more difficult, many of the components making up the EVII system were outdated, in need of maintenance or simply did not meet the Commercial Exploitation Team's requirements for providing support to the Army.

Commercial imagery has a reputation for being untimely and often hard to get, yet there is tremendous value in the unclassified data that goes beyond a literal analysis of pixel groups. Space officers within the Coalition Provisional Authority and CJTF-7 set to work identifying shortfalls within their collection systems that could be supported via a direct downlinked commercial imagery ground station. These officers went on to advocate the utility of spectral imagery analysis and geospatial intelligence as seen during Operation Iraqi Freedom through the use of the Air Force's Eagle Vision I ground station to support Special Operations Forces.

Interest stirred within the commands and a few capabilities briefings later, CJTF-7 and CPA were requesting that CENTCOM bring the CET into theater. The CET followed up with a briefing to CENTCOM, who saw the potential to use the CET not only to support CPA and CJTF-7, but also to cover other hot spots within CENTCOM's area of operations because of EVII's satellite visibility.

The Spectral Operations Resource Center has a history of designing and building imagery analysis powerhouses, so the mission to bring EVII into the 21st century was a familiar one. The task list was enormous and the timing left little room for delays in order to meet the specified CET arrival date into theater. The challenge to coordinate this effort went to the SORC's contractor Brian Plaisted, a former ARSPACE officer. The SORC also enlisted the help of Darren Willey, a former ARSTRAT NCO with more than 10 years of satellite experience, five of them with EVII. While the SORC could handle the redesign and construction of the analysis and production components, the task to rebuild the imagery acquisition segment would have to go to an outside contractor. The SORC solicited the work to the commercial imagery community and eventually awarded the contract to the Vexcel Corporation of Boulder, Colo.

Through the months of February and March 2004, the SORC's Roger Ward burned up the phone lines purchasing components while Vexcel was busy assembling and testing software needed to downlink imagery at their lab in Boulder. Meanwhile, Dave Christianson, SSG Jeremy Jones and SPC Taurus Jones were elbow-deep within the heart of EVII installing four new imagery workstations and a massive data archive system needed to handle the imagery analysis and production missions. The mammoth EVII 5.4-meter antenna was inspected, serviced by the manufacturer and found to be in satisfactory shape despite sitting idle for the past year.

Finally, on March 19, only a few days after Vexcel installed its downlinking components and with CET Soldiers sitting alongside, EVII caught its first satellite acquisition on its ascending pass. Success? We wish! Anyone can catch a satellite in flight; turning a stream of data into a picture is the real talent and for the next three weeks we continued to burn in the components needed to make sense of the data. It was but the first of many, many passes to come.

Meanwhile, the 1st Space Battalion filled the last remaining team vacancy to complete the Army's first and only Commercial Exploitation Team. All but one

SPC Joshua Foye, left, and SGT Kat Estrada set up the Eagle Vision II. *Photo by MAJ Tim Haynie*

was new to the world of commercial imagery ground stations, but none were strangers to deployments. Five members of the team had already supported OPERATIONS ENDURING FREEDOM AND IRAQI FREEDOM during deployments to Afghanistan, Iraq, Kuwait and Qatar; they had fought with the Marines over the Tigris River, sweated through the humanitarian efforts of the CPA and took the fight to the Taliban regime.

Before the CET Soldiers could deploy, they had to first become Team Certified on the equipment and mission essential skills. Team Certification consisted of three training levels. Tasks ranged from the normal weapons qualification and force protection to the complex spectral imagery analysis and EVII system build up/tear down. Once again, the SORC was there to help with the training and provided some of the world's best spectral imagery analysts to hone the individual skills needed to exploit commercial imagery. MSGT Rich Burch (USAF) passed along one of the most valuable lessons learned locating mass graves and finding desert anomalies during OIF: sometimes you don't know exactly what your mission is until you get embedded with your unit and find out what they need. Based on this, team certification had to cover a wide range of skill sets and involve cross training team members to ensure redundancy in key tasks.

Much of the team training involved direct interface with the National Geospatial-Intelligence Agency (NGA) to iron out procedures for requesting and receiving imagery, procedures never before established and at this point still written in pencil, as we're currently proposing new methods for commercial imagery support. The team also received extensive training in ground station operations. In order to validate EVII's reception capability, the CET had to perform a number of downlinks and transmit the required post-pass reports. All of this led up to team certification, completed only one week before the team prepared to load the equipment on the aircraft.

Fast forward to the present: with EVII in place, and Army Space Support Team 3 operating as the CET's liaison, the battalion's "One Space Team, One Fight" concept is set to provide CENTCOM with direct downlink commercial imagery. While much remains to be worked out, the CET ensures that directly downlinked commercial imagery gets to the people who need it, when they need it, throughout the command.

MAJ Tim Haynie is the FA40 Commander of the 1st Space Battalion's Commercial Exploitation Team currently on his second deployment to the Middle East in support of Operation Iraqi Freedom. MAJ Haynie has been working with the Eagle Vision II system since it was delivered to the Army in July 1999 and deployed world-wide providing directly downlinked commercial imagery and imagery products to warfighters.

COMMAND IN BRIEF

1st Satellite Control Battalion welcomes new commander

By CPT Ethan Allen

PETERSON AIR FORCE BASE, Colo. — The 1st Satellite Control Battalion said farewell to outgoing battalion commander, LTC Mearen Bethea, and welcomed a new commander, LTC Hae-Sue Park June 30.

"During her tour the battalion flawlessly executed thousands of tactical and strategic Defense Satellite Communications System missions," said COL David Shaffer, 1st Space Brigade commander. He praised Bethea for taking care of her Soldiers as he described her distinguished achievements during her tour of duty as battalion commander.

"The battalion had a problem getting its Soldiers into NCOES schools. LTC Bethea got 100 percent of her NCOs into the schools and saw 100 percent graduate with over 55 percent graduating with honors. This is a statistic I do not think anyone else in the Army can match," Shaffer said.

Shaffer welcoming incoming commander, Park, described her as having a "wealth of signal experience," and addressing her said, "your task is to continue to keep the battalion ready to support the warfighter."

Park commented that she was proud to have been chosen to lead such fine Soldiers and that she knows from experience that, "because of its reputation the 1st SATCON Battalion is the most requested assignment by young, up-and-coming officers." She added, "I am honored by the opportunity to continue the leadership of these incredible Soldiers."

On assuming command of the Army's only unit to control Space-based communications assets, Park now leads a battalion engaged in operations supporting OPERATION ENDURING FREEDOM, the global war on terrorism and OPERATION IRAQI FREEDOM.

Park's military service began in 1982 when she enlisted in the U.S. Army as a multi-channel communications equipment operator. Upon graduation from the U.S. Military Academy at West Point, N.Y., she began her commissioned service on May 27, 1987.

Formerly a professor at the U.S. Military Academy at West Point, Park holds a bachelor's degree from the U.S. Military Academy, and a master's degree in business administration from Harvard University. Her most recent assignment was as the U.S. Army Signal Branch Majors, Lieutenant Colonels and Colonels Assignment Officer, U.S. Army Human Resource Command, Alexandria, Va.

Members of the 1st Satellite Control Battalion stand in formation during the Battalion Change of Command ceremony. *Photo by Dennis Plummer*

Battalion becomes part of SMDC 20 years after formulation

The U.S. Army has played a critical role in the development of the command and control, management, and planning techniques for the Defense Satellite Communications System.

The 1st Satellite Control Battalion became a part of Army Space Command (ARSPACE) in October 1990, after more than 20 years of direct responsibility to the Department of Defense as a primary satellite communications activity.

In October 1990, the four DSCS Operations Centers in existence at the time were transferred to ARSPACE, now known as the U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command, and in August 1994 a provisional battalion was designated within ARSPACE to provide non-technical direction to the DSCSOCs.

In November 1995 the 1st Satellite Control Battalion was activated as the Army's first battalion dedicated to providing quality Space support to all of DoD.

