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HOMELAND DEFENSE

The broadening role of SPACE

SPACE SUPPORT

EARLY MISSILE WARNING ...

the Army Space Journal

Communicating Space to the warfighter

The U. S. Army Space and Missile Defense Command publishes **the Army Space Journal** quarterly, with special editions as required. The publication consists of four sections, FROM THE TOP — Leadership Updates; JOURNAL FORUM — Space Topics; TIP OF THE SPHERE — SMDC Features; and FLIPSIDE — Space Cadre News /Features.

The Journal provides a forum through which Space operations professionals can disseminate professional knowledge and furnish information within the U.S. Army. The purpose is to increase the effectiveness of Space operations through a professional discussion of events and lessons learned. It is also intended to inform the Army warfighter on Army Space issues.

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Cover Photos Courtesy SMDC/ARSTRAT

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What you didn't know ...

On Strategic Communication

Many people think the only reason federal agencies communicate is to increase their resources or authority — strategically placing information in front of decision makers in order to get more money, people or power. However, I think public support and confidence are the primary targets of strategic communication. Failure to maintain both will result in mission failure because neither resources nor courses of action will be continued or increased without these life-giving ingredients. They are the key equities here. In light of recent news about our Army, I would like to offer a few thoughts on strategic communication.

In The Prince, the story-inside-the-story resonates with the need for strategic communication today. Essentially, the advising 16th-century writer compares undetected potential political problems in governing organizations to cancer or other fatal medical maladies which increase in seriousness within the human body, requiring more drastic measures and urgency to remove or cure if not done so early on. While his writings have been interpreted on many levels in regard to individual and organizational leadership, Machiavelli's brief analogy provides possible insight into why governing bodies — as well as organizations, businesses and the military — need to understand, from genesis, the domino implications to what they do. Machiavelli provides a poignant comparison which implies it is critical to identify second-or-third-order negative effects of legislation or behaviors early on and remove or mitigate them before damage is done. Doing so is essential to not only smooth running and longevity of the governing body or organization, but to survival. Although much in the business and political worlds have changed since ink-to-paper of Machiavelli's analogy, a possible case can be made that connects it as a statement on the importance of the strategic communication efforts for military organizations today.

Machiavelli provides an intriguing historical perspective that, I think, potentially applies to any serious inquiry into the purpose and role of strategic communication. Even if credence is not provided today to Machiavelli and his analogy as an argument for the importance of public activities, the strategic communication task still boils down to determining how to create conditions among a multitude of diverse audiences that will enable and foster success for accomplishing whatever the organization's purpose or bottom line is among those audiences. The communication need for any organization — public, private; business or political — comes down to the same challenge whether you call the effort marketing, public relations, strategic communication, public affairs or even politics. The quest is to understand the impacts of an organization's actions while predicting bumps or roadblocks, avoiding or removing them and, by so doing, fostering success in the organization's key business or purpose.

The centerpiece of Machiavelli's medical analogy, however, remains as something that requires deeper understanding of communication effects in a broader context of today's complex world environment. More importantly, 9/11 provides a fresh and even frightening context that may well shape the inquiry spurred by Machiavelli's idea. Consider the consequence of failed strategic com-

In the simplest definition, the product of strategic communication is public support or confidence in an organization, its product and activities. The goal should be to impact public opinion by helping build that confidence in national security.

munication today. The result varies based upon how the individual judging the consequences perceives the importance and span of influence of the organization. When you ask just a few questions that pop into mind, the responses are similar to explaining the pieces on a chess board and the various implications of different moves of the game pieces. Does inattention to how an organization's behavior impacts audiences spell doom to an endeavor? Will public issues evolve as cancerous growths which require drastic effort to overcome? Can they be terminal? But now put this whole line of inquiry into the context of efforts which provide security to the United States of America — where the impact of failed communications can touch social, ideology, and economic issues and, even, freedom. At a minimum, 9/11 intensifies the strategic communication question in national security as terrorism is now considered acts of war vice crime. This all places the Machiavelli analogy onto a whole different playing field with potentially grave consequences.

Can America afford failed strategic communication efforts in the time of crisis? In the simplest definition, the product of strategic communication is public support or confidence in an organization, its product and activities. The goal should be to impact public opinion by helping build that confidence in national security. Questions introduced by the Machiavelli short story need to be explored to learn whether or not strategic communication considerations must be correctly included in the genetic fiber of humanitarian and military actions in securing the homeland and all that the military does. This inquiry looks at how essential it is to time strategic communication efforts in conducting successful missions. Still deeper, does or should consideration for strategic communication factors become so ingrained in the perspective of an activity that it shapes what is done? Based upon my experience, military planners primarily see communication efforts as secondary — rarely are they considered show-stoppers for mission success during the planning stages. Yet in the context of current operations in Iraq, the question of continued public support weighs more heavily today than, apparently, it did in the early days of military action there. As for the humanitarian piece, public confidence in Hurricane Katrina relief efforts waned from the very beginning, making it very difficult to see that federal agencies were thinking about public implications at all. Even in the wake of changes in Army leadership and at Walter Reed Army Medical Center, and how they came about, the true equity that was challenged and at risk was public confidence in the Army to take care of its war wounded.

Niccolo Machiavelli

Which brings the focus back to Machiavelli's words, according to one translation:

> *"Because in these cases (they) did what all wise princes must do, who have to have an eye not only on present disorders but on future ones as well, and have to avoid the latter with all industriousness: because, by providing for oneself beforehand, one can remedy them easily, but if one waits until they draw close, the medicine is not on time, because the illness has become incurable. And of this, it happens as the physicians say of the (consumptive disease) which in the beginning of its malignity is easy to cure and difficult to know, but in the progression of time, not having known it in the beginning nor medicated it, it becomes easy to know and difficult to cure. So it happens in the things of the state …"*

From my perspective, strategic communication is the very act of protecting democracy, securing the homeland. In my view, this translates to designing and implementing communication programs that endure and help create conditions that assist in accomplishing the mission. The analogy from The Prince implies that an empowered leader with increased effectiveness and a broad span of influence would be wise enough to avoid pitfalls that will fester in the public sectors and, in the end, have unnecessarily doomed the effort from the start.

— Michael L. Howard
Editor in Chief

Asymmetrical Threats:

A Vital Relevancy for Information Operations

LTG Kevin T. Campbell
Commanding General,
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America's unrivaled military superiority means that potential enemies — whether nations or terrorist groups — that choose to attack us will be more likely to resort to terror instead of conventional military assault. Moreover, easier access to sophisticated technology means that the destructive power available to terrorists is greater than ever. Adversaries may thus be tempted to use unconventional tools, such as weapons of mass destruction, to target our cities and disrupt the operations of our government. They may try to attack our economy and critical infrastructure using advanced computer technology. [1]

The above citation, taken from Presidential Decision Directive 62 signed in May 1998, foresaw the potential that unconventional methods of warfare could be used against our Homeland. Although much has changed since publication of this document to address vulnerabilities, the threat remains for adversaries to attack our Nation, interests and military forces by unconventional or asymmetric approaches.

The end of the Cold War resulted in significant realignments of alliances and an increase in regional instabilities. The former Soviet Union, once the predominant threat to American security, has been supplanted by rogue and failed states and non-state networks and actors. These entities attempt to avoid confrontation with our conventional military capabilities by striking weak points in our Nation's social, economic and political structures, or by taking advantage of perceived U.S. military vulnerabilities. They often attempt to operate at the extremes of the conflict spectrum. At one end, North Korea is actively pursuing nuclear weapons capabilities. At the other end, groups such as al-Qaeda, remnants of Saddam Hussein's former Ba'athist regime and various sectarian militia groups pursue insurgency warfare using asymmetrical approaches.

Adversaries increasingly respond to U.S. military dominance by pursuing indirect, unorthodox or surprising approaches, and using the capabilities of information technology, especially the Internet, as a tool of asymmetric warfare. Because of this, Information Operations has emerged as a critical component of the Army's operational readiness. Information Operations is defined as, "the integrated employment of the core capabilities of electronic warfare, computer network operations, psychological operations, military deception and operations security, in concert with specified supporting and related capabilities, to influence, disrupt, corrupt or usurp adversarial human and automated decision-making while protecting our own." [2] Space professionals, by their access to and understanding of the relationships between the core Information Operations capabilities, are particularly well qualified to support Information Operations against asymmetric threats.

Asymmetric Warfare: An Ongoing Challenge in Our Current Security Environment

Asymmetric warfare deals with one force attempting to circumvent or undermine strengths while exploiting weaknesses by using methods, nontraditional tactics, weapons or technologies that differ significantly from expected methods of operation. In essence, asymmetrical warfare is acting, organizing and thinking differently than opponents in order to maximize one's own advantages, exploit an opponent's weaknesses, attain the initiative or gain greater freedom of action. [3] Asymmetric warfare approaches can be applied across the spectrum of military operations.

Asymmetric warfare is a relative concept. The means of warfare by one group might be considered "asymmetric," while for the other group the means would merely be viewed as using all means available. As an example, "to the

Asymmetric warfare is a relative concept. The means of warfare by one group might be considered "asymmetric," while for the other group the means would merely be viewed as using all means available … "to the al-Qaeda fighter cowering in a cave in a remote part of Afghanistan, fuel air explosives dropped with deadly precision from aircraft miles away and thousands of feet up, directed by laser designators wielded by highly trained and stealthy special operations forces, is as asymmetric to him as his tactics are to us.

al-Qaeda fighter cowering in a cave in a remote part of Afghanistan, fuel air explosives, dropped with deadly precision from aircraft miles away and thousands of feet up, directed by laser designators wielded by highly trained and stealthy special operations forces, is as asymmetric to him as his tactics are to us." [4]

Although a variety of descriptions can be found, the characteristics of approaches that generally are deemed to be "asymmetric" from an American military standpoint include: [5]

- "unusual" threats, e.g., taking and torturing hostages;
- "irregular" threats unrecognized by the practice and laws of wars, treaties and arms control agreements, e.g., nuclear explosions to disrupt satellite operations;
- "unmatched" threats that look different from war, e.g., the attacks of Sept. 11, 2001;
- threats highly leveraged against U.S. military and civil assets, e.g., ballistic missiles and weapons of mass destruction;
- threats that are difficult to respond to in kind, e.g., terrorism and weapons of mass destruction;
- threats difficult to respond to in a discriminate and proportionate manner, e.g., nuclear terrorism, guerrilla warfare and sabotage;
- "unknown" threats, e.g., ramifications resulting from an extensive attack with biological weapons.

Old and New Capabilities as Evolving Threats

Our Nation's adversaries currently attempt to employ a variety of weapons and capabilities in both conventional and unconventional ways to achieve their desired effects. A frequently cited example of an asymmetric approach is the use of Improvised Explosive Devices (IEDs), the leading cause of casualties for our warfighters in Iraq. In the majority of cases, one or more artillery projectiles are command detonated using a variety of triggering devices. In August 2006 alone, approximately 1,200 IEDs were detonated as insurgent forces continue to invent new ways to design and hide these lethal munitions. [6]

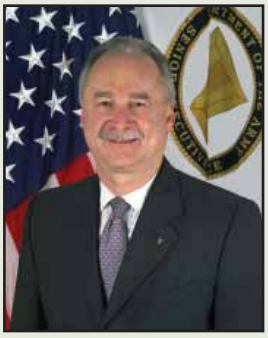
By relying on IEDs as a means of attack, insurgent forces attempt to create a situation where our combat forces have difficulty in identifying adversaries to engage. [7] In several instances, videos showing insurgent attacks using IEDs have been uploaded to popular Internet video-sharing sites, such as YouTube and Google Video. [8] The result is that insurgents have now seized the initiative in conveying their messages to a worldwide audience in a manner that is not subject to widely accepted journalistic standards.

The greatest concern of asymmetric approaches is the use, or threat of use, of weapons of mass destruction by terrorists, including their employment with missiles. As stated in the most recent Quadrennial Defense Review Report, "Our enemies seek weapons of mass destruction and, if they are successful, will likely attempt to use them in their conflict with free people everywhere." [9] GEN James Cartwright, commander, U.S. Strategic Command, also acknowledged: "The danger may be particularly grave if a terrorist or rogue nation can arm such missiles with nuclear warheads or other highly destructive weapons. [10]

It is notable many radical and terrorist groups add the threat of the use of nuclear weapons to their manifestos and pronouncements posted on the Internet. [11] Recent assessments indicate chemical, biological, radiological and nuclear (CBRN) "capabilities will continue to be sought by jihadist groups." [12] As a result, according

(Asymmetrical Threats, page 38)

Technology Initiatives in Support of Joint Warfighters — Current Initiatives



Michael C. Schexnayder
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Our Army and Nation remain engaged in a global war on terror that demands we maximize each member's contribution from the joint team. In this article, I want to discuss how U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) continues to explore better ways to meet its ever-growing mission demands. This article explores current initiatives that will improve support to missile tracking and testing and Space launch efforts at the Ronald Reagan Ballistic Missile Defense Test Site (RTS)/U.S. Army Kwajalein Atoll (USAKA); support to the joint warfighter through the use of operationally responsive Space and high altitude platforms; and the contributions of the Big Crow Project Office.

Real time mission data from the Pacific Rim possible through fiber optic cable

SMDC/ARSTRAT supports the Missile Defense Agency's (MDA) efforts to build a missile defense system through real-time mission support at RTS. Negotiations continue for the installation of a submarine fiber optic cable to be in place by Fiscal Year 2008 between RTS and the continental U.S. (CONUS) and other dispersed locations. This multi-million dollar cable will stretch almost 2200 miles from USAKA in the Republic of the Marshall Islands (RMI) — through the Federated States of Micronesia (FSM) — to Guam. This project, known as the Kwajalein Cable System (KCS), is a key element of the USAKA strategic vision to enhance customer support in the areas of theatre and ballistic missile testing and Space operations.

Low bandwidth terrestrial communications and the latency and availability of satellite communications currently restrict the amount of real time information that can be transmitted between RTS and CONUS. High bandwidth fiber connectivity will allow real-time information such as visualization, video images and sensor-tracking displays to be transmitted directly to CONUS locations. This high bandwidth connection will speed distribution of mission data and provide analysis more quickly to users. Additionally, this new enabler will allow USAKA, and test customers, to remote some technical capability to SMDC/ARSTRAT locations in Huntsville. This will allow programs to meet many of their test objectives without sending large numbers of personnel to Kwajalein Atoll.

U.S. Army Kwajalein Atoll (USAKA)

The KCS project directly complements the Department of Defense and Army transformation efforts to create a secure, robust optical Internet Protocol terrestrial network — also known as the Global Information Grid. The Defense Information Security Agency will perform the contracting actions necessary through its contracting activity, the Defense Information Technology Contracting Office. The KCS will be the first land line connection between USAKA and CONUS, providing reliable and timely data transfer. High bandwidth connectivity will greatly benefit RTS as the primary ground-based missile defense test site and an integral participant in ballistic missile development.

The FSM Telecommunications Corporation and the Marshall Islands National Telecommunications Agency are negotiating to purchase fiber optic bandwidth on this cable system. Plans are to finance the project through the Rural Utility Services, an agency of the U.S. Department of Agriculture. Both the FSM and RMI are anxious to acquire the fiber to their countries since they view it as important

for economic growth as well as for improving quality of life for their citizens.

The KCS will allow a vast increase in test and operational support capability for USAKA/RTS. Several organizations within the U.S. Pacific Command (PACOM) have already contacted USAKA about establishing remote UHF, VHF and HF communication sites. The U.S. Air Force has requested real time display of all Space surveillance data and customers conducting tests could reduce their footprint at USAKA, because the data from a test could be displayed real time anywhere in the world.

USAKA/RTS Spacelift Vision

In addition to its missile tracking and testing mission, RTS also offers several unique features that are advantageous when considering locations for Space launch operations, especially operationally responsive Spacelift. Kwajalein Atoll is part of the Marshall Islands situated in the West Central Pacific Ocean at a near equatorial location of about 9 degrees North latitude.

This location provides two advantages: 1) Space launches to the east realize significant benefits from the rotational velocity of the Earth. From the launch vehicle standpoint, this translates to a significant increase in payload capacity to orbit versus CONUS launch sites. 2) Space launches into geosynchronous orbit, the most significant commercial orbit, require a smaller plane change (from 9 degrees to equator) than other launch sites. Compared to Cape Canaveral, Fla., 20 percent less velocity is required.

There are no U.S.-based equatorial launch sites from which Space launch customers can conduct launches. Although Low Earth Orbits (LEO) with low inclinations can be achieved from Cape Canaveral, launching from this location requires an extremely inefficient dogleg maneuver which reduces the payload and increases the fuel requirements. One possible U.S. equatorial launch option is the Boeing "Sea Launch" platform. "Sea Launch," however, can be very expensive due to the large personnel and logistical support requirements. The last alternative is launching from foreign locations. French Guiana has an equatorial launch location. This can be an expensive option in addition to issues with classified payloads. This presents a significant obstacle to many payload providers due to legal, security and technology transfer concerns that significantly limit the ability to launch U.S. payloads on foreign launch vehicles from the CONUS-based Space ports and employ extremely costly and inefficient dogleg trajectories to achieve low inclination orbits. Due to the unique status of Kwajalein, the potential exists to provide a near equatorial launch site for a U.S. launch vehicle provider while avoiding export considerations.

Another significant advantage enjoyed by Kwajalein is the potential to fly a wide variety of trajectories and launch azimuths as a result of the extraordinary low population density in the RMI. This is the same advantage that has resulted in the U.S. using Kwajalein as its primary ballistic missile test site for more than 40 years. The total land area of the RMI is only 70 square miles and thus it is relatively difficult to endanger personnel and property through an errant missile.

A closely related advantage, a result of the RMI consisting primarily of deep ocean area, is that there is relatively little land area to be considered in terms of missile debris. Most launch vehicle contractors have encountered the stringent regulations associated with CONUS operation and would realize significant operational savings at Kwajalein.

Another factor is the advantage of collocating a Space launch facility at the range. Operations at Kwajalein enjoy the advantages of favorable safety, security and environmental constraints with high levels of radio frequency isolation. The suite of instrumentation available at Kwajalein is unparalleled in the world with significant wideband connectivity to CONUS locations via DS3 and soon with fiber. This offers the potential to provide a level of "diagnostic" information unavailable at any other launch facility in the world. This can be particularly important for relatively immature launch vehicles that are likely to experience flight anomalies.

An additional factor related to collocation with the range is the nature of the community at Kwajalein. The entire Kwajalein community is focused on missile test and associated support. The level of experience and expertise is the highest in the world and provides a tremendous pool of talent to assist the launch vehicle and payload personnel in addressing any issues associated with their operations.

The Kwajalein community is also very comfortable with a wide variety of missile flight test operations thus there is little likelihood of community resistance to introduction of a new launch vehicle, as one would expect to encounter at some other launch sites. Typical expenses associated with community outreach, town hall meetings, local permits, etc., would largely be eliminated at Kwajalein.

The USAKA/RTS equatorial location, unparalleled instrumentation and extensive logistical infrastructure offer a major advantage for a Space launch complex and support Department of Defense's Operationally Responsive Space (ORS) program. Under this concept, multiple boosters and payloads would be pre-positioned at USAKA. Different trajectories would be developed for each contingency. If a strategic need arises, entire new constellations could be launched to achieve needed satellite coverage.

Operationally Responsive Space Program

SMDC/ARSTRAT is actively involved in the ORS Program, a joint U.S. military initiative with the goal of providing tactically responsive, operationally relevant Space capabilities to the warfighters on the battlefield. The goal is to provide and exploit on-orbit capabilities quicker than today, with a shorter development and acquisition cycle. To achieve this goal, the Department of Defense is considering technologies such as a common Spacecraft bus, plug and play operational payloads, and operationally responsive launch vehicles. This should result in characteristically simpler, smaller, and cheaper satellites that can be called up and launched within days to weeks rather than months or years.

Space assets are low density, high demand resources. As a result, the Army's Space activities must be coordinated with all ser-

(Current Initiatives, page 42)

Coupling Assured Space and Missile Defense

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

Country X continues to slowly slip into chaos, and there are strong indications its military forces are posturing for war in response to its perceived escalating. Its economy has nearly come to a halt. Country X appears to have placed all of its military forces on heightened alert and have begun deploying mobile ballistic missile forces. What was once a functioning state is now on the brink of implosion and is increasingly a threat to regional and international security. In response, the U.S. has begun its own planning to address head-on this growing threat to our way of life.

Sound familiar? Most of you have read these fictional scripts detailing the buildup of tensions to set the stage and context for exercises and war games. Unfortunately, these scenarios are often not that far from real-world events.

The Department of Defense, under the guidance from National leadership, plans for these threats. For our part, the current integrated Ballistic Missile Defense System (BMDS) that includes radars, other sensors, shooters and the Ground-based Midcourse Defense (GMD) system, is a concrete example of a "family of systems" to combat threats such as those poised by Country X.

We routinely train and exercise against these fictitious scenarios by rogue or hostile states and/or actors. What we learn in training and exercises, however, is very real. We employ the concept of operations we plan to use. Our tactics, techniques and procedures are put into action and run through the ringer as if it were a real crisis or war. The real-world events help us as well. This past July, North Korea's launch of several missiles provided a test of the Ballistic Missile Defense System architecture.

