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An Evolution of Space Support

We are in an era of persistent conflict operating in a contested domain – Space. Comments from the 2008 Allard Commission (see box on page __) highlight the importance of that domain to the Nation and our military. As Space professionals we have long recognized the validity of Space, and have endeavored to provide the leadership and stewardship of our particular lanes in the Space business and will continue to do so.

One of those lanes is how the Army Space community, in concert with the other services and the industrial base, is going to support and provide the Space systems, doctrine and techniques, tactics, and procedures to the Army's Future Combat System. This System is a Space-enabled capability that is highly reliant on assured access to those supporting Space capabilities for mission success. As the Army continues to develop and field the Future Combat System, the amount and specifics of the Space support for that system of systems will continue to evolve. So as Space professionals, we need to stay engaged.

Looking at our past, evaluating our present, and looking toward our future, sets an azimuth on our way-ahead for providing world-class Space-based capabilities to the warfighter.

Past to present (2001 to now)

When planes flew into the World Trade Center, then-Army Space Command (ARSPACE) had five Army Space Support Teams aligned in habitual relationships with operational organizations. In 2002 as U.S. Army Space and Missile Defense Command and ARSPACE developed supporting plans, along with the rest of the Army, to invade Iraq, requests for Army Space Support Teams soon claimed all the available Active Army, Army National Guard and U.S. Army Reserve teams. To provide additional teams to meet the demand, the command battle-rostered all of its Space Operations Officers (FA40), intelligence officers and supporting noncommissioned officers (some which came from the Army at large). ARSPACE met the challenge.

In 2001 the Commercial Exploitation Team was a deployable capability of the then-Spectral Operations Resource Center. Because of its deployable status, it was assigned to the 1st Space Brigade and forward-deployed. Early in the conflict, the Commercial Exploitation Team tried to “e-mail” imagery and send compact discs to Army Space Support Teams. One image was typically 500MB. Through the 2003 - 2004 NIPR/SIPR connections, transmission of just one scene could well exceed a 1-hour transmission time. Multiple scenes were routinely requested, which turned into gigabytes of information and resulted in hours of transmission time and usually ended up in a system “time out” error long before the transmission was successful. The U.S. Army Space and Missile Defense Command/Army Space Command, Command Information Office was routinely contacted regarding transmission limitations and came up with the “Band-Aid” fix of dedicated FTP (file transfer protocol) servers. The Commercial Exploitation Team was later upgraded with a link to Digital Globe for Quickbird imagery. Since 2004, the Commercial Exploitation Team and its Eagle Vision II shelter have been in Bahrain partnering with National Geospatial-Intelligence Agency's Middle East Team to provide needed support to warfighters.¹ See summer 2008 edition for the evolution of the Commercial Exploitation Team.

At that time, the Department of Defense blue force tracking capabilities were still in the study/experimental stages. Immediately following Sept. 11, Commander, U.S. Space Command, ordered its Army Service Component

The following comments from the 2008 Allard Commission highlight the importance of Space to the Nation and our military:

- “Space capabilities underpin U.S. economic, scientific and military leadership. The Space enterprise is embedded in the fabric of our Nation’s economy, providing technological leadership and sustainment of the industrial base.”
- “The military use of Space-based capabilities is becoming increasingly sophisticated ... [and pervasive].”
- “Military capabilities at all levels – strategic, operational and tactical – increasingly rely on the availability of Space-based capabilities.”
- “...continued leadership in Space is a vital national interest that merits strong national leadership and careful stewardship.”



Command to stand up a capability to provide blue force tracking data services to U.S. Central Command within 30 days. The Army Service Component Command, then-ARSPACE, operationalized its experimental Blue Force Tracking Mission Management Center and manned it with internal staff, U.S. Space Command J33 staff, and mobilized National Guard noncommissioned officers. It was operational on October 23, 2001. During that initial phase of the Global War on Terrorism, it provided blue force tracking data services to only one type of device. It now supports multiple devices, classified and unclassified. The Command has continued to grow its ability to support ever expanding requirements for blue force tracking and situational awareness levied on U.S. Strategic Command to support the joint, inter-agency and multinational communities.

