

## Chapter 2

# Impact of Space on Force Projection Army Operations

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Due to the fact that space systems are “force multipliers” able to support missions across the full range of military operations, commanders at all levels must understand space capabilities and fully integrate them into Army operations. This chapter describes how space systems impact the full range of force projection Army operations. It relates the value added by space to the Army’s characteristics and addresses the relationship between space and the tenets of Army operations. Finally, it discusses the impact of space on the combat functions: intelligence, maneuver, fire support, air defense, mobility and survivability, logistics, and battle command.

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## THE STRATEGIC ARMY

Faced with challenges that are constantly changing the range of operations, today’s Army must be prepared to quickly adapt and to deliver decisive military force upon demand. Only by employing every available asset will the strategic Army succeed. Mission accomplishment depends upon how well the Army exploits the use of space systems and space forces and support from Air Force, Navy, Marine Corps, and allied and coalition forces. Participation in joint and multinational training exercises provides the Army an opportunity to refine its interoperability and deployability plans and strategic role. Exploitation of space capabilities is a must if political, economic, diplomatic, and national security interests are to be assured strategically. Space capabilities enhance the Army’s ability to be better prepared, better equipped, and more capable of—

- Conducting full-dimensional operations.
- Exercising more efficient and effective battle command when participating in joint, multinational, United Nations, or interagency force-level training exercises.

- Meeting the “deployable” demands of a force projection Army.
- Responding to expansible requirements associated with changes and surges that may occur during various phases of military operations.
- Ensuring the combat power needed to assure a decisive victory in achieving the overall national security strategy.

## CAPABLE OF FULL-DIMENSIONAL OPERATIONS

Space-based assets provide the force multipliers needed to successfully conduct full-dimensional operations. Today’s Army must be capable of conducting a variety of military operations on short notice and at minimum cost in lives and other resources. The most efficient and effective means available must be employed to accomplish this goal. Space systems offer enhancements in many of the mission areas that are critical to success. Battle command, synchronization of resources, enhanced information dissemination, parallel

planning, concentration of fires, and the massing of other combat power are but a few of the benefits that are available and may be realized through the use of space systems. Commanders and staff planners at every level should become thoroughly familiar with the space assets available and ensure their use in every aspect of the planned operations.

### **TRAINED TO FIGHT AS PART OF A JOINT OR MULTINATIONAL FORCE**

The Army will become more involved with other services, national agencies, and nations to protect US national interests. The ability of the Army to conduct a wide variety of operations under joint/multinational command and control relationships will be essential in future operations. The Army must be capable of supporting war as well as MOOTW requirements. The diversity of missions, coupled with anticipated budget restrictions, mandates that the Army do more with less. As a result, it must use all available training facilities, opportunities, and capabilities to increase the operational effectiveness of the force. The use of space assets enables the Army to support this wider range of missions with increased effectiveness and *efficiency*.

### **DEPLOYABLE**

Force projection is the cornerstone of the successful implementation of the national military strategy. No longer can the Army plan on being in the area of operations prior to a crisis. Operations will start with the movement of forces and equipment to the area of operations. Space systems currently in orbit are already deployed and can support the Army prior to and during deployment, providing information that reduces ambiguity and improves decision making. Satellites provide the initial communications, surveillance, and weather system infrastructures to support deployment. They gather information and provide a means for rapid dissemination of data to appropriate echelons of command. Data from space assets is integrated with other sources of information to facilitate mission planning and ensure knowledgeable entry into the area of operations. Additionally, data from space

systems facilitates in-transit visibility and total asset visibility. Space systems permit accurate tracking of critical equipment en route to the deployment area. Space systems also enhance the Army's deployability by providing information to accurately tailor the force package, potentially reducing the amount and size of ground-based equipment that must be transported. The forces and equipment deployed can also be reduced through split-based operations, facilitated by the capabilities of space systems to provide and transmit information.

### **CAPABLE OF DECISIVE VICTORY**

Lethality is essential for the rapid defeat of an adversary. The ability of the commander to effectively command and control forces and to see the battlefield, regardless of size or maturity, permits Army forces to react faster than the enemy. This quick reaction can be obtained and enhanced by the application of space-related capabilities. The use of space-based communications and intelligence data, accurate position and navigation information, and weather, terrain, and environmental monitoring directly enhances target acquisition and engagement opportunities and improves weapon system performance and lethality for Army forces. The capabilities of space systems to support information operations will also contribute to decisive victory by allowing our forces to be informed simultaneously, thereby enhancing their responsiveness and improving battle command.

### **EXPANSIBLE**

The Army must be able to meet several threats to US national interests simultaneously. This may require expanding the size of the active Army by activating reserve components, creating new units, and mobilizing the industrial base to support increased requirements. Likewise, space assets can be reallocated, moved, leased, or purchased to improve the operational effectiveness of the expanding force. The use of civil and commercial systems, on-orbit spares, and a robust launch capability will increase the number of space assets available to support Army users.

## **SPACE AND THE TENETS OF ARMY OPERATIONS**

By collecting data and disseminating information, space capabilities support the tenets identified in FM 100-5: initiative, agility, depth, synchronization, and versatility.

### **INITIATIVE**

Space systems provide intelligence support for indications and warnings to US forces—an essential element for supporting the NMS. In an environment in which uncertainty and instability are major threats, global situational awareness is critical. Satellite systems help commanders see the enemy situation, understand terrain, know the current and future weather conditions, and accurately position forces and track resources. Not only does this information reduce the element of surprise and the vulnerability of the force, it facilitates planning by allowing military forces to anticipate events. Once planning is completed, communications satellites provide a means to transmit information necessary to execute the plan. The capability to seize the initiative with certainty and to act decisively as a result of near-real-time information may exhaust the enemy's options and avert further escalation.

### **AGILITY**

Access to data from space systems enhances the commander's situational awareness and provides a better understanding of the battlefield, which, in turn, facilitates decision making. The timely information afforded by space-based systems improves the ability of Army forces to act and react faster than hostile forces. Space-based communication assets provide the connectivity required to transmit the necessary information to support command and control of maneuver elements over extended distances, which further enhances the agility of the force. Positioning information from Global Positioning System (GPS) satellites can be used to help reduce fratricide, facilitate force positioning, and enable commanders to track resources throughout the area of operations. These capabilities enable commanders to synchronize operations and ensure concentration of effort at the right time and place.

### **DEPTH**

Space capabilities ensure vital coverage of the battle space. Additionally, they provide the multiplicity of data needed to support intelligence, targeting, navigation, weather, terrain, environmental monitoring, and command and control functions. Satellites enable commanders to see the area of operation and battle space in sufficient depth (deeper than land or air platforms) and detail to anticipate likely enemy options and to evaluate the effectiveness of friendly operations. This extension allows the Army to locate and identify enemy assets, plan operations that will disrupt the enemy's tempo, and conduct simultaneous attacks throughout the battle space. In force projection operations, information broadcast from satellites will permit simultaneous situational awareness throughout the battlefield.

### **SYNCHRONIZATION**

Space capabilities facilitate unit coordination and management of critical resources necessary to ensure that the end state identified in the campaign plan is achieved. Satellites play a key role in synchronization. They permit forces to share information and enable commanders to combine resources and operations at the decisive time and place. Sequencing and combining operations reinforce and amplify the effects of each specific operation and ensure unity of effort in the application of resources.

### **VERSATILITY**

The diverse and multifunctional array of space systems offers unique advantages that increase the Army's versatility and can have a dramatic effect on all Army missions. Satellites are in orbit, have worldwide coverage, and can support training, MOOTW, and combat equally well. The POWNAV satellites-NAVSTAR GPS-enable anyone with a passive receiver to know his position more accurately. Military and civilian communications satellites offer worldwide links with virtual line of sight to anyone. Weather and terrain information is available from Defense Meteorological Satellite Program (DMSP) and civil environmental satellites, such as the US-launched civil earth imaging satellites (Landsat), Japanese-launched marine observation satellite (MOS-1),

and France's *Systeme Probatoire d'Observation de la Terre* (SPOT) satellite, to support intelligence preparation of the battlefield (IPB), planning, and rapid decision making. Space systems provide reconnaissance, intelligence, surveillance, and target acquisition (RISTA) and communications support to tactical commanders. The Army's

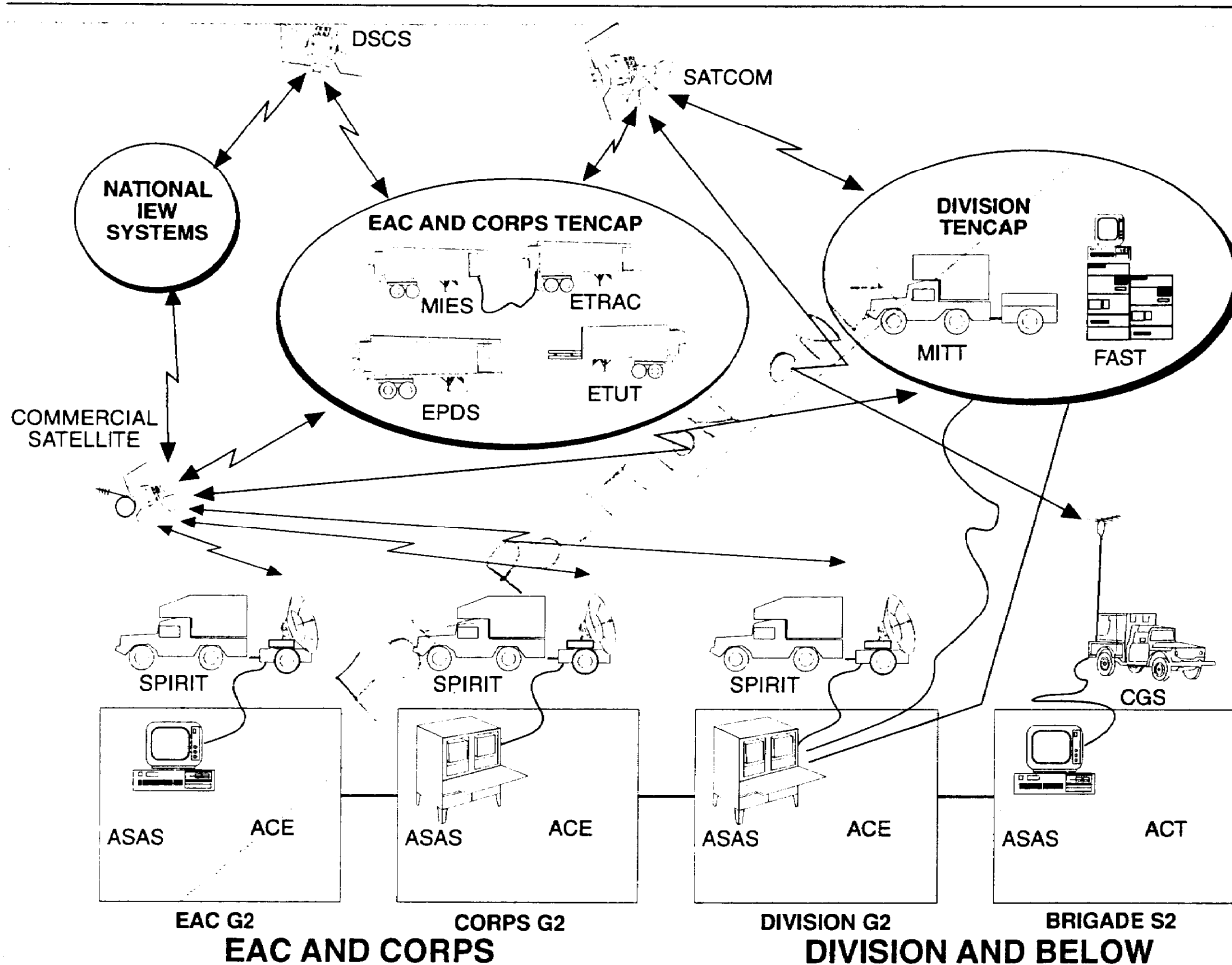
TENCAP Program provides the interface between space-based intelligence and electronic warfare (IEW) sensors and the all-source analysis system (ASAS) within the analysis and control element (ACE) located at echelons above corps (EAC), corps, divisions, separate brigades, and armored cavalry regiments (see Figure 2-1).

## COMBAT FUNCTIONS

To successfully accomplish strategic, operational, and tactical military objectives, the force at each level of war performs the combat functions of intelligence, maneuver, fire support, air defense, mobility and survivability, logistics, and battle command.

Commanders integrate and coordinate these functions to synchronize battle effects in time, space, and purpose. The use of space systems as a force enhancer multiplies the commander's effectiveness when executing combat functions.

**Figure 2-1. Space Connectivity to the TENCAP and IEW Architecture**



**Note:** TENCAP systems are normally assigned to division or higher; depending on METT-T and task organization, they may be allocated to echelons below division.

### INTELLIGENCE

Intelligence is the collection of functions that generate knowledge of the enemy, weather, and geographical features that a commander requires in planning and conducting operations. It is derived from an analysis of the information provided by multiple sources on the enemy's capabilities, intentions, vulnerabilities, and the battle space environment.

Army commanders use intelligence, electronic warfare, and counterintelligence support to conduct combat operations. The intelligence cycle phases of directing, collecting, processing, and disseminating place tremendous demands on command, control, and communications, reconnaissance, and surveillance assets, which are critical to the intelligence effort. Space systems provide special advantages for IEW operations.

Dedicated and nondedicated ground, airborne, and space systems are employed to provide critical intelligence functions and subfunctions support. Communications satellites support the flow of all types of information and intelligence connectivity to all IEW users, improved communications security, fewer terrain-dependent operations, increased capacity, less downtime for movement, global coverage, more survivable redundant systems, and continuity of service. On-orbit position location and navigation systems provide the IEW system accurate and timely data needed to support targeting and weapons delivery.

Surveillance and reconnaissance efforts are a part of national intelligence gathering and the systematic observation process. Surveillance operations are effected to collect information continuously from the air, land, and sea. Reconnaissance operations are directed toward specific targets. Through surveillance and reconnaissance, varied data, such as meteorological, hydrographic, geographic, electronic, and communications characteristics, can be collected on any given area of the earth's surface.

The tactical commander will need to gain timely intelligence from the full integration of national and theater assets. The ability of theater or national intelligence sources to fulfill tactical intelligence requirements and to remain responsive to dynamic, lower echelon

needs is key. Force projection operations need accurate and responsive tactical intelligence. Intelligence preparation must begin as early as possible to allow commanders to develop adequate plans. The deploying force achieves this through split-based operations, which integrate CONUS-based national systems with forward deploying tactical systems.

### MANEUVER

Maneuver is the employment of forces on the battlefield through movement and direct fires, in combination with fire support, to achieve a position of advantage in respect to enemy ground forces in order to accomplish the mission. It pertains to all combat, combat support, and combat service support. Space systems to support maneuver focus primarily on force enhancement to improve the effectiveness of combat forces. Forces must be capable of operating on a highly mobile, nonlinear lethal battlefield, continuously, night and day, in all weather, on any terrain. Space offers an added dimension to maneuver capabilities of the force. Space assets provide a global view of theaters of conflict, an operational view of the battlefield, accurate movement, and the ability to assess the terrain and weather, locate enemy forces, and help determine their vulnerabilities and intent. Space assets also assist in deceiving the enemy, expediting maneuver, and striking the enemy throughout the full depth of the battlefield. Near-real-time assessment of the location and progress of subordinate units enables the commander to rapidly shift or reinforce the main effort, exploit enemy vulnerabilities, and sustain the momentum of the force. Combat forces benefit directly from space capabilities. Multicapable sensors and navigation devices facilitate command and control of ground maneuver forces and provide the commander with knowledge of the enemy and terrain. Regardless of the terrain or distance, satellites provide a communications link, thus allowing the commander to exercise effective command and control. Space systems help the commander to see deep, move fast, and engage the enemy across the breadth and depth of the battlefield.

## **FIRE SUPPORT**

The fire support system is the collective and coordinated use of target acquisition data, indirect-fire weapons, armed aircraft (less attack helicopters), and other lethal and nonlethal means against ground targets in support of maneuver force operations. It includes artillery, mortar, and other non-line-of-sight fires, naval gunfire, close air support, and electronic countermeasures. Space systems, due to their unique high-ground vantage point, provide data on terrain and weather as well as communications capabilities, allowing fire support systems to operate in a wide range of geographic circumstances and in all weather conditions. Space systems integrated with intelligence systems provide target acquisition, identification, and tracking information to fire support control systems. The range, flexibility, and speed provided by space systems complement the technologies employed on the fast-moving nonlinear battlefield.

Access to satellite communications provides secure, robust range extension of tactical communications nets to maneuver commanders; GPS satellites provide highly accurate, real-time, three-dimensional positioning and navigation data; weather satellites scan the battlefield and transmit reports and atmospheric profiles from space; and other earth resource satellites produce topographic products. All are used to assist battlefield movement and to provide other critical fire support data needed to destroy, neutralize, suppress, degrade, or disrupt threat formations and systems in support of the maneuver commander.

## **AIR DEFENSE**

Tactical air defense artillery units have the mission of nullifying or reducing the effectiveness of enemy attack or surveillance aircraft and/or missiles. Strategic air defense forces have the mission of providing attack warning and attack assessment of air and ballistic missile attacks on North America. A family of weapons is employed to provide the needed air defense coverage since no single air defense system is capable of protecting the wide variety of critical strategic and tactical

assets that are potential targets for the enemy. A mix of ground, sea, air, and space-based sensors provides early warning, detection, tracking, discrimination, identification, targeting, and other vital information to the force. Communications satellites allow for wide-area-surveillance net broadcasting, near-real-time targeting transfer, and command and control over extremely large areas. Space-based position location and navigation systems greatly enhance air defense operations with worldwide, accurate position location, which can be integrated with near-real-time intelligence and accurate weather and terrain data to give the maneuver force commander complete situational awareness.

## **MOBILITY AND SURVIVABILITY**

Mobility and survivability describe the functions associated with providing friendly forces freedom of movement over battlefield terrain against obstacles while denying the same to the adversary. These functions also reduce friendly force vulnerability to the effects of enemy weapon systems and natural occurrences. Space system capabilities offer considerable enhancements to the success of mobility and survivability missions. Multicapable sensors, navigation systems, and satellite communications facilitate command and control of widely dispersed forces with the transfer of timely intelligence and information data. Space observation platforms and sensors provide commanders with an operational view of the battlefield, which significantly adds to the ability to detect natural and man-made obstacles, ensuring timely information on routes, bridges, water-crossing sites, employed obstacles, and minefield locations. Weather, terrain, and environmental monitoring systems give information on terrain features, obscurants, and trafficability, which can pose mobility restrictions to the movement of large forces and on lines of communication. Topographic products and information provided through the use of space-based imagery intelligence maps, charts, overlays, and digital terrain data bases support precise positioning of artillery, command, control, and communications, and intelligence systems. Also, space-supported topographic products can

assist in the precise positioning of obstacle zones, belts, and groups to turn, fix, block, and disrupt the enemy. Position location and navigation systems provide increased navigation capability, which enhances maneuverability and responsiveness.

### LOGISTICS

Logistics are those functions directly related to the development and maintenance of maximum combat power through the sustainment of combat forces. Included are personnel service support, health services, general supply, field services, maintenance, transportation, facilities, and quality of life. At the tactical level, logistics focus on the combat service support (CSS) functions of arming, fixing, fueling, manning, moving, and sustaining soldiers and their equipment.

Logistics support must be flexible enough to support a force projection force operating on widely dispersed battlefields anywhere in the world under varying climatic and terrain conditions and with varying degrees of host nation support and infrastructure. This support will require a mix of sustaining base assets capable of pushing supplies and maintenance assets forward and forward-based logistics units capable of providing immediate support as needed. To support forces in this type of an environment, the logistics system will require enhanced access to timely, accurate intelligence and weather information; improved logistics management processes; more rapid, responsive, and reliable transportation; better methods for assessing battlefield damage; and robust and fast communications and automatic data processing support. Space systems will provide these capabilities to help ensure success on the future battlefield.

Space-based sensors identify sources for water, food, and fuel. Support facilities such as hospitals, major roads, airports, and seaports are located to assist planners in determining the level of support and the kinds of materiel needed. Weather, terrain, and climatic conditions are also studied to assess their impact on the logistics system. Space-based systems provide force

enhancement capabilities that facilitate information transfer and processing. Space-based tracking devices maintain location of units and supply bases and provide in-transit visibility. Satellite communications provide a true split-based capability, allowing logisticians to communicate through data transfer from the theater of operations back to the sustaining base in CONUS or elsewhere. Position and navigation devices allow tracking of the movement of transportation assets and supplies, giving commanders total asset visibility. This capability, coupled with reliable space-based communications, weather, terrain, and environmental monitoring systems and space-based intelligence, provides real-time command and control to commanders. Commanders are able to tailor and adjust CSS missions and assets in response to the situational awareness gained by having these capabilities available throughout the area of operations.

Advanced automation equipment that receives and transmits logistics information via satellite systems allows for supply and maintenance requests to be received, consolidated, and requisitioned from appropriate sources, facilitating unitized, modularly configured packages. Near-real-time battle damage assessment data provided through space systems and advanced automation enables maintenance efforts to concentrate on specific problems, shortening the time required for equipment to be returned to an operational status.

Health services support, replacement operations, casualty reporting, strength accounting, finance services, chaplain activities, postal services, legal services, public affairs, and morale, welfare, and recreation activities are enhanced through the application of telecommunications, navigational satellite transmission and reception communications stations, computers, audio-video equipment, satellite retransmission of television programming, digitized facsimile telemetry, and other space-produced capabilities. The use of space-based assets will result in timely and accurate processing of financial information in support of contracting (local vendor support),

disbursing, payroll, and accounting information. This capability will provide better management information to commanders and increased support to service members.

Rapid force projection from CONUS, extended lines of communications, and potential forcible entry into logistically bare-based areas of operations require an Army logistics system that is versatile, deployable, and expandable. Administrative and logistical support, to include split-based operations, will be more efficient and timely due to utilizing space-based assets for enhanced tracking, requisitioning, position location and navigation, and imagery operations. The improved CSS Battle Command System will link logistical asset sources to the total distribution system in the theater of operation and CONUS. Using total asset visibility combined with advanced information communication flow will ensure that required material will be immediately ordered, its location identified, and its delivery tracked through precise inventory accountability transfer. Personnel replacement and medical support operations will also improve significantly because of enhanced capabilities derived from using space assets.

All space-based systems deployed in support of contingency operations or MOOTW have weaknesses, limitations, and vulnerabilities. Support plans—that is, the space operations annex—must adequately identify and address these factors to ensure maximum benefits are realized from the space capability.

### **BATTLE COMMAND**

Battle command is a properly designated commander's exercise of authority and direction

over assigned forces to accomplish a mission. It specifies those functions that leaders must perform in making sound and timely decisions and in directing the activities of assigned and supporting units. Information is the medium of the battle command process, which results in decisions and directives at every echelon and in every branch. Battle command is the process of acquiring information, assessing whether any new actions are required, determining what these actions should be, and directing the appropriate one. Information about the mission, enemy, terrain and weather, troops available, and time (METT-T) is acquired through a variety of means. The information is sent and received; the means of communicating the information is managed; and the information is maintained in a form convenient to the decision-making process. The battle command functions are necessary to execute the intelligence, maneuver, fire support, air defense, logistics, mobility, and survivability combat functions. The battle command function is substantially aided by the availability of space-based systems. Space-based communications equipment and the attendant ground terminals offer communications support to facilitate information transfer, for example, to transmit orders, control measures, changes to orders, unit status, and requests for support. Space-based systems that identify targets can also determine which fire support means should engage a target. Space systems provide rapid information on the enemy, his movements, and his intentions. They can provide the commander with real-time and near-real-time intelligence, target acquisition, environmental and trafficability analysis, logistics, and so forth. These capabilities enable the combat, combat support, and CSS elements to take appropriate actions and play a significant role in enhancing efficiency and responsiveness.