North Korea didn't tell us what kind of missiles they were going to launch or their trajectories. As a precaution the president put the 100th Missile Defense Brigade (GMD) and its battalion, the 49th Missile Defense Battalion (GMD) in Alaska, on alert. The situation allowed the chain of command to exercise the operations plan, from the president through the Department of Defense and two combatant commanders (U.S. Strategic Command and U.S. Northern Command) to the brigade and battalion. In early September our defensive plan was again exercised during the successful integrated flight test of the ground-based interceptor conducted by the Missile Defense Agency.

These two events are detailed in an article in this issue from the perspective of 100th Missile Defense Brigade crew members who were involved in them.

In July while the 100th was on heightened alert status, its sister brigade, the 1st Space Brigade, was also standing ready. The 1st Space Battalion's Joint Tactical Ground Stations (JTAGS) were standing watch to provide missile warning. COL Timothy Coffin, commander, 1st Space Brigade, will discuss the JTAGS crews and their missions in an article also in this journal.

The 1st Space Brigade is an integral part of the Ballistic Missile Defense System. This summer, the brigade activated the FBX-T(Forward-based X-Band - Transportable) radar detachment and the Soldiers who operate the system. Those Soldiers now operate under the day-to-day control of the 94th Army Air Missile Defense Command in support of the Ballistic Missile Defense System mission. The Missile Defense Agency is projecting that several more FBX-Ts will come on-line over the coming decade. 1st Space Brigade will have an expanding role in activating these units.

This is definitely a growth industry. As other sensors become part of the Ballistic Missile Defense System architecture, the demand for information from sensors continues to grow. This has always been the case, but now warfighting commanders require the same information packaged in such a way to support timely situational awareness, missile warning and decision making. It is no longer good enough

You should feel assured that the Nation's many defense industry companies and Department of Defense agencies, such as the Missile Defense Agency, are partnered with us to produce the best capabilities to defend our Nation and our allies.

to report that a missile was launched from an approximate location and will impact in a general area. It is no longer sufficient to tell a commander that something "hot" occurred at a particular place and time. The commander, from the strategic level to the tactical level, and his forces need precise information to better support attack operations; timely, precise in-flight information to better focus active defense assets; and refined impact prediction to better focus active defense assets and direct passive defense efforts. To do this, all sensor data must be fused and correlated.

Ballistic Missile Defense System sensor robustness lies in the ability to receive, integrate and process data from multiple sensors. All supporting sensors must be able to provide reports on events, which create signatures across the entire energy spectrum, not just those detected by Space-based missile detection systems. The fused information must be received in a timely manner to give the various Ballistic Missile Defense System weapon systems time to react. This concept ensures that we avoid data, sensor and weapons stovepipes, and that the systems contribute to a common operational picture that supports the entire Ballistic Missile Defense System architecture. Those infrared sensors include but are not limited to: Space-based Infrared System; the Alternative InfraRed Satellite System; other air-based infrared sensors; as well as ground, air, sea and Space-based radars. This concept will provide a more robust capability to provide critical warning and battlespace awareness not only to theater commanders who rely on early missile warning, but also for our Nation's leadership who watch from a global perspective in defense of our Nation.

You should feel assured that the Nation's many defense industry companies and Department of Defense agencies, such as the Missile Defense Agency, are partnered with us to produce the best capabilities to defend our Nation and our allies. As an example, the Missile Defense Agency has done an exceptional job of leveraging and integrating the data from sensors (Cobra Dane, Upgraded Early Warning Radar, the Aegis SPY-1, etc), which were built for service missions and needs, into a common alerting system for the Ballistic Missile Defense System.

Even as the system matures and grows, it is dependent on electrons moving from sensor to sensor to ground stations or weapon systems, often through Space rather than through land lines of fiber. The Ballistic Missile Defense System is not the only system that relies on Space assets. Our Nation's military and those of our allies are becoming increasingly dependent on Space because of what those Space-based systems allow and enable forces to do. As stated in the 2006 Army Space Master Plan, "Space capabilities can significantly reduce the fog, friction and uncertainty of warfare when integrated with complementary airborne and terrestrial-based systems that promote understanding."

Commanders will use this information to enable them to direct military operations across the battlefield. As they depend on the Space-based capabilities to a greater degree, we will need to maintain access to them.

It is no wonder that maintaining access to Space systems is one of the primary goals espoused in the majority of articles and publications on Space. The United States national security is critically dependant upon Space capabilities, and this dependence will grow. Army doctrine in Field Manual 3-0 lists protection of Space assets as a component of force protection and that is echoed in the 2006 Army Space Master Plan.

Several initiatives are moving forward to assure the Army's access to Space-based systems and capabilities. The initiatives fall into two basic categories: they either provide Space and near-Space platforms or they protect the systems.

One initiative is the high altitude long endurance (HALE) program. The objective for HALE platforms — the HiSentinel, Lighter Than Air, Heavier Than Air, and Integrated Sensor Is the Structure (ISIS) — is to provide commanders with an operationally responsive system that they can tailor with a single or multi-mission payload, e.g., for intelligence, surveillance, missile defense cueing or communications. These four payloads could then be put in place where they are needed and left there for an extended amount of time. The HALE programs are all still in the test stages.

(See Coupling, page 45)

The View From (Army) Space ...

By COL Bruce Smith

Today's Army is critically dependent upon Space capabilities to enable and enhance land warfare. Virtually every Army operation relies on Space capabilities to some degree to enhance the effectiveness of our combat forces. Currently, the Army uses Space capabilities to communicate, navigate, target the enemy and protect our forces. In the not too distant future, the Army's use of and dependence on Space capabilities will be more robust than today. The Army's future formations and systems will use Space in new ways that will cut across traditional Battle Field Operating Systems and bring increasingly integrated and effective capabilities. Tomorrow's Soldiers will rely on the expanded use of Space capabilities, to include expanded Space forces, Space expertise, Space enabled systems and expanded Space doctrine.

The Directorate of Combat Development, as part of the Future Warfare Center, is working to bring these expanded Space capabilities to tomorrow's Soldier. We work to develop the future doctrine, organizations, training and leadership programs that the Army will use to employ Space and missile defense capabilities. Our charter is to ensure the Army has the Soldiers and structures that are ready to meet future Space and missile defense requirements. Through independent and complementary activities, our overriding and unifying purpose is to expand Space and missile defense capabilities within the Army. This being the **Army Space Journal**, I am going to concentrate on our Space roles and activities.

Army Space Master Plan

Though the Air Force is designated as Department of Defense's Executive Agent for Space, the Army has a significant role in both current and future Space operations. Space activities and operations are found throughout the Army in every component, as well as across a number of branches, agencies and commands. Combat operations, support operations and acquisition activities are all impacted by Space, and in turn, shape and influence Army Space requirements.

In previous years, Army Space requirements, as well as activities, were developed and managed separately in various stovepiped proponents or organizations. Today the Army is rapidly moving to break down stovepiped organizations and systems in order to increase combat effectiveness and gain efficiencies as well. To guide the management and expansion of Space activities in this changing environment the Army has recently published the Army Space Master Plan. The plan is just what it says. It is the Army's plan, not Space and Missile Defense Command's plan. The plan identifies Army capability gaps as well as Army priorities and solutions to meet these gaps. The plan crosses all Army organizations and proponents and provides a comprehensive and fully integrated approach to meet Space needs at tactical, organizational and strategic levels. The Army Space Master Plan is helping to ensure Space capabilities are expanded across the Army, by linking Space doctrine, organizational structures, as well as spending priorities, with Army operational needs in a holistic fashion.

Space Cadre

Another way we are expanding Army Space capabilities is through the creation and implementation of the Army Space Cadre. Per Congressional direction, the Army, in conjunction with each of the other Services, is standing up a Space cadre to develop and maintain a cadre of Space qualified professionals in sufficient quantities to represent the Army's interests in Space acquisition and operations. The Army Space Cadre will be man joint Space organizations as well as serving as Space experts within Army staffs and organizations. Today the cadre consists of FA40s, who are identified as Space professionals. However the Army Space cadre

The most recent graduating class of FA40s (pictured) are added to the ranks of the more than 200 Space Operations Officers already serving at all levels of the Army and the Joint community. The graduates of FA40 class 06-02 are (first row l. to r.) MAJ Sergio A. Gonzales, MAJ Timothy Ormand, MAJ John T. Prouty, CPT Elizabeth Thomas, CPT Andy R. Lee (USMC), MAJ Edward Schober, MAJ Samuel Ybarra, LTC John C. Madrid and SGT Daniel Holscher. Second row (l. to r.) includes MAJ Robert Berg, LTC Jeffery Reichman, CPT Adam C. Wolfe, MAJ Paul B. Strickland, 1LT Derek Musser, MAJ Paul Madsen, 2LT Steven Cowan and MAJ Dennis Willie. Back row (l. to r.) includes MAJ Keith Stone, MAJ Kenneth Klock, MAJ Johnathan Matey, MAJ Scott Moore and CPT Matthew Bowes. Not pictured is CPT Timothy Bean.

is expanding. Recently, the Senior Army Space Council, whose members consist of senior members of the Army Staff as well as Training and Doctrine Command, has approved the expansion of the Space cadre to include enlisted Soldiers and civilians. These members of the cadre will be designated as Space Enablers. Space Enablers will serve throughout the Army in a variety of career fields. Their primary career field is not Space, but they perform unique Space related tasks or functions related to Army Space acquisition or operations.

The Army is in the midst of identifying its Space Enabler personnel and billets now. In addition to identifying these personnel and billets we are also reviewing all Space training in the Army. Over the next several years the Army will gain a Space cadre that crosses all components, consisting of both military and civilian personnel that have a common baseline of Space knowledge and training. The cadre will work across the Army in multiple proponents and organizations. Army Space cadre personnel will directly work on and influence operations, acquisition, training, etc. The Army Space cadre will expand Space knowledge across and throughout the Army, bringing increasingly effective Space capabilities to the warfighter.

Space Support Elements

We are also expanding Space capabilities within the Army by the ongoing efforts to field organic Space forces to several Army headquarters; Army, Corps, Divisions and Fires Brigades. In the past, U.S. Army Space and Missile Defense Command provided Space expertise and capabilities to forces through augmentation in the form of the Army Space Support Teams. While the teams continue to provide critical capabilities to deployed forces, the Army has realized that headquarters need their own organic Space capabilities in order to facilitate improved Space planning and integration. Space Support Elements are expanding both Space capabilities within the Army, as well as opportunities for Space Operations Officers. FA40s will have the opportunity to be assigned to senior staffs and bring Space expertise to forces that previously did not have dedicated Space support. FA40s within the Space Support Elements are serving a critical role in expanding Space capabilities across and throughout the Army.

Space Integration

The Army is the largest user of Space capabilities and products. Space-based capabilities and enabled products and services provide today's ground warfighter critical capabilities that were unimaginable only a few years ago. These capabilities are moving out of the strategic realm and are now aiding in the operational as well as tactical warfight. Yet the Army does not own, develop or operate the majority of the Space systems it uses and relies upon. How does the Army ensure that its capability gaps are being met? Integration is the short answer. Army personnel from the Future Warfare Center, Training and Doctrine Command, Department of Army Staff, ASA(ALT) are continually working together to identify and define Army requirements as well as develop Army positions concerning jointly provided Space capabilities. These individuals work together in close concert, often under the direction of the Army Space Council, to integrate disparate needs and opinions into a single Army requirement or need. They work to ensure Army requirements are integrated into other Service's and Agency's development documents and concepts. We are working to change others' thinking concerning Space. Space derived capabilities cannot be confined to the operational level only. The Army through experience in Operation Iraqi Freedom and Operation Enduring Freedom recognizes that Space capabilities are critical to the modern ground fight — down to the tactical level. Soldiers down to the lowest levels of command require satellite communications; Space based imagery, Space position navigation and timing data as well as missile warning information. Space integration activities are expanding Space capabilities within the Army by changing mindsets as well as operational concepts throughout the National Security Space community.

Training

Lastly, we are expanding Space capabilities across the Army

(See Expanding Space, page 43)

SUCCESSFUL FLIGHT TEST

GMD crews prepare with many hours of training

By MAJ Paul Fritz

The events that led up to the successful flight test seemed to drag on forever for the Ground-based Midcourse Defense test flight crew. However, the development and training preceding the test were the critical components of its success.

Prior to the training, a Missile Defense Element crew was invited down to Huntsville, Ala., to view a training scenario and discuss GMD engagement tactics with the test community and developers that support GMD. This was critical in enabling developers' understanding of the warfighter's tactics, techniques and procedures and it also provided an opportunity for the crew to get a first look at what the flight test would actually look like.

Since it was determined that the defense of the homeland was too critical to sacrifice an active crew for the commitment to flight test training, a sixth crew was assembled from the GMD support staff which consisted of five members who had served on crews in the past. The flight test crew consisted of MAJ Paul Fritz, crew director; CPT Tim Shaffer, deputy director; 1LT Walter Loyola, current operations officer; SFC Brian Clemons, future operations officer; and SSG Eddie Negron, readiness officer. Although this group was not an active crew, all of them had at least eight months to a year of crew experience and were able to dedicate their time to the success of the upcoming flight test.

Most of the training days consisted of Count Down Training events which lead up to a computer based training scenario using the actual GMD system. The training scenario was built to portray what the actual test event would look like utilizing data collected over past test events. The developers did an outstanding job building a training scenario that was as realistic as possible. Using this scenario, the crew was trained to react to several possible system failures.

The crew participated in about 20 Count Down Training events which lasted several hours each over a period of about four weeks. The training events were overseen by the Boeing Test Director, Kelly Bryan, for this flight test. He ensured that the crew reacted correctly and was always ready to step in personally if needed. Several of the test events were designed to test Bryan to make sure he was ready as well.

The test was originally planned for Aug. 31, but heavy fog in both Kodiak, the target launch site, and Vandenberg Air Force Base, Calif., the Ground Based Interceptor launch site, prevented the test from occurring as planned. Everyone went home disappointed after a very long day — knowing that

1LT Jodee Aubol Haining, now the Battalion S-4 Logistics officer, sits on the operating system at Fort Greely, Alaska.

the weather report for the next day was not any more encouraging.

Both the test crew and the flight test support personnel reported to Schriever by 3 a.m. Mountain Standard Time on Sept. 1, hoping that the weather would clear for the flight test. As the local weather reports began to come in to the Missile Defense Element, hopes for a launch started to dwindle. The launch window was scheduled to close at 12 p.m. Mountain Standard Time since the Federal Aviation Authority could only keep the area clear of commercial air traffic for so long. As the hours ticked by, the weather was not getting any better. Finally, at around 11 a.m., a break in the fog and cloud cover at both sites converged and the test was given a green light.

The crew was isolated from the test control communication nets, so we did not know when the actual target launch time was to occur. The intent of the flight test was for us to only use information provided on our GMD systems, just like we would if this were an actual attack against the United States. The GMD system performed exactly as the training models had done during our training. A launch out of Kodiak, Alaska had been detected and was threatening the defended area of the test impact site. We requested permission to go to "weapons free" from the command director located in Cheyenne Mountain who in turn requested the same from the commander of Northern Command. Permission was granted and the GMD system to was transitioned to "weapons free." Once "weapons free" was entered into the GMD system, standard tactics techniques and procedures were followed and we engaged the "threat" re-entry vehicle. The GMD system behaved exactly as designed and a Ground-Based Interceptor was launched from Vandenberg. The Exo-atmospheric Kill Vehicle found its target and successfully intercepted the re-entry vehicle. The final stage of the Ground-Based Interceptor is known as the Exo-atmospheric Kill Vehicle or EKV. This is the portion that actually intercepts the threat re-entry vehicle and destroys it using kinetic energy.

As the reports of how successful the test had been started to trickle into the Missile Defense Element, the crew started cheering as did the support personnel in the test center located in the next room. Everyone on the crew was happy to have taken part in the test and especially happy that it was such a success. Although the train-up was long, each member of the crew would do it all over again to ensure another success.

MAJ Paul Fritz is currently a Missile Defense Element (MDE) Director with the 100th Missile Defense Brigade located in Colorado Springs. He is a graduate of the Intermediate Leaders Course and has his Masters in Space Operations Engineering Management from Webster University. He has been assigned to the 100th since 2003 where he has served as a Deputy MDE Director and as the Assistant S-3.

Standing Watch!

A look at Theater Missile Warning Detachments

By COL Timothy Coffin and MAJ Joseph Carroll

At 5 p.m. on Osan Air Base, Korea, most people are on their way home from work, but for Alpha Crew, Charlie Detachment, 1st Space Company (Joint Tactical Ground Stations, JTAGS) the day is just beginning. Physical Training starts at 5 p.m. The crew meets at 7:30 p.m. to review global ballistic missile activity from the past 24 hours and receive an intelligence estimate for ballistic missile events which are likely to occur in the next 24 hours. Following the intelligence update, Alpha Crew heads to the JTAGS shelter, deep in the bowels of the Korean Combined Operations and Intelligence Center. The Alpha Crew Chief receives a thorough briefing from the outgoing crew chief on all activities from the past 12 hours, conducts a sensitive item inventory, checks the equipment and operations status of the data processors and communications systems, and then assumes responsibility for missile warning operations. The Alpha Crew Primary Operator completes primary workstation changeover with the primary operator from the previous shift, ensuring the system is fully mission capable. Next in sequence, the Alpha Crew Secondary Operator completes changeover with his predecessor. The Secondary completes communications checks with the Cheyenne Mountain Missile Correlation Center, and U.S. Pacific Command, Central Command and European Command's primary missile warning nodes using U.S. Strategic Command's First Detect/First Report secure voice network. At the completion of these checks, crew changeover is complete and Alpha Crew has fully assumed the JTAGS missile warning mission. The crew embraces the detachments motto "A CUT ABOVE" and digs in for the ensuing 12 hour shift ready and willing to provide 24/7/365 real world mission support to the Army, Joint warfighter and coalition partners. This routine happens twice a day, 365 days a year in the Pacific, European and Central Theaters as JTAGS detachments stand ever vigilant and on guard for the Soldier.

JTAGS is a transportable satellite ground station and information processing system which receives and processes in the theater of operations, raw, wideband infrared sensor data down-linked from Defense Support Program Satellites. JTAGS detachments disseminate warning, alerting and cueing information on ballistic missiles and other tactical events of interest throughout the theater using a redundant network of communications systems.

The JTAGS detachments today evolved from a highly successful fast innovation and rapid prototyping effort from the Army Space Exploitation Demonstration Program. Prototype systems were built and demonstrated to Combatant Commanders in Europe and Korea in 1993 and 1994. Originally developed and built by GenCorp-Aerojet (now Northrop-Grumman) for the U.S. Army, JTAGS determines the ballistic missile source by identifying missile launch point and time, and provides an estimated impact point and time. The direct downlink and in theater, architecture of the system reduces the possibility of single-points of failure in long-haul communication systems, reduces the vulnerability of those networks to enemy interdiction and is responsive to the theater commander demands for warning and battlespace characterization. The JTAGS system fulfills the critical in

theater leg of the triad of systems which make up the U.S. Strategic Command's Theater Event System.

JTAGS processes data from up to three Defense Support Program infrared, missile warning satellites in orbit over 22,000 miles away from earth to determine launch points and time, azimuth of flight and predicted point and time of impact for ballistic missiles. It supports the passive defense pillar of air defense by providing in-theater early warning of enemy ballistic missile launch events. JTAGS also supports active defense by cueing air defense assets to the missile track. Data is also provided on launch location to deep attack assets to aid in attack operations and elimination of the theater missile threat.

JTAGS provide reports on other infrared events such as large fires or explosions that may be indicators of events that support the Commander's Critical Information Requirements. These reports contribute to a commander's battlespace awareness, assisting him in deciding how to best employ his forces to minimize risk and maximize his desired effects.

Training lies at the heart of JTAGS ability to provide near-real time ballistic missile warning. From the first day at a JTAGS site a new operator undergoes an intensive 30 day Table-IV certification process. During this individual Table Certification the operator learns all site specific information to include regional launch locations, missiles of importance and communications. Communications, advanced event processing and warning notification procedures are then drilled into the operator until they become second nature. Once a crew member has mastered the skills of processing an event they are placed on a crew where they observe live operations. Finally, once a crew has demonstrated proficiency as a team they are Table V certified. The team certification tests a variety of situations from loss of the crew chief to mass attack procedures. A successful Table V takes about one week of dedicated practice and a crew rarely passes on the first attempt. It is this tough, realistic training that allows JTAGS to quickly and accurately provide ballistic missile warning under all conditions.

To keep in-line with the unit-level battle-focused training, JTAGS detachments routinely participate in theater missile warning exercises. Anticipated real-world scenarios are the primary focus in these exercises so that all players and missile warning producers will be able to effectively provide ballistic missile warning based on any number of scenarios.

The training pays off. In the early morning hours on July 5, 2006, (Korea Standard Time), North Korea test launched numerous ballistic missiles from its arsenal. The days surrounding these launches were tense as the World and U.S. Forces Korea waited to see if there would be follow-on actions. As these events unfolded JTAGS provided the U.S. Forces Korea and U.S. Pacific Command commanders reliable, accurate near-real time information on the North Korean Missile launches. Training was the key to this success.

Combatant Commanders view JTAGS as a critical capability — so much so that both U.S. Central Command and U.S. Pacific Command have formally stated that they consider JTAGS ability to directly down-link, process and disseminate warning data from within the theater an essential part of their missile warning architectures.

The demand for information from infrared sensors continues to grow. Current and anticipated threats demand improved sensor capabilities and the ability to fuse and correlate data from multiple sensor types and systems. It is no longer good enough to report that a missile launched from an approximate location or will impact in a general area. It is no longer good enough to tell a commander that something "hot" occurred at a particular place and time on the battlefield. The commander and his forces need precise launch points to better support attack operations, and refined impact prediction to better focus active defense assets and direct passive defense. The commander needs to know what occurred to produce the "hot event."

JTAGS future lies in the ability to receive and process data from multiple sensors being developed and fielded today to provide reports on events creating signatures across the energy spectrum, not only those detected by Space-based missile detection systems. This concept ensures that we avoid data and sensor stovepipes and contribute to a common operational picture. Those sensor include but are not limited to: Space-Based Infrared System; Space Tracking and Surveillance System; the Alternative InfraRed Satellite System; other air based infrared sensors; and ground, air and Space-based radars. This will not only provide a more robust capability to provide critical warning and battlespace awareness to theater commanders, but will also create the ability for JTAGS to support other customers such as the Ballistic Missile Defense System or Missile Defense Agency's kill chain for Aegis, Terminal High-Altitude Area Defense, Kinetic Energy Interceptor or Patriot engagements.

Only JTAGS, by its in-theater ability to integrate directly into the theaters' missile warning architecture, and in-theater ability to directly down-link, process and disseminate warning data, is uniquely suited to meet the Combatant Commanders' requirements for assured timely and accurate missile warning. Expanding today's capabilities enable JTAGS to continue to meet warfighter and commander requirements in the missile threat environment of the future battlefield.

Contributions to this article were made by SSG Jared English, Lt. Cmdr. Kent Meyer, MAJ Timothy Dalton and Charles Ehlers.

COL Timothy R. Coffin assumed command of the 1st Space Brigade, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) on July 27, 2006. In this position he is responsible for the supervision of three one-of-a-kind battalions — the 53rd Signal Battalion (SATCON), the 1st Space Battalion and the 117th Space Support Battalion of the Colorado Army National Guard. These units are charged with providing day-to-day Space support to the operational Army. Coffin has been an Army Space officer for the last ten years.

MAJ(P) Joseph Carroll has been the S3 of the 1st Space Brigade since June 2005. His previous assignments include Space Control Planner, ARSST Team Leader, Joint Planner and Army G3 action officer. He is a native of Boston, MA and a graduate of Providence College and the University of Texas, at Austin.

Ulchi Focus Lens

Maintaining balance across a joint spectrum

By MAJ Joseph Carroll

August 2006 once again witnessed a large deployment of 1st Space Brigade forces in support of Ulchi Focus Lens (UFL) on the Korean Peninsula. Although the annual occurrence of this exercise may prompt the notion of a static construct — the 1st Space Brigade and U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command continuously analyze and modify strategies to better support the Korean theater — specifically the Ground Component Command. Deploying to the peninsula a mere month after the North Korean launch of a Taepo Dong II missile, it was more critical than ever to learn from past experiences and ensure that "lessons learned" were captured, analyzed and applied in near real time to improve future training and warfighting. This year's deployment consisted of 40 Space Soldiers from off peninsula, in addition to the 18 Soldiers/Sailors from the Joint Tactical Ground Station-Pacific Detachment, configured to maximize Space support, Space related targeting and Space effects in support of the Ground Component Command.

Maintaining Balance

As the demand for Space support increases across the joint and interagency warfighting community, the task of appropriately allocating Space forces in support of specific missions and units becomes complex. The 1st Space Brigade, a Modified Table of Organization and Equipment organization as of Oct. 16, 2005, starts this process with a clear focus on directed missions. The brigade's primary focus is to provide trained and ready Space forces in support of deployed combat forces while simultaneously conducting 24/7 missions, providing missile warning and communications capabilities, in support of combatant commanders and U.S. Strategic Command. The preparation, deployment and sustainment of Space forces for combat continues to drive the brigade's training focus — with continued support to missions across the Central Command Area of Responsibility. The second priority is to meet the brigade's responsibilities as outlined in approved Theater War Plans. This is normally manifest in participation in major theater exercises, such as Ulchi Focus Lens, that call for the deployment and employment of Army Space forces in support of specific objectives. Participation in the exercise meets the unit's responsibilities to contribute in accordance with an existing plan while also providing a unique venue to maximize collective training objectives. This segues well into the brigade's third priority — to plan, train and execute battled-focused training that supports Mission Essential Task List proficiency.

Evolving Theater Space Support Construct

Beyond the 1st Space Brigade's training strategy, the unit frequently seizes the opportunity to contribute the expertise of its Soldiers and officers to the SMDC/ARSTRAT Battle Lab and Future Warfare Center to enable the development of doctrine and future capabilities that meet the requirements of supported units. One critical document that the brigade helped shape is the concept paper: Army Theater Space Support in Joint Operations — Today.

Signed on July 26, 2006, this document captured the lessons learned from multiple exercises and operations, and was delivered by the Future Warfare Center in time to positively affect the employment of brigade forces during UFL 06. The brigade referenced this document extensively to inform a strategy of providing a modular, rapidly deployable Space Task Force, under the command of the 1st Space Brigade commander, to support both the specific

The challenge of providing trained and ready Space forces at the correct echelon and location to positively enable ground forces remains a moving target that demands an adaptable, flexible and deployable Space force capability. As the battlefield environment changes, our Space forces must adapt quickly and decisively in order to remain relevant and ready to support land forces.

and broad Space needs of the Ground Component Command commander in the United Nations Command/Combined Force Command Korea.

Space Coordinating Detachment

Key to supporting the Ground Component Command commander was the construct of the Space Coordinating Detachment. Split into two sections, the detachment ensured that the Ground Component Command's Space requirements and effects nominations were clearly understood and serviced at the Air Component Command — where that commander serves as the Theater Space Authority and the Space Coordinating Officer serves as the primary representative of the Space Authority. (Central Command refers to this position as the Director of Space Forces). The necessity of splitting the Space Coordinating Detachment into two sections became readily apparent for a number of reasons. First, the detachment at the Ground Component Command is inherently necessary in order to adequately support command requirements and establish the center of gravity for theater Space support to the command. The planners from this detachment integrated in the C35 Fires and Effects Coordination Cell in order to support Space-related targeting and effects and be positioned to communicate these to the detachment at the Air Component Command.

The Space Coordinating Detachment at the Air Component Command integrated through the Battlefield Coordination Detachment, which is doctrinally located at the Air Component and whose commander speaks on behalf of the Ground Component Command commander. The Air Component Command detachment enabled direct access to the Space Coordinating Officer, a number of Space subject matter experts located throughout the command headquarters, and most importantly the combined effects board that finalizes and prioritizes the targets and effects for incorporation into the Integrated Tasking Order. The efforts of both the Air and Ground Component Command Space Coordinating Detachments, utilizing the existing theater processes by which the Fires and Effects Coordination Cell forwards target and effect nominations to the Battlefield Coordination Detachment, provided a solid doctrinal foundation for supporting ground component commander requirements.

Integrations with Joint Space Forces

Integral to all current and future operations is the ability to integrate with other service and inter-agency partners — and the Korean theater is no exception. Brigade Space forces participated in the twice daily Joint Functional Component Command-Space/Joint Space Operations Center Video Teleconferences, working these into their battle rhythms and leveraging these forums to highlight Ground Component Command requirements. Additionally, Space Coordinating Detachment planners fostered professional relationships with Air Force Space augmentees, permanent party members, and representatives from the National Interagency Liaison Team. The benefits of collaborating in a coalition, joint, interagency environment were mutually beneficial to all involved and greatly contributed to a unity of effort across the theater.

Conclusion

Just as the geopolitical climate of East Asia and the Korean peninsula are constantly in a state of change and evolution — so is the construct for the employment of U.S. military forces in the region. The challenge of providing trained and ready Space forces at the correct echelon and location to positively enable ground forces remains a moving target that demands an adaptable, flexible and deployable Space force capability. As the battlefield environment changes, our Space forces must adapt quickly and decisively in order to remain relevant and ready to support land forces.

MAJ(P) Joseph Carroll has been the S3 of the 1st Space Brigade since June 2005. His previous assignments include Space Control Planner, Army Space Support Team Leader, Joint Planner and Army G3 action officer. He is a native of Boston, Mass., and a graduate of Providence College and the University of Texas, at Austin.

Army Space Master Plan

By Ron Dickerman

The United States is the unquestioned leader in Space activities and is developing Space capabilities that will help transform the military. The United States Army is undergoing its own transformation from a heavy-oriented force to a light and agile force that will radically change how it conducts ground operations. The nation's Space capabilities have the potential to support all aspects of the ground maneuver force's operations and will be an integral component supporting the Army's transformation. Therefore, the Army needs a plan for how best to incorporate Space capabilities into its current and future forces, and a set of guidelines to develop Service positions on the design, acquisition, and employment of Space capabilities.

The Senior Army Space Council, chaired by the Deputy Chief of Staff, Operations (Department of Army G3), tasked U.S. Army Space and Missile Defense Command to lead an Army-wide effort to develop an Army Space Master Plan that can guide development of Space capabilities in support of ground maneuver force operations. There are two versions of the Army Space Master Plan; an unclassified, high-level extract and a classified (SECRET) version containing the specific details. This article describes the material found in the Plan and the process used to develop the document.

The Army Space Master Plan identifies roles and capabilities to guide development of Space capabilities as key enablers in support of ground maneuver force operations. And, it can be used as the basis for developing official Army positions on Space issues and for synchronizing Army efforts to leverage Space capabilities, as well as to develop Space-related input to Program Objective Memorandum decisions, The Army Plan, DOTMLPF (Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities) development activities, the Army Campaign Plan, and the next Capability Needs Analysis. The assessment also supports the Space Operations Concept Capability Plan and can guide Army Science and Technology development efforts.

The U.S. Army Training and Doctrine Command Capability Needs Analysis 08-13 identified 61 capabilities required for success in future ground maneuver force operations. The Army Space Master Plan assessment team used the Capability Needs Analysis to derive Space capabilities that bridge operational capability gaps and to link potential Space solutions to Capability Needs Analysis-identified capability needs. The assessment team also prioritized gaps in the identified Army Space-required capabilities.

The assessment and prioritization was based on the following objectives: 1) the need to influence the development and design of future Space systems and their operational concepts to support the full range of joint ground force operations; 2) the Army's need to improve its ability to exploit Space systems in support of the current and future forces; and 3) the need to facilitate delivery of Space capabilities that address Army requirements.

The following conclusions about the role of Space emerged from the Space assessment and staffing process:

- An Army Combat Developer community that can understand, substantiate, articulate and defend Space requirements that support the ground maneuver force in the Joint Capabilities Integration and Development System process is critical to influencing future Space capabilities to support operational missions.
- A complementary mix of highly-trained and motivated Army Space cadre and traditional functional area experts is necessary for the Army to effectively exploit Space assets in support of ground maneuver force operations. Specific Space

Support to Army formations must be responsive, timely and assured.

Army Space Priorities

cadre positions, tasks and functions need to be identified as soon as possible.

- Satellite Communications (SATCOM) is critical to current and future force success. SATCOM service to theater operations is an amalgamation of multiple government programs with a heavy reliance on commercial providers to meet operational requirements, making vulnerability a potential problem area.
- Space-based Intelligence, Surveillance and Reconnaissance (ISR) systems are crucial to Entry/Shaping phases and non-contiguous operations, and Theater Downlink/Direct Downlink and Dynamic Tasking from theater are fundamental to timely, assured and responsive support to the ground maneuver force.
- Historically, Space capabilities were focused on global/strategic missions, with tactical applications piggy-backed on strategic and National assets. The Army must continue to influence the development, design and deployment of National assets to incorporate responsive, assured and timely support to ground maneuver operations in the initial design phases.
- Space-related Research and Development efforts need to be better linked to future capability gaps.
- Space Control will become an increasing area of emphasis as potential adversaries gain the technology to reduce our asymmetrical advantage in Space.

The following positions and actions support the Army's land dominance objectives:

- Emphasize the importance and utility of Space capabilities' timeliness, assuredness, and responsiveness to ground operations at the Joint and National levels and ensure those attributes are appropriately emphasized in Space system design and concept development.
- Articulate Army requirements in Space-related Joint Capabilities Integration and Development System documentation and other Department of Defense, National, and intelligence community forum to ensure Army needs are adequately considered in new and emerging overhead systems and support architectures.
- Ensure new Space systems are designed for compatibility with Army information architectures to the maximum extent feasible, and that Army user equipment acquisition is synchronized with Space programs.
- Maintain flexibility to take advantage of technology developments that enable Space assets to meet the Army's maneuver capability gaps and develop new tactics, techniques, procedures and doctrine to enable those capabilities.
- Emphasize developing the personnel, training and tools to exploit Space capabilities.

The assessment supporting the Army Space Master Plan determined that the largest gaps in Space capabilities, and the greatest potential risk to ground operations, are a lack of high throughput, protected military satellite communications. Additionally, the assessment identified critical concerns over the continued availability of theater missile warning. Other gaps include lack of tactically responsive Space sensors, limited tactical responsiveness in Space control, and limited Space situation understanding. The gaps articulated in the Army Space Master Plan can be used as the basis for developing Army positions on Space programs as they move thorough the Joint Capabilities Integration and Development System process and can provide supporting rationale for advocating specific Space capabilities.

The Army Space Master Plan is built around the five Joint Functional Concepts, and shows how Space assets support those concepts and articulates the Army role relative to Space.

1) Joint Command and Control encompasses a commander's need to continually address changing situations and missions by dynamically linking functions within and across the Joint Operating environment. The cornerstone of Joint command and control for the Future Force is a ubiquitous, multi-layered command and con-

(See ASMP, page 46)

Army and Air Force Space Power

The Way Forward

[The following article has been simultaneously submitted to the Air & Space Power Journal and the Army Space Journal, since it addresses problems that cannot be resolved without the combined and concerted efforts of Space professionals within both the Air Force and the Army. It is the earnest hope of the authors, representing both services, that this may spark discussion in areas that have previously been ignored or unjustly dismissed.]

By 1LT Adam C. Wolfe, USA
1LT Brent D. Ziarnick, USAF

Anyone surveying the current state of joint Space power, and in particular Air Force and Army Space power , is soon struck by a number of interconnected problems: a political conflict over who will occupy key Space positions (such as the Director of Space Forces, or within the Joint Functional Component Command-Space), coupled with an extremely convoluted organizational structure; a cultural conflict between CONUS-based Air Force Space officers who rarely deploy (and then for relatively short periods) and their Army counterparts, who operate in theater for extended periods of time; and a developing acquisitional conflict between the warfighter and those who equip him. These conflicts are the inevitable outcome of the division between the Army as primary user of Space and the Air Force as primary provider of Space. It is the aim of this paper to demonstrate not only that such a division hinders our nation's defense, but also that the eventual unification of Space power is the only way to realize its full potential.

It may surprise some that the primary obstacle for the further development of U.S. Space power has little to do with technology at all; it is, rather, a problem of organization. Consider what is perhaps the most critical area for Space power today: ensuring that those on the battlefield are aware and take full advantage of the full spectrum of Space capabilities, from counterspace/Space control and multi-spectral imagery to GPS navigational accuracy and Theater Ballistic Missile warning. To ensure that warfighters are able to utilize Space requires nothing less than the presence of Space professionals on the ground, in theater, not at the end of some call line which is only manned during a CONUS dayshift. The Army has created units with precisely this purpose in mind, yet Air Force Space Command is removing all but a nominal presence in theater, depriving itself of an unparalleled opportunity to shape the operational use of Space.

Consider the Army Space Support Teams and Space Support Elements, which are the primary means by which the capabilities of Space power are conveyed to the warfighter on the battlefield. An Army Space Support Team is a deployable team of 6-7 Space personnel, typically made up of an FA40 (Army Space) major, a captain, and four NCOs specializing in Satellite Communication and intelligence analysis. A Space Support Element is often a four to five person cell at a Division or Corps, comprised of two to three FA40s in the rank of captain to lieutenant colonel and two NCOs, which have been with the unit prior to deployment and are an integrated part of its operations (G3) staff. The current Air Force contribution to these vital units is nothing less than abysmal. Most Army Space Support Teams and Space Support Elements have not included anyone representing Air Force Space Command, even though these cells are the primary means by which Space-related operational support is conveyed to the warfighter on the ground. Even when the Air Force has contributed someone to an Army Space Support Team or Space Support Element, it has been only for a four-month tour of duty, in contrast to the standard Army 12-month tour. Thus, the Air Force will rotate three officers through the same cell Army Space officers have manned from the beginning. Not only is this a problem for the proper training of the Air Force officer, who perhaps reaches a basic level of competence only upon the eve of rotating out, but it is also a source of institutional resentment, thus laying bare the widening cultural rift between the two services. And yet

The first step is to foster less of an adversarial attitude between Air Force Space Command and U.S. Army Space and Missile Defense Command, which requires moving far beyond the paltry number of joint billets currently in existence to nothing less than a full-scale exchange program.

even this paltry contribution is being phased out. One would think that the executive agent for Space would have a more serious commitment to seeing Space fully exploited by the warfighter.

The Air Force may regard Space as its birthright, but like Esau it stands in danger of selling it for a mess of pottage. The Air Force remains the executive agent for Space, but that decision is not irreversible, and in the future, every shortcoming of the Air Force in the area of Space will be met by an Army only too willing to fill the gap. This is the inevitable outcome of the organizational schism between the warfighter as primary user of Space power and those who distantly provide the necessary support. This division, however, is far from inevitable. There are a number of concrete, graduated steps that, if enacted, would have far-reaching consequences for military Space.

The first step is to foster less of an adversarial attitude between Air Force Space Command and U.S. Army Space and Missile Defense Command, which requires moving far beyond the paltry number of joint billets currently in existence to nothing less than a full-scale exchange program. As the first proposed step in this transition, every deploying Army Space Support Team and Space Support Element should be accompanied by an Air Force Space officer, and for the duration of the deployment, not a fraction. These need not be restricted to Weapons School graduates (W13S), and not simply for manning reasons. Such a restriction would miss a crucial point: it is not Air Force expertise, per se, that is needed (although it would be much appreciated) so much as Air Force presence, creating the potential for a growing body of 13S's from all backgrounds to have had experience on the business end of U.S. Space power. What would be in order, however, is a willingness to send captains (and increasingly junior ones, at that), rather than majors, which ties in directly to a second problem and to the second proposal.

On the one hand, the numerically limited Functional Area 40 (FA40) of Army Space officers, comprised of barely 200 senior captains and majors, is straining at the demands put upon its scant forces, while on the other, it is next to impossible for Air Force 13S's to deploy, or, if allowed, then almost always in the guise of an augmentee rather than in a Space capacity. After spending a tour at Schriever or Buckley Air Force Bases, many lieutenants and captains feel little connection to the events they view on an ops floor screen, even though the telemetry they monitor is of the utmost importance to the warfighter's combat performance. Many of these young officers want to be more involved in the war on terror and would jump at the opportunity to do so as a Space officer. Even before Air Force Space Command began to loadshed Space professionals under "force shaping," many had already decided to leave the Air Force after their first tour, and they represent a great loss of Space experience to the military as a whole. This is experience that could be used by both the Army and the Air Force if these Space officers were only given the opportunity to work alongside the warfighter they have spent so long supporting from afar. 13S lieutenants and captains are streaming out of the Air Force, and the Army should allow them to enter this sister service as Space officers. Instead, some of these individuals will pursue Space in the civilian sector, while others will leave the field entirely, when many would gladly become Army Space officers if given the chance.

This should not be a one-way process. If Air Force Space Command will commit itself to putting a qualified 13S in every deploying division or corps Space cell, the Army should consider the advantages of a reciprocal move — namely, of making FA40s available for key positions within Air Force satellite operations and missile warning. This is not to propose adding one more body to a crew; on the contrary, it is to supply its future commander. With regard to feasibility, there is nothing insurmountable about this proposal. Within

(See The Way Forward, page 44)

Life in the joint side of Space

By MAJ J. Dave Price

On July 19, the commander of U.S. Strategic Command signed the implementation directive giving the commander of the Joint Functional Component Command-Space (JFCC-Space) the authority and responsibility to command and control almost all Department of Defense Space assets worldwide. This is the first time that almost all of Space was centrally and centrically controlled by one command and commander.

For the past couple of years, the 14th Air Force Space and Air Operations Center has transformed into a Joint Space Operations Center. For the past year, the Joint Space Operations Center has been the operations center for the commander, Joint Space Operations (JSO). This all changed after the implementation directive as the commander, JFCC-Space assumed command and control of a majority of all the Space current operational elements from Naval Space Operations Center, Army Forces Strategic Command and Air Force Space Command. The commander JFCC-Space is the Global Space Coordinating Authority and provides Space mission expertise to plan support, integrate, assess and synchronize efforts for U.S. Strategic Command and other combatant commanders' operational level requirements. These requirements include taking lead for Space control, Space situational awareness, Space offensive and defensive operations, Space force enhancements such as Intelligence, Surveillance and Reconnaissance; ITW/AA; environmental monitoring; Satellite Communication; Positioning, Navigation and Timing; and also in Space support (lift and satellite operations) and Space force applications. JFCC-Space is also the day to day manager of missile warning capability and serves as the supporting commander to JFCC-Integrated Missile Defense and JFCC-Intelligence Surveillance and Reconnaissance for management of the missile warning centers and data.

One of the major drawbacks to JFCC-Space is that a good slice of Space operations are not in Vandenberg, Calif. — but this is where the new joint headquarters is located. A lot of the joint Space staff and expertise resides at Offutt, Neb., and in Colorado Springs, Colo. It will be necessary to move many of these office structures, organizations and manpower to Vandenberg to complete the transformation of the command to a fully operational capability. The movement of the Space control center, the missile correlation center, J35 (U.S. Strategic Command Space staff), and unified Space vault to Vandenberg over the next three years will finalize the formation of a single command to provide command and control of Space organizations by one joint staff. While the commander, Joint Space Operations had a couple of liaison officers from separate and combined services, there were no joint billets assigned to them. Now U.S. Strategic Command has approved the movement and/or addition of up to 129 joint billets in Vandenberg. The first four joint Army officers were assigned in September 2006 with the rest to follow in the next three years. The majority of these billets will transition from Nebraska, Colorado and JFCC-Global Strike and Integration as folks change stations from their

current joint positions. These positions will be backfilled in California. Currently there are two allied officers assigned from the United Kingdom and Australia.

The command will be headquartered in Vandenberg and will consist of a J2, J3/7, J5/8, J4/6 and Joint Space Operations Center. The Center is a separate staff that is based on the Air Force Air Operations Center concept. However, although it has a Strategy, Plans and an Intelligence Surveillance and Reconnaissance division, the real difference is in the Combat Operations Division. There have been many variations in the last couple of years, but there is a way ahead. The Combat Operations Division will consist of the command and control element (battle watch), Theater Integration Cell, Global Space Tracking and Surveillance Cell, Assured Access and Manned Flight, Global Information Services, Unified Space Vault Operations and Space Superiority.

The command and control element includes a Battle Watch Commander (identified as the Senior Space Duty Officer), a Crew Chief (and Information Manager), and Senior Intelligence Duty Officer in order to manage the common operating picture and provide a single integrated Space picture.

The Theater Integration Cell will be the focal point for all products, programs, and Space support requirements by theater.

The Global Space Tracking and Surveillance Cell provides radar sensor management, provides nuclear exoatmospheric detonation detection and missile warning oversight, and interoperability with the Missile Correlation Center and Global Positioning System Operations Center.

Assured Access provides monitoring and support of the Air Force Space Control Network and all domestic launch activities and is supported by members of the National Aeronautics and Space Administration Manned Flight Team. The Manned Flight Team supports the operations center by tracking and monitoring all manned flight activities.

Space superiority is conducted by the Space Control Center at Cheyenne Mountain (known as Joint Space Operations Center mountain) and is moving to Vandenberg (along with the Unified Space Vault) shortly to perform these duties as a part of Combat Operations Division. They are responsible for the Space Surveillance Network, tracking all things in Space, and predicting re-entries and deorbits of Space matter.

The Senior Intelligence Officer supports the Senior Space Duty Officer/Space Watch and Battle Watch by supervising and integrating the efforts of the Intelligence, Surveillance and Reconnaissance team embedded with the Global Space Tracking and Surveillance Cell and the Space Superiority Cell.

U.S. Strategic Command has not divested its interest in Space but is executing these responsibilities through the commander JFCC-Space as the one stop shop for operations and staffing to provide the best current Space support to Department of Defense and the National Command Authority. Research, development and acquisition still remains in the hands of the multiple service battle labs and acquisition organizations.

MAJ J. Dave Price is one of the first of many officers to be assigned to Joint Functional Component Command-Space/U.S. Strategic Command and is currently serving as the first Joint Senior Space Duty Officer in the Joint Space Operations Center. He can be reached for comment at John.Price1@us.army.mil or DSN 276-9994.

Campbell earns 3rd star

assumes command of SMDC/ARSTRAT

By Marco Morales

FORT MYER, Va. — LTG Kevin T. Campbell assumed command of the U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) and as commander, Joint Functional Component Command for Integrated Missile Defense (JFCC-IMD), during ceremonies here Dec. 18.

GEN James E. Cartwright, commander, U.S. Strategic Command (USSTRATCOM); GEN Peter J. Schoomaker, chief of staff, U.S. Army; LTG Campbell; LTG Larry J. Dodgen; and CSM David L. Lady participated in the change of command and exchange of unit colors.

In his remarks, Campbell acknowledged the significant contributions Dodgen provided over the past three years, particularly with his actions in transforming SMDC/ARSTRAT to support worldwide wartime operations. Campbell also commented on Dodgen's efforts to support U.S. Strategic Command.

Looking forward, Campbell focused his remarks on moving the organization forward to best support the Army today and into the future. Campbell also acknowledged he and his wife, "are so very proud of the opportunity to serve on behalf of the Army and our Soldiers."

Before this assignment, Campbell served as chief of staff, U.S. Strategic Command. Campbell's other past assignments include director of plans, U.S. Space Command; deputy commanding general, U.S. Army Air Defense Artillery Center and Fort Bliss, Texas; commanding general, 32nd Army Air and Missile Fort Bliss; and assistant deputy chief of staff for Combat Developments, U.S. Army Training and Doctrine Command, Fort Monroe, Va.

"General Campbell's biggest challenge is success ... making the systems work," said Cartwright, referring to Campbell's new role. "He will be responsible for moving from integrated missile defense to integrated cruise missile defense and integrating sensors and other systems," Cartwright said. Cartwright also pledged great confidence in Campbell's capabilities, but challenged him in moving forward by commenting, "Just do it!"

"The Army's bench is loaded with talent," said Schoomaker, referring to Campbell as the new commanding general for SMDC/ARSTRAT. Schoomaker also indicated he passed a set of dog tags to Campbell about the Army Ethos and indicated he had full faith and confidence he would serve the Army and our Nation with great distinction.

Dodgen, who was presented the Distinguished Service Medal and Defense Superior Service Medal during the ceremony, is scheduled to retire from active duty in January.

SMDC/ARSTRAT conducts Space and missile defense operations and provides planning, integration, control, and coordination of Army forces and capabilities in support of U.S. Strategic Command missions; serves as proponent for Space and ground-based midcourse defense; is the Army operational integrator for global missile defense; conducts mission related research, development, and acquisition in support of Army Title 10 responsibilities and serves as the focal point for desired characteristics and capabilities in support of U.S. Strategic Command missions.

With its headquarters in Arlington, Va., SMDC/ARSTRAT has major subordinate elements in Huntsville; Colorado Springs, Colo.; White Sands Missile Range, N.M.; Fort Greely, Alaska; and the U.S. Army Kwajalein Atoll in the Republic of Marshall Islands. Other elements around the globe provide satellite communications and early tactical missile warning.

Clockwise from top, COL Bob Pricone, regimental commander of the 3rd U.S. Infantry Regiment (center) accompanies LTG Kevin T. Campbell (left) and LTG Larry J. Dodgen (right) during the pass in review; At right, outgoing Commanding General LTG Larry J. Dodgen accepts the unit colors from CSM David L. lady as Army Chief of Staff GEN Peter J. Schoomaker, left, and incoming Commanding General LTG Kevin T. Campbell stand ready to proceed with the exchange; The Honor Guard advances to post the colors during the change of command ceremony. *Photos by William M. Congo*

ARMY SPACE SUPPORT TEAMS DEPLOY IN SUPPORT OF OIF

By Ed White

PETERSON AIR FORCE BASE, Colo. — Two Army Space Support Teams recently departed Colorado in support of Operation Iraqi Freedom. The first group, a three man Army Space Support Team is now providing Space support along with members from the Colorado Army National Guard Space Support Battalion already supporting the warfighters in Iraq.

These Soldiers were farewelled in ceremonies held at the U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command operational headquarters. COL Timothy Coffin, 1st Space Brigade commander said, "The reason why we have these ceremonies for our deploying troops is that we want you to understand the level of support you have behind you as you go out on deployment. We are here to help you and to make sure that all the important things stay connected while you are gone."

LTC Lee Gizzi, the team's battalion commander presented the team leader with a coin symbolic of the team's commitment and unity. A coin goes with each team and symbolizes their unity, their purpose and their role as Soldiers. As each team returns from a deployment, the coins are retired and hung in the Battalion conference room. Currently there are 23 returned coins hanging on the wall.

"I charge you to accept this coin, protect it while you are deployed and bring it and all your Soldiers back safely from the fight," Gizzi said. "You are responsible for each other. Watch each other's back, help each other accomplish the mission and come back as one team."

Army Space Support Team 7 was also feted in a departure ceremony as they deployed to Operation Iraqi Freedom to replace Army Space Support Team 2.

"You are replacing a team that has set the bar high," said Gizzi. "However, I know you will exceed their standard. You are trained. You are ready, now go and execute the mission. I charge you to look out for each other and bring everyone on the team home safely."

"This Team is a combination of Active and Reserve Soldiers — each one volunteering for this mission. Many of them are on their second tour to Iraq. They represent the Warrior Ethos in all of us," Gizzi said as he presented a battalion coin to yet another team leader.

Space support plays a key role on the modern battlefield and Army Space Support Teams have been deployed in support of combat operations in the theater since the beginning of the Global War on Terrorism. They have been a constant presence in the theater, providing timely, accurate and tailored Space support to the planners and operators prosecuting combat operations. Whether it is digital imagery that can be used in a wide variety of ways for planning and executing operations; or the effects of Space weather on the accuracy and capabilities of communications and location systems; or the ability to make 3-D flythroughs for mission rehearsal, Space support has earned its place in the pantheon of primary military operational requirements and it is here to stay.

For the families left behind, Gizzi added, "For these Soldiers it is easy. They know what they are going to be doing for the duration of their deployment. For you, it is much harder, and we appreciate the support that you provide to them. It is the unknown that makes it difficult on the families. It is all the responsibilities that you have as wives and as mothers taking care of the family, keeping things moving on the home front that often goes unrecognized and underappreciated. We recognize and appreciate your sacrifices and we have a Family Readiness Group standing by to support you for whatever you might need during your husband's deployment."

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

Above, COL Timothy Coffin, (right) commander, 1st Space Brigade, wishes members of Army Space Support Team 4, Godspeed on the eve of the team's departure for Iraq. One member of the team held his infant daughter, who in a touching moment seen to the right, crawled to her father during the farewell. Her father scooped her up into his arms and held her throughout the remainder of the ceremony.

Above, Army Space Support Team 7 is made up of Active Duty and Reserve Soldiers. Right, LTC Lee Gizzi (right) passes the unit coin to the team leader. The coin symbolizes the unit's commitment, solidarity and professionalism and serves as a reminder that they are a team. When returned at the end of their tour it will hang on the wall of the battalion's conference room with the twenty three others that have been returned from successful deployments in the global war against terror.

FINDING "NEEMO"

By DJ Montoya

The concept of two Soldiers training on the ocean floor seems to be all wet — or does it? Not for two Army Astronauts though as COL Timothy J. (TJ) Creamer and LTC Timothy L. Kopra joined other fellow NASA team members on a week-long exercise back at the end of September at an undersea laboratory known as the National Oceanic and Atmospheric Administration's (NOAA) Aquarius.

The event was the NASA Extreme Environment Mission Operations (NEEMO) 11 and was the third and final one conducted for this year. The crew for this last NEEMO mission consisted of four Astronauts with Sandra H. Magnus and Air Force Maj. Robert L. Behnken joining Creamer and Kopra.

During the seven-day from Sept. 16 – 22 stay on the 45-foot-long, 13-foot-diameter Aquarius complex located three miles off Key Largo in the Florida Keys National Marine Sanctuary the crew simulated moon walks, techniques for communication, navigation, geological sample retrieval, construction and the use of a remote-controlled robot. All of this was conducted 62 feet beneath the surface.

Valuable lessons were learned as the crew conducted their daily routines outside the Aquarius with a watchful eye at NASA's Johnson Space Center's Exploration Planning Operations Center, Houston.

"Making remote operations work well takes a lot of practice and choreography," said Creamer.

"We just can't start tomorrow operating on the lunar surface, or on Mars. There is so much preparation, rehearsal, protocol development, difficulties in coordination to overcome.

"This NEEMO environment exercises all of that, and is part of the very necessary baby-stepping required to get us back to the Moon, and farther."

Kopra echoed these same thoughts by saying, "This sort of mission, just like complex military operations or Space flight which requires a tremendous amount of planning, coordination, training, rehearsal, and review."

"These are skills we can all use during our preparation and execution of missions on board the International Space Station, but NEEMO 11 was also an opportunity to identify and hone 'best practices' that can be used on future lunar missions. This type of mission is the leading edge

NEEMO 11 crew members take a moment to pose for a crew photo during preparations for their stay inside the Aquarius Underwater Laboratory off the coast of Key Largo, Florida. Astronaut/aquanaut Sandra H. Magnus (second right) led the crew for the eleventh NASA Extreme Environment Mission Operations (NEEMO) project. Astronaut Timothy J. Creamer (left), Robert L. Behnken, and Timothy L. Kopra round out the crew. The crew is spent seven days, Sept. 16-22, on an undersea mission aboard the National Oceanic and Atmospheric Administration's (NOAA) Aquarius Underwater Laboratory, which is operated by the University of North Carolina at Wilmington and located off the coast of Key Largo, Florida.

development for how we'll conduct operations once we return to the moon."

The crew, split into two teams, took turns daily performing Extra Vehicular Activity as in a simulated extraterrestrial environment. Since both Creamer and Kopra have the same first names they were paired up with different partners — Creamer/Magnus and Kopra/Behnken.

Also, to avoid confusion during their voice transmissions outside the Aquarius — which at times sounded like Darth Vader — Creamer was referred to as 'TJ' saying, "I am TJ Creamer — full name: Timothy John Creamer, but I only ever heard that when my Mother was upset with me."

Although one would think operating in an underwater environment would be a cake-walk as seen in all those Discovery Channel documentaries Creamer and Kopra found both ups and downs.

"The fun aspects were simply being able to observe nature so closely — we were truly on "another planet" while we were EVA-ing, and seeing all of the wildlife, the activity, the interactions, the beauty was the most fun aspect; and in my mind's eye, extending that to when we really do walk on the Moon again," said Creamer.

On the flip side Creamer pointed the more difficult aspect of the EVAs tended to be the developmental projects dealing with the design of the next generation of Spacesuits for planetary exploration.

"The worst case was a 90-pound suit with a very forward center of gravity, and trying to pick up a dozen rocks as samples. This configuration made it extremely difficult to recover from either a prone position or from one knee, and of course … the event was timed, so we were at max effort.

"My thoughts during this portion of the testing were that I'd not like this configuration if I was remotely operating on the Moon — I'd get dangerously fatigued pretty quickly."

Kopra, who has scuba diving experience, found the adjustment from swimming to walking in this simulated lunar environment more natural.

"Depending on the particular dive, we had weights distributed on a Spacesuit mockup, around our torso, or on our legs," said Kopra.

"With this sort of configuration, it was quite natural to walk or run, but we were more buoyant to simulate the reduced gravity of the moon. It wasn't difficult at all to move around during the EVAs. In fact, after a few days, it felt quite natural.

"Sometimes, you could feel the pull of the umbilical

NEEMO 11 astronaut/aquanauts COL Timothy J. Creamer (left) and LTC Timothy L. Kopra (right) photographed in their undersea habitat for the NASA Extreme Environment Mission Operations (NEEMO) project.

that supplied our air and communications or had to walk against a slight current, but I think it would be very difficult to find a better analog for an extraterrestrial environment."

Both Creamer and Kopra felt that their experience during this mission and the role the Army has to play in future Space missions is a valuable one.

For Creamer his robotics training at NASA helped when he was flying the Remotely Operated Vehicle around Aquarius. According to Creamer the ability to do mental gymnastics and change coordinate frames were the key.

"I have to confess, to a greater extent, my Army helicopter background helped even more with the control touch and vehicle awareness," he said.

Kopra said, "The Army clearly has a role in future Space exploration missions.

"The Army provides critical skills that contribute to these ambitious goals — operational experience, discipline, and mission focus — and these will be vital for NASA's planning and execution of missions to the Moon and Mars."

After a successful seven-day mission, which included swapping notes with fellow Army Astronaut COL Jeffrey Williams aboard the International Space Station on day six via a video teleconference, both Creamer and Kopra continue working toward future missions on board the ISS.

Donald Montoya is public affairs specialist with 32 years of federal service. He has almost seven years experience with U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command. Before that he spent 25 years at White Sands Missile Range, N.M., in the Public Affairs shop as the chief of Command Information. He currently serves as the public affairs representative for the 1st Space Brigade and is a regular contributor to **the Army Space Journal.**

Clockwise from top: NEEMO 11 astronaut/aquanauts Timothy L. Kopra and Timothy J. Creamer (inside habitat) take a moment to pose for a photo during a dive session for the NASA Extreme Environment Mission Operations (NEEMO) project; After splashdown, NEEMO 11 crew members make their way to their undersea habitat to begin the eleventh NASA Extreme Environment Mission Operations (NEEMO) project. From left to right are astronaut/aquanauts Robert L. Behnken, Timothy L. Kopra, Timothy J. Creamer and Sandra H. Magnus; The NEEMO 11 crew members and support team return to the surface as the eleventh NASA Extreme Environment Mission Operations (NEEMO) project draws to a close.

Indian Wars staff ride educates GMD Soldiers

By MAJ Laura Kenney

STORY, Wyoming — The hills look much different today … Then, they were littered with the broken, bloody bodies of cavalrymen in blue and of their equally agonized horses. The feathered arrows punctuating the battlefield served mute testimony to the agents of the combatants' demise, but naught else was quiet — screams from wounded and dying men and horses mingled with curses and prayers to create a horrific blanket of sound.

Today, all is quiet … one could hear the wind in the tall grasses surrounding the silent white gravestones. The ground is now clear — evidence of that long ago tragedy is buried with its blood and bones and tears under the green hills.

Standing by the graves of LTC George Armstrong Custer and his men was a fitting culmination to an Indian Wars staff ride undertaken by Soldiers of the 100th Missile Defense Brigade (Ground-based Midcourse Defense). Sixteen members of the unit and six family members took the five hundred mile trip here from their headquarters in Colorado Springs Aug. 24-26. The purpose of the trip was to educate unit members on how military lessons of the past may be applied to today's battlefield, and to also build unit cohesiveness and esprit-de-corps. Staff rides are a centuries old tradition in the military of passing on lessons learned.

This particular staff ride emphasized the journey to the catastrophic Battle of Little Big Horn, both chronologically and physically. Unit members, accompanied by military history experts from the Staff Ride Team, Combat Studies Institute, Fort Leavenworth, Kansas, visited three different battle sites that were considered to be preludes to "Custer's Last Stand," before completing the journey and the story where it ended 130 years ago.

Andy Tafoya, a Department of the Army contractor serving as a senior military analyst for the 100th MDB, set up the staff ride for the unit. Tafoya, a retired Air Defense Artillery officer who had previously worked extensively with missile defense during his military career, has been an avid history buff since his first staff ride twenty-some-odd years ago. And perhaps even longer than that, as he was raised on stories of a famous ancestor — Bernardo Miera y Pacheco — who was the first cartographer to chart the

At Fort Phil Kearny, Dr. Ricardo Herrera (back to camera) describes the layout of the historic fort as Soldiers and family members listen intently. *Photo by Sgt. Sara Storey*

Grand Canyon region back in the 1700s.

"We began planning this staff ride two years ago. Costs are always a concern, and have to be balanced with value and other priorities, but we were able to do this at minimal cost to the unit, with maximum effect. The military history teachers actually ended up being no cost to us, through a now-defunct funding site. Soldiers who took family members did so at their own expense."

Practicalities such as expense out of the way, Tafoya brought an enthusiasm and a passion to the project that was contagious. At a planning meeting just two weeks before departure, Tafoya outlined upcoming events, ending with a heartfelt, "In just a few days, you'll be standing where Custer stood, seeing something of what he saw in the last moments of his life. You should all be getting goose bumps about now."

Numerous professional development classes prior to the staff ride gave attendees a baseline education on what they could expect to see, to better their future understanding. Officers and NCOs of the unit were tasked to research different aspects of the Indian Wars, and in turn educate their fellow Soldiers. Movies such as "Death runs riot/The West" and "Son of the Morning Star" were shown. A 200-page read-ahead was given to attendees.

Finally, the two instructors from Leavenworth greeted the Soldiers and family members when they arrived at the staging area here, the morning of Aug. 25.

Dr. Ricardo Herrera and LTC Kevin Kennedy gathered the group together in a half-circle on the lawn outside the Wagon Box Inn — the cowboy-bunk style inn where staff ride attendees stayed. Introducing themselves, the instructors used charts to detail the upcoming journey, starting with Fort Phil Kearny, moving to the Bozeman Trail, then to the sites of the Fetterman and Connor Battlefields and the Wagon Box Fight, finally culminating at Little Big Horn. The instructors drew parallels between past and present, and the unchanging, in their view, nature of man.

Herrera stated categorically, "Don't think what we're doing in Iraq is the first time we've been involved in so-called "nation-building." That is exactly what we were doing in the Indian Wars, facing many of the same challenges our Soldiers in the Middle East are facing as we speak. Back "then," our Soldiers had to find the enemy, he didn't just openly confront. Our troops had to figure out how many they were facing — the Indians didn't want pitched battles as they

Above, Michael Tafoya, son of 100th Missile Defense Brigade (Ground-based Midcourse Defense) senior military analyst Andy Tafoya, checks out a cannon at Fort Phil Kearny with the assistance of Branwyn Kenney, daughter of MAJ Laura Kenney, during an Indian Wars staff ride that Soldiers and family members of the unit attended in August. Left, LTC Kevin Kennedy (pointing) describes the layout of the Fetterman Fight, in which eighty-one cavalrymen were massacred by over two thousand Indians, to attendees of the Indian Wars staff ride. *Photos by SGT Sara Storey*

couldn't afford to lose large numbers of people. Their biggest threat to our Soldiers was often their constant harassment of supply trains. Think convoy. Does any of this sound familiar? It should."

Visiting Fort Phil Kearny, the Soldiers saw cannons and the outlines of the original fort. They listened as the instructors told of the fort's mission of protecting travelers along the Bozeman Trail, and of trying to prevent intertribal warfare between the Native Americans in the area. They heard how the site became the focal point of a violent war between the U.S. Army and the Sioux, Cheyenne and Arapaho Indians opposed to white intrusions into the last great hunting grounds on the Northern Plains. Silhouettes of Indians on horseback stood guard on the surrounding hills, allowing the modern day visitor a small inkling of how members of the fort might have felt so long ago, continually under observation.

One attendee, SSG Kurtiss Clark, who'd brought his nine-year-old son, Jaron, with, commented, "Reading about and seeing the actual sites of these battles are two different things. Literally seeing it from the perspective of the men who fought them made a big difference. Bringing my son was a good idea — although I'm sure he didn't get some of the details, he did absorb a lot of the big picture, and a big picture it certainly was."

Traveling to the site of the Fetterman Fight and the monument erected to commemorate the massacre, the group walked some of the trail eighty-one cavalrymen fled down a century plus ago, in their uneven and doomed battle against two thousand Indians.

Instructor Kennedy read a moving account of one Soldier's heroism, told from the perspective of a victorious Indian.

"Fighting against the horse soldiers (cavalrymen) Swift Hawk did not feel brave when he stabbed the bugler, an old man who had fought bravely. When the old man had used all his bullets, he struck at our braves with his bugle, refusing to give up. He was old, he should have been sitting by the fire while his children fought. After he died, a brave covered him with a buffalo skin." Kennedy concluded the vignette by saying that the body of the valiant bugler was one of the few corpses left undesecrated after the fight.

Another highlight of the unique professional development event was the opportunity to see the battlefields on horseback, by taking the terrain appreciation ride. Soldiers and family members could survey the battlefield from the height of a nearby mountain, and many took the opportunity. Seeing the sites from the same vantage point many of the Soldiers of yesteryear had enjoyed gave participants a different feel for the distances traveled, and the pace traveled at. For many, this was the highlight of the trip.

Eleven-year-old Branwyn Kenney, daughter of a GMD Soldier, said, "It must have taken them so long to travel distances. The tour and all we learned was very sad and sometimes beautiful, like the story about the bugler. My favorite part was the horseback ride." Her 13-year-old brother Reilly, on the other hand, seemed more interested in tomahawks and scalping.

Coming at last, as Custer did, to Little Big Horn, the instructors intentionally took the group through the physical and chronological route of how the battle played out, discussing mistakes and misunderstandings that led to the final, infamous defeat. Ending at Custer's grave, attendees stood quietly for a moment, looking at the resting place of a man who, until that last day, had been renowned for both his battle prowess and his vanity.

SFC Charles Rice, missile defense crewman, a history buff who'd researched the battles extensively, said, "Standing there, after having seen and walked the actual terrain, changed my view of the battle dramatically. I understood it much better than before. It brought home to me two lessons: one, that you should never underestimate your enemy, and two, just because something worked before doesn't mean it will work again. This tour was a very clear demonstration of those points."

From Little Big Horn through missile defense to nation-building in Iraq — for the Soldiers of the 100th MDB, the staff ride drew it all together.

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

Colorado Army National Guard Space Support Battalion welcomes new commander

By DJ Montoya

PETERSON AIR FORCE BASE, Colo. — The Colorado Army National Guard Space Support Battalion recently said farewell to outgoing battalion commander, LTC Scot H. Cuthbertson, and welcomed a new commander, LTC Donald P. Laucirica during a ceremony at the Peterson Parade Grounds on the afternoon of Nov. 3.

In his remarks, COL Robert K. Balster, commander of the COARNG 89th Troop Command said, "A change of command is much like passing a baton in a relay race."

"Those selected for command are given a chance to run a lap or two in an endless race to advance that baton. Lieutenant Colonel Scot Cuthbertson was selected to be on this unique battalion command team. For three important years he ran laps as the commander never dropping that baton.

"His race was run under the watchful eye of not only the COARNG but that of the proponent for all Army Space operations. He met both of these commands high expectations.

"His other job and experience set as deputy sheriff for El Paso County has led to his selection as operations officer of our emergency operations center. Another race and another baton."

Balster commented on incoming commander Laucirica saying, "Welcome to the race."

Accepting his new position Laucirica stated "that the welfare of this battalion was his top priority before all other priorities."

"It is indeed an honor to command America's most precious assets, that being America's sons and daughters and Colorado's finest citizen Soldiers."

A native of North Carolina Laucirica is a graduate of the University of Utah. His military education includes the Infantry Officer Basic and Advanced Courses, the Special Forces Enlisted and Officers Qualifications Courses, the Combined Arms Service Staff School, the United States Army Command and General Staff College, the Inter-Service Space Fundamentals Course, and the Space Operations Officer Qualification Course.

His most recent assignment was Operation and Training Officer (S-3) and Executive Officer, 89th Troop Command, Colorado Army National Guard. The COARNG Space Support Battalion was activated on Sept. 28, 2001 as the 193rd Space Battalion. Its activation signified an important commitment by the Army National Guard to fully embrace Space operations as an Army core competency.

Citizen Soldiers of the COARNG Space Support Battalion have served alongside their active Army counterparts in every aspect of Operation Enduring Freedom and Operation Iraqi Freedom along with numerous major exercises spanning the globe. Since November 2001, the Citizen Soldiers of this battalion have been mobilized and deployed continuously. These Soldiers have served with the Combined Forces Land Component Commander in Kuwait; the Office of Reconstruction and Humanitarian Assistance, later known as the Office of the Coalition Provisional Authority from the Office of the Secretary of Defense, Baghdad Iraq; the Space Electronic Warfare Detachment in Oman, the Space and Information Operations Element — Reachback, and the Blue Force Tracking Mission Management Center, and numerous deployments to the Republic of South Korea to participate in exercises that prepare United States Forces Korea to deter war.

LTC Donald Laucirica (top photo, center) receives the unit flag from COL Robert K. Balster, commander of the 89th Troop Command, Colorado Army National Guard. (Balster is pictured at right in the inset) Accepting the unit flag symbolizes acceptance of all the things that leadership of the unit entails. In a ceremony as old as the Army, Laucirica became only the third commander of this unique unit. *Photos by Dennis Plummer*

to the National Strategy for Combating Terrorism, "Preventing their acquisition and the dire consequences of their use is a key priority." [13]

The knowledge and resources necessary to manufacture biological and chemical agents are within the capabilities of some individuals and terrorist groups. A variety of groups seek to employ chemical agents, as was aptly demonstrated in the Sarin gas attack on the Tokyo subway in March 1995 by members of the religious group Aum Shinrikyo. In five coordinated attacks, the conspirators released Sarin gas on several lines of the Tokyo Subway, killing 12 people and seriously injuring 54. Prior to the attacks, Aum Shinrikyo extensively used video products as a means to convey various types of information to followers. [14] Consequently, this group was able to recruit followers and promulgate their sect dogma to individuals who otherwise would not have been introduced to it.

Asymmetric threats also come in the form of missiles, both short-range and ballistic, as noted by GEN Cartwright: "The most likely threats may come from adversaries that lack the traditional military apparatus of the former Cold War rivals, but nonetheless wield potentially great power with a small number of short- or medium-range missiles." [15] As an example, during the recent military conflict in northern Israel and southern Lebanon, fighters affiliated with the radical Islamic group Hezbollah fired an average of 150 Katyusha rockets a day, more than 4,000 total, against Israeli cities, towns and villages, "employing them as political, economic and psychological weapons." [16]

The launch sites were often placed between buildings occupied by civilians and therefore difficult to detect. The short-range rockets reached targets in seconds, making interception nearly impossible. As a result, Hezbollah forces were able to "set up a missile launcher with a couple of soldiers, move them away from the launcher and then fire it by remote control. When the Israeli retaliation hits, the Hezbollah fighters are well out of range." [17] Significantly, the missile launchers were placed in areas where the Israeli military response, if launched by missiles or artillery fire, despite significant precautions, risked causing civilian casualties and damage to civilian infrastructure. Hezbollah exerted great effort in publicizing to the world via the Internet and other means of media dissemination the unfortunate instances of collateral damage. The employment of missiles in this manner was an example of high-visibility asymmetric attack that could be exploited through Information Operations. Moreover, the capabilities extended by the Internet have significantly increased the speed and extent of this dissemination. As acknowledged by one senior Israeli official, "When we look at the big picture, what you have is a completely different kind of war. This is asymmetric war in its purest form." [18]

Additional asymmetric threats are posed by man-portable air defense systems. Shoulder-fired missiles have been used in at least 36 attacks on civilian aircraft in the past 30 years. In late November 2002, two shoulder-fired missiles narrowly missed an Israeli jetliner as it left the Mombasa international airport in Kenya bound for Tel Aviv. A year later, a DHL cargo plane was badly damaged after being struck by a missile in Iraq. [19] A videotape released a few days after the DHL plane attack purported to show a man firing what appeared to be a Soviet surface-to-air missile followed by a damaged cargo plane landing at Baghdad's airport. Later analysis of the video brought into question the relationship of these purportedly connected events. However, the primary goal of the video likely had already been achieved since significantly fewer individuals became aware of the dubious validity of the video than saw the initial news report and videotape presentation.

The Cyber World Challenge

Adversaries need not invest in conventional weapons, ballistic missiles or technological alliances to acquire destructive capabilities. America's global economy, relatively open borders and open communication sources allow access to a range of goods, services and information that together can be developed into formidable weapons. Access to knowledge, skills and components has changed significantly: "In today's increasingly market-driven, global economy, nations so motivated have faster, cheaper and more efficient access to modern technology." [20] Open accessibility to technological information many times through the Internet has helped lower development times and costs from both technical and budget obstacles to advanced technologies.

Notably, the Internet offers: [21]

- easy access;
- little or no regulation, censorship or other forms of government control;
- potentially huge audiences spread throughout the world;
- anonymity of communication;
- fast flow of information;
- inexpensive development and maintenance of a Web presence;
- a multimedia environment (the ability to combine text, graphics, audio and video and let users download films, songs, books, posters and so forth);
- the ability to shape coverage in the traditional mass media, which increasingly use the Internet as a source for stories.

Adversaries have found unexpected ways to use familiar technology against us. Even low-tech countermeasures can exploit the vulnerabilities of some U.S. weapons and their supporting systems. Cyber-attacks can be used to disable computer networks, paralyzing communications, transportation, power systems and industrial enterprises. Our nation's reliance on automated systems for its critical infrastructure, including energy distribution, transportation,

For years, disturbing videos of executions, ambushes and roadside bombings have been disseminated to interested audiences. However, the emerging trend is how these videos are distributed. The dissemination of videos on the Internet showing the murders of the journalist Daniel Pearl in Pakistan and the American businessman Nicolas Berg in Iraq resulted in extensive renown for the perpetrators but shock and condemnation from the civilized world at large.

banking and finance, emergency services, telecommunications and continuity of government, makes their disruption potentially devastating.[22] Notably, societies with immature information assurance systems may be at even greater risk to cyber-attacks.

The great virtues of the Internet — ease of access, lack of regulation, vast potential audiences and fast flow of information — are also being widely used by groups committed to asymmetric warfare. By its very nature, the Internet is an ideal environment for use by groups that want to exchange or disseminate information with current and potential supporters. Notably, "adversaries are increasingly exploring and testing Information Operations actions as asymmetric warfare that can be used to thwart U.S. military objectives that are heavily reliant on information systems. This requires the U.S. military to employ defensive technologies and utilize leading-edge tactics and procedures to prevent our forces and systems from being successfully attacked."[23]

Contemporary adversaries use the Internet in a variety of ways, including: developing and disseminating propaganda, raising and transferring funds, recruiting, data mining and coordination of attacks. As noted in the National Strategy for Combating Terrorism: "The Internet provides an inexpensive, anonymous, geographically unbounded and largely unregulated virtual haven for terrorists. Terrorist organizations can use virtual safe havens based anywhere in the world, regardless of where their members or operatives are located."[24] This same description applies to the use of the Internet by our Nation's adversaries who have not been described as "terrorists."

One of the most important ways in which adversaries use the Internet is as a medium for propaganda. Until the advent of the Internet, many groups' hopes of winning publicity for their causes and activities depended on attracting the attention of television, radio or the print media. For years, disturbing videos of executions, ambushes and roadside bombings have been disseminated to interested audiences. However, the emerging trend is how these videos are distributed. The dissemination of videos on the Internet showing the murders of the journalist Daniel Pearl in Pakistan and the American businessman Nicolas Berg in Iraq resulted in extensive renown for the perpetrators but shock and condemnation from the civilized world at large. More recently, the posting of a video clip on the CNN Web site purportedly showing sniper attacks on Americans Soldiers was apparently made by Iraqi insurgents with the intent of influencing the American public as well as rallying supporters.[25] The expeditious transmittal of images to worldwide audiences will likely increase in the future: "The cellular [networks] and land lines have become ingredients of the modern psychological and propaganda wars, joining other tools … like the radio, TV, flyers and the Internet."[26]

U.S. intelligence sources cite some 30 nations that have developed aggressive computer warfare programs; however, relatively few countries currently have the extensive technical and financial resources to mount sophisticated attacks on U.S. weapon systems and computer networks.[27] Nevertheless, denial of service attacks, cyber-incursions and malicious attempts to adversely affect physical infrastructures like power grids and banking transactions have increased in frequency and sophistication in the past few years. As a point of comparison, the number of reported attempts to penetrate computer networks supporting the Pentagon has risen from fewer than 800 in 1996 to more than 160,000 in 2005.[28] Similarly, computer-related crime is having an increased financial impact. The Federal Bureau of Investigation estimates all types of computer crime in the U.S. has already cost industry approximately $400 billion.[29] Of equal concern is the unauthorized theft of information and identities. Spyware software, in particular, is a pervasive problem, both for individuals and organizations. By one estimate reported in August 2006, some 527,000 malicious Web sites were identified, an increase of 100,000 from just a year earlier.[30]

Direct attacks have been made against individual Web sites, although these actions have generally been limited in both scope

and importance. In one of the most widely reported instances, a variety of would-be cyber-terrorists swore to carry out a "revenge battle on Danish newspapers" in retaliation for publication of cartoons of the Prophet Muhammad in September 2005.[31]

Supporting the Fight in the Information Environment: The Role of the Space Professional

The challenge today for commanders is to operate effectively in dynamic joint and multinational operational environments while combating a tenacious and capable enemy. Information superiority is vital to this process. Very simply, "the goal of Information Operations is to gain and maintain information superiority, a condition that allows commanders to seize, retain and exploit the initiative. Information Operations involves constant efforts to deny adversaries the ability to detect and respond to friendly operations, while simultaneously retaining and enhancing friendly force freedom of action."[32] Information Operations supports the collection and processing of battlefield information into actionable information, which then supports achievement of mission objectives designated by the commander. This relationship is particularly important in insurgent and asymmetric environments. Winning against a determined enemy requires that we operate at a faster tempo than our adversaries, or better, get inside his decision-making process.

Space professionals must consider that Information Operations is conducted within the context of an environment — an Information Environment. This Information Environment is comprised of physical, informational and cognitive dimensions that interrelate as individuals, organizations and systems.[33] Consequently, a thorough Intelligence Preparation of the Battlefield is required to fully assess the breadth and relationships between the three dimensions.

The physical dimension is comprised of the command and control systems and supporting systems (physical platforms and the communications networks) that enable individuals and organizations to conduct operations across the domains of air, land, sea and Space. Because information enhances capabilities, the resources required to maintain this dominance provide lucrative targets for asymmetric threats. As new technologies develop, so too will be the means and approaches of attack and disruption. As a result, this dimension must be protected from physical attack.

The informational dimension is where information is collected, processed, stored, disseminated, displayed and protected. This information is generally accessible to the world at large. It is also the dimension where the command and control of military forces is communicated.

The cognitive dimension is where decision-makers and the target audience think, perceive, visualize and decide. A leader's ability to recognize what is happening and remain attentive to threats, change and opportunity is one of the most difficult challenges of asymmetric warfare. The factors of leadership, morale, unit cohesion, level of training, experience, situational awareness, as well as public opinion, media, local attitudes and personalities of those living in the area of operations influence this dimension. As indicated in a recent article, "Winning … is as much about winning the trust and confidence of the people … as it is about winning tactical battles on the ground."[34] This dimension also includes enemy capabilities, decision-making styles and what information systems the enemy has at their disposal.

In planning Information Operations support for commanders, Space professionals have multiple U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command organizations at their availability. All of these assets must be considered when planning support, particularly against asymmetric threats. Space-based capabilities, for example U.S. Strategic Command's Measurement and Signature Intelligence Advanced Geospatial Intelligence (MASINT AGI) Node, supports decision superiority in the informational dimension through the provision of commercial and civil data from satellite, ground and airborne sources. The 53rd Signal Battalion (Satellite Control) supports the provision of satellite communications to convey Information Operation products. The Joint Blue Force Situational Awareness Mission Management Center provides blue force situational awareness data to the Common Operational Picture to support situational awareness.

Space professionals also must continually consider steps to protect the informational dimension of friendly forces from cyber-attack. Concurrently, they must be prepared to provide technical advice to commanders on how to deny adversaries access to their own communications and media links and nodes. For example, Space Control capabilities could deny the provision of position, navigation and timing data for which to support adversaries' decision-making.

The Unexpected Can Always Happen

In a recent magazine article, GEN Cartwright wrote, "Americans are familiar with the host of new challenges posed by the forces of international terrorism, but one of the greatest threats we face may not be human at all … the next big threat could be a natural disaster or something unanticipated."[35] The article went on to emphasize the importance of putting in place the fundamental structures to address challenges and threats wherever they might originate. Military actions often have second- and third-order effects and the

opportunity for unintended consequences increases with uncertainty and asymmetry. Consequently, Information Operations is not likely to be a short-lived operational planning requirement. Space professionals must be at the center of the planning process, and should be prepared to consider the implications of the following questions: [36]

- How do we counter a threat that seeks to obviate the advantages we possess in conventional military power?
- How might our enemy change his operational structure or organization in an attempt to accomplish his ends?
- In what areas might he develop superior knowledge or some unprecedented use of a capability?
- What capabilities do our adversaries have that we do not understand or expect?
- How do we anticipate their ability to innovate?

Former Secretary of Defense Donald Rumsfeld recently emphasized: "The future will require us to think differently and develop the kinds of forces and capabilities that can adapt quickly to new challenges and unexpected circumstances." [37] In considering the challenges of countering adversaries employing asymmetric approaches, we must remember that borders have become seamless. Moreover, adversaries are increasingly becoming more adept at combining conventional capabilities with cyber-world media suaveness. In response, Space professionals must be prepared to step forward and leverage our Nation's great technological capabilities in support of joint warfighters.

Secure the High Ground!

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vices and leverage any and all available assets. Launch of U.S. military payloads from USAKA/RTS would almost certainly be in support of the U.S. Air Force. The U.S. Air Force would be providing responsive Space support to deployed Soldiers, Sailors, Marines and Airmen deployed around the world. The Army's Space responsibilities begin with the requirements generation process, extend to technology research and development, demonstrations and experimentation, and culminate with presentation of capabilities and forces. Consistent with the Army's Space competencies (i.e. force enhancement, Space control, force application), the Army must determine what Space activities have the greatest potential for mission success, and achieve the desired effects and payoff to the warfighter.

One major element of ORS is the Tactical Satellite (TacSat) Demonstration Program. TacSat is a technology demonstration program that sets out to build smaller, cheaper, simpler satellites to provide relevant Space capabilities, and demonstrate military utility through operational experimentation. The Tactical Satellite program provides the Army and SMDC/ARSTRAT an opportunity to influence and develop satellite payloads to directly address the Land Component and Army's operational capability gaps. SMDC/ARSTRAT is fully engaged in ORS activities.

As the Army executive agent for TacSat, the SMDC/ARSTRAT Technical Center has oversight and responsibility for Army TacSat advocacy and efforts, and is taking the lead for the Army in ORS. In addition, the Technical Center is also the Technical Manager for all Army TacSat payload development efforts. Payload concepts addressing communications on the move and persistent battlefield surveillance/characterization are currently being worked in a joint, collaborative environment with the other services and Combatant Commanders. SMDC/ARSTRAT Future Warfare Center is also developing a Multi-User Ground Station intended to provide payload tasking and Command and Control of Army TacSat sponsored payloads. Space capabilities developed under ORS/TacSat have the potential to provide real-time Space capabilities to the warfighter on the battlefield within weeks rather than months or years.

TacSat 1 is scheduled for launch in December aboard the developmental Space X Falcon 1 rocket. The Falcon 1 is one of two developmental rocket programs being sponsored by the Defense Advanced Research Projects Agency (DARPA) through their FALCON program. Originally scheduled to launch from Vandenberg AFB on the California central coast, Space X moved their operation to RTS. The other developmental DARPA program is the AirLaunch QuickReach launch vehicle. This responsive booster is designed to be airdropped from an Air Force C-17 and launched from altitude. Both initiatives have the potential to offer operationally responsive, low cost launch services for small tactical satellites as required by the Joint Force and the Component Commanders.

High Altitude Platforms

The Army's need to understand and manage the battlespace, however, continues to increase beyond the capability of support by Space based assets. Platforms operating in the high altitude region can support the warfighter by augmenting Space platforms and can provide the products and services needed to support decision-making, planning, and combat operations. These high altitude platforms would operate between 20 km. (12.4 miles) and 100 km. (62 miles). As an example, for platforms positioned at an altitude of 60,000 feet, the line of sight to the horizon is 389 miles providing the warfighting commander with an extended view of the battlefield. Although current HALL platforms are limited to short duration missions of 24 hours or less., future HALL platforms potentially fill capability gaps in persistent 24/7 surveillance and communications capabilities for theater and homeland defense operations.

Lighter than Air platforms will be unmanned, gas-filled airships. There are three Lighter than Air efforts being pursued by SMDC/ARSTRAT. The first effort is the HiSentinel, which is a spiral development that will be launched in-theater with a payload weight ranging from 50-200 pounds and payload power of 200-1,000 W. The first part of the spiral development was an airship that reached an altitude of 74,000 feet in November 2005.

High Altitude Technology Demonstration

This was a technology demonstration that provided valuable lessons learned for the next scheduled launch in November 2007. The second effort supports the Missile Defense Agency High Altitude Airship program. The prototype will have a payload weight of 500 pounds and payload power of 3,000W at an altitude of 60,000 feet for 30-day duration in 2010. The third effort is to provide technical support to the Defense Advanced Research Projects Agency Integrated-Sensor-Is-the-Structure program, which provides a complete system that integrates radar into the airship structure.

The Heavier than Air effort is the Orion Unmanned Aerial Vehicle which is projected to fly at altitudes over 65,000 feet with a payload weight of 400 pounds and payload power of 4,000W. Orion will utilize a newly designed hydrogen powered system and will have the capability to be launched in the U.S. or in-theater and remain on station for four days providing line of sight and Beyond Line-of-Sight communications and surveillance to the Warfighter.

The Near Space Long Loitering Payload Testbed will provide multiple

functions for payload operations. The first function is the modeling and simulation of the HALL platform and payload that will validate the military utility of the HALL concepts and support military modeling and simulation exercises. The second function is the hardware-in-the-loop capability that will provide an interface for payloads to be integrated, tested, and verified prior to demonstration on HALL platforms.

Big Crow Program Office

At a slightly lower altitude, SMDC/ARSTRAT's Big Crow Program Office provides support to customers that ranges from Electronic Warfare threat environments, Telemetry recording and retransmit, air refueling, Information Operations, technology prototyping and demonstrations, and training. Customers supported by the Big Crow Program Office are the U.S Navy Program Office for Aegis, the National Aeronautics and Space Administration (NASA), the National Reconnaissance Office, MDA, the North American Aerospace Defense Command (NORAD), and the North Atlantic Treaty Organization or NATO.

The Big Crow Program Office was established with a mission to provide Electronic Warfare environments for the purpose of testing U.S. military Radio Frequency sensor, communication and navigation systems. Today, Big Crow's mission and capabilities span the electronic gamut of Electronic Warfare, Telemetry, Radar, Electro-Optical, Information Operation, and System Test Bed. Mobile and world-wide deployable, the Big Crow Program Office offers a variety of unique capabilities to the Nation's research, test and evaluation, training and commercial communities. Two C-135 aircraft, a myriad of smaller fixed and rotary wing platforms, ground platforms, advanced instrumentation, multi-spectral electronics, in-house configuration control and modification authorities, and technical competency are several of the advantages that give the Big Crow Program Office overall technical capability that is significantly greater than the sum of it parts.

Big Crow Aircraft 8050 Supporting Airborne Laser Program

As the operator of the only remaining large-scale airborne Electronic Warfare test platforms, Big Crow is a key national asset that provides a unique combination of capabilities and solutions for test, training, exercises and on-call operations. Big Crow has an unmatched ability to dissect threat systems, identify vulnerabilities, and exploit them to the warfighter's advantage — key characteristics for the delivery of non-kinetic effects to these threat systems. Applied to friendly systems, this offers unique opportunities to exercise and train Tactics, Techniques and Procedures in an operationally realistic threat environment.

Expanding Space … from page 11

by expanding the scope of Space training and opportunities. The Army has partnered with the Air Force at the National Security Space Institute to conduct Space Operations Officer Qualification training. In addition to training, all newly designated FA40s, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command and the National Security Space Institute train roughly 40 additional Army personnel each year that serve in a variety of career fields and commands across the Army. In addition the Army provides fully qualified instructors to the institute. These Army instructors bring their Space knowledge and operational experience to the institute, providing a valuable joint perspective concerning Space operations to the faculty and students, the majority of which are in the Air Force. Their presence expands Army Space knowledge as well as expanding the Air Force's awareness of the Army's Space requirements, operations, force structure and capabilities.

Space training will continue to expand within the Army over the next several years. Establishment of the Space cadre will drive new Space training requirements. The Army envisions that Space training will expand beyond FA40s to include civilians and enlisted Soldiers, as they are designated and officially incorporated into the Space Cadre. In addition Space training will grow to include National Guard and Reserve Soldiers who will man newly formed reserve component Army Space Support Teams and Space Support Elements. We will have to look at new and innovative methods of training to include the use of Mobile Training Teams, distance education and increased joint education opportunities, to meet the needs of deployed and Reserve Component forces. In summary our future training activities and programs will continue to expand Space knowledge, expertise and capabilities across the Army.

Conclusion

The Army has changed dramatically over the last five years and will continue to evolve rapidly for the foreseeable future. New systems, such as Future Combat Systems, WINT and JNN will change how the Army is equipped. In turn, new doctrine and organizational structures will be implemented to take advantage of these new systems. The Army will turn to Space capabilities to enable its future force and ensure that the American Soldier has every advantage possible. Consequently, Space Operations Officers and Space Cadre will actively work to promote and expand Space knowledge, expertise and capabilities across the Army, to further empower the American Soldier.

The Way Forward ... from page 21

Air Force Space Command, it is not unusual to see a missileer captain, having spent years in an environment quite different from satellite operations, take command of a crew after six months or so of training, when his previous experience in Space operations may have been limited to Space 100. The path for an Army FA40 would be similar. With regard to desirability, it would clearly bring a sense of immediacy to the operations floor if a captain or major with nearly a decade of experience as an infantryman, for example, became a part of daily operations. The warfighter and his needs would perhaps cease to be so much of an abstraction. Many Army FA40s, for their part, after having deployed multiple times to Bosnia, Afghanistan, and Iraq, might welcome the opportunity to spend a three-year tour stateside. This must be accompanied by a much greater FA40 presence in the Space and Missile Center (SMC) at Los Angeles Air Force Base, currently consisting of one officer, if future Space systems are to be operationally responsive.

The easiest as well as most desirable way to accomplish this two-fold transformation would be to establish a joint school for both Air Force and Army Space officers. Current developments already suggest such a parallel track: FA40s attend the National Security Space Institute's four-week Space 200 course prior to the rest of their Space Operations Officer Qualification Course. The six remaining weeks of the Space Operations Officer Course typically include trips to the Joint Space Operations Center at Vandenberg Air Force Base, the Space and Missile Center at Los Angeles Air Force Base, the White Sands Missile Complex, the Pentagon, the National Reconnaissance Office, the National Security Agency, and other agencies within the Space community, in addition to classroom-based training for future Army Space Support Team and Space Support Element members. Air Force Space officers who are designated to join an Army Space Support Team or Space Support Element should receive the same training, with this difference: rather than attend Space 200 (which many of them may have already done), they would spend those four weeks learning ground operations and Army organization. Ideally, such training would be co-located, with Army and Air Force Space officers sharing the same facilities and discussing the same things, joining together for the final six weeks. Each Space Operations Officer Qualification Course class would then be truly joint, with future Army Space Support Team and Space Support Element members from both services sharing a common experience before they even deploy.

There is nothing earthshaking about these proposals, but they have consequences that are far-reaching. To begin with, the current dichotomy between warfighter (alternately "user" or "customer" in corporate parlance) and Space support will begin to be erased. There will be a growing body of captains in Air Force Space Command who will have been Space officers in a combat zone, and they will draw upon these experiences as they progress through their careers. Correspondingly, an increasing number of FA40s will have become experts in GPS satellite operations, satellite communication, acquisitions and many other areas. An FA40, for instance, who had been a part of a 2 SWS crew would bring an unrivaled expertise in theater ballistic missile warning to any Space cell of which he was a part. Taken together, these changes will have a tremendous impact on the cultural gap between Air Force and Army Space. It will matter less and less which billet in joint Space is occupied by the Air Force and which by the Army, when each service can look at a Space officer and know that his or her experience is in part their own. That, however, is only the beginning.

As Space becomes more operationally responsive and its capabilities known at lower echelons within the Army, these lower levels will begin to call for this responsiveness within their own unit — in other words, to have Space Support Elements or a Space Officer at the brigade, battalion and even company level. In the area of imagery, for instance, Army Space officers bring a wealth of resources and knowledge of Space capabilities to bear, but as this imagery becomes of finer resolution, combining more sources, and more tactically usable, there will be an increasing demand from Soldiers for a low level, quick-access means to acquire this imagery. Having someone at the tactical level who knows what assets are in orbit, what they can and cannot provide, and how to get what they do provide will be invaluable. Similar issues will undoubtedly arise with Satellite Communication, Global Positioning and Blue Force Tracking, enemy Theater Ballistic Missiles, and special programs.

One possible model for meeting this challenge is provided by the field artillery. The Fire Support Officer at company level is typically a lieutenant fresh out of artillery training who is assigned to an infantry or armor unit. As head of the Fire Support Team, which includes enlisted members, he is responsible above all for calling in artillery fires in support of the maneuver company, the fire support being provided by an artillery unit. Fire Support Officers are embedded in each higher echelon, as well, usually with an Fire Support Officer captain at the battalion and a major at the brigade. Likewise, the Space officer could also be assigned to these echelons, and at each level, he would tap into the Space capabilities provided by the Army's 1st Space Brigade, Air Force Space Command, and the broader Space community, military, national and commercial. This is just one possible model.

As Space capabilities become more widely known, and as these capabilities themselves undergo future augmentation, it will clearly require more than a

lowering of the years required before one can track into FA40 (currently at the 7-year mark). As it is, there are members of Army Space Support Teams and Space Support Elements performing a vital Space mission, including lieutenants and NCOs, but since they are not FA40s, their expertise cannot so easily be kept within the Army Space community. Army Space cannot remain a small coterie of mostly field grade officers and meet the needs of its own service members. It must become its own branch, with fully developed career paths for both officers and enlisted. These proposals, taken together, represent a planned transition to just such a state.

As for Air Force Space Command, this plan would create an entirely new career path and a growing pool of Space officers with operational and even combat experience and first-hand knowledge of the warfighting employment of Space assets. It would help Space Command come into its own as an operations branch truly parallel to that of flying operations.

With increasing traffic between the Air Force and Army Space branches, there would arise a group of Space warriors whose experience would cut across the military Space world from acquisitions to support ops to combat employment, sharing a common body of knowledge, a common medium, a common language, a common commitment, a common doctrine and a common destiny. It would then be clear that a true Space force would already be a reality, if not yet organizationally recognized as such. The path of development outlined here represents not only the most responsive employment of military Space in service to the warfighter, but also the foundation for Space as a warfighting medium in itself.

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1LT Brent D. Ziarnick, U.S. Air Force, is a Space tactics officer in the 50th Space Wing Weapons & Tactics Flight. He has been a satellite vehicle operator, Spacecraft systems analyst, and tactician for the Global Positioning System in the 2nd Space Operations Squadron. He is a 2005 graduate of the National Security Space Institute's Navigation Operations Advanced Course and a 2003 graduate of the U.S. Air Force Academy.

Coupling ... from page 9

Operationally Responsive Space is another initiative. The term itself means different things to different people. To some, particularly Army leaders, it means a Space system or payload responsive to the theater commander that provides dynamic retasking and theater, en route and beyond-line-of-sight direct downlink. To others it means a small satellite that is reasonable in cost, quickly available (or already in storage), and supported with capabilities to launch it into Space upon request to support military operations. This latter definition is what the Department of Defense Executive Agent for Space refers to in its draft paper, "DoD Operationally Responsive Space Strategy," dated April 2006.

According to the draft, the "concept of ORS encompasses the ability not only to field capabilities expeditiously but also to react and escalate technically in response to changes in the security environment, potential threats or the needs of our nation and allies." The strategy focuses on small satellites that are designed for theater coverage with a modest payload, single tasking process and limited data processing. They may be designed to operate for one to two years or less.

The feasibility and capabilities of these small "sats" are being tested in a series of tactical satellite (TacSat) experiments (the current plan calls for six.) These experiments will investigate the capability to rapidly augment an existing constellation of Spacecraft, and/or to rapidly deploy Space assets with payloads tailored to specific Joint Task Force commanders' requirements and directly responsive to deployed tactical commanders. Technology advancements in small satellites, along with responsive launch, offer the potential of cost-effective, tactical Space systems. The Space and Missile Defense Battle Lab has developed a prototype tactical ground station called the Multi-User Ground Station for evaluating tactical tasking of the Spacecraft and receipt, and dissemination of tactical products from these small sats. It will be some time before the Department of Defense knows whether the small satellites and their related responsive lift are the mean by which commanders are provided assured Space.

The other issue of assured Space is how to protect what we currently have, i.e., how do we control Space, how do we prevent the adversary from blocking or interfering with the vital information flow that might keep the joint force commander from battlefield success? We achieve that through the joint functional concept of Joint Force Protection. The Army Space Master Plan describes that to effectively enable continuous operations supporting the joint commander's intent Army elements must "integrate Space situational awareness into a common operating picture; plan, coordinate, integrate and synchronize employment of joint Space control capabilities; exploit Space control capabilities in theater; and operate Space-based missile warning capabilities in theater."

By providing "Space capabilities to support continuous, global strategic and tactical warning as well as a multi-layered and integrated missile defense," the Secretary of Defense has met his responsibility as spelled out in the National Space Policy and has enabled both the 100th Missile Defense Brigade (GMD) and the 1st Space Brigade to effectively respond to the latest North Korean missile crisis. Although one may not see Space operations and missile defense as integrally related, they are. As Space professionals, we need to look for the larger picture and wider application of our Space expertise. As we pursue the initiatives I outlined in this article, we may find expanded applications and missions for the systems so that the entire Department of Defense is prepared to counter the threats that face us today and those we will face tomorrow.

ASMP ... from page 19

trol network extending the essential command and control processes from the strategic to the tactical level. Satellite Communications networks enable extended range connectivity (even to forces on the move) that integrates all echelons in the Joint operational area. Space-based position, velocity, navigation and timing capabilities enable commanders at all echelons to shape the battlespace out of contact by enabling control and accuracy of extended range munitions and coordinated maneuver. Army elements will engage at all levels of Space planning and operations and synchronize collection and support activities supporting Joint command and control to achieve desired effects. The most consistent gap in this functional area is a shortage of Military Satellite Communication access.

2) Battlespace awareness contributes to battlespace success by enabling commanders to make better decisions more efficiently by providing actual and predictive cognizance. Battlespace awareness is enabled by seamless integration of a highly responsive overhead, airborne and terrestrial sensors across disciplines with a Flat Network (see the Army Intelligence Campaign Plan). Data derived from Space-based, and other, sensors will be inserted into a net-centric environment that produces information that supports operational time lines for both maneuver operations and missile defense; the intent is to provide unprecedented access to data from across sensors, systems, databases and networks in order to approach total situational awareness. Satellite communications links are necessary to integrate disparate systems and networks into a united network that enables successful joint operations from pre-deployment through decisive operations. Space-based position, velocity, navigation and timing capabilities will enable current and future forces to maneuver to contact at the maneuver commander's discretion. Army elements will fuse Space sensor products into usable information, integrate Space into a common operating picture, operate select SATCOM and high-altitude/sensor payloads and operate ground-based Space and missile defense radars. The most consistent gap is a shortage of tactically responsive sensors and the difficulty in providing data gathered within operational time lines.

3) Force Application synchronizes maneuver and engagement against an adversary to create the effects necessary to achieve assigned mission objectives. Space-based force enhancement capabilities provide intelligence, surveillance, reconnaissance and position, velocity, navigation and timing data, communications connectivity, and weather information that enable extended range engagements, precision weapon control, target tracking, actionable targeting and damage assessment. It also includes aspects of Space control. Space-based intelligence, surveillance and reconnaissance sensors will collect data to support an integrated operational picture of the battlespace at all echelons to quickly generate and synchronize maneuver and engagement for desired effects at decisive points, and satellite communications will be the primary data delivery mechanism. Operational and tactical success will depend on the ability to coordinate, direct, control and integrate Force Application activities in time, Space and purpose across the battlefield. Therefore, Space control activities will be necessary to protect critical Space assets and to protect Army forces from hostile Space capabilities. Army elements will fuse Space sensor products with data from other sources into effects-based planning, targeting and fire direction processes; provide remotely-delivered wide-area Global Positioning System (GPS) enhancement capabilities to urban and mountainous regions; and operate or control responsive, tactically relevant offensive Space negation capabilities. There are consistent shortfalls in military satellite communications interfaces, throughput to support Space-based intelligence, surveillance and reconnaissance sensors, and limited Space control capabilities.

4) Focused logistics provides end-to-end control over the supply pipeline to ensure that forces, equipment, and sustaining support arrive where needed and on time. Space-based position, velocity, navigation and timing, Intelligence, surveillance and reconnaissance, Satellite Communication and Weather, Terrain and Environmental Monitoring systems facilitate focused logistics by supplying information used in traffic ability estimates, supply system visibility, precise tactical re-supply and maneuver. Satellite communications will be critical to a theater and global network-centric architecture enabling logistics decision superiority and the ability to integrate logistics with operations. Army elements will integrate satellite communications capabilities and Space sensor data products into logistics planning, control and operations. The capability gaps associated with focused logistics are related to shortfalls in military satellite communications, sensor coverage and position/navigation assets.

5) Joint Force Protection enables continuous operation in supporting the Joint Force Commander's intent. Space capabilities will provide missile launch detection, Military Satellite Communication networks, position, velocity, navigation and timing information and Space-based intelligence, surveillance and reconnaissance data for an asynchronous advantage over our adversaries which must be protected during employment, sustaining activities and redeployment. The goal is to prevent an adversary from employing capabilities that would restrict or prevent the joint force from achieving decisive results at the time and place of the U.S. leadership's choosing. Protection also includes actions necessary to protect the Joint Task Force from tactical missiles and release of chemical, biological, radiological, nuclear or environmental materials, as well as their effects. Army elements will integrate Space situational awareness into a common operating picture; plan, coordinate, integrate and synchronize employment of Joint Space control capabilities; exploit Space control capabilities in theater; and oper-

ate Space-based missile warning capabilities in theater. The most persistent gaps are the delay in replacing existing missile warning satellites and the lack of inherent interoperability in Blue Force Situational Awareness devices.

The Space assessment supporting Army Space Master Plan development identified a number of issues and questions that need proactive decisions by the Army leadership. Therefore, the plan recommends studies and assessments on the following questions and issues to enable Senior Leaders to make prudent decisions,

1. The Army must seek innovative solutions, to include partnering with commercial providers, to overcome military SATCOM shortfalls in capacity, user access and delays in capability improvements.

2. Where should the Army invest in near- Space and high-altitude, long-endurance platforms as a lower cost, more responsive alternative to Space platforms if they prove technically feasible?

3. Establish Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities development proponents (where they do not currently exist), and assign responsibilities for potential Army involvement in tactical satellite and near- Space and high-altitude, long-endurance capabilities and operations.

4. Assess the utility in pursuing a more efficient commercial imagery policy and process in order to better support time-sensitive tactical use.

5. Plan for the prioritized migration from using Commercial Satellite Communication to using Military Satellite Communication as the primary means of transmitting mission-critical data.

6. Determine and execute a course of action to bridge the two-year capability gap (2010-2012) between Joint Tactical Ground Station (JTAGS)/Defense Support Program and JTAGS follow-on/Space-Based Infra-Red Satellite to maintain an organic theater missile warning capability.

7. Army-operated elements of the Missile Defense Agency-developed Ballistic Missile Defense System must be supported in accordance with the Ballistic Missile Defense System transition and transfer plan to defeat Space transiting ballistic missiles launched against the U.S. Homeland, allies, deployed forces, and other national interests, and to provide enhanced missile detection and assured warning for the U.S. Homeland and regional Combatant Commanders

8. Assess the utility of using directed energy as a weapons system within the Future Force. Consider mission areas, applications and constraints as part of the assessment.

The Space assessment of the Capability Needs Analysis identified Space capabilities that are critical to the Future Forces' ability to achieve mission success. Therefore, the Army Space Master Plan recommends that the Army carry the following positions into Space acquisition and Space operation discussions at every level:

- Military Satellite Communication programs will provide critical capabilities for Joint Command and Control; they must stay on schedule and meet performance levels. Joint Blue Force Situational Awareness, Combat Identification, and other blue force tracking activities need to migrate to Military Satellite Communication with the desire for further migration to protected Military Satellite Communication.
- The Army needs to continue to influence intelligence community and Department of Defense for tactically responsive sensors supporting Battlespace Awareness; this includes the capability for dynamic retasking and theater, en route and beyond line-of-sight downlink capabilities as part of the Space Radar design, without going back to the Continental United States. This means the Army should support Global Information Grid and Intel Enterprise capabilities that include theater/direct downlinks. Battlespace Awareness also needs better local weather support and timely, high-fidelity weather data. Satellite providers for Department of Defense operations need on-board standards for detecting and responding to attack, enabling a quality of assurance for support to ground operations. A "quick time to first fix" capability for GPS III and robust, anti-jam GPS signals are necessary to support Joint Blue Force Situational Awareness.
- Advocate an assessment of the utility of a Space sensor direct-to-shooter capability on future Department of Defense and National systems as support to Force Application. Joint Space Control efforts should include an offensive focus, aimed at creating tactical effects. Those efforts need to be synchronized and integrated with other Joint Space control activities. Determine the need for Joint development of a tactical single integrated Space picture capability embedded in Joint Battle Command systems.
- There can be no compromise on the need for a direct downlink capability from Overhead Non-Imaging InfraRed sensors to the theater as part of the protection concept. Also, Army Combat Developers must ensure that U.S. Strategic Command's Functional Solution Analysis for Space control fully addresses the impact of Space control capability gaps on the ground maneuver force.
- Joint Space doctrine needs updating to provide needed depth and clarity for command and control of Space forces as part of the effort to integrate Space into the Future Force. In addition, Space impacts on ground operations must be integrated across the Joint virtual and live training complex.

The Army Space Master Plan with annexes provides guidelines for developing Army positions relative to Space questions and issues. It ties needed Space capabilities to Army operational capabilities in support of the five Joint Functional Concepts — Joint Command and Control, Battlespace Awareness, Force Application, Focused Logistics, and Protection. It also identifies potential gaps in needed Space capabilities, and recommends some doctrine, organization, training, material, leadership, personnel and facilities solutions to bridge (at least partially) those gaps. The experience and insight gained from implementing the recommendations and resolving the identified issues, and the analysis conducted to support those activities, will make the Army a better-educated consumer of Space products.

Ron Dickerman is a Combat Developer in U.S. Army Space and Missile Defense Command/ U.S. Army Forces Strategic Command's Directorate of Combat Developments and the SMDC/ARSTRAT lead for developing the Army Space Master Plan. The Army Space Master Plan resulted from the collective efforts of Headquarters Department of the Army Staff Elements, Headquarters Training and Doctrine Command (and proponent schools), Combined Arms Center and SMDC/ARSTRAT. This article is a slightly modified version of the published Army Space Master Plan Unclassified Extract.

Training Insights

by Larry Mize

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

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-NSSI: https://halfway.peterson.af.mil/nssi/(2bpgiiuljf10ytyk3v5w5y2l)/index.aspx

2007 FA40 Space Operations Officer Qualification Courses (SOOQC)

- SOOQC 07-01 June 7 – Aug. 17, 2007
- SOOQC 07-02 Sept. 6 – Nov. 16, 2007

For more information contact: Larry Mize, chief of training, FWC DCD: larry.mize@smdc-cs.army.mil (719) 554-4545

FWC DCD to Mentor/Support Naval Postgraduate School FA40 Space Operations/Engineering Students

Final coordination between FWC DCD Training and Captain Al Scott, USN, Program Officer, Space Systems Engineering/Operations, Naval Postgraduate School has resulted in a cooperative program of support for FA40s attending NPS through the Army's Advanced Civilian Schooling (ACS) degree program. The main themes of this cooperation center on FA40 Proponency and DCD Education and Training Branch direct support to F40s through:

-visits and one-on-one discussions with newly arrived FA40s during their first quarter

-nominating topics for the multi-service class design project and serving as project advisor for Army aspects of the project

-soliciting Army topics and nominating these to Captain Scott for consideration of NPS students/curriculum advisors as thesis proposals. For those Army topics selected for thesis work, DCD will mentor students and facilitate entrées with program leads and subject matter experts

-visiting NPS as guest lecturers in support of NPS' Space Seminar program.

As this program matures and FA40s attend other ACS program schools, such as the Air Force Institute of Technology (AFIT), DCD's outreach will extend to them. NPS and DCD view this as a win-win arrangement that benefits NPS and its Space Systems Engineering/Operations Program and provides the Army with an academic resource to apply to any variety of focus areas/studies.

Six Years of Space Operations Officer Qualification Course Stats

With the Nov. 17 graduation of the 11th SOOQC, 212 Space Professionals have passed through the halls of DCD's one-room schoolhouse. Provided below are the demographics for these eleven classes.

			TOTAL	OFFICER									BY RANK					
	CLASS	DATES	STUDENTS	FA40	AC NON-40	NGB	RC	USMC	USAF	WO	NCO	CIV	COL	LTC	MAJ	CPT-LT	WO	NCO
1	01-01	13 JUN-03 AUG 01	14	13		1								1	12	1		
2	02-01	17 JAN-08 MAR 02	15	11		4							1	3	11			
3	02-02	08 JUL-23 AUG 02	20	19				1					4	4	12			
4	03-01	13 JUN-08 AUG 03	20	16		1	3							8	11	1		
5	03-02	18 AUG-10 OCT 03	19	8	3	3	2	1	1		1		1	5	6	6		1
6	04-01	07 JUL-27 AUG 04	21	15	4		1			1				2	13	5	1	
7	04-02	08 SEP-19 NOV 04	19	7	3	4	3	1			1			3	10	5		1
8	05-01	27 JUN-01 SEP 05	17	11	2	1	2	1							11	6		
9	05-02	08 SEP-18 NOV 05	19	8	2	5	3		1					3	12	4		
10	06-01	08 JUN-18 AUG 06	25	7	7	1	6		2		2			2	15	6		2
11	06-02	07 SEP-17 NOV 06	23	8	2	3	8	1			1			2	13	7		1
	TOTALS		212	123	23	23	28	5	4	1	5	0	6	33	126	41	1	5

TRADOC CG Awards Certificate of Accreditation for Space Operations Officer Qualification Course

Formal accreditation of the FA40 Space Operations Officer Qualification Course was received from CG TRADOC following the TRADOC Quality Assurance Office inspection in September 2006. See below article by Thomas Coleman, DCD.

HQ TRADOC sees "Institute of Excellence Quality" in SOOQC Course

by Tom Coleman

The current Space Operations Officer Qualification Course (SOOQC) has obtained the "Quality Seal of Accreditation" from Headquarters Training and Doctrine Command (TRADOC) and the entire U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) Directorate of Combat Development (DCD) training team could not be happier. The team has been working toward this goal for more than three years. On Dec. 1, the commanding general TRADOC awarded "Full Accreditation" (100 percent of all standards met) status and designated SMDC as an "Institution of Excellence" for that course.

The course has been in existence since 2001, but was only seven weeks long back then. Following a strategic roadmap that includes an aggressive after action report program, annual critical task selection boards, DCO validation of critical tasks and, foremost, integrating the current operational environment into training, FA40 Space Operations Officer Qualification training has evolved into a very robust eleven-week resident course conducted in Colorado Springs. "TRADOC formal accreditation of the command's SOOQC shows the hard work and quality that the DCD training team puts forth into this important Space instruction for our Army Space Professionals," said Larry Mize, Chief of Space Education and Training at DCD.

The goal of TRADOC accreditation of the course was established more than three years ago in Oct. 2003 with a TRADOC Quality Assurance Office Staff Assistance Visit to help DCD focus efforts and improve the course," said Tom Coleman, Chief of Training Development at DCD. "This has always been our goal, to demonstrate that we have a TRADOC-approved, quality Space training course" Coleman said. In 2003, the Quality Assurance Office spent three days with the DCD to review all the Space Operations Officer Qualification Course materials and discuss ways for the training team to improve the course even more.

The headquarters TRADOC Quality Assurance Office accreditation team arrived in Colorado Springs on Sept. 26 for their three-day review. The criteria for TRADOC accreditation included compliance with 24 TRADOC Quality Assurance Office standards. These standards cover the areas of (1) Conduct of Training, (2) Training Support and (3) Proponent Functions. The two-person Quality Assurance Office team stayed busy reviewing all course curriculum and training materials to include; lesson plans, Program of Instruction, testing procedures, student and instructor folders, Army Training Requirements and Resources System records, training facilities, classroom design, administrative support and a myriad of other training program requirements. The Quality Assurance Office team began working with Coleman and Deborah Harvey, as well as the other members of the DCD training team at the first of the year. "Lots of important coordination had to take place prior to the QAO team's arrival here in September," said Coleman. The team was impressed with the course and DCD's ability to execute a top-notch Space training course. The Quality Assurance Office inspectors were highly lauding of the "best business practice" of partnering with the U.S. Air Force and the National Security Space Institute. TRADOC Quality Assurance Office plans to take DCD's business model and export it to other TRADOC proponent schools as a proven model to enhance training efficiency amidst an era of strained resources and high Operations Tempo.

This Army/U.S. Air Force/National Security Space Institute partnership started in 2003 during a review of the basic Space curricula taught during the Space Operations Officer Qualification Course and the National Security Space Institute's Space 200 course showed nearly an 80 percent overlap in similar topics. At that time, DCD entered into discussions with the institute and established what was to become an important and viable partnership between both schools in delivering quality Space training. Agreement was reached between DCD and the National Space Security Institute to include Space 200 as an integral part of the overall Space Operations Officer Qualification Course experience.

Today, the students who arrive in Colorado Springs attend the course in three phases. Phase One is a 2-3 day technical refresh and orientation to the Army Space community. Phase Two is attendance at the 4-week Space 200 course at the National Security Space Institute. Phase Three is a 6-week training session conducted back at the DCD training facility where the students receive Army-focused training on specific Army Space applications and operations. Over the past several years, the course has seen some significant improvements. The field trips for the students have been expanded to include Vandenberg Air Force Base in California, as well as contractor facilities in the Los Angeles area, the High Energy Laser System Test Facility and White Sands, and the 5-day D.C. trip. The Space Operations Officer Qualification Course culminates in a robust three-day Command Post Exercise which includes insight from Army FA40s and others who have recently returned from Operation Iraqi Freedom and other field locations to further enhance the Command Post Exercise experience.

The Quality Assurance Office team recognized the goodness in partnering with the National Space Security Institute, the quality of instruction being delivered, and the ability of the DCD training team to deliver a professional Space training course notwithstanding their limited resources and manpower constraints. "Our entire training team has worked hard and I am proud of each of them for achieving this important TRADOC accreditation and recognition for SMDC/ARSTRAT," said COL Bruce Smith, Director of DCD.

The Training and Doctrine Command accreditation is good for three years.

Space Professional Personnel Update

by MAJ Christopher Livingstone

MAJ(P) Chris Livingstone is an FA40 Space Operations Officer serving as the Chief, FA40 Personnel Proponent Office. MAJ(P) Livingstone has served with U.S. Army Space and Missile Defense Command / Army Forces Strategic Command in the 1st Space Battalion for the past three years as an Army Space Support Team Leader, Commander of the 2nd Space Company, and Executive Officer of the 1st Space Battalion. He served as an Ordnance Officer in the 1st Infantry Division, 1st Armor Division, 1st Cavalry Division, and First U.S. Army prior to entering the Space Operations Career Field in 2003.

Accessions

The functional designation process now assesses Captains at the seven-year mark. As a result, a warm welcome goes out to our 11 newest FA40 members accessed in September 2006: CPT Michael J. Bancroft, CPT Donald K. Brooks, CPT Jason M. Favero, CPT Charles F. Harmon III, CPT Charles D. Hayes, CPT Bryan G. Juntunen, CPT Eric J. Marion, CPT John B. Marley, CPT Cecil A. Strickland, CPT Christopher G. Turner and CPT William C. Wright.

Air Force Space Badge

On Feb. 22, 2006, the Air Force approved the Army criteria for award and wear of the new Air Force Space Badge at the Basic, Senior and Master levels to Army Space Cadre members that meet the rigorous qualification criteria based on training/education and experience gained serving in a validated Space Cadre position. The Air Force also authorized the Army to wear a black subdued version of the new badge on appropriate duty uniforms (Battle Dress and Army Combat Uniforms). A request for exception to policy to AR 670-1 (Wear and Appearance of Army Uniforms and Insignia) from Department of the Army to authorize acceptance and wear of the new badge on the Army uniform was submitted and approved by the Chief of Staff of the Army on Aug. 22, 2006. The initial release of memorandums awarding and authorizing individuals to wear the new badge were dated Sept. 1, 2006.

In accordance with AR 670-1, the new AFSB is considered an Army Group 3 Badge (special skill badge) and will be worn on the Army uniform in the same manner as U.S. Army combat or special skill badges. Army Space Cadre members eligible to wear the new badge on their dress uniforms (Class A and B, Blue, White, etc.) can either wear the regular or miniature size nickel-plated, mirror-like polished pin-on badge already procured and fielded by the Air Force. To comply with Army wear policy, we are coordinating with the Institute of Heraldry to develop, procure and field pin-on black subdued AFSBs for wear on the Battle Dress Uniform and the Army Combat Uniform. We are also coordinating with the Institute of Heraldry to develop, procure and field a dress miniature pin-on badge for the Army Mess Dress uniform since the Air Force 'miniature' version is equivalent to our regular sized version and therefore, too large for the Army Mess Dress uniform. Black subdued pin-on and Army Mess Dress miniature pin-on badges for the old Air Force Space and Missile Badge at the Basic, Senior, and Master levels will also be developed, procured and fielded. Note: Wear of the new Air Force Space Badge supersedes wear of the old Air Force Space and Missile Badge.

Upon finalization of all procurement actions, officers and enlisted Soldiers will be able to purchase the black subdued pin-on and Army Mess Dress miniature pin-on badges at Military Clothing and Sales Stores along with the already procured and fielded nickel-plated, mirror-like polished pin-on badges (regular or Air Force miniature size). Additionally, enlisted personnel will be authorized to receive the black subdued pin-on and regular or Air Force miniature size nickel-plated, mirror-like polished pin-on badges they qualify for from their unit supply sergeant. Pin-on miniature badges for the Army Mess Dress uniform will not be issued because the uniform is not a supply room issued item.

Also, codes and acronym entries have been developed or modified for the Officer or Enlisted Record Brief to distinguish the new badge from the previously issued badge. As mentioned previously, there are three levels of achievement for both the old and the new badges; however, the requirement criteria for the new badge is different from the requirement criteria for the old one.

Soldier Record Briefs are updated using the field 'CBTSPB' to enter the value (or codes) for the appropriate level of badge awarded. The codes for the previously issued badges have not changed; however, the acronym on ORB/ERBs is slightly different. The acronyms now for the old Air Force Space and Missile Badge shows as AFSMB for the Basic level, SAFSMB for the Senior level, and MAFSMB for the Master level. Codes for the new Air Force Space Badge are: ES for the Master level; ET for the Senior level; and EU for the Basic level. The acronym that shows on ORBs (and eventually on ERBs as the Army Space Cadre moves forward and includes enlisted Space Enablers) for each level of the new AFSB is: AFSB for the Basic level, SAFSB for the Senior level, and MAFSB for the Master level.

Education and Training

Space 300 is a resident, 15-day capstone course taught by the Air Force at the National Security Space Institute located in Colorado Springs, CO. The National Security Space Institute is the Department of Defense's single focal point for Space education and training, complementing existing Space education programs at Air University, the Naval Postgraduate School and the Air Force Institute of Technology. Students attending Space 300 represent a broad range of National Security Space organizations, with the target audience centering on the Space Professional at the rank of senior Major through Colonel. The material and span of the course includes subject areas and decisions contemplated from our senior officers to the highest levels of government. Space 300 is a thinker's course, primarily using guided discussion techniques in order to equip tomorrow's Space leaders with skills needed to solve problems of Space bearing on national security. The course is essential for the professional development of our senior Army Space Cadre. The multi-service population of this course prepares the FA40 Space Operations Officer for assignments throughout the Joint and National Security Space Communities. Completing the course also results in certification as a credentialed, Level-3 Space Professional. Course attendance for Army Space Professionals is managed by the FA40 Personnel Proponent Office. With only one Army seat per course and offered nine times in Fiscal Year 2007, the FA40 Personnel Proponent Office has established criteria in order to develop an order of merit list for selection of students. The criteria used has been vetted and approved by our FA40 Counsel of Colonels and consists of: 1) Accumulated Space Experience (at least 84 months or will reach 84 months within the fiscal year); 2) Type of assignment (current or follow-on); and 3) Availability. Although only one seat per course is allotted to the Army at this time, we are negotiating with Headquarters Air Force Space/A1FX to double our annual throughput from 9 to 18 in order to send nearly half of our eligible 39 FA40 Space Operations Officers (four COLs, 28 LTCs, and seven MAJs) to Space 300 during Fiscal Year 2007. More than one name is submitted per course (primary and two alternates) in the event the primary individual is unable to attend or additional seats come available.

Army Space Cadre

As the Army Specified Proponent for Space, U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command is leading the effort to develop a cadre of Space-qualified professionals comprised of military and civilian personnel, with oversight provided by the Senior Army Space Council. Currently, the Army Space Cadre is comprised of 189 FA40 Space Professionals assigned throughout the Joint and National Security Space communities. In October 2006, the Senior Army Space Council approved the four-phased Army Space Cadre Strategy that includes identifying and developing a cadre of Space Enablers consisting of Soldiers and civilian personnel, whose primary career field is not Space, but perform unique tasks or functions or may require skills to apply Space capabilities. We are currently in the beginning stages of Phase II of the strategy which will result in the identification of Space Enabler positions throughout the Army by 3rd Quarter Fiscal Year 2007. Upon identification of Space Enabler positions, we will develop additional training opportunities (where required) for Space Cadre personnel (Phase III) and begin tracking and reporting of all Space Cadre personnel as well as further develop supporting policies and regulations (Phase IV). The primary objectives of this strategy are to develop and maintain a cadre of Space-qualified personnel in sufficient quantities to represent the Army's interests in Space acquisition and operations. This strategy allows the Army to accomplish these objectives while generating a sufficient number of appropriately qualified personnel to man Joint Space organizations, as well as, function as Space experts throughout the Army. Additional information regarding the status of the Army Space Cadre will be provided in future **Army Space Journal** updates.

Promotions

The Fiscal Year 2006 Colonel's Board selected two of our FA40s. Congratulations to LTC(P) Jeff Farnsworth and LTC(P) Tim Kopra on your recent selection. The board was conducted under OPMS XXI standards with FA40 in the Information Operations Career Field. The first board to be conducted under the OPMS redesign will be the February 2007 Lieutenant Colonel's Board. As explained in previous issues of the **Army Space Journal**, the OPMS redesign eliminated the four career fields and established three Functionally Aligned Categories for both promotion and management. The Functionally Aligned Categories are further subdivided into Functional Groups. FA40 is now aligned as follows:
Functionally Aligned Category: Operations Support (OS). FA40 officers will compete for promotion within this category.
Functional Group: Network and Space Operations (FA40, FA24, FA53 and SC).

Please visit the Human Resources Command Web site to view the latest changes associated with OPMS.

Also, congratulations to LTC Steve Choi, LTC Jay Driscoll, LTC Rich Lewis, LTC Jim Patterson, LTC Larry Roberts, LTC Lem Williams, MAJ Alex Braszko, MAJ Bill Eldridge, MAJ Jason Lange, and MAJ Jeff Sheehan on your recent promotion.

Base Realignment and Closure (BRAC)

As a result of the recent Base Realignment and Closure (BRAC) initiative, U.S. Army Space and Missile Defense Command / Army Forces Strategic Command will move its Headquarters to Huntsville, Alabama this summer (2007). The FA40 Personnel Proponent Office will be part of that move. However, no one from the FA40 Personnel Proponent Office Staff working in DC/Arlington is relocating. Ms. Patsy Campbell, Ms. Rosemary Cuadros, and Ms. Carolyn Maddox have decided to remain in the DC area and seek other employment opportunities. Mr. Larry Fallen and his temporary replacement Mr. Steve Lewis have already moved on to other assignments. I will continue as the Chief of the FA40 Personnel Proponent Office over the next few months in Colorado Springs, CO as my entire staff changes over. As my DC/Arlington staff prepare for the transition, they may seek information from the FA40 community to ensure all files are current and ready for transfer to new staff personnel. I ask that you be responsive to those requests so the operation of this office can continue to run effectively and efficiently. My staff will remain readily accessible to you even as personnel change. You are encouraged to keep the FA40 hotline number and e-mail address as primary references. Both are independent (not name dependent). The e-mail address is not subject to change or deletion; however, the phone number will change when the office departs DC. Those references are: (703) 602-1325/DSN 332 and FA40-Space@smdc.army.mil.

Tactical Space Tiger Team - Successes from the Field

Focus on 3rd Infantry Division Space Support Element

"I want Space operations involved in every offensive operation we do."
— COL Charlton, Division G3 first six months of rotation

"[The SSE] is right on the money, right between the curbs." [The SSE] is "a good and functional plug [to a division headquarter]."
— COL Burch, Chief of Staff

"I can't tell you how valuable this is [using commercial imagery to debrief EPWs]. It's worth its weight in gold."
— COL Grimes, Fires and Effects Coordination Cell Chief

By LTC Jim Rozzi, Bill Coffey and Bob Zaza

This is the first edition of the Tactical Space Tiger Team Successes from the Field column. The column's purpose is to inform readers of recent vignettes in which Army Space Forces, in particular Space Support Elements, solved planning or operational challenges. In addition, it provides comments from key leaders about Army Space Forces. This edition focuses on the 3rd Infantry Division (3ID) Space Support Element, the first element to be fielded in the Army, during its first rotation in Iraq as a modular headquarters. Future columns will focus on other units, so please note that similar challenges may generate different solutions depending on Mission, Enemy, Terrain, Troops Available, Time, and Civilian Considerations (METT-TC).

The process of developing Space Support Elements included an assessment of the ability of a Division Headquarters to perform Space tasks both with and without a Space Support Element. The baseline for comparison was the 1st Cavalry Division staff's performance of Space tasks prior to being fielded a Space Support Element. 1st Cavalry Division was able to perform 24 percent of Space tasks without a Space Support Element in Operation Iraqi Freedom 2, while 3rd Infantry Division performed 76 percent of them with a Space Support Element in Operation Iraqi Freedom 3. In Operation Iraqi Freedom 2, 1st Cavalry Division was able to conduct reachback to 34 percent of the available Space resources, while 3rd Infantry Division was able to conduct reachback to 81 percent of the available Space resources in Operation Iraqi Freedom 3.

3rd Infantry Division, Space Support Element Camp Victory, Baghdad, Iraq May 7, 2005

L to R: MAJ Cliff Hodges, PFC Orry W. Estelle (3rd Infantry Division Augmentee), SGT Jennifer Swift (Army Space Support Team Augmentee), SSG Ronnie Anglin, SGT Tobias Mitchell (Army Space Support Team Augmentee), MAJ Jim Rozzi. (Not pictured, LTC George Andary who was on full-time Liaison Officer duties to Multi-National Corps-Iraq.) *Courtesy photo*

Commercial Imagery

The SSE provided a "basic load" of commercial imagery, which they used to support the staff and subordinate units. The great value of having this basic load was speed of access and use. Commercial imagery was the SSE's second biggest area of support. US Cells supporting the Iraqi Security Forces were the main consumer. The SSE provided hard and soft copy in true color, mostly from Quickbird. The SSE maintained a good working relationship with the Geospatial Information and Services Cell, and got most of the updated unclassified imagery from the Strategic Command Measurements and Signatures Intelligence Advanced Geospatial Intelligence Node over the Space Application Technology User Reachback Node (SATURN); the SATURN's fast data transfer capability made it possible. Tactical Human Intelligence Teams used commercial imagery in debriefing enemy prisoners of war (EPWs) to enhance and expedite target development and precision engagement. The SSE also provided large amounts of commercial imagery, largely in hard copy, to Military Transition Teams.

Periodic Updates to Global Positioning System (GPS) Devices

All military GPS devices need to be updated annually for encryption and bi-annually for GPS timing (keeping in mind that some commercial GPS devices use military GPS components). These GPS device maintenance issues are typically coordinated through the G6 offices. Army Space forces support the planning of such updates to ensure that critical GPS applications and effects are not interrupted during critical operations. The SSE provided assessments and updates on FBCB2, MTS, MTX, Satellite Tracking System, TALON Reach, Precision Lightweight GPS Receiver, and Iridium Tracker to the Division G6 to enhance all activities reliant on GPS, including resolution of GPS electromagnetic interference issues.

Blue Force Tracking (BFT)

BFT was the main support effort for the 3ID SSE during its rotation. 3ID technically and operationally integrated over 1,000 Force XXI Battle Command Brigade and Below (FBCB2) (L-band) devices, as well as numerous Movement Tracking System (MTS), Grenadier Brat, Mini Transmitter (MTX), and MTX II devices. In taking charge of this key area in terms of both architecture and logistics, the SSE increased the Operational Readiness Rate of BFT devices from 57% to a steady 93%. The increase was largely due to the conversion of Enhanced Position Location Reporting System FBCB2 to L-band. The SSE worked with the Division G6 and PM FBCB2 to determine the right BFT architecture for 3ID. The SSE also developed Field Standing Operational Procedures to use the BFT "combat message" text capability to transmit emergency "911" messages to support Personnel Recovery and other combat operations.

The Tactical Space Tiger Team consists of LTC Jim Rozzi, Bill Coffey and Bob Zaza.

Rozzi is a Space Operations Officer with U.S. Army Space and Missile Defense Command's Future Warfare Center, and serves as the TACSPACE Tiger Team Trail Boss. He has served in numerous command and staff positions, including TACSPACE Tiger Team Chief, 3rd Infantry Division Space Support Element Deputy Team Chief, Army Space Program Office Advanced Plans and Fielding Officer, Combined Joint Task Force-180 Army Space Support Team Leader, and Combined Intelligence Watch Commander, Cheyenne Mountain Operations Center.

Coffey has been a member of the TACSPACE Tiger Team since February 2003 and has served in the Space and Missile Defense Battle Lab since 1993. A retired Army Military Intelligence Officer, he served in various tactical and strategic assignments to include 2nd and 4th Infantry Divisions, V Corps and Northern Command. He served in Iraq and Afghanistan in 2006 conducting assessments of Theater Space Operations. He is currently a Senior Space Operations Analyst with CAMBER Corporation.

Zaza has been a member of the TACSPACE Tiger Team since February 2005. An FA40 LTC in the Army Reserve, he has served in various leadership and staff positions, including Combined Joint Task Force-180 Army Space Support Team Leader; S-2, 4th Brigade, 4th Infantry Division; Observer/Controller, 1st Brigade, 91st Division; and Antiterrorism and Force Protection Officer, J2, U.S. Southern Command. He is currently a Senior Space Operations Analyst with CAMBER Corporation.

Former Secretary of Defense Donald Rumsfeld looks on as SPC Russell Smith of the 49th Missile Defense Battalion (GMD) briefs his duties as a weapons operator. *Photo courtesy 100th MDB (GMD)*

which would destroy an ICBM re-entry vehicle on collision. Three test failures were followed by a success in 1986, destroying a Minuteman re-entry vehicle with a closing speed of about 6.1 km/s at an altitude of more than 160 km. The technology was absorbed into the Strategic Defense Initiative, next step in the developmental chronology.

President Ronald Reagan was the driving force behind SDI, which quickly became known as "Star Wars." In response to Soviet first-strike capability, Reagan proposed a robust, multi-tiered system that would defend against an all-out attack, versus the limited scope of earlier programs. SDI involved Space-based laser battle stations, X-ray laser satellites and extremely sophisticated command and control systems.

Political debate waxed furious — with detractors questioning the program's feasibility and whether the concept was strategically sound. SDI advocates prevailed, and, in 1984, the project was funded. The fall of the USSR, signaling the end of the Cold War, effectively removed the enemy the system was designed against, and momentum for progress in the ballistic missile defense arena collapsed.

The end of the Cold War, initially hailed as ushering in an era of lasting peace, soon devolved into rising fear of terrorism and rogue states that moved into the 'threat status' left vacant with the demise of the USSR. Uncertainty about the security of existing nuclear missile stocks and increasingly developed technology that made "suitcase bombs" a possibility created an entire new playing field in the 1990s and early 21st century. Missile defense goals of that time period segued into preventing the United States from being subjected to nuclear blackmail or terrorism.

The first Persian Gulf War and the success, although limited, of Patriot missiles bringing down Scuds renewed interest in the "hitting a bullet with a bullet" concept. President Bill Clinton gave qualified support to continued development of such a system, saying in September, 2000, "an extra dimension of insurance in a world where proliferation has complicated the task of preserving the peace."

Funding and emphasis, however, lagged, and development proceeded at a commensurate pace.

Then came the horrific events of Sept. 11, 2001, which, with a new "day of infamy," proved conclusively to this generation of Americans that they too can be attacked on their home soil.

A presidential directive issued in December of 2002 by President George W. Bush required the nation to rapidly field a missile defense system. The directive, a direct response to the events of Sept. 11, effectively sped up the process for a system in development since the 1990s, but with roots in the "Star Wars" initiative of the Reagan years.

The system, now named the Ground-based Midcourse Defense System, is part of a concept of layered Ballistic Missile Defense, the latter which will eventually target threat missiles in all stages of their trajectory. The GMD portion of the system is aimed at destroying incoming missiles in Space during the midcourse of their flight, with an Exo-Atmospheric Kill Vehicle using non-nuclear kinetic warheads. The system is considered to be in "spiral development," deployed while simultaneously being tested and improved.

On June 15, 2002, ground was broken for the

The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) is a tethered aerostat equipped with a sensor suite which includes surveillance radar and precision track and illumination radar. From its position above the battlefield, it provides detection and tracking capability of incoming cruise missiles allowing them to be engaged by surface-based air defense systems even before the targets can be seen by the system. The JLENS achieved the first live, over-the-horizon engagement using an elevated platform on April 4, 2000. The Forward Pass demonstration, which proved the joint interoperability of the system, also saw the first handover of a missile flight to an external radar to intercept a low-flying target. Image *Courtesy SMDC Historical Office*

Missile Defense Complex at Fort Greely, Alaska — home to future interceptors. The post was brought back from near extinction after a base realignment and closure. A small group of Soldiers began training on the system in Colorado Springs, Colorado, future location of the 100th Missile Defense Brigade (GMD).

A successful intercept was achieved by a ground based interceptor launched from the Ronald Reagan Ballistic Missile Defense Site in October 2002. It destroyed a mock warhead 225 km above the Pacific.

On Oct. 16, 2003, an activation ceremony was held at Peterson Air Force Base, Colorado Springs, Colorado that 'stood-up' the 100th. The brigade is staffed largely by active Colorado National Guardsmen in their time-honored role of defending the homeland. A nationwide hiring search drew the best qualified Soldiers from across America, who then became Colorado Guardsmen and women. A small contingent of Active Duty Soldiers makes the unit multi-component.

On Jan. 22, 2004, the 49th Missile Defense Battalion (GMD) was activated at Fort Greely. The battalion is completely staffed by Alaska National Guardsmen, hired in a similar nationwide search.

On July 22, 2004, the first interceptor was emplaced at Fort Greely, and on Dec. 10, 2004, an interceptor was emplaced at Vandenberg Air Force Base, Calif. — the first for this location, which would be primarily used for testing.

Since 2002, the U.S. has been discussing the possibility of building a third missile site in Europe, which would enable defense against different missile trajectories than those provided by Alaska and California. Talks are, today, ongoing.

Two failed interceptor tests, in 2004 and 2005, were due to anomalies and support malfunctions, rather than the concept or main technology of the system. The failures fueled detractors of the program, who are legion, as was historically the case with all such systems.

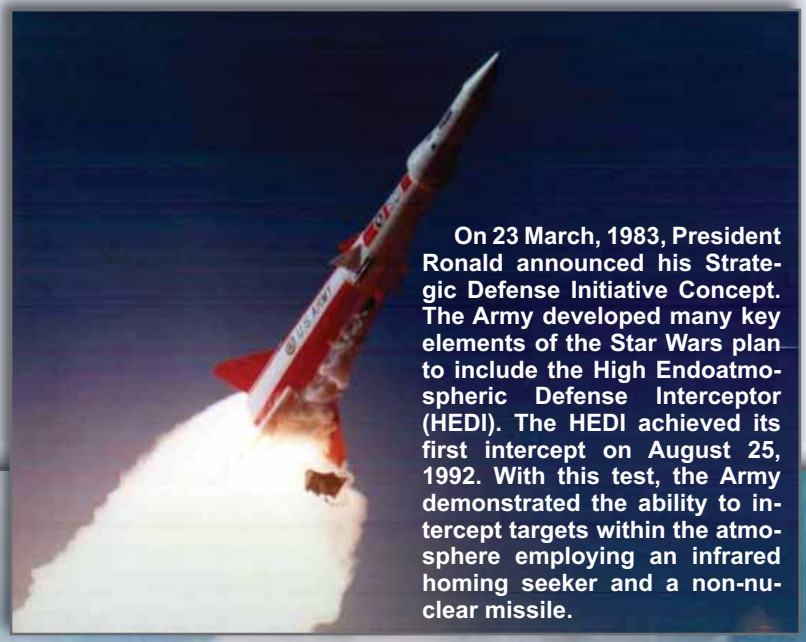
The summer of 2006 was fraught with high-level political tension, as North Korea advertised their plan to test a long-range ballistic missile, in defiance of world opinion. In July, the ground-based midcourse system was brought to full operational status in response. The Korean launch of July 4 failed, but the Soldiers and interceptors of the nation's missile defense system were ready to perform as they had been trained and designed to do.

On Sept. 1, 2006, an interceptor launched from the California site successfully intercepted and destroyed a target launched from Kodiak, Alaska.

The future of Ballistic Missile Defense will/may include the integration of sea-based, Space-based, laser and high altitude missile systems. Each military service has a role in its deployment, from satellites and radars, through the sea-based Aegis Ballistic Missile Defense System. The current limited defensive capability of the Ground-based Midcourse Defense System is a beginning…

Today, the 100th Missile Defense Brigade (GMD) stands ready, proud and able to defend the United States against ballistic missile attacks.

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



On 23 March, 1983, President Ronald announced his Strategic Defense Initiative Concept. The Army developed many key elements of the Star Wars plan to include the High Endoatmospheric Defense Interceptor (HEDI). The HEDI achieved its first intercept on August 25, 1992. With this test, the Army demonstrated the ability to intercept targets within the atmosphere employing an infrared homing seeker and a non-nuclear missile.

On September 28, 1975, the Stanley R. Mickelsen SAFEGUARD Complex reached full operating capability with the deployment of 30 SPARTAN and 70 SPRINT missiles. The SPRINT was a short-range, nuclear-tipped, interceptor designed to provide terminal defense on any azimuth. The SPRINT presents significant accomplishments in valve technology, propellant, heat shields, shock proofing and hardening.

Above, the SAFEGUARD System constructed near Grand Forks, N.D., the only deployed antiballistic missile system in the Western World, also included two radars — the Perimeter Acquisition Radar and the Missile Site Radar (MSR). The pyramid shaped MSR served many functions to include surveillance and limited discrimination, re-entry target tracking, and track and command guidance to the SPRINT and SPARTAN missiles. With the ratification of the Anti-Ballistic Missile Treaty, Congress ordered the deactivation of the Safeguard Complex. It closed in February 1976 after being operational for less than four months. *Images Courtesy SMDC Historical Office*

Right, missile defense system operators continually train on the ground-based midcourse defense system, maintaining a high level of proficiency on the system designed to protect the United States. *Photo courtesy 100th MDB (GMD)*

On the cover, clockwise from top left, The Homing Overlay Experiment consisted of a series of four missile intercept tests conducted in 1983 and 1984 at Kwajalein Missile Range, in the Marshall Islands. The HOE tests proved that it was literally possible to hit "a bullet with a bullet." The radial net of the HOE would unfurl like the spokes of an umbrella to destroy the incoming warhead. The first such intercept of an Intercontinental Ballistic Missile in the exoatmosphere using only kinetic energy occurred on June 10, 1984. The Homing Overlay Experiment (HOE) was designed to destroy an incoming warhead by direct impact versus detonation.

The Army began to address national missile defense in the 1950's with the NIKE-ZEUS project. The Zeus Acquisition Radar (ZAR), the first track-while-scan radar, was but one element of this intricate network of seven radars and the ZEUS interceptor. In addition to the ZAR, the system included two Target Track Radars, a Discrimination Radar, and three Missile Track Radars. *Images Courtesy SMDC Historical Office*

The first ground-based interceptor, a multi-stage silo-launched booster rocket and kill vehicle that will track and destroy high-speed ballistic missiles in their midcourse phase, is emplaced at Fort Greely, Alaska July 22, 2004. *Photo courtesy 100th MDB (GMD)*

Defending the Homeland

Path of missile defense development full of ups and downs

By MAJ Laura Kenney

The missile blasting triumphantly out of the silo that foggy September morning in 2006, to soon even more resoundingly meet and destroy a target at over 100 miles measured straight up, symbolized a defining and culminating moment in the history of missile defense. Such a moment will only be eclipsed with a future actual usage of the system for the purpose for which it's intended — destroying a ballistic missile aimed at the United States of America. The path to the September victory, from the earliest beginnings of missile defense theory and nascent practice, to the technological marvel represented by the "hitting a bullet with a bullet" flight test has been a rocky one...

The need for an anti-missile system originated during World War II with the success of Germany's short range ballistic missiles against London and Antwerp. The threat posed by longer range missiles became a reality in the 1950s with the development of accurate guidance systems and nuclear warheads. The necessity to combat these lethal, distance-ranging missiles gave birth to anti-ballistic missile research and development programs.

The 1960s saw the Union of Soviet Socialist Republic and the U.S. testing aspects of defensive systems, which were armed with nuclear warheads and directed by elaborate radar networks.

Enormous technical challenges of the day were coupled with political minefields. A debate raged between a requirement for national defense against perceived antagonists and the opposite position that an arms race of any kind, including defensive, increased the odds of a disastrous confrontation.

The first anti-ballistic missile system to emerge from the technological and political turmoil was the Nike-Zeus system. Elements of the system performed impressively in individual tests, but an overall consensus emerged declaring the system to be impractical, due to its inability to discriminate between decoys and an actual threat, and other limitations such as where it could engage a target and how many separate targets could be tracked simultaneously. The project was cancelled in 1961.

The next system to step up to the plate was Project Defender, featuring missiles to be launched from platforms orbiting directly over the USSR. In response to fears raised over consequences attendant upon exploding nuclear warheads over friendly territory, this system would deploy huge wire meshes intended to disable Soviets ICBMs in the early launch phase. Difficulties surrounding the protection of the orbiting platforms scuttled the program in 1968.

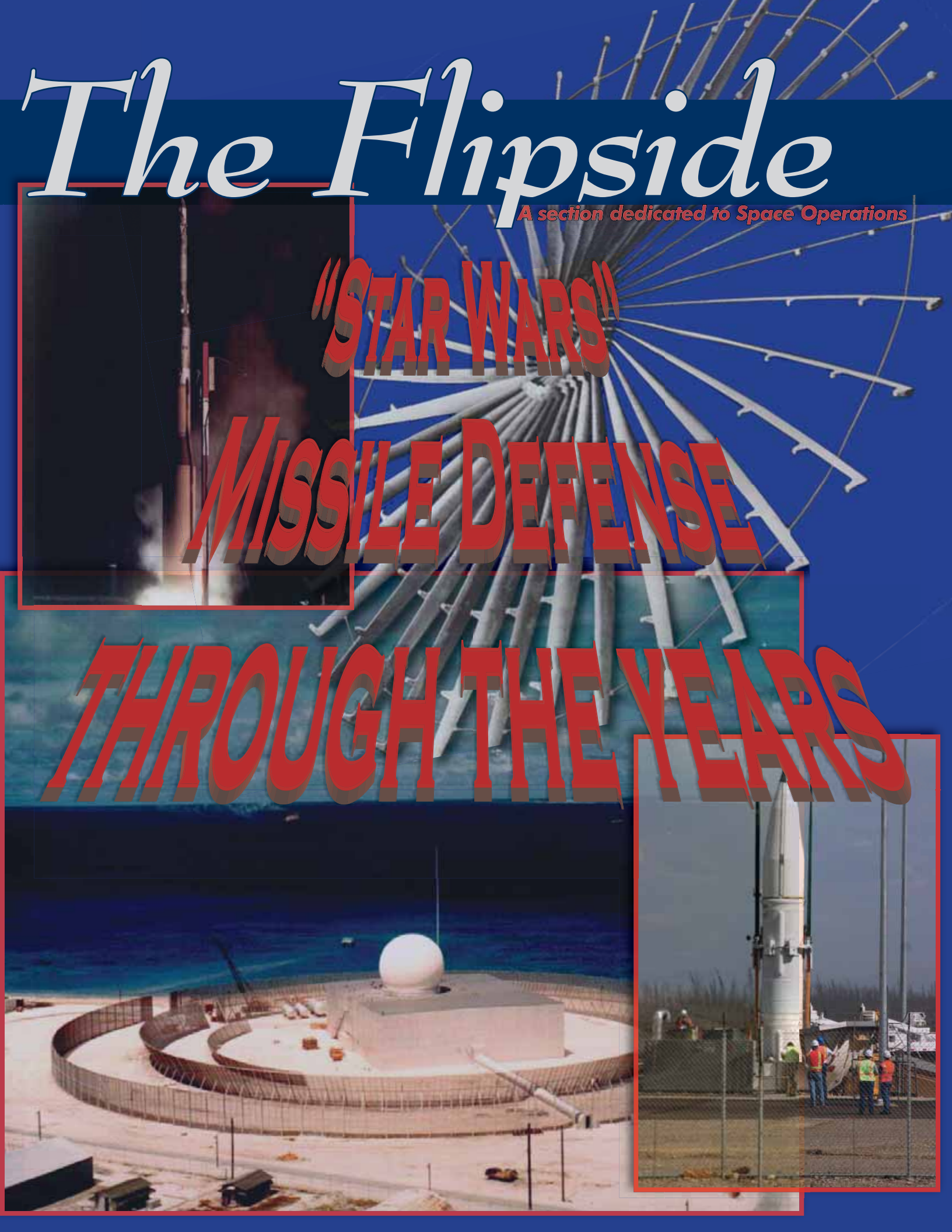
Sentinel followed, with a goal of providing a defense against a limited nuclear strike, such as might be launched by the People's Republic of China. Politics and limited technology caused then-President Richard Nixon to freeze pending deployment of the system in 1969.

The Safeguard Program earned the distinction of being the only missile defense system actually to deploy and become operational, until the advent of today's Ground-based Midcourse Defense System. A scaled-down version of Sentinel, it was designed to defend U.S. ICBM sites against attack, rather than cities. It became operational in 1975, and was shut down in 1976, based on the vulnerability of its radars.

Concerns about using nuclear-tipped interceptors led to the development of a radically different concept embodied in the Homing Overlay Experiment. Instead of a nuclear explosion destroying an incoming missile, a Kinetic Kill Vehicle was designed to extend a structure similar to an umbrella skeleton

The Flipside

A section dedicated to Space Operations



"Star Wars" Missile Defense Through the Years