In 2001, Space Support Elements didn't exist. The Army began training, fielding, and assigning these Elements to the Army corps, divisions, and fires brigades starting in Fiscal Year 2004. The Element is “first and foremost a planning agent providing recommendations, coordinating space-based products and services, and preparing space input to plans and orders.” The 3rd Infantry Division received the first team of Space-savvy planners in late 2004.

Since 2001 providing Space-based capabilities and support to ground-based commanders has evolved and grown. Field Manual 3-14 (Space Support to Army Operations, May 2005) lists five Space force enhancement functions: satellite communications; positioning, navigation and timing; environmental monitoring; intelligence, surveillance and reconnaissance; and missile warning as Space operations core competencies. Joint Publication 3-14 “Space Operations” dated Jan. 6, 2009, examines those functions.

This evolution includes Space control, which ensures freedom of action in Space for friendly forces, and when directed, denies an adversary the same. In accordance with the recently released Joint Publication 3-4, Space control now consists of Offensive Space Control, Defensive Space

Control and Space Situational Awareness. Prevention, Negation, Protection and Surveillance remain pillars of Space control.

Coming – Support to Future Combat System

Today, we are providing Space support to the warfighter. Space now enables what will become the legacy systems. At the same time the Army is evolving and transforming to the Future Combat System which is enabled by Space-based systems.

The Future Combat System is a system of systems program with equipment, like sensors and unmanned aerial vehicles, and lighter rolling stock designed to make the Army more mobile and expeditionary. Fielding for the first full Future Combat System brigade is slated for fiscal year 2015. It consists of 14 systems, a network and the Soldier. And all of these systems are networked by the Army's portion of the Global Information Grid, called LandWarNet. Under the LandWarNet umbrella, all Future Combat System vehicles beyond-line-of-sight will be connected by Warfighter Information Network-Tactical (WIN-T).

Commanders can mix and match the systems to meet their need and maintain command and control through WIN-T. “FCS gets its lethality from the ability to move information around rapidly to understand where the enemy is and then engage the enemy at a distance” — to see first, understand first, act first and finish decisively.

The WIN-T network has been developed to support a more mobile, expeditionary Army by providing more network robustness and through-put capacity than the legacy Mobile Subscriber Equipment could. This new communications architecture was designed to move with the Future Combat System formations by allowing the user to switch between satellite communications, aerial relays and line-of-sight communications to best extend the communications range and to stay in communication with the rest of the formation.

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Where do we go from here?

According to the National Weather Service, since 1851 there is an average of two major hurricanes that hit the Gulf or the Atlantic Coast every three years.⁶ If history is a guide, we can anticipate two things: there will be a Category 3 hurricane again within the next 12-18 months and the Army will be there to provide support to relief operations. We cannot influence the first possibility, but we can certainly begin planning for the second. We can assume there will be damage and we can assume there will be a need to provide accurate damage assessments.

The old adage of “train like we fight” needs to apply to disaster relief as well. In order to improve operations and to establish a habitual relationship with Army North, Army Space Support Team 3 trained with the Army North Operational Command Post during exercise Vigilant Shield 09, which took place at Fort Sam Houston, Texas, in November 2008. Historically, Army Space support to Defense Support to Civil Authorities has been low. Habitual support relationships and tactics, techniques, and procedures will need to be established.

We must continue to be proactive in preparing for the next disaster and incorporate the lessons learned in order to include Army Space Support Teams’ unique capabilities into disaster relief operations planning and training.

As I mentioned at the start, I would like to see those Space professionals who supported disaster relief operations to provide articles that discuss tactics, techniques and procedures. Tell us what worked and what didn’t work during your deployment. Only by sharing information can we improve. 

