Intelligence Preparation of the Battlefield Needs SPACE

Major Dan Corey, U.S. Army

AS AN ELEMENT of Transformation, space affects intelligence preparation of the battlefield (IPB). U.S. Army professionals must expand their space knowledge and procedurally integrate space into the IPB process. Additionally, U.S. Army doctrine must formally recognize space as a dimension of the battlefield and include it in the term "battlespace" to refer to an Army combatant commander's defined area of operations and interest. In short, it is time to expand the Army battle staff's preparation of the battlespace from mud to sun.

When it comes right down to it, IPB is a command and staff application of age-old common sense performed before a military engagement. The visionaries in our doctrine centers apply new lexicons from time to time to describe and define IPB. It is just a simple process that staffs use to help commanders decide where and when to fight and how best to take apart an enemy force in detail. Every battle—past, present, and future—is intellectually prepared and researched ahead of time. Arguably, the degree of preparation will vary, but the battle is prepared nonetheless.

Throughout history, technological advances have complicated IPB as military professionals attempt to grasp the impact of new technologies on military operations. Once the technologies are learned and incorporated into prebattle planning, they become institutionalized or normalized. The U.S. Army has yet to normalize the dimension of space. Incorporating the space dimension into IPB brings the Army one step closer to normalizing this new dimension of the battlespace.

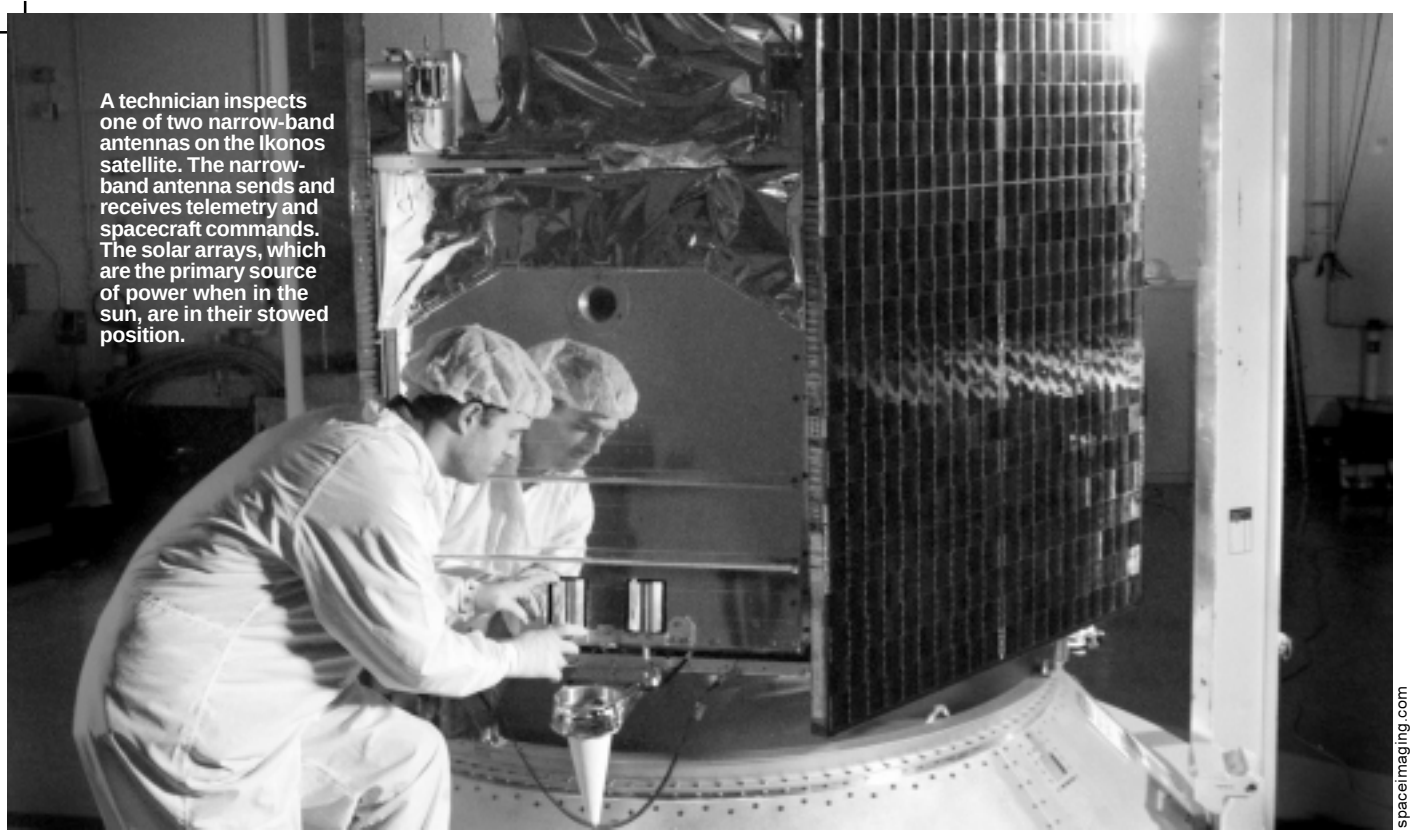
Given the rapid advances and proliferation of space systems technology, as well as commercializing some space applications, it makes sense to expand IPB into space and incorporate it into Army doctrine. Adding the space dimension to traditional IPB will also expand the collective understanding of adversarial and friendly space capabilities and vulnerabilities that will prove critical during future conflicts.

Staff preparation of the battlespace is an organizational methodology; hence, it is a social science, and the social sciences have always lagged behind the hard sciences. Introducing the rifled musket and minié ball during the Civil War resulted in horrendous casualties on both sides because Union and Confederate commanders were slow to adapt their tactics to emerging technology. Today, Intranet and Internet web browsing and electronic mail alter traditional command and staff relationships. Proliferating space technology, as well as its commercialization, is forcing Army battle staffs at all levels to adjust their planning processes and methodologies.

Adding a space dimension to the traditional IPB process is a natural extension of what is already an accepted and integral part of MDMP. Because space IPB is a new concept, FA 40 may prove invaluable to some staffs that lack the necessary expertise of the component parts of space IPB. Ideally, space IPB is a shared FA 40/G2 function that leverages the experience of seasoned intelligence professionals with a focused space expert.

As the U.S Army transforms, battle staffs must incorporate the space dimension into IPB. Forces that are lighter, more mobile, and increasingly self-sufficient will rely on space like never before. Space systems will enhance the new forces' ability to realize the vision outlined in Joint Vision 2010—to perform precision engagement, dominate information, deliver focused logistics, and enable full-dimensional protection.

On 8 May 2001, the Department of Defense issued a press release announcing Secretary Donald H. Rumsfeld's space initiative. In assessing his findings of the Commission to Assess U.S. National Security, Space Management and Organization, Rumsfeld offered his views on the commission's recommendations. What is clear from Rumsfeld's comments is the importance of outer space and related space activities to U.S. security. Additionally, he directed the Department of the Army to continue



A technician inspects one of two narrow-band antennas on the Ikonos satellite. The narrow-band antenna sends and receives telemetry and spacecraft commands. The solar arrays, which are the primary source of power when in the sun, are in their stowed position.

spaceimaging.com

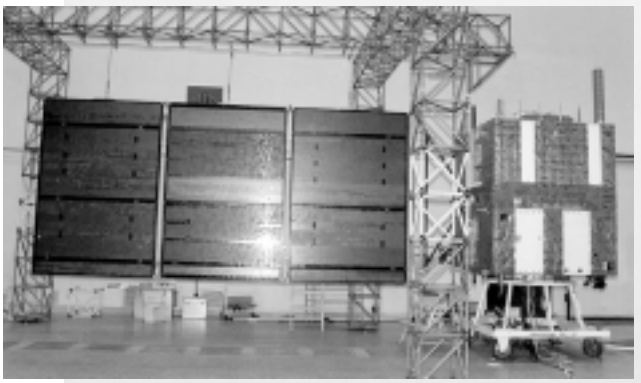
When Space Imaging of Thornton, Colorado, successfully placed its Ikonos electro-optical imaging satellite in orbit, it ushered in a new era of conducting ISR from space. For the first time, any group or individual could purchase imagery with military utility. The 1-meter-resolution Ikonos images are good enough to allow an analyst to determine tactically significant dispositions of Army ground forces.

its effort to establish space requirements and to develop and deploy Army-unique space systems. To improve space knowledge, each military service is directed to enhance its education programs at all levels so that military professionals understand how to integrate space activities into military operations. The Army currently fields a cadre of space-qualified officers in the functional area (FA) 40 career field, and it is this cadre that was singled out along with the U.S. Navy's to be maintained. Regrettably, at some echelon-above-corps and corps-level commands, the FA 40 officer is relegated to nonspace duties.

Army FA 40 officers are essential space planners who work among all staff elements to integrate space into military plans and orders via the military decisionmaking process (MDMP). Adding a space dimension to the traditional IPB process is a natural extension of what is already an accepted and integral part of MDMP. Because space IPB is a new concept, FA 40 may prove invaluable to some staffs that lack the necessary expertise of the component parts of space IPB. Ideally, space IPB is a shared FA 40/G2 function that leverages the experience of seasoned intelligence professionals with a focused space expert. Once the MDMP concludes, the commander reviews courses of action complemented by space considerations. For instance, when combat aviation is committed against the second operational echelon, space plays an important role due to FA 40's efforts to synthesize space support with the seven battlefield operating systems. Global positioning system (GPS) accuracy assessments; threat intelligence, surveillance, and reconnaissance (ISR) awareness; potential communications disruptions due to space weather; and accurate premission terrain-orienting simulations are some of what the FA 40—aided by Army space support teams—brings to today's warfighter.

Future FA 40s will use the insights gained from space IPB to coordinate space control and negation systems that the U.S. Army Space Command owns and operates to directly support the maneuver commander. So, when a threat imaging system breaks the horizon, tactical lasers engage and blind its sensors, thus denying the enemy deadly intelligence about friendly forces' composition and disposition. What land force commander would reject such a proposition? Detailed, accurate, and valid space IPB is the first step toward denying such a dangerous ISR capability to the enemy.

The four-step process used in traditional IPB provides an adequate framework for conducting space IPB. Defining the battlespace environment and its effects, evaluating the threat, and determining threat courses of action are steps that, when expanded to



The Chinese-Brazilian Ziyuan-1 earth resources satellite during transportation to its Changzheng (Long March) 4B rocket.

(*Inset*) The Ziyuan with its solar panel deployed before launch.

National Institute for Space Research, Brazil

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include space, allow us to fully consider an adversary's ability to use space or deny its use to friendly forces. Although the IPB framework remains the same, there are stark differences between traditional and space IPB. The most notable differences are the size and scope of the area of interest, introducing commercial entities or third-party countries, and the phenomenon of space weather.

A space system with all its component parts is rarely confined to a single geographic region and, therefore, adds an inherently strategic aspect to the operational level of war. Because an adversary's ability to leverage space may be organic, borrowed, or purchased, the supporting space architecture may span several continents or involve neutral nations or even commercial entities, including those registered in the United States. When spacecraft in various orbits are added to the terrestrial architecture to complete a space system, it makes for a very large space area of interest.

The space area of interest may contain targets the operational commander cannot influence himself without involving U.S. Space Command (USSPACECOM) or its components. Currently, the commander in chief (CINC), USSPACECOM, does not have a designated space area of operations like the combatant CINCs. He does, however, have the means to influence the space battle upon another CINC's request. Likewise, an army or corps may not have the organic ability to influence the entire space area of operations and interest, but the unreachable space battle can reasonably be effected through support tendered by USSPACECOM or its component commands. Knowing what support to request from a higher command and when to request it is a byproduct of space IPB.

Determining how an adversary will leverage space is a tall order even for staff officers with space experience. Is imagery or signals intelligence information available, and if it is, how long does it take to task, collect, process, and disseminate that information to military forces? Do space systems enhance enemy communications? Do space-based positioning systems assist navigation? These questions are pretty basic, but accurate answers are some of the most difficult to provide. It is not enough, for example, to inform the commander that his forces are being imaged from space without providing a timeline for tasking, processing, exploitation, and dissemination (TPED). The adversarial TPED assessment is what determines not only if but also when force can be brought to bear on friendly units. Determining an adversary's TPED is a challenge that becomes more complex when commercial entities or third-party countries are involved.

A third-party country, itself a space-faring nation,

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may choose to provide space support to an American adversary preceding or during armed conflict. The support could include any combination of ISR, communications, navigation, targeting, or space control. The U.S. intelligence community is challenged to determine the type of support being tendered and its associated TPED so that it can consider capabilities and timelines during the IPB process.

When Space Imaging of Thornton, Colorado, successfully placed its IKONOS electro-optical imaging satellite in orbit, it ushered in a new era of conducting ISR from space. For the first time, any group or individual could purchase imagery with military utility. The 1-meter-resolution IKONOS images are good enough to allow an analyst to determine tactically significant dispositions of Army ground forces. These images can be made available to any customer over an Internet connection or directly downlinked anywhere in the world once the IKONOS satellite gains line of sight with its associated ground station.

Fortunately, Space Imaging is an American company that is subject to U.S. legal restrictions. These restrictions, coined "shutter control," would likely be directed in time of crisis or conflict. When foreign companies, however, own and operate space systems, U.S. restrictions on shutter control do not apply without a legal agreement. It is up to the space staff officer to determine the commercial availability of space support to the adversary as well as its associated TPED, which are all pieces and parts of space IPB.

There are numerous classified and unclassified online resources available to assist the FA 40. By working with the G2 and leveraging the intelligence community, the FA 40 should be able to assess an adversary's space support whether it is organic to that nation, purchased commercially, or provided by another country. What is known about an adversary's space capability can then be integrated into the MDMP and synchronized with the seven battlefield operating systems.

Both the terrestrial and space environments influence the ability of friendly and adversary forces to use their space systems at maximum effectiveness. Terrestrial weather and terrain degrade some space systems during heavy precipitation, high winds, or in dense clouds. Line-of-sight limitations can impact a ground station's ability to communicate with its spacecraft, and it can also affect the quality of some space-based ISR systems.

Space weather conditions affect the ability of space systems to function properly. Solar activity creates most space weather conditions. Solar flares, coronal mass ejections, solar wind, and proton events all disturb the near-Earth environment. Space weather can degrade or even eliminate our military space communication and some terrestrial communications capabilities for a few minutes to several hours.

Although science and technology have progressed, considerable work is needed in the area of solar physics. Predicting solar weather's effects on space and terrestrial systems must improve if space weather forecasts are to have any operational relevance. Through the space IPB process, battle staffs must recognize the potential disruption to their systems so that a critical phase of the battle is not planned during a period of elevated risk. Solar weather can affect high-frequency and satellite communications systems, GPS, or overhead collection systems.

It has been more than 40 years since the former Soviet Union stunned the world by placing Sputnik in low-Earth orbit. Since then, space technology has advanced rapidly. U.S. military forces increasingly depend on space systems for various force-enhancement and application functions. The trend toward increased dependency creates both opportunities and vulnerabilities in future crises and conflicts. U.S. Army professionals must respond to this increasing reliance on space by improving their collective knowledge and by institutionalizing and ultimately normalizing space. Incorporating the space dimension into existing Army planning methodologies like IPB is just one step toward normalizing space to most Army professionals. ***MR***

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