



Space Support Elements: Embedded Space Expertise in Army Modular Forces

The Army's Future Force, serving as part of the Joint Force, will be adaptable and lethal, leveraging the extraordinary capabilities of space. Army Modular Forces will routinely exploit the overhead constellations of national, commercial and military space and near-space platforms. They will rely on knowledge-based networks that are vertically and horizontally integrated from strategic to tactical levels. Warfighters will have access to near real-time actionable intelligence, terrestrial and space-based sensors, focused surveillance, wide-band satellite communications, missile early warning, weather/terrain/environmental monitoring, and space control capabilities. To a great degree, space-based systems will deliver these capabilities.

One of the steps to "operationalize space" into the Future Force, as part of the Army's Current to Future Force strategy, is establishment of an organic Space Support Element (SSE) in each of the Army Modular Forces headquarters. Notably, this action furthers the Army's integration of space capabilities and operations into planning, exercises, training and all phases of combat operations. The SSE, as part of a joint theater space architecture, will become the focal point for maximizing space-related capabilities to operate as part of the full-spectrum Joint and Interagency Team.

Doctrine

The genesis of the Army's embedded space forces began in November 2004 with the U.S.

Army Training and Doctrine Command's (TRADOC's) publication of the *Army Comprehensive Guide to Modularity*. TRADOC Pamphlet 525-3-14 (*Concept for Space Operations in Support of the Objective Force*), Army Field Manual 3-14 (*Space Support to Army Operations*) and the emerging *Space Operations Concept Capability Plan* established the concepts, doctrine and conditions for further development and refinement of embedded space force organizations. The Space Operations Tactics, Techniques, and Procedures (TTP) for the Army's Modular Forces are being refined to portray space operation successes in support of the Global War on Terrorism. An ongoing data collection and analysis effort by the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT) regarding space operations in support of current combat operations is being used to shape and develop doctrine, training, materiel and TTPs.

The SSEs will ensure the vertical extension of the battlespace is fully and seamlessly integrated as the battlefield becomes disparate, noncontiguous and distributed. This increasingly noncontiguous nature of the battlefield is consistent with the evolving concepts and operational framework of how Army Modular Forces must operate. Terrestrial systems alone cannot sustain and empower full-spectrum dominance; the establishment of SSEs and assignment of organic Space Operations

Officers (SOO) to Fires Brigades will ensure space and space-related capabilities and effects support Joint Warfighters while mitigating friendly forces' space vulnerabilities.

Organization

An organic SSE will be established as a specialized staff activity in the G3 section in the headquarters of each of the active and reserve component Army Modular Forces at division, corps and army levels. The SSE will provide the requisite expertise, reachback and enabling technologies to plan, coordinate and integrate space operations by ensuring the staff and subordinate units are capable of fully accessing and exploiting all space capabilities. The SSE will additionally coordinate with the in-theater Space Coordinating Authority (also referred to as the Joint Director of Space Forces) and the Joint Space Operations Center to ensure there is a team effort when it comes to harnessing space capabilities.

Through extensive experimentation and modeling, and with real-world manning constraints imposed, a four-Soldier SSE—two SOOs and two noncommissioned officers (NCOs)—was established as the objective baseline for all divisions. At the corps level, a five-Soldier SSE (three SOOs and two NCOs) was established. For future army-level headquarters, a six-Soldier SSE (five SOOs and one NCO) is planned. One SOO major is envisioned to support each of the 12 (six active and six reserve component) Fires Brigades.

In all, 27 SSEs (19 active Army and eight Army Reserve/Army National Guard) will be activated and SOOs will be embedded within each of the 12 Fires Brigades. As of Fall 2005, five active SSEs—3d Infantry Division, 10th Mountain Division, 101st Airborne Division (Air Assault), 4th Infantry Division (4th ID) and 1st Cavalry Division—have been activated and manned and one Fires Brigade in the 4th ID has been activated. The current SOO population in the active component, from which the requisite SSE Fires

Brigade officers are derived, is approximately 150 officers. The SSE NCOs hold the 25S (Satellite Communication Systems Operator/Maintainer) Military Occupational Specialty.

Training

The core competencies of the SSE primarily reside with the space expertise provided by each SOO. Each Career Field Designated Functional Area 40 (FA40) SOO attends the SOO Qualification Course, an 11-week introduction and overview of space systems and both joint and Army space operations. The six-week Tactical Space Operations Course, which includes four weeks of training on the Space Support Enhancement Toolset (SSET) and two weeks of doctrine and TTP training, will support initial and sustainment training of SSE Soldiers and Fires Brigade SOOs.

Leadership education of the Army's embedded space forces will be further enhanced with the annual FA40 Training Conference, a quarterly Tactical Space Warfighting Conference, development of additional computer-based training modules hosted on the Army Learning Management System, Army Knowledge Online Officer Professional Development lessons, and the USASMDC/ARSTRAT online reference library. Additionally each SOO has access to the Space Operations Network (SONET), which provides the SOO with a knowledge management system focused on space support to the Army.

Materiel

Reachback, space analysis and, to a limited extent, the production of space products are supported by an SSET coupled with the appropriate software applications. The mounted variant of the SSET is configured on an M1097 High-Mobility Multipurpose Wheeled Vehicle with a Rigid Walled Shelter. Within the shelter are four Space Operations System (SOS) workstations and a robust high-bandwidth secure satellite communications capability. The dismounted variant of the SSET—SSET (Dismounted)—includes four

SOS workstations and a commercial satellite communications suite, configured in ruggedized transit cases. Each SOS workstation includes a suite of software applications that provides reachback capability, space analysis tools and a limited capability to produce space-related products. Each Fires Brigade SOO receives one SOS workstation.