1 Homeland Security Council, National Strategy for Homeland Security, October 2007, 10

2 Lynda E. Davis, Jill Rough, et al, Rand Corp, Hurricane Katrina Lessons for Army Planning and Operations, 2

3 The Great Chicago Fire, Rescue and Relief Essay, (<http://www.chicagohs.org/fire/rescue/>)

4 GAO Report to Congressional Committees, Hurricane Katrina: Better Plans and Exercises Needed to Guide the Military’s Response to Catastrophic Natural Disasters, May 2006, 11. A copy of the Stafford Act is available at <http://www.fema.gov/about/stafact.shtm>

5 GAO Report to the Chairman, Subcommittee on Readiness, Committee on Armed Services, House of Representatives, Disaster Assistance: DOD’s Support for Hurricane Andrew and Iniki and Typhoon Omar, June 1993, 6

6 Eric S. Blake, et al, National Weather Service, The Deadliest, Costliest, and Most Intense United States Tropical Cyclones from 1851 to 2006, April 2007, 13 (a major hurricane is one that is Category 3 or greater).

Even though fielding for the first full Future Combat System brigade is slated for fiscal year 2015, a few of the systems or spin-off technologies have already been fielded: small UGV (unmanned guided vehicle), several unattended ground sensors and an Unmanned Aircraft System. In fact, 2nd Brigade, 25 Infantry Division took 30 of the Class I Unmanned Aerial Vehicles (gasoline-powered Micro Air Vehicle) with them to Iraq last summer in response to an joint operational needs statement asking for more intelligence, surveillance and reconnaissance assets. And the Pennsylvania National Guard’s 56th Stryker Brigade Combat Team will deploy to Iraq in January 2009 with 15 of the Unmanned Aerial Vehicles. (This is the first Guard unit to use one of these unmanned vehicles.) This particular system is man-portable and has the capability to hover and stare which other Army and Air Force Unmanned Aerial Vehicles don’t.

Overall, Space-based capabilities are critical enablers of the Future Combat System’s fundamental operational maneuver principles: to see first, understand first, act first and finish decisively. For example, all that the mobile equipment will use the Global Positioning System for is position and navigation. The Battle Command network will need satellite communication to provide secure, reliable access to distribute information over extended distances throughout the Global Information Grid over open or complex terrain. Information from the unattended ground sensors/data, which the Future Combat System depends on, will be exfiltrated using Space-based communications. Commanders and staffs of the Future Combat System will team collaboratively and virtually with other elements through a global Battle Command network linking the Future Combat System Brigade Combat Team to higher headquarters and joint, inter-agency and multi-national community assets and organizations. Information must be current, near real time. In all, to be successful, this family of systems will be required to acquire, access, and disseminate relevant and accurate information at requisite levels of detail over the area of operation, regardless of how large the area.

A lot of electrons will need to move around the battlespace. The network that handles all this information will require robust bandwidth and redundant systems. The network disseminating the electrons will likely consist of multiple tiers or layers, including terrestrial, airborne, high altitude and Space. Ground force commanders will depend on assured access to the network, and will expect appropriate doctrine to be written to support the land component commanders.

Today’s Army priorities for Space (enhanced satellite communications; early missile warning; assured access and asset protection; persistent surveillance; position, navigation, timing; and weather, terrain, and environmental monitoring) support the Future Combat System needs.

This is where Space operations and USASMDC/ARSTRAT come in as both the Army's proponent for Space and as a combat developer of "Space" equipment.

As the proponent for Space, USASMDC/ARSTRAT fully supported the action to create a billet and assign a Space Operations Officer to the Future Force Integration Directorate which is Program Manager for the Future Combat System. The officer will be fully engaged as the first System Brigade Combat Team goes through its initial operational test and evaluation beginning during the 3rd quarter, fiscal year 2011. He will be in a position to ensure that current Space-based and high altitude capabilities – so essential for the Future Combat System Brigade Combat Team mission success – are accessible.

