MilitaryReview

SPACE OPERATIONS

11 September 2001

A Call to Arms

Military Review's **Mission** is to provide a forum for the open exchange of ideas on military affairs; to focus on concepts, doctrine and warfighting at the tactical and operational levels of war; and to support the education, training, doctrine development and integration missions of the Combined Arms Center and Command and General Staff College (CGSC).

Military Review

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From the Editor

This issue of *Military Review* was originally planned with space operations as its theme. Although space remains the focus, *Military Review* could not allow the events of 11 September to pass without acknowledgment. To that end, the journal has included with this issue a special insert that affirms America's resolve to fight this war against terrorism. David Shaughnessy and Lieutenant Colonel Thomas Cowan address how the attacks on the World Trade Center and the Pentagon reveal fundamental changes in the way international terrorists operate and how the United States and the coalition must combat those changes.

Space has long intrigued the military imagination. Since the Gulf War, space has grown tremendously important to U.S. warfighters. Now, perhaps more than ever before, especially in light of combat operations in southern Asia, space-based operations are vital to the success of U.S. forces. Lieutenant General Edward G. Anderson III, deputy commander, U.S. Space Command (USSPACECOM), explains how USSPACECOM enables that success. The article by Lieutenant Colonel Brian Anderson and Robert Bogart discusses how USSPACECOM supports the joint force commander.

The U.S. Army Space Command (ARSPACE) is deeply involved in space operations. ARSPACE leads the effort to integrate space operations across the full spectrum of Army operations. Two articles from contributing authors Lieutenant Colonel Brad Baehr, Chuck Purkiss, Willie Breazell, Russ Smith, J. G. Byrum, and Tommy Houston explain how ARSPACE brings space to the ground warfighter

Perhaps the most important aspect of space operations is the role space plays in communications and information management. In fact, space operations entail getting the right information to the right user at the right time. Major Dan Corey explains how space-based systems significantly enhance intelligence preparation of the battlefield. In addition, William Messer relates how intelligence, surveillance, and reconnaissance data empