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STRATEGY RESEARCH PROJECT

PLANNING FOR SPACE SYSTEMS TO BE EMPLOYED BY THE U.S. ARMY

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ABSTRACT

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U.S. space systems supplement and support the terrestrial force structure, allowing more effective and efficient application of such force. Given rapidly advancing technology, space systems will increase their capabilities and, as air, land, and sea force structure decreases, become even more important as a force multiplier. The planning for space systems, therefore, becomes critical in ensuring space systems are integrated to enable the warfighter to dominate the full range of military operations into the 21st century. The planning process occurs at the National/Department of Defense, Joint, and Army levels. It is particularly important that an effective structure be in place within the Army to ensure space systems meet Army needs across all battlefield operating systems and Army Modernization Plan Objectives. The space functional areas of Force Application, Force Enhancement, Space Control, and Space Support must be applied to the required capabilities of the Army Modification Plan Objectives (Dominant Maneuver, Precision Strike, Information Operations, and Force Projection, Protection, and Sustainment) to plan for future space systems.

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Over the last three decades the United States has led the world in development of space systems and the use of space. The realm of the possible expanded beyond imagination with the landing of man on the moon, and subsequent development of the space shuttle, Hubble Telescope, and progress towards a space station. Space launches have become commonplace, seldom even warranting attention by the media or the public. The use of satellites in telecommunications is now taken for granted, bringing images from around the world directly into the American living room. Likewise for the military, space has become an integral part of the daily business of defending our country. Space systems provide the Armed Forces with intelligence, communication, navigation, weather and mapping information, and warning, at levels from the strategic decision-maker to the soldier in the foxhole.[1]

Given rapidly advancing technology, space systems will increase their capability to operate effectively and efficiently. As air, land, and sea force structures decrease, space power becomes even more important as a force multiplier.[2] Therefore it is extremely important that the Army's needs for space systems are integrated into the planning process in the development of these systems. This planning occurs at the National and Department of Defense (DOD) level, as part of the Joint Strategic Planning System, and within the Army.

This paper shall examine the planning process for space systems beginning with the development of the National Security Space Master Plan (NSSMP) by the Deputy Undersecretary of Defense for Space (DUSD (Space)) and the development of joint requirements for space by the United States Space Command. The paper shall then describe the process within the Army and suggest a more effective organizational

structure and approach to ensure Army warfighter needs are included in requirements for space systems.

Finally, the paper will provide recommendations for some specific requirements in the space functional areas of Communications; Reconnaissance, Intelligence, Surveillance, and Target Acquisition (RISTA); Weather, Terrain, and Environmental Monitoring (WTEM); Positioning and Navigation; and Missile Warning. It will show how these required capabilities will enable the achievement of the Army Modernization Objectives of precision strike, dominant maneuver, force protection, force projection, and winning the information war. Ensuring Army needs are met by future space systems is key to achieving the Army vision for space:

> Provide the Army with Timely, Integrated, Responsive and Reliable Space Capabilities that Enable the WARFIGHTER to Dominate the Full Range of Military Operations into the 21st Century.[3]

As space capabilities are integrated today to enable all FM 100-5 Combat Functions, they must be developed to enable the full range of military operations in the future.

THE PLANNING PROCESS

The process to plan the development of space systems occurs at several levels. The DUSD (Space) conducts National and DOD planning, incorporating inputs from numerous agencies, including the services, into the National Security Space Master Plan. The United States Space Command is the advocate of space requirements, including force enhancement, space control, space support, and force application, for the unified and specified command Commanders in Chief (CINC's).[4] Within the Army, Training and Doctrine Command (TRADOC) is responsible for developing all requirements, but several other organizations play a key role. This often presents organizational structure

challenges to the coordinated and efficient development of space requirements. Army requirements are developed for the space enhancement functional areas of communications; Reconnaissance, Intelligence, Surveillance, and Target Acquisition (RISTA); Weather, Terrain, and Environmental Monitoring (WTEM); position/navigation; and missile warning.

National and Department of Defense Level Planning for Space

The office of the DUSD (Space) was established on 10 December 1994 with responsibilities and functions aggregated into three areas including space policy, space architectures, and space programs. Specifically, in the area of space architectures, he is responsible for the development and integration of space mission and space system architectures into an overall "system of systems" architecture. He is charged with oversight of architectures, programs, and space forces employment plans of the Military Departments, Services, Defense Agencies, Chairman, Joint Chiefs of Staff, and combatant commanders. To accomplish this mission the position of Space Architect has been created within the DUSD (Space) organization, with architecture development teams for Military Satellite Communications (MILSATCOM), Space Control, and Satellite Operations. These teams are comprised of representatives from each of the organizations listed above, to ensure their needs are met. Additionally, the DUSD (Space) has established DOD Senior Steering Group, a flag officer level committee to provide top-level visibility to the process.[5]

The process at the National/DOD level is time consuming and personnel intensive. It is, however, perhaps the most critical effort in the development of future

space systems and the Army, as the primary user of space capabilities, must influence this planning. As such, it is essential that the Army provide representation knowledgeable in how space enhances warfighter capabilities, armed with the specifics of the Army Modernization Objectives and the contribution space functions provide towards their achievement.

Joint Planning for Space

The mission of the United States Space Command includes exercise of combatant command over assigned space control, space support, and force enhancement forces as well as forces that provide strategic ballistic missile defense for the United States. The mission also includes advocating space and missile warning requirements of other CINC's and planning for and developing requirements for strategic ballistic missile defense and space-based tactical missile defense.[6] The intent is clearly to capitalize on the experience of United States Space Command and its components in the operation of space systems to develop valid requirements for the space systems of the future. This has indeed occurred during the development of Joint Mission Need Statements (JMNS) and Operation Requirements Documents (ORD's) for the MILSTAR communications satellite system, a National Missile Defense (NMD) system, and the Space Based Infrared System (SBIRS). Of particular note are the requirements for the latter, the SBIRS system, stemming not only from decades of experience with strategic missile warning from the Defense Support Program (DSP), but from the adaptation of that system to tactical missile, e.g. SCUD, warning during the Gulf War.

The service components of United States Space Command play an important role in the development of requirements for space systems based upon direct contact with operational units. The Army component provides space support to Army warfighters by operating the communications payload of the Defense Satellite Communications System (DSCS), providing missile warning direct to theater from DSP satellites with the Joint Tactical Ground Station (JTAGS), and access to other space products from the Army Space Support Teams (ARSSTs)[7]. This integration of space capability directly into Army operations provides invaluable experience on how space systems should be employed, resulting in warfighter needs being funneled directly into the joint requirements system. A recent example of this process is the ongoing effort by United States Space Command to develop a JMNS for a Space Based Blue Force Tracking system based upon demonstrations of prototype capabilities by each of the components to operational units of their respective services.

Army Planning for Space

All Army requirements, including those for space systems, are developed by TRADOC. These requirements are written by the Directorates of Combat Development at the various TRADOC Schools and Centers to meet the needs of their respective Battlefield Operating Systems (BOS).[8] Most TRADOC requirements for space systems have originated at the Signal Center for satellite communications systems and the Military Intelligence Center for RISTA systems. Additionally, some space needs originated by Space and Strategic Defense Command (SSDC) including Army Space

Command Forward and the Army Space Program Office, have been validated through the TRADOC system.

Coordination of space requirements across all elements of the BOS, when it occurred, has been through the Space and Information Operations Division of Headquarters, TRADOC, and through meetings of space action officer working groups, a space council of colonels, and a space general officer steering group. The process has lacked designated leadership and resources to systematically ensure space was being considered in requirements development and integrated horizontally across all BOS. The systems developed have been largely stovepiped to the particular function to be performed. Often space systems have not been considered as requirements were developed.

In February 1997, the Commanding Generals of TRADOC and SSDC signed a Memorandum of Agreement (MOA) designating SSDC as the specified proponent for space, including requirements generation and horizontal integration of space capabilities across the BOS.[9] This MOA officially recognizes the leadership and resources of SSDC in the space community, and provides direct entry into the Army requirements process. It advantages the same Army space component experience described earlier, as well as insights gained through the battle lab-like Army Space Demonstration Program (ASEDP), a Commercial-Off-the-Shelf (COTS) space technology demonstration program. The MOA also will allow SSDC to continue to be the Army's voice in the DUSD (Space) planning process.

To implement the MOA, SSDC will become the Space and Missile Defense Command and reorganize to include the Space and Missile Defense Force Development

and Integration Center and the Space and Missile Defense Battle Lab. The Force Development and Integration Center will perform the Doctrine, Training, Leadership, Organization, Materiel, and Soldier (DTLOMS) functions normally associated with a Directorate of Combat Developments at a TRADOC School, including development of operational requirements. The Battle Lab will continue the work of the ASEDP program, conducting experiments with COTS technologies to better understand the contributions space systems can make to warfighting.

To effectively plan for future space systems, these new organizations must employ a structured approach or methodology. The structure described here was developed at Army Space Command in building a Space Roadmap as input to the DUSD(Space) planning outlined earlier. This structure is strongly recommended as the model for developing future space requirements.

The methodology begins with the evaluation of the warfighter mission. Where today we attempt to integrate space across all combat functions or Battlefield Operating System (BOS) elements, for Army XXI we will use the Army Modernization Objectives (AMO's) of precision strike, dominant maneuver, force protection, force projection, and information dominance. These objectives are similar to the imperatives of Joint Vision 2010 and Army Vision 2010, and the objectives the Revolution of Military Affairs' (RMA) Army After Next (AAN) of 2020 and beyond.[10] [11] The focus, regardless of which period we are planning for, must be on what the warfighter needs to accomplish, and what capabilities are required to enable that mission.

The next step is to map the space mission areas and functions to the capabilities required by the Army Modernization Objective. The force enhancement mission area

functions of missile warning, RISTA, WTEM, position/navigation, and communications will be the primary space enablers for Army XXI. As new space technologies are developed, space control, space support, and force application from space could also directly affect the land battle of the Army After Next.

The space support mission area includes launch, orbit maintenance or Tracking, Telemetry, and Control (TTC), and, in most cases, payload control. Today, space systems are limited by low onboard power budgets using solar, fuel cell, and nuclear power sources. TTC is centralized and still requires extensive human input. Launches are expensive and use the liquid and solid propellants we have seen on television during space launches over the years. And, most launch and TTC capability is owned and operated by the government. Space support is an Air Force mission, and will not be addressed as we examine future systems, other than the possibility of major technical breakthroughs and their potential implications for the Army.

Force application is the employment of weapons in, from, or through space. Intercontinental ballistic missiles are the only weapons that operate though space today. A ground based National Missile Defense (NMD) system, to be operated by the Army, that would protect the United States from ballistic missile attacks by intercepting the missiles in space, is in research and development, with a possible deployment by the year 2003. It is technically possible to orbit offensive or defensive weapons in space, and although treaties today limit such activities, they should not necessarily be ruled out in the future. Planning for force application systems will not be discussed in this paper, except for the possible implications of weapons in space in the Army After Next timeframe.

Space control is access to space for our systems and capabilities, and the denial of space to an enemy. There is significant overlap between space control and information operations/warfare. Today most United States space systems are vulnerable to various kinds of attack, with the exception of MILSTAR, a communications system built to operate in a nuclear environment. A key lesson learned from the Army After Next Winter Wargame at Carlisle Barracks in January, 1997 was the vulnerability of our space systems to attack and the huge negative impact on our warfighting capability when those space systems were neutralized. Protection from attack must be a requirement as we plan for future space systems. The United States currently has no space denial capability, although research and development activities are ongoing for directed energy and kinetic energy anti-satellite systems.

THE PRODUCT

The products of the planning process are requirements for space capabilities that significantly enhance the warfighter's ability to accomplish his mission. This section of the paper will suggest what some of these requirements should be, by space functional area, and describe how the requirements contribute to warfighter mission accomplishment, in this case, the Army Modernization Objectives. This section will begin by showing current space systems and how they are integrated into the combat functions. It will then outline some required capabilities for the Force XXI Army of 2010. Due to shrinking budgets, this will be a product improved Army, and the requirements suggested will largely be for horizontal integration of current space capabilities into Army systems, instead of for new space capabilities. Finally,

requirements for the Army After Next of 2020 and beyond will be described, outlining capabilities for new satellite systems and exploring the potential impact of possible space technology breakthroughs.

Current Space Systems

Military satellite communication (MILSATCOM) is perhaps the most widely used application of space systems. MILSATCOM systems provide communications connectivity in areas where line of sight (LOS) communications are not possible, whether due to long distances or in mountainous terrain on the battlefield. It enables command and control during the force projection phase of a campaign and split based operations. On the battlefield MILSATCOM supports deep operations by special operations forces and attack helicopter units. Current MILSATCOM capabilities include the Defense Satellite Communications System (DSCS), Fleet Satellite (FLTSAT), Air Force Satellite Communications (AFSATCOM), and Commercial Satellite systems.

DSCS provides strategic, long haul, super high frequency (SHF), high data rate communications between the National Command Authority/Joint Chiefs of Staff, Commanders in Chief, and other Joint Chiefs of Staff approved users via multichannel communication terminals such as the AN/TSC-85/93. Allocation or redistribution of these terminals is possible depending on mission and communication requirements and priority.

FLTSAT and AFSATCOM systems, as well as Leased Commercial Satellite (LEASAT) provide Ultra High Frequency (UHF), single channel, secure voice, low data rate communications. Although primarily utilized to support command and control of Air

Force and Naval operations, these systems are designed to be multiple access compatible, and the Army's AN/PSC-5 communications terminal allows their employment. These terminals are fielded to support command and control at the division and corps levels.

Commercial international satellite systems such as International Telecommunications Satellite (INTELSAT) and International Maritime Satellite (INMARSAT), provide worldwide voice and low data rate communications through commercial phone systems at fixed sites or through portable terminals with small antennae at remote locations.

Although highly effective at providing communications at the strategic and operational levels, applications of most of the above communications systems at the tactical levels are limited. This is primarily due to limited channel and bandwidth availability, and the size and pointing requirement for satellite antennae.[12]

Accurate, responsive position determination and navigation are essential to the conduct of all elements of any military operation. By establishing connectivity with the Global Positioning System (GPS), consisting of a constellation of 26 satellites, users anywhere in the world will be able to receive signals from at least four satellites at all times, providing three dimensional position, velocity, and time information. The hand held Small Lightweight GPS Receiver (SLGR), fielded during the Gulf War, was invaluable in providing position and navigation data in the featureless terrain of the desert. The second generation Precision Lightweight GPS Receiver (PLGR) has proliferated throughout the Army, and has become the primary means of position determination and navigation for all battlefield operating systems. Although still a stand-alone system in most applications, GPS is being designed as an embedded capability in

many new combat systems (the fire control computer for the Paladin Artillery system for example) and in the guidance package of many precision weapons.[13]

Knowledge of current weather and terrain in the area of operations, along with an accurate prediction of future conditions, is critical in planning and execution for all battlefield operating systems. Satellite systems such as the United States' LANDSAT, France's SPOT, Japan's MOS, and Europe's ERS-1 are capable of providing multispectral imagery ranging from 5 to 80 meter spatial resolution. This data may be procured to update geographical data bases, support mapping requirements, analyze trafficability, develop predictive models, display situations, develop simulations, support mission planning and rehearsal, and train soldiers. Processing of multispectral imagery data is currently limited to stand-alone systems available to units, usually at the corps and division level, on request from the Army Deputy Chief of Staff for Operations and Plans (DCSOPS), and is not integrated into command and control systems.[14]

Today's space based weather capabilities include Defense Meteorological Support Program and Geostationary Orbiting Earth Satellite (GOES) systems. Weather images are received at the Air Force Global Weather Center where they are processed and disseminated to users throughout the world, including staff weather teams supporting the Army. Recently prototype small weather terminals have been developed that receive weather data directly from the satellite, greatly increasing responsiveness to combat commanders in the field and enhancing their planning. As the Integrated Meteorological System (IMETS) is developed, it will incorporate the direct downlink capability. These systems are not integrated into current command and control systems.[15]

Intelligence is fundamental to effective planning and vital prior to the beginning and during the execution of any operation. National space intelligence systems are capable of providing worldwide surveillance and reconnaissance and can satisfy many intelligence requirements. While these systems are controlled at the national level, Army forces can receive this information through the Tactical Exploitation of National Capabilities (TENCAP) Program. TENCAP provides Army commanders with high leverage equipment that can process, correlate, exploit, and disseminate data provided by national space intelligence systems. TENCAP systems include the Modernized Imagery Exploitation System, Enhanced Tactical Radar Correlator, Electronic Processing and Dissemination System, Enhanced Tactical Users Terminal, Mobile Integrated Tactical Terminal, and Forward Area Support Terminal. These systems are deployed at the echelon above corps and corps level, and enable direct or indirect interface with space systems to receive intelligence information.[16] They are limited by their high classification level and that of the data they provide, and by the high demand for their products, causing reduced availability. They are stand-alone systems, not integrated into current command and control systems.

The Gulf War demonstrated the vulnerability of United States and coalition forces, and surrounding nations, to attack by ballistic missiles. The Defense Support Program (DSP) satellites detect missile launches and provide warning of impact area and a launch location. Although designed to send missile data to a central location for processing and dissemination, a ground segment for the system, the Joint Tactical Ground Station (JTAGS), has been developed to receive warning directly in theater.[17] This system has reduced warning times and increased accuracy of launch point and impact

area locations. DSP and JTAGS play a key role in the force protection mission of Theater Missile Defense, contributing to passive and active defense, and launcher attack operations.

Space Systems for Army XXI

As the Army moves into the 21st century, information age technology will provide opportunities to greatly improve, if not revolutionize the way we do business. However, budget constraints will probably limit these improvements to product improvements of current systems, except for those few systems that have been approved for new acquisition programs. The same will hold true for space systems; except for the programs already approved for development, the challenge will be to more fully integrate current space capabilities with each other, as well as into systems that enable the Army Modernization Objectives (AMO's). This section will discuss, by space functional area applied to AMO's, both the new systems and modifications required to current systems. For the purpose of this discussion Army XXI will be achieved by the year 2010.

Army XXI will need both increased capability from MILSATCOM, and increased integration with other space systems and all command and control systems. Satellite communications must become available across the battlefield, expanding the ranges of current terrestrial based communication systems, or replacing them altogether. Satellite antenna dish size for both receiving and transmitting will need to be smaller and require less pointing accuracy, and perhaps even be conformable to the shapes of vehicle canopies, tents, or camouflage nets. This will allow access to MILSATCOM from all units on the battlefield while on the move.

The Global Broadcast System (GBS) technology represented by the commercially available DirectTV and DirectPC services, which use huge communication pipes (23 Megabits per second) to transmit hundreds of television channels through satellites, has excellent potential for military use.[18] The signal is received through small (approximately one foot diameter) antennae, and displayed on television or personal computer screens. This technology is being employed in prototype form in support of soldiers in Bosnia and as part of the Task Force XXI and other exercises. The applications being explored are the transmission of video intelligence images, including Unmanned Aerial Vehicle feeds, high volume mapping data, and even Cable News Network and Armed Forces Television programming, to field locations. The Army must continue to pursue this capability, integrating GBS to send intelligence, weather, mapping, situational awareness, and other data to units with very small satellite dish antennae in the field, and allowing them to display the information on standard command and control systems, such as Maneuver Control System, All Source Analysis System, or Global Command and Control System.

GBS was originally designed for transmission of data from a fixed site uplink facility using large high-power satellite dish antennae, typically located in the continental United States. The Army Space Command has developed a prototype mobile uplink system, the Joint In-Theater Inject (JITI) facility, that enables the transmission of the same high data rate information as a fixed site, but from within a theater of operations. This capability will allow the theater commander to provide a complete picture of the battlefield directly to subordinate units at the lowest levels.[19]

Several commercial communications companies are in the process of launching constellations consisting of 20-30 low earth orbiting satellites that will operate as augmentation to or replace terrestrial based cellular phone networks for voice or data communications. The Orbcom, Global Star, and Irridium satellite constellations are examples of these Personal Communication Systems that will be fielded within the next five years.[20] The Army should build a requirement to advantage these type systems as augmentations to Mobile Subscriber Equipment (MSE), allowing communications from vehicle mounted Mobile Subscriber Radio Telephones (MSRT's) even when out of range of Radio Access Unit (RAU) towers. This capability would be particularly useful during early entry operations or in areas where a RAU network is not emplaced. Additionally, the Army should continue to develop a requirement to employ Personal Communications Systems technology to augment terrestrial based blue force tracking systems, such as the Enhanced Position Location Reporting System (EPLRS), providing greatly increased range. The Appliqué system for shared situational awareness developed for the Task Force XXI exercise in March, 1997, should be enhanced with the addition of a space based blue force tracking capability using Personal Communications Systems technology.[21] Command and control systems such as the Maneuver Control System must be programmed to accept information from the space based communications system.

The Army must continue to improve access to current MILSATCOM systems described earlier from terrestrial based systems. This includes ongoing efforts to field a system to extend MSE ranges by linking Long-range Extension Nodes (LENs) and Short-range Extension Nodes (SENs) through the new MILSTAR constellation, and through DSCS ground terminals. Additionally, the potential of using satellites for retransmission

of Single Channel Ground Airborne Radio System (SINCGARS) radio signals, replacing hilltop based "retrans" stations, should be explored.

The Global Positioning System (GPS) will continue to play an important role for Army XXI. As miniaturization technology continues, GPS receivers will become smaller, probably to microchip size. Army systems must continue to integrate this capability to provide precision location and navigation. Work should continue on innovative utilization of GPS provided locations, such as the Attitude Determination Device which computes accurate pointing direction (within 3 mils) for enhancement of direction finding capabilities on artillery and direct fire systems.[22] Efforts should continue to improve GPS location accuracies, potentially with terrestrial based error correction systems.

As the Army moves towards the year 2010, more emphasis must be placed on direct downlink to theater of Weather, Terrain, and Environmental Monitoring (WTEM) satellite signals. The success of the small weather receiver should be expanded to include a capability to direct downlink terrain mapping data from SPOT and LANDSAT satellite systems. Hyperspectral technology should be advantaged to extract the maximum information possible from terrain and weather imagery. WTEM systems will continue to be critical in planning for maneuver, ground and air, and mobility/countermobility.

Integration of Reconnaissance, Intelligence, Surveillance, and Target Acquisition (RISTA) systems into Army XXI will continue to be a challenge. Classification levels have forced the acquisition of stovepiped systems that are purposely not integrated to protect sensitive information. As methods for filtering this information for declassification are perfected, the GBS technology described earlier should be utilized to

disseminate RISTA information to units across the battlefield for integration into command and control systems. Where possible, the Army should continue to pursue direct downlink from national assets to the theater of operation.

As the Space Based Infrared System (SBIRS) is deployed, the Army must continue in its efforts to ensure direct downlink to theater is fielded, as the Joint Tactical Ground Station (JTAGS) downlinks from the Defense Support Program today. This will ensure rapid, accurate missile warning to soldiers on the battlefield, as well as target quality data for active and attack Theater Missile Defense measures. Additionally, low earth orbiting Personal Communications Systems should be employed to disseminate missile warning to the individual soldier, equipped with a beeper type receiver that would activate if he was in the affected area.

Space Systems for Army After Next

The technological breakthroughs possible by the year 2020, in the Army After Next timeframe, could expand the employment of space for warfighting exponentially. New launch systems and lighter weight materials could allow the deployment of more satellite systems to accomplish all the space missions, for greatly reduced cost. New energy sources could extend the lifetime of space systems and provide large amounts of power, enabling such capabilities as laser and kinetic energy weapons in space, for attack of space, atmospheric, and even ground targets. Ballistic Missile Defense, both theater and strategic would be accomplished by this type system.

Communications for Army After Next will be supported by multiband terminals, and satellites will provide seamless communications, allowing instant access from any

ground terminal to transparently meet user needs. Two way GBS will allow flow of massive amounts of information to and from the battlefield. The Mstar Global Communications System concept being developed by Motorola would have a 72 satellite constellation in medium earth orbit (the same as Global Positioning System) providing two way communications at 51.84 Megabits per second.

By 2020 RISTA systems will provide detailed realtime accurate weather and terrain information along with intelligence. All information will be downlinked directly to the battlefield and integrated into a single command and control system that provides and accurate picture of the battlefield. RISTA satellite payloads will be taskable directly from the theater, allowing combat commanders to look over the next hill as his needs dictate.

CONCLUSION

As the United States Army enters the next century there are superb opportunities to greatly enhance military operations by employing space systems. As forces are reduced, space will increasingly become the force multiplier that will enable success on future battlefields. Information operations will continue to rely heavily on space capabilities. It is critical, therefore, that the Army have an organization and process in place that ensures effective space systems are developed.

The Memorandum of Agreement between TRADOC and SSDC places the responsibility of planning space systems for the Army on SSDC (renamed Space and Missile Defense Command (SMDC). SMDC's Force Development and Integration Center and the Battle Lab will perform the DTLOMS and experimentation functions to

carry out the planning process, providing input to the DUSD (Space) National Security Space Master Plan, as well as to the joint planning being conducted by the United States Space Command.

As these SMDC space planning organizations develop requirements, they must ensure that a methodology is employed that applies each of the space functions (communications, missile warning, position/navigation, RISTA, and WTEM) to achieve the Army Modernization Objectives of dominant maneuver, precision strike, force protection, force projection, and winning the information war. The focus of the planning must be on the warfighter mission, and how space systems and technologies, present and future, can best be employed to enhance the accomplishment of that mission.

The products of this planning methodology should be operational requirements for space systems that integrate to improve current systems for the Army XXI of 2010 and, as technological breakthroughs occur, poise the Army After Next to dominate the full range of military operations through 2020 and beyond. These systems should exploit the exciting space capabilities being developed today such as the Global Broadcasting System, Personal Communications Systems, space based blue force tracking, and space based missile warning. As well, they should continue to advantage existing space capabilities by horizontal integration with other space systems and terrestrial based command and control and communications systems.

Three decades of experience in space has lead to incredible technological breakthroughs for the United States. Space has become a fact of life in the day to day performance of the defense of our country, greatly enhancing warfighting capabilities.

The challenge is to build on the accomplishments already made, and to exploit the vast potential of future space systems to dominate the global battlefield of the 21st century.

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