As the proponent for Space, USASMDC/ARSTRAT acts as the Army's advocate for Space capabilities. Since many Army organizations have significant stakes in what Space-based capabilities deliver, the proponent coordinates with the other stakeholders (Headquarters Department of Army, Command Information Operations/G6, G3/5/7, G2, USA Network Command, U.S. Army Intelligence and Security Command, Assistant Secretary of the Army (Acquisitions, Logistics and Technology), and U.S. Training and Doctrine Command, to ensure that the Army's requirements are met and that the Army leadership speaks with one voice:

For example, WIN-T (Increment 4) will be required if the Future Combat System is to communicate with the legacy systems. According to the WIN-T (Increment 4) Acquisition Decision Memorandum, that increment is dependent on the capabilities the Transformational Satellite will deliver. It is the only satellite being specifically designed for high data rate, protected (anti-jam and anti-sciintillation), networked, communications to mobile, on-the-move, ground forces. Clearly, the Army requires the Transformational Satellite to meet the needs of the Future Combat System, but the Transformational Satellite launch continues to slip. The Army Vice Chief of Staff, Department of the Army Command Information Office/G6, and USASMDC/ARSTRAT have been fully engaged with Air Force Space Command, the developer, to ensure that the capabilities on the satellite that support Future Combat Systems will continue to be a major consideration in any redesign or further launch slippage. Point is: the Army community needs to maintain one-voice in all forums for capabilities supporting Future Combat Systems.

In an environment of constrained resources, like the one affecting Transformational Satellite, where it is unlikely that all the original requirements can be met, Space professionals will look for "trade Space" or alternative solutions. That is, if a system cannot now provide one of the capabilities it was designed for within the appropriate time frame, can some other requirement be slipped to a subsequent spiral out or build of the system? Can another system provide the capability in the interim? What is in the realm of possibility so that the needs of the ground commanders are met?

Maybe those needs can be met by an apparatus in the high altitude domain. In accordance with The Army Space Master Plan, the combat developer of Army Space systems (USASMDC/ARSTRAT) is working to develop capabilities in that domain. High Altitude systems allow persistent sensor coverage, permit changing sensor loads and payloads, and allow developmental spirals to increase capability. Although High Altitude systems cannot replace Space systems, they can augment them. The multi-altitude or multi-domain solutions can maximize effectiveness of the Future Combat System by providing an option of increased capability along with redundancy. Space-only solutions become unaffordable for some critical capabilities.

Another effort that USASMDC/ARSTRAT is concentrating on is the Responsive Space Initiative. This initiative is focused on providing Space and high altitude capabilities that can, as the name implies, rapidly respond to the joint and ground-based warfighters' emergent needs. The objectives of the initiative are threefold: to demonstrate that it is possible to develop new capabilities to meet Warfighter needs within 9-12 months; to demonstrate that small-satellite class Space vehicles can provide meaningful effects to the Warfighter; and to demonstrate that a level of persistence over a specific region for a specific purpose is feasible using small-satellite formations. USASMDC/ARSTRAT and its industry partners are in the process of developing and building small satellite Space vehicles and believe low-cost small satellites will satisfy warfighter needs for beyond-line-of-sight communications as well as other requirements.

Conclusion

As I said in the opening paragraph, we are in an era of persistent conflict operating in a contested domain. Even as we expect to be combating terrorism for the foreseeable future, we need to continue to think about and work toward capabilities the Army will need for the next conflict. The Army is banking on the Future Combat System to be that capability, and it will continue to evolve. It is one of those systems that the Allard Commission must have had in mind when it wrote "The military use of Space-based capabilities is becoming increasingly sophisticated" and reliant on them.

As Space professionals, we need to understand the Army's Space priorities and speak with one voice as we engage the Space professionals and combat developers in the other Services to advocate Army requirements and look for the "trade Space"/alternatives in a constrained environment. We then will provide, as we have in the past, strong leadership and stewardship within our particular lanes in the Space business.

Future Combat Systems will continue to evolve and spin out. One day the Space systems, Space operations doctrine; and tactics, techniques and procedures provided to enable it will take their places alongside the list of evolutionary developments in Space operations since Sept. 11. 

| Army Space Journal, 2008 Summer Edition, pg 45