Space Support to Garrison (Phases I and II) Operations

To date, SSEs in garrison have provided significant support to their respective staffs and subordinate units (Brigade Combat Teams) as these headquarters prepare for combat deployments. This support, although spread across all staff sections, is concentrated primarily in the G2, G3 and G6 sections. Examples of real-world SSE support to their staffs and subordinate units include but are not limited to:

G2 (Intelligence):

- coordinated the development of commercial satellite imagery “basic loads” for use by the G2 section. These “basic loads” included 1 meter and sub-1 meter imagery for their areas of responsibility. The total basic loads range from 200 to 270 gigabytes of satellite imagery;
- developed standard processes, division of labor, file formats and imagery working groups to rapidly develop customized and relevant imagery products for all staff sections;
- supported the acquisition of software licenses and associated operator training of specialized National Geospatial-Intelligence Agency imagery software that retrieves and processes National Technical Means imagery; and
- provided coordination and planning support for the integration of a newly emerged unique intelligence broadcast capability into division intelligence operations.

G3 (Operations):

- provided space architectural expertise to support the operational integration of all divisional Blue Force Tracking (BFT)

capabilities into Common Operational Pictures (COPs). This support included coordination with the Joint Blue Force Situational Awareness Mission Management Center, multiple BFT Program Managers and a significant amount of education regarding the space-based aspects (capabilities, limitations, reporting latency, cost-benefit analysis and vulnerabilities) of each BFT capability;

- developed Standard Operating Procedures (“battle drills”) and integration capabilities for Personnel Recovery missions (Combat Search and Rescue, downed pilots and missing Soldiers) involving space-based BFT capabilities, e.g., Combat Survivor Evader Locator, Miniature Transmitter, Grenadier BRAT (Beyond Line-of-Sight Reporting and Tracking) and Force XXI Battle Command Brigade and Below (FBCB2);
- supported the development and dissemination of imagery maps for current training and operations, to include the acquisition of recently collected unclassified commercial satellite imagery to support Department of Homeland Security missions in support of Joint Task Force Katrina; and
- developed TTPs to access and exploit their command’s use of Overhead Non-Imaging Infrared capabilities to provide definitive discrimination on the detection, location, and identification of specific tactical Infrared events.

G6 (Information):

- supported the coordination for specialized satellite communications operator training and commissioning of satellite terminals by leveraging the expertise of USASMDC/ARSTRAT’s Extremely High Frequency Network Operations Manager;
- supported the development of real-world space and space-related data feeds into the Global Command and Control System COP architecture; and

- assisted G6 NCOs with specialized satellite coordination and request processes to Regional SATCOM Support Centers.

Space Support to Combat Operations in Iraq and Afghanistan

Data collection and analysis regarding space operations have been continuous since the commencement of planning for combat operations in Afghanistan and Iraq. Considerable data have been collected on how space-based capabilities support tactical space forces in both theaters. Additional information will be collected as SSEs deploy with their units. Tactical- and operational-level space forces have successfully supported their staffs and subordinate units in four primary areas:

- **Space Education.** Perhaps the most significant area of support to date has been the type and amount of space-related leadership education provided. Much of this support is accomplished on a “face- to-face” basis and includes considerable information on how space can support combat operations.
- **Theater and Global Reach to Space Forces and Space Analysis Centers.** Another significant area of support to date relates to the space force’s knowledge of and ability to fully access space forces, organizations and operations centers to leverage existing and ongoing space products and analysis. The collaboration among all space forces throughout the world allows timely sharing of space products, analysis and reports to support commanders and staffs.
- **Space Support to National and Commercial Imagery.** Access to and exploitation of existing imagery from Imagery Product Libraries (IPLs) have proven invaluable to joint warfighters. Nearly 300 different IPLs are currently accessible. With no requirements for special hardware or software, and with only a small amount of operator training, the

imagery from these IPLs is readily accessible and provides a significant enhancement to battle command and situational awareness for commanders and staffs at all echelons.

- **Space Support to Blue Force Tracking.** The majority of the currently fielded BFT device types are dependant on satellites for their message transmissions, routing and dissemination. Both the operational and technical architectures of these BFT devices, to include the inherent message reporting latencies and reporting limitations, have become major focus areas for tactical space support to commanders and staffs.

Conclusion

As indicated by ongoing combat operations, our joint warfighters’ routine access to and exploitation of space capabilities (expertise, products, and services) have become indispensable components of our nation’s military capability. The 21st century security environment requires space forces to empower joint warfighters with capabilities to pursue the enemy on a 24/7 basis and to know the capabilities of adversaries to employ air forces, unmanned aerial vehicles, short-range ballistic missiles and cruise missiles.

The growing capacity of potential adversaries to achieve “space parity” with the United States will continue as they develop more and better organic space capabilities, increase their access to “gray” (commercial, international space consortiums) space and enhance their capabilities to disrupt U.S. and coalition space assets. In addition, as U.S. military forces are given ever-greater responsibilities, larger battlespace and compressed planning timelines, it is likely there will be increased demands for and reliance upon space-based expertise, reachback, space-related lethal and nonlethal effects and materiel capabilities. These developments will further define the focus and priorities of future space support to U.S. combat operations.