Wooden "monkey bars" with widely spaced poles present a challenge to Alpha SATCON Soldiers. *Alpha Co., 1st SATCON photo*

Field training tests SATCON Soldiers

By SSG Daniel Sanker

FORT DETRICK, Md. — Armed with M-16s and wearing "full battle rattle," Alpha Company, 1st Satellite Control Battalion, Soldiers loaded their vehicles April 27 and convoyed to Fort A.P. Hill, Va., for the unit's first-ever field training exercise.

For the next two weeks, the Soldiers performed tasks needed for combat, gained leadership experience in the field environment and developed team cohesion and esprit de corps.

The 50 Soldiers arrived before the morning mist had left the weapon ranges of Fort A.P. Hill.

"GAS, GAS, GAS!" signaled the Soldiers to don protective masks. It was the first time for many Soldiers to fire while masked since basic combat training. As darkness fell, the Soldiers sent a fury of ball and tracer rounds down range. Not one target was left standing by the time the last round left the last M-16.

Map, compass and protractor in hand, the Soldiers set out the next morning to find eight objectives. Four hours through swamps, hills, thick brush and wildlife, and an unknown number of miles under their boots and more water and muck than a set of battle dress uniforms can hold, the Soldiers completed the course. Even though not all the objectives were found, lessons were learned by one and all.

As if the land navigation course hadn't provided enough of a challenge during the day, the cadre decided to "up it" a notch. As the day's light faded, the Soldiers headed back out to tackle the same course at night. Heading out in teams of three or four, the Soldiers realized the importance of relying on those in the team to accomplish the mission. Two hours and four points later, all the Soldiers returned to the rally points and headed back to base camp.

Day Three offered a 4.5-mile tactical road march, followed by an obstacle course. The first go-around of the course of 16 obstacles was run in squad-sized elements, followed by an individual run. 2nd Squad took the honors for the best run, graded on time, teamwork and motivation. SGT Charles Clapp completed the individual course in an astounding five hours, 12 minutes, followed by Staff Sgt. Michael Hughes with five hours, 24 minutes.

The morning of the last day in the field brought with it a set of challenges rarely seen in a SATCON Soldier's daily operations.

The Leadership Reactionary Course provided situational challenges in a stressed environment. The water obstacles tended to be more of a challenge — as the teams got wet it took more effort to get anything accomplished. As the teams of four or five moved through the obstacles, the role of the leader would change. This offered some junior enlisted Soldiers more of an opportunity to take control.

The more-than-full day rounded off with a visit to the ever-popular CS chamber, followed by the opportunity to switch to "fresh" uniforms before heading for home.

When Alpha Co. returned to home base, it was easy to see that this was not the same unit that had left. Two weeks of work in hardcore Soldier skills, added to the sophisticated Satellite Controller skills they were already expert at, added a hard edge and sheen to the Satellite Control Soldiers.

Opposing forces liven up field training exercise

By 1SG Joey Thornburg

FORT A.P. HILL, Va. — It wasn't just your average field training exercise — at least, not when the opposing forces were hardcore military police out to best the soldiers of Bravo Company, 1st Satellite Control Battalion during their annual field training exercise.

Knowing ahead of time that the locally stationed 241st Military Police Company was the adversary, Bravo Soldiers from Fort Meade, Md., started training months before the exercise actually kicked off. They conducted road marches, movement techniques, ambushes and reacting to direct and indirect fire — all to ensure their victory over the MPs.

This exercise focused on teaching the Black Dragons the basics in Military Operations on Urbanized Terrain (MOUT), testing their individual physical abilities on the obstacle course, building confidence in their mask in the nuclear, biological, chemical chamber and developing their leadership skills during the Leadership Reaction Course. As a squad, the Soldiers tested their physical endurance and Soldiering skills by conducting a 5-mile road march in conjunction with reacting to a deliberate ambush against opposing forces using MILES (Multiple Integrated Laser Engagement System) gear.

The FTX was divided into two rotations. Headquarters stayed in the field for the full week and the rest of the company came out in two-day rotations

SPC Joshua Rodriguez braces SGT Christopher Foster on his shoulders as 1st Squad, Bravo Co., 1st Satellite Control Battalion figures out a way to complete a task in the Leadership Reaction Course during a field training exercise. *Bravo Co., 1st SATCON photo*

CPL Chad Duncan (left) and SGT Eric Erisman (center) surge to the front as their squad negotiates a "toothed" obstacle. ***Bravo Co., 1st SATCON photo***

to allow Bravo Co. to continue performing its wartime mission and train at the FTX at the same time.

When B Company arrived at the MOUT site, it was raining. "Perfect weather for training," according to unit leadership. But that did not dampen the Soldiers' motivation — they hit the ground running. When the MPs who were scheduled to conduct MOUT training did not show up, the instructors who'd wisely prepared options stepped up to the plate and conducted training.

SSG Matthew Smith explained and illustrated how to assault a building. Each squad then practiced on its own and perfected the routine.

Loaded with ammunition, grenades and smoke, each squad demonstrated the knowledge they had gained and methodically cleared the Combat Village of unknown OPFOR who would do their worst.

Smoke grenades, artillery and grenade simulators gave the training a realistic effect. The Soldiers assaulted buildings by throwing a grenade inside and busting through doors. As they met and eliminated the OPFOR, each squad accomplished its mission.

MOUT training completed, each squad was given a fragmentary order. 4th squad was to do a mounted road march, secure a base camp and set up an ambush for any enemy forces; 3rd squad was to accomplish an unmounted road march to squash enemies along the way — 3rd Squad road marched for approximately 5 miles before encountering the bad guys, whom they then summarily "squashed."

The second day began with stand-to in the pre-dawn hours. While the Soldiers pulled security, the leadership in the Tactical Operations Center was busy making last minute adjustments to the missions that would be carried out that day. The Soldiers were split into squads and sent to a Listening Post/Observation Post. They were ambushed en route, but successfully cleared the LP/OP, and advanced to a more built-up enemy position, rejoining their sister squad.

The squads conducted a successful platoon movement to contact and took time off for lunch and classes presented by SSG Raul Sheran about Individual Movement Techniques and reacting to conventional and NBC artillery. The squads then moved to assault an enemy position that contained a .50 caliber machine gun.

Black Dragons put their classes to use as artillery simulators, smoke grenades simulating NBC attacks and multiple hand grenades with small explosive fuses were employed during the assault. The Soldiers were then driven back to the assembly area, given hot chow and sent home. The cadre began preparation for the next rotation.

The second rotation arrived early Thursday morning and began to cycle through the FTX tasks in a different order due to the weather. Heat Category Five temperatures forced the second rotation to road march to the obstacle course first since the morning was the coolest time of day.

This turn of events left the second group so tired that no one would take on visiting West Point Cadet Andrew Maxa in a race through the obstacle course. The Soldiers then ate lunch and did NBC training at the gas chamber.

Company Commander CPT Timothy Root, in traditional company commander style, offered a challenge to all Soldiers, betting he could stay in the dreaded chamber longer than any-

one else. At first, no one responded, but then SGT Joshua Lowell took up the gauntlet. Root toughed it out for more than 10 minutes, but Lowell triumphed with 11 minutes in a chamber that was much stronger than the previous rotation's.

Soaring temperatures forced a break in training and the group returned to the assembly area for a break. After the temperature had come back down to a reasonable level, the squads were sent out on patrol. Fighting mock battles until well past dusk, the squads were sent back to the AA to get some rest for the night. Unfortunately, the OPFOR had other plans …

Positions were probed well into the night. At around 3:30 a.m., the OPFOR ran out of ammo/simulated NBC grenades and thankfully called it a night. Stand-to came bright and early at 5 a.m., after which the AA was torn down and the Soldiers headed back to home station.

A more junior member of the unit agreed.

"I knew Bravo was the best company in the battalion, but I never thought I would have the opportunity to do this kind of HOOAH training," said PFC William Langford.

"The purpose of the FTX was the practical application of command task skills and overall unit readiness for possible tactical unit deployment. We definitely met our objective and then some," said SGT Amanzio Brady, the FTX NCO in charge.

Ground-based Missile Defense operators graduate in Colorado Springs ceremony

By Ed White

PETERSON AIR FORCE BASE, Colo. — "You are a remarkable class," said Thomas Devanney, deputy program director for Ground-based Missile Defense (GMD) to the assembled graduates of the Ground-based Midcourse Operations Advanced Course, class 2-04. "You are on the front line of defending our homeland."

Graduates are members of the 100th Missile Defense Brigade (GMD) headquartered here. Many of the graduates will serve as operators at the Alaska-based 49th Missile Defense Battalion — an operative arm of the 100th. The GMD system is scheduled for activation this fall, and will provide the first part of the integrated Ballistic Missile Defense System, which, in concert with sister services, is designed to protect the nation from accidental or intentional limited ballistic missile attacks.

Graduates of the Ground-based Midcourse Operations Advanced Course, class 2-04. *SMDC-CS photo*

The seven-week advanced course followed an intensive five-week basic course, which introduced the students to the fundamentals of the GMD system and computer screen navigation.

The advanced course qualified graduates on the fire control system, taking them through day-to-day crises and combat and recovery operations.

Devanney said the ceremony marked "another important event on the way to having a defense of our nation against ballistic missiles for the first time in the 50 years that we have been facing the threat."

Distinguished honor graduates were MAJ Elizabeth Yarborough and CPT Stephen Sexton, both with 100 percent average scores.

National missile defense is not a new concept, but one that has received recent emphasis from President George W. Bush.

Modern ballistic missiles have been around since World War II when Germany rained the V2 rocket down on England. The United States fielded a national missile defense program, Safeguard, in the mid 1970s, but Congress deactivated it shortly after it was fielded.

President Reagan created the Strategic Defense Initiative to re-address the need for national missile defense program. The current program is split into three phases: boost, midcourse and terminal.

Warrants "branch" out

Army warrant officers change to branch insignia

By Sharon L. Hartman

PETERSON AIR FORCE BASE, Colo. — On July 9, warrant officers Army-wide made the change from the "Rising Eagle" insignia to branch insignia. Regular commissioned officers in the Army have always worn their branch insignia on their left collar. The uniform change for warrant officers is an enormous step toward their full integration into the branch-based systems of the officer corps. To honor the exceptional warrant officers of SMDC/ARSTRAT, a special ceremony hosted by SMDC/ARSTRAT Deputy Commander for Operations COL Jeffrey Horne was held in Colorado Springs on July 9. This event marked an historic moment for these technical experts of the Army.

The Army and Space 1958-1984

The Jupiter Rocket with an Explorer I satellite.

By Dr. Lewis Bernstein

The Army's interest in exploiting Space has its roots in the ways it has used technology to enhance combat power, always seeking the highest ground to dominate the battlefield. It has used new technology to enhance functions rather than merely seeking improved equipment. These functions included gathering intelligence (to include weather and terrain information and the enemy's location), command and control, communicating messages and killing the enemy. These functions give Soldiers increased powers of observation of the terrain, weather and the enemy, and communication, while denying them to an adversary. Today, our use of Space technologies is the result of a convergence of technological change and doctrinal renaissance.

While the Army has historically sought to use Space to improve battlefield advantage, it did not play a lead role in the development of technology and use of Space between 1958 and 1984. Space had been divided between the U.S. Air Force and NASA. The Army maintained its interest in Space, but was often relegated to a lesser partner as is explained below. By 1984, Army leaders had reasserted the Army's need to use and develop Space and convinced (which) leaders to allow the Army to pursue Space.

Throughout the Second World War, the Army applied its research and development expertise to radar, photography, signals transmission and intelligence, rocket, missile and aircraft development. By 1945 it had taken, processed and analyzed millions of intelligence photographs and its code breaking capacity allowed American decision-makers to eavesdrop on enemies, allies and neutrals. The Signal Corps created and operated the largest, secure, unified, global military communications network in existence to that time. The Army had also developed ground-based and airborne radars used in early warning systems and aerial bombardment and along with its air arm it was developing guided missiles. After 1945, the Army still concerned itself with Space age communications and missiles despite the widespread idea that these devices were science fiction.

Through the late 1950s, these efforts were complementary — each capability worked to enhance the other and, although not seen at the time, they were inter-locking. In fact, the Army built and launched the nation's first ballistic missile and earth orbiting satellite. The first communications and reconnaissance satellites were developed and launched through a partnership between private industry and government in which the Army played a prominent part. This link was temporarily broken by the Eisenhower Administration's decision to create NASA and redistribute Space and missile roles

Recommendations for topics or submissions for the Historical Feature segment of the Army Space Journal are welcomed and encouraged. Submission may be sent to the Managing Editor via email to richard.burks@SMDC-CS.army.mil

An artist's conception of TIROS, the first weather satellite.

and missions among the services. Between 1958 and 1961, the Army transferred most of its Space programs and expertise to the National Aeronautics and Space Administration (NASA). Nevertheless, the Army Map Service made the maps of the moon the Apollo astronauts used and the Army Corps of Engineers built most of NASA's launch, test and research facilities.

In the early 1960s the Army's role in Space exploration ended but it retained a role in satellite communications, managing ground terminals and ground support for Space communications systems. By 1967, satellites of the Defense Communications System were relaying photographs and other data from Vietnam to Hawaii and Washington.

Between 1961 and 1975, Vietnam turned the Army from Space and using Space-based instruments as a force multiplier. Satellites did not offer direct tactical aid to the Soldier—assisting communication was the only way Space-based assets intervened in ground fighting. Instead of thinking about Space-based assets that could be used as force multipliers or to shape future wars, the Army moved to field effective tactical weapons troops could use immediately—thinking about the future was a self-indulgent luxury.

In 1970, the Secretary of Defense allowed each service to conduct research and develop programs that would serve its unique needs for battlefield surveillance, communication, navigation, mapping and charting. However, the Army could not take advantage of this opportunity until it began to think about the future of warfare and its own place on the battlefield.

The Army's post-Vietnam rebirth began with the DePuy reorganization, the doctrinal debates of the late 1970s, which led to creating AirLand Battle Doctrine and the DePuy-Gorman Training Revolution that created the Combat Training Centers. Part of this rebirth was the 1973 creation of the Army Space Program Office to use the Tactical Exploitation of National Capabilities Program to find ways to exploit the tactical potential of national intelligence programs by integrating them and their products into its tactical military decision making process.

Thus, although the Army maintained an interest in Space, it was only used to provide theater commanders with secure long-haul communications systems and access to national intelligence assets through the 1980s. Facing a revived Soviet threat as the Russians reverted to a traditional doctrinal theme—a combined arms approach to warfare that emphasized balanced force development, the Army continued to follow its traditional defensive strategy to contain Russian military expansion in Europe.

The defense budget increases that began after the Soviets invaded Afghanistan in 1979 occurred during an Army-wide doctrinal debate begun by General DePuy. This debate was the direct stimulus to re-evaluating the role of Space assets. It was then that the Army determined the ground commander's needs required it return to Space. Space-related activities offered the ground commander unique platforms for observation, positioning, and communications over a greatly expanded battlefield. At the same time, there was also a growing disquietude in Soviet military journals as various authors analyzed AirLand Battle Doctrine. The cozy world of Soviet military planning was disturbed by the ways the U.S. Army assimilated new technology into military theory, doctrine, and equipment.

The Army proceeded deliberately with concepts followed by long-range planning and investment in programs. It was prodded by its growing needs for the products that Space systems would provide ground forces. Although satellite intelligence and surveillance capabilities garnered the most attention, the Army used Space assets to multiply its abilities to deter, detour, and defeat an enemy. The other services formed Space commands to centralize and coordinate their efforts to use Space. In 1982, the Air Force, as the lead armed service in Space, established U.S. Air Force Space Command (AFSPC) to consolidate operational Space activities and support Space operations, including satellite control and DoD Space shuttle flight planning, readiness, and command and control. In 1983, the Navy, dependent upon a world-wide communications and intelligence network for its surface and submarine fleet operations, formed Naval Space Command.

President Reagan's announcement of the Strategic Defense Initiative in March 1983 challenged the Army to think about Space in new ways. The Army slowly began to pay attention to its Space role conceptually and organizationally. In 1983, the Army Science Board concluded the Army was not using Space systems to their full potential; to achieve better exploitation a high-level commitment had to be matched by sufficient resources. The 1983 invasion of Grenada highlighted the scramble for limited Space assets between different services and government levels. The Army had used the other services' systems too long, and they assigned the Army the leftovers in a crisis situation. The Combined Arms Grenada Work Group recommended the Army develop, own, and control its own satellites to assure critical communications in such operations.

Later in 1983, an Army Space General Officer Working Group was founded to direct Army Space efforts. In 1984, the Army Science Board concluded that the Army made limited use of Space assets and was neither active nor influential in designing and operating most of the Space systems then in use. In August 1984, an Army Space Council was created in Washington to coordinate and approve proposals and provide direction for the Army's involvement in and use of Space among various functionally organized staff offices.

In September 1984 General Maxwell Thurman, the Vice Chief of Staff of the Army (VCSA) activated an Army Staff Field Element at AFSPC headquarters, the nascent form of the U. S. Army Space and Missile Defense Command—Colorado Springs. The Field Element acted as liaison to AFSPC and initiated planning for Army participation in the unified U.S. Space Command. It exchanged information about Space policy, strategy and plans, monitored Army Space-related education and training developments, represented the Army Space Office at HQ Space Command and provided technical information regarding Army Space efforts. In October 1984, the Army Space Council met to discuss the Army's emerging role in Space and produced guidance for future Army efforts. Thus, the Army created a staff organization to manage its Space activities after the other services. Although the Army's interest in and influence over the role of Space in military operations had decreased as the role of Space in military operations expanded, this would change.

By the end of 1984, the Army was poised to expand its Space activities. The Army Management Structure for Space had four components: (1) an Army Space Council, (2) the Army Space Working Group, supporting the Space Council, (3) the Army Space Office, serving as liaison to the Joint Staff and the Office of the Secretary of Defense and (4) the Army Staff Field Element of AFSPC. The Army Space Office had five immediate tasks: to (1) develop an Army Space policy, (2) create an inventory of existing Army Space-related requirements and programs, (3) create immediate enhancements to key areas of Army Space involvement, (4) to develop an operational concept for Space support to warfighting, and (5) develop Army options for supporting a unified Space command. Thus, the Army was poised to begin to use Space again.

Lewis Bernstein is a Senior Historian in the SMDC Historical Office. Previously, he worked in the Combined Arms Center History Office at Fort Leavenworth where he was involved in creating a digital archive and engaged in research on Army training and experimental units. Before joining the government, he was a professor of history at Brigham Young University and Boise State University where he taught Chinese and Japanese history. He has also been a Fulbright fellow.

Remembering Iraq

U.S. Army Forces Strategic Command members Journal their support to Operation Iraqi Freedom

By MAJ Michael Willis, MSG James Bunch, SSG Brett Mills and SGT Winston Delgado, Army Space Support Team 12

Baghdad, Iraq – Few people are ever close enough to world-shaping events to make a difference. Army Space Support Team 12, a cell from the 193rd Space Battalion, U. S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command not only witnessed such events, they were instrumental in shaping their outcome. At the beginning of their journey to Iraq, Team 12 was faced with the war's reality in Baltimore.

"Planes arriving at the base were bringing the bodies of our comrades from action in the war," said MAJ Michael Willis, the Team 12 leader. The team touched down briefly in Moron, Spain, and was impressed with the similarity of it to home.

"I expected it to be extremely hot but it was similar to the hot August days we get in Colorado," Willis said.

Then it was on to Baghdad.

Life at the Palace

The bleakness of Baghdad was not alleviated by the team's first accommodations.

"We stayed for the first few weeks in a hallway on the north side of the presidential palace," Willis said. "It was nice to be in the air conditioning but the noise from the snoring was deafening. Two British men staying in the same area competed to see who the chainsaw-snoring master was."

SGT Winston Delgado played the national sport — football — also known as soccer. The magic of the sport and the power of the football were easily noticed. The route from the palace to the football field was about a half-mile long. The eyes of the Iraqis — adults and children — shined when Delgado walked toward the playing field with his football. Everyone wanted to play. It is a favorite sport in this part of the world — inexpensive in America, but could be costly for many people here. A half-hour game was not just a physical challenge; it was also immeasurably satisfying to play what is called the ultimate sport.

"Eventually we were given rooms in the Al Rasheed Hotel. As a group we were a bit leery of the place as a target, but we decided it was better than the palace hallway," Willis said. The team's feeling about the place turned out to be prophetic.

Attack on the Al Rasheed

"On Oct. 26, 2003, around 6:20 a.m., the hotel was attacked by a homemade rocket launcher that was mounted on a generator with forty 120 millimeter rockets," said MSG James Bunch. "Nineteen rockets hit the west side of the hotel."

"The first rockets that struck the building woke us up," said Mills. "They left the floors covered with broken glass and a dark, heavy cloud of dust and smoke in the hallways." An immediate search began to locate all team members and to help anyone in need.

There were also two members of the Spectral Operations Resource Center — SGT Sean Moudy and Gene Walacavage — staying in the hotel.

In the pandemonium of the smoke- and debris-filled building, the team located Walacavage, who had been seriously wounded in the eyes by flying debris and had a chunk of concrete embedded in his arm. Walacavage and Moudy were extremely lucky that day; one of the rockets entered the window of their room, flew directly over their heads as they lay in bed and penetrated the bathroom wall where it fell into the sink – a dud.

While Willis and CPT George O'Neil, a Team 12 member,

Left, members of the Civilian Provisional Authority pick out shoes and clothes donated by friends and family members of Army Space Support Team 12. Below, MAJ Michael Willis pulls a map from the map cabinet.

gave Walacavage immediate care in their room, Bunch carried a woman to the medics. Her arm had been nearly severed by one of the blasts. Team 12 member SSG Brett Mills' room was on the 10th floor. A rocket blew out almost every door in that part of the building. Mills, wearing his jeans, a Harley long sleeved shirt, his armor vest and his loaded pistol calmly strode out of his room and immediately began moving people off the floor and out of the hotel to safety. His room-to-room search led him to the end of the hallway where he found a room with the door jammed shut. He could hear a woman screaming inside. Unable to knock the door down, Mills went out the window of an adjacent room and slithered along the outside of the building until he was able to enter her room. He helped the woman out by retracing his steps and once she was on her way to safety, he cleared the rest of the rooms on the floor with the help of a Marine, who was the chief of hotel security.

The Marine and Mills moved to the 11th floor and found the room of LTC Charles Beuhring, whose room had been hit by a rocket. The injured officer was lying back on a chair when they found him. Mills attempted to administer first aid but Beuhring was not doing well.

"When the medics arrived they could not start an IV because his veins had collapsed," Mills said.

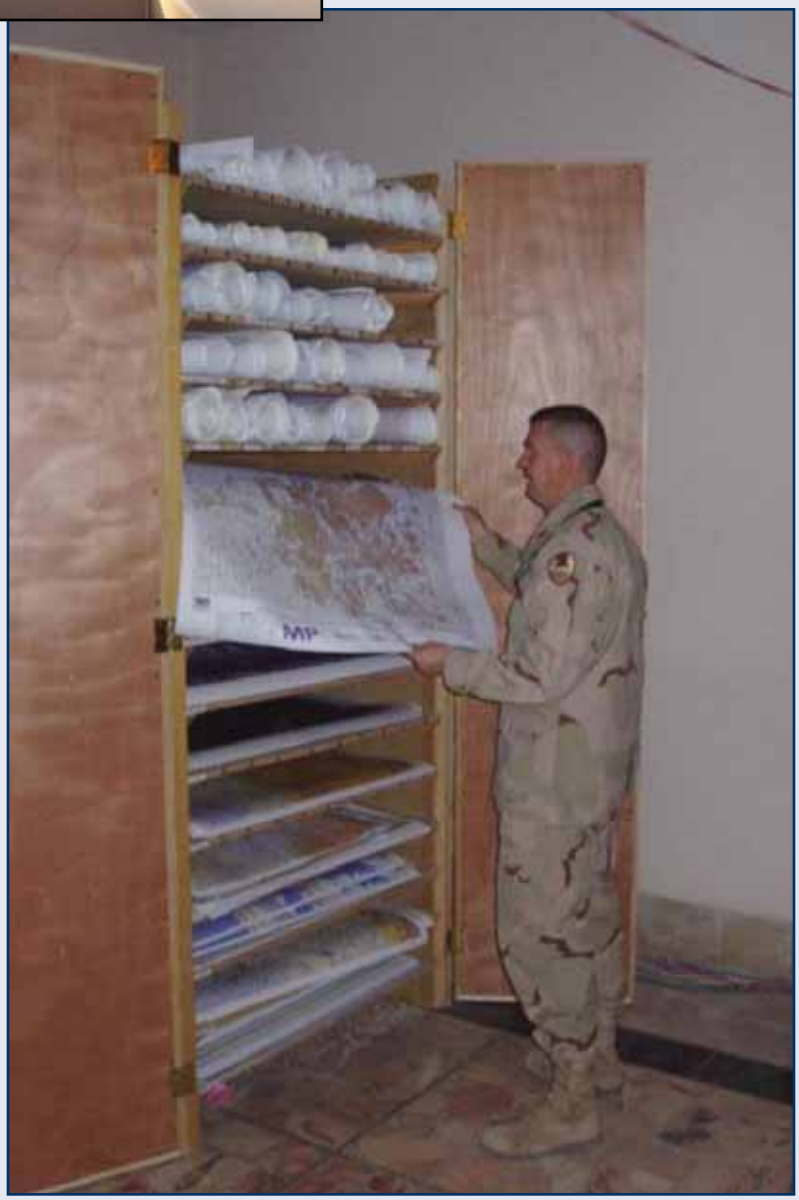
Mills, the medics, and Bunch carried the wounded man to the lobby. The medics did all they could to stabilize Beuhring, but he later died.

During the time that the Marine and Mills were working on the evacuation of the building, the rest of Team 12 was caring for Walacavage. Their rescue was captured on national television as they carried the wounded civilian to an ambulance.

Saddam's Capture

Sunday, Dec. 14, 2003, brought an early Christmas present

(See Remembering Iraq, page 15F)



for everyone stationed in Iraq. It was the day Saddam was captured in a hole in the ground. BG Mark Kimmit, deputy director of operations, Command Joint Task Force-7, tasked the team to produce data and imagery for the press release.

"The team did many jobs like that for the general during its tour of duty, including capturing images of the deaths of Uday and Qsay Hussein, the apprehension of terrorists and wanted posters for high-ranking Baath party members and terrorists," said Willis.

Holidays in Baghdad

"Being far from home at holiday time is not the most pleasurable thing," Willis said. "But with the British around, there is always time for a celebration."

The team discovered that the Christmas party at one of the official British residences in Baghdad was a blowout. Another party New Year's Eve was also fun, although both parties were punctuated by mortar and small arms fire nearby.

Visiting Babylon

One of the highlights of the Team's time in Iraq was a visit to Babylon. It was not long after their arrival in country that the team went to deliver Space products to the Coalition Provisional Authority's south central headquarters. Babylon "was one of the sites where Saddam wanted to begin his climb to become the modern-day Nebuchadnezzar by rebuilding Babylon and the hanging gardens," Willis said.

He added that the site had been picked clean over the centuries and that the best artifacts now reside in museums in Germany, England and Baghdad.

"The Great Gate of Ishtar, minus the arch, still stands. The lions and dragons are still visible, imbedded in the brickwork. This gate has seen an untold number of people of all kinds pass through over the centuries. The archaic script that dedicated the gate being built by Nebuchadnezzar can be clearly seen today," Willis said.

The SMDC/ARSTRAT Space Support Cell in Iraq consisted of both military and civilians. They supported the CPA in the planning, reorganization and reconstruction of the oil, gas and electrical grids. They also supported efforts to rebuild the water grid, the prison system, schools, government buildings, sports complexes, local neighborhood housing areas, roads, museums and historical ruins. The team's efforts also included support to rebuilding and refurbishing hospitals, police stations, airports, seaports, the rail system and anything that a modern society might have. Space cell products were also used to fight and find insurgents, former Baath party members, weapons caches and terrorist safe houses.

SMDC/ARSTRAT members also showed ordinary Iraqis some of the marvels of modern technology — such as a digital camera that became an instant hit. Under Saddam Hussein, photos of ordinary folks had been forbidden. Bunch made copies of photos for Iraqis he supervised on a work detail and became an instant hero. The Iraqi foreman on the detail told him that the small gesture of printing some photos was an immeasurable gift to those Iraqis present.

The team also gave shoes and clothing sent by people from the U.S. to the workers at the CPA compound; many of them had the chance to pick some for their families.

Bunch summed up the Iraqi experience in mission-oriented terms. "We went through many difficult challenges, both personal and technical. Poor power service and a congested communications network caused the technical issues. However, with perseverance, trouble-shooting skills, and the assistance of everyone supporting our team — we were successful."

CPT George O'Neil of ARSST 12 creates a map. *Photo courtesy of ARSST 12.*

SORC members narrowly escape from Baghdad with their lives

By Sharon L. Hartman

BAGHDAD, Iraq — Have you ever heard someone say they cheated death? Not too many people can make that statement in the way that Gene Walacavage and SGT Sean Moudy can! Walacavage and Moudy are members of the U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command's Spectral Operations Resource Center (SORC). Both were deployed to Baghdad last year in support of OPERATION IRAQI FREEDOM and both lived through an experience that is nothing short of miraculous.

Just imagine lying peacefully in bed at sunrise and then in an instant hearing a huge incredible blast. Imagine the blast has just blown open a side of your room and you are left injured, dazed and confused. Walacavage and Moudy did not have to imagine this — they experienced it.

During the early morning hours of Oct. 26, 2003, 19 high explosive rockets hit the Al Rasheed Hotel in Baghdad, Iraq, where they were staying, killing one American Soldier and wounding more.

"I was sleeping in my room at the hotel when a rocket propelled grenade smashed through the concrete and metal window frame. It crossed the room, and punched a hole in the wall over my bed before coming to rest in the bathroom," said Walacavage.

"Luckily for me and SGT Moudy, my roommate, the bomb failed to detonate on impact."

However, the force from the kinetic blast of the rocket shot concrete debris into Walacavage's face and upper body.

"My face was burning, and I couldn't breathe at first because of the debris in my mouth," Walacavage added.

"I could not see for the first few seconds and had no idea what was happening until I heard the other rockets impacting on the hotel at which point I rolled onto the floor beside my bed until the explosions stopped.

"I tried to make my way into the bathroom to wash out my eyes but the debris kept me from getting in. I later learned this was a good thing because the unexploded ordinance was lying in the sink. I made my way back toward Sean and shouted to him several times. He answered and said he was 'OK'."

Moudy, who was also injured, found Walacavage amidst the debris, and together they left the room — Moudy leading the blinded Walacavage.

CPT George O'Neil and MAJ Michael Willis, members of SMDC/ARSTRAT's Army Space Support Team 12 who were also staying in the hotel, met them in the hall and brought them into their room where they performed triage on Walacavage until they were able to get a stretcher and carried him down to a waiting ambulance.

As they left the building that lay in a smoking ruin, they realized that they had indeed cheated death.

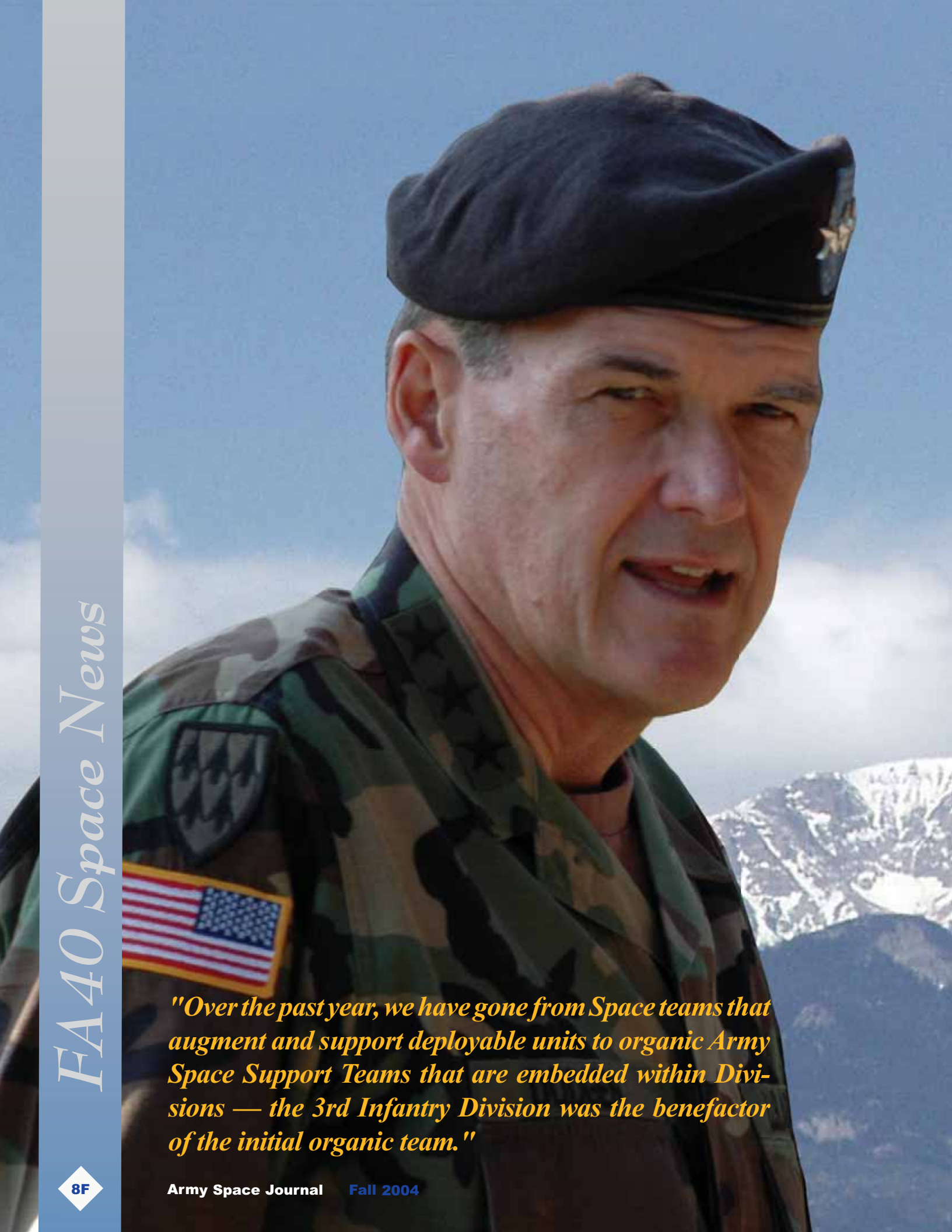
Walacavage and several of the other injured were transported to the 28th Combat Support Hospital in Baghdad where Walacavage spent about a week until his eyes healed enough for him to be sent to Germany. He spent four days there with an ophthalmologist before continuing his journey home.

Since then, he has had traumatic cataracts removed from each eye. This has cleared his eyesight, but he still needs some dental work because of losing some teeth in the attack.

Walacavage received the Defense of Freedom medal — the civilian equivalent of the military Purple Heart. The award was created following the terrorist attack of Sept. 11, 2001. Moudy received the Purple Heart Medal for the injuries he sustained.

Sharon L. Hartman is a Department of Defense Army Contractor with COLSA Corporation, and has served in the U.S. Army Space and Missile Defense Command Colorado Springs Public Affairs Office for four and a half years. She is a computer graphics designer, journalist and photographer, and is the Graphics Director for ***the Army Space Journal.***

Clockwise from top right, A rocket propelled grenade entered SORC members Gene Walacavage and Sgt. Sean Moudy's room through this window during an attack on the Al Rasheed Hotel, Oct. 26, 2003; This hallway photo shows the vast damage the RPG did to Walacavage and Moudy's room. Fortunately for the two men, the shell failed to detonate; The RPG penetrated this concrete wall above Walacavage's bed; From inside the bathroom you can see the thickness of the concrete wall the RPG tore through. Photos by



"Over the past year, we have gone from Space teams that augment and support deployable units to organic Army Space Support Teams that are embedded within Divisions — the 3rd Infantry Division was the benefactor of the initial organic team."

LTG LARRY J. DODGEN

Statement Before House Armed Services Committee Strategic Forces Subcommittee

July 22, 2004

Thank you for the opportunity to appear before this distinguished committee and for your ongoing support of our Army including our efforts in Space. Today, I appear before this committee as the Army proponent for Space and consider it a privilege to be among these distinguished panel members as a joint advocate of a well-trained Space cadre.

As you know, in 2001, the Space Commission unanimously concluded that the security and well being of the United States, its allies and friends depended on the nation's ability to operate in Space. The Army recognized this need in 1998 when it established Functional Area (FA) 40 — Space Operations within our commissioned officer corps.

In operations in Afghanistan and Iraq, Army Space Support Teams have performed admirably. Over the past year, we have gone from Space teams that augment and support deployable units to organic Army Space Support Teams that are embedded within Divisions — the 3rd Infantry Division was the benefactor of the initial organic team. In the next few years we foresee additional Divisions (UEx s) being embedded with Army Space Support Teams as the Army continues to transform. This is great news for the Space Cadre and the joint warfighter.

In order to comply with Department of Defense direction and General Accounting Office recommendations, the Army directed my command to use the Force Management Analysis Review process, known as the FORMAL, to establish and maintain a professional Space cadre.

The Army Space Cadre FORMAL is comprised of four phases. The first phase, which we are presently in, will establish an Army-unique definition for the Army Space Cadre. Second, the FORMAL will analyze force structure to identify Space cadre roles, missions, organizations, and personnel. Third, the eight personnel life cycle management functions envisioned for the Army Space Cadre will be reviewed and incorporated into Army policies. Finally, all necessary combat development elements such as doctrine, organization structure, training and leadership development will be built for the Army Space Cadre end-state strategy.

The FORMAL will result in a strategy to develop and maintain a core of highly trained professionals that fully support our Nation's Warfighters.

As we develop the Space Cadre, the Army recognizes education and training are critical for success. Accordingly, training courses have been developed for the FA40 students. The students are trained in such areas as the planning of Space operations, analyzing friendly and enemy force Space capabilities and limitations, and determining the impact of weather on Space and terrestrial operations in support of a joint force commander.

The Army is also actively participating in the development of new joint courses that will be offered by the U.S. Air Force Space Operations School. For example, the Army is working with the Air Force to develop a training course that will provide senior Space operators with a strategic-level focus of Space operations and a 12-week mission area specific series of courses. These courses will produce technically proficient officers that will work hand-in-hand with operational counterparts in the mission areas of navigation warfare, missile warning, and Space control. Joint educational endeavors will continue to evolve as formal training at the National Security Space Institute (NSSI) will soon become a reality. We enthusiastically look to the NSSI endeavor as the ultimate high ground training institute that will meet the education and training requirements of the Army's maturing Space cadre.

Mr. Chairman, the future of the Army's professional Space Cadre is an exciting one as it continues to evolve and grow. The Army's Space Cadre Strategy developed through the FORMAL process will be in full compliance with Congressional intent, DoD Executive Agent directives, and GAO recommendations. As we move forward with our sister services, the Army is determined to ensure DoD remains at the forefront of Space developments.

Army promotions recognize growing importance of Space

COLORADO SPRINGS, Colorado — Nine Space Operations Officers were recently selected for promotion to the rank of lieutenant colonel. They are; MAJ Dennis Brozek, assigned to the 10th Mountain Div., MAJ Thomas James, assigned to FDIC-West, MAJ Robert Klingseisen, assigned to U.S. Strategic Command, MAJ Alan Personius, also assigned to U.S. Strategic Command, MAJ James Pruneski, assigned to G-8 in the Pentagon, MAJ Gordon Quick, assigned to 18th Airborne Corps, MAJ Clay Scherer, a student in advanced civil schooling, MAJ Andrew Weate, assigned to SMDC/ARSTRAT, and MAJ Saundra Yanna assigned to SMDC/ARSTRAT.

Recent Career Field Designation transfers (New FA40s): MAJ Kurt Hoch is assigned to 1st Space Brigade and MAJ Larry Roberts is assigned to SMDC Headquarters.

Additionally 12 individuals were selected for promotion to major. They are CPT James Bushong assigned to Fort Knox, CPT James Cook assigned to Fort Bragg, CPT Jeffrey Douds on his way to SMDC Headquarters, CPT Darin Eades will teach at Drexel University (assist PMS), CPT Curt Hewett assigned to Fort Bragg, CPT Andrew Hittner assigned to Fort Campbell (SSE), CPT Jason Kalainoff assigned to West Point, CPT Scott Moore will attend the Naval Post Grad School, CPT Stephen Murphy will teach at Dickinson College, PA (assist PMS), CPT John Rayburn assigned to Fort Leavenworth, CPT Sakura Therrien assigned to West Point, and CPT Samuel Ybarra assigned to Fort Carson.

"These promotions are a huge vote of confidence for these fine Space Soldiers," said COL Jeff Horne, SMDC Deputy Commander for Operations. "And it is a great recognition of the important contribution made by Space forces to the Army. "

MAJ Jay Driscoll the FA40 Assignments Officer echoed COL Horne's sentiments saying, "This is a clear statement by the Army. It recognizes the need for FA40s at all levels throughout the force."

Driscoll is an experienced Space operator," said COL Jim Pierson, FDIC-West director. "He is exactly the man we need as the FA40 assignments officer at this point in time. His experience and institutional knowledge of the Space force will ensure that we are putting the right people in just the right assignments to support the force in any circumstances."

Driscoll was an Army Space Support Team member, Company Commander of the Theater Missile Warning Company and the Battalion S-3 of the 1st Space Battalion. He also deployed to Iraq with the 10th Special Forces Group as the Joint Special Operations Task Force-North Space Officer. Driscoll has 14 years of active duty, four years in Space assignments and holds a Bachelor's of Science degree in Business Administration from the University of Southern California.

Top: Members of the most recent Space Operations Officer Qualifications Course listen intently to the information being taught. Most of the FA40 material is technical and is presented in structured class situations. The current class is a real cross-section of the Army's functional areas bringing their unique experiences and viewpoints to the art of providing Space support to U.S. forces.
Bottom: COL Jeffrey Horne, SMDC Deputy Commander for Operations addresses soldiers as they begin their studies to become FA40 Space Operations Officers. Since the first class in August 2001, 109 officers have been trained as FA40s.
Photos by Ed White

Professional Reading

"Space Notes" excerpts professional articles of interest to Space professionals. The section will attempt to present a broad spectrum of newsworthy items, with references to the full article for those who wish to read further. Suggestions and submissions for this section are solicited, and should be forwarded to the Managing Editor at richard.burks@smdc-cs.army.mil.

India plans to build long-range missiles with Israel: official

NEW DELHI (AFP) Aug. 31, 2004

India, which tested an indigenously-built ballistic missile on Sunday, is holding talks with Israel about joint production of a long-range missile, the country's chief military scientist announced on Tuesday.

Japanese military wants fatter budget for missile defense, intelligence

TOKYO (AFP) Aug. 31, 2004

Japan's military pressed Tuesday for a 35 percent jump in spending on missile defense and intelligence systems for the next financial year to cope with new risks such as guerrilla attacks.

The request is part an overall budget demand by Japan's defense agency for 4.93 trillion yen for the fiscal year starting in April 2005, a rise of 1.2 percent from this year.

Maintenance Work Paying Off For ISS Crew

Houston TX (SPX) Aug. 30, 2004

"Success" is the key word this week aboard the International Space Station (ISS) as maintenance efforts by the Expedition 9 crew paid off on several major equipment items.

NASA ISS Science Officer Mike Fincke performed the most complex spacesuit repair job ever conducted in flight on a U.S. spacesuit. He replaced a water pump in the suit's cooling system.

The four-and-a-half-hour replacement job on Monday was followed by several hours of tests on Tuesday. The tests showed the new pump worked perfectly, and engineers on the ground will now determine whether to declare the spacesuit usable in the future.

Fledgling Space power China launches scientific satellite

BEIJING (AFP) Aug. 29, 2004

Fledgling Space power China Sunday launched a satellite from a remote desert region for a short-term scientific mission, state media reported.

The satellite, atop a Long March 2C carrier rocket, blasted off mid-afternoon from the Jiuquan launch center in northwestern Gansu province, the Xinhua news agency reported.

The satellite, which will remain in orbit for just a few days before returning to Earth, will be used for land surveying, mapping and other scientific experiments, the agency said.

U.S. Army's Tactical High Energy Laser Shoots Down Mortar Rounds

Redondo Beach CA (SPX) Aug. 27, 2004

The Tactical High Energy Laser, built by Northrop Grumman for the U.S. Army, shot down multiple mortar rounds Aug.. 24, proving that laser weapons could be applied on the battlefield to protect against common threats.

gearing up to begin hardware integration early next year and is on track to launch in September 2006, according to Program Manager Lt. Col. James Shoemaker.

Begun in 2002, Orbital Express is developing technologies for refueling, upgrading, and reconfiguring spacecraft while in orbit. Originally budgeted at roughly $100 million, the program's future was threatened earlier this year when its cost, excluding launch costs, ballooned to $240 million.

Newest Lockheed Martin-Built GPS Satellite Begins Service for Navigation Users Worldwide

Tuesday July 20, 9:02 am ET

FARNBOROUGH AIR SHOW, July 20 /PRNewswire-FirstCall/ — Lockheed Martin (NYSE: LMT — News) and the U.S. Air Force have completed on-orbit checkout of the upgraded Global Positioning System (GPS) satellite launched successfully June 23 from Cape Canaveral. The spacecraft has been declared fully operational for military and civilian navigation users around the globe.

Built by Lockheed Martin in Valley Forge, Pa., the satellite, designated Space Vehicle Number (SVN) 60 and GPS Mission IIR-12, is the third Block IIR to feature a high-performance antenna panel designed to provide greater signal power to navigation users. The current constellation of 29 GPS satellites now includes 11 fully operational Block IIR spacecraft, which were developed to improve global coverage and increase the overall performance of the global positioning system

Lockheed Martin Selected by Pentagon to Develop Prototype Communications System

Associated Press

Monday July 19, 3:16 p.m. ET

AKRON, Ohio (AP) — Lockheed Martin Corp. said it will lead a team selected by the Pentagon to develop a prototype communications system to keep commanders in touch in wartime.

Lockheed Martin's Akron-based Maritime Systems and Sensors unit will be the prime contractor for the project, which has an initial value of $15 million, the company said Monday.

The other companies participating are ITT, L3Com, BAE Systems, Adaptive Optics Associates, Accipter Systems, EMS and Dayton Aerospace, Lockheed Martin said.

The project will combine the speed of laser-based communications with the dependability of radio frequencies. The system would adapt to changing conditions, including heavy data needs.

The goal is to test a prototype in the field in 1 1/2 years and have a flight test in 2 1/2 years

Lawmaker: Missile testing to stay on Kauai

Associated Press

July 19, 2004

LIHUE, Hawaii — Sen. Daniel Inouye says the military's program for testing medium-range missile interceptor rockets will remain at the Navy's Pacific Missile Range Facility on Kauai, according to a spokesman.

"Due to the unique location and breadth of the Pacific Missile Range, Senator Inouye is assured that Barking Sands will remain the premier choice for longer-range missile testing well into the future," spokesman Mike Yuen said.

Earlier this month, Sen. Pete Domenici, R-N.M., asked the Defense Department to look into the possibility of taking the missile testing mission away from the Navy range at Barking Sands, on the western tip of Kauai, and moving it to the Army's White Sands Missile Range in his home state.

For the past decade, interceptor missiles designed to knock down hostile rockets have undergone preliminary tests at White Sands. Missiles then are sent either to Kauai or to the Army's missile range at Kwajalein in the Marshall Islands for final testing.

In tests representative of actual mortar threat scenarios, the THEL test bed destroyed both single mortar rounds and mortar rounds fired in a salvo at White Sands Missile Range, NM.

The tests were conducted by the Army as part of the Mobile THEL (MTHEL) program. The MTHEL program is the responsibility of the SHORAD Project Office under the U.S. Army's Program Executive Office for Air, Space, and Missile Defense.

Collaboration Of Manned, Unmanned Aircraft Demonstrated For UCAR Program

Owego NY (SPX) Aug. 24, 2004

Lockheed Martin successfully completed a demonstration of manned and unmanned aircraft collaboration as one of the advanced command and control concepts it is developing for its Unmanned Combat Armed Rotorcraft (UCAR) program.

The goal of UCAR is to demonstrate the technical feasibility, military utility, and operational value of an unmanned rotorcraft system capable of autonomous collaboration with manned and unmanned air and ground systems.

The Defense Advanced Research Projects Agency (DARPA) is developing the UCAR system jointly with the U.S. Army.

Fuel Cell Driven Tablet Brings Wearable Computers To U.S. Air Force

Scottsdale AZ (SPX) Aug. 24, 2004

General Dynamics C4 Systems, a business unit of General Dynamics has been awarded a contract by the United States Air Force (USAF) to develop and deliver 10 prototype tablet computers powered by direct liquid fuel cells for evaluation as a potential replacement for the department's current ground air traffic control computers.

The program will combine commercial-off-the-shelf computer equipment with privately developed fuel cell technology, and could enable extended field operations that will reduce the USAF's reliance on centrally located recharging apparatus and spare batteries.

Raytheon Delivers Exoatmospheric Kill Vehicle Payloads For Fort Greely

Tucson AZ (SPX) Aug. 18, 2004

Raytheon has delivered the first deployable flight elements of the Missile Defense Agency (MDA) Ground- based Midcourse Defense (GMD) program from its Missile Defense Kinetic Kill Vehicle production facility in Tucson, Ariz.

The Exoatmospheric Kill Vehicle (EKV) payload is designed to intercept hostile ballistic missile targets outside the atmosphere in the midcourse phase of flight.

The delivered payloads evolved from the EKV design that has been successfully flight tested over the last four years. By September, Raytheon will have delivered all required EKVs for the GMD program's initial deployment and testing.

Europeans May Aid U.S. Firms With Star Wars

Paris (SPX) Aug. 17, 2004

American defense contractors Lockheed Martin and Northrop Grumman say they will cooperate closely with European companies on the development of George W. Bush's so-called "Star Wars" missile defense system.

In a joint memorandum of understanding with EADS, the companies said they would work together to develop missile defense systems for the United States, Europe and Asia.

Orbital Express Program On Track For Launch In September 2006

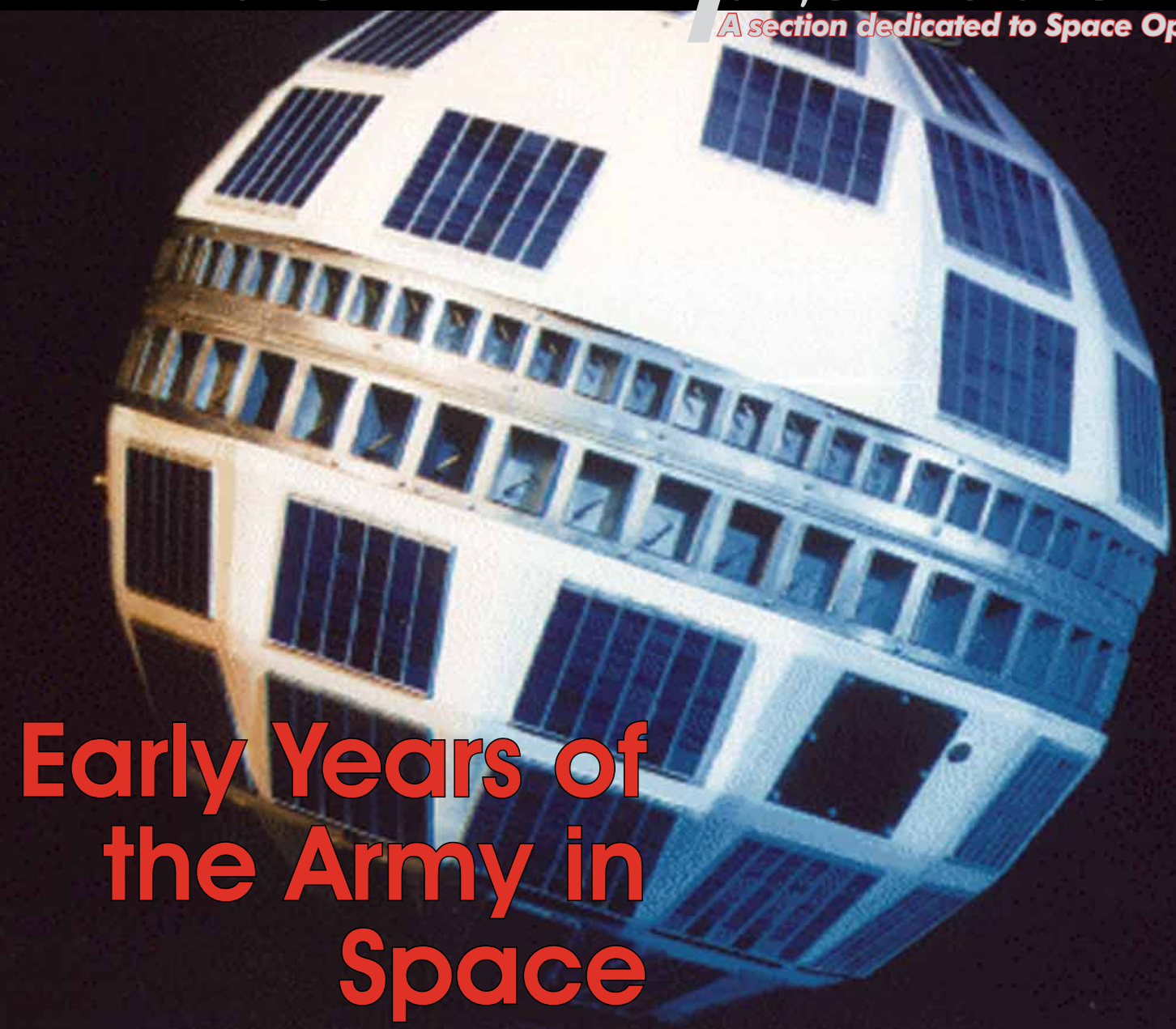
By Jefferson Morris

07/15/2004 09:32:41 AM

The Defense Advanced Research Projects Agency's (DARPA) Orbital Express satellite servicing demonstration program is

The Flipside

A section dedicated to Space Operations



Early Years of the Army in Space

A personal journal of the Army Space Support Team 13 experience in Iraq

Includes an exclusive on the attack on the Al Rasheed Hotel

Give us your opinion on these

lightning rod issues!

Should there be a Space Force?

Should FA40s command?

Should near-space be the primary domain of the Army?

Should the Army ever be the Theater Space Authority?

Comments on these questions may be sent to the Editor in chief via email to michael.howard@smdc-cs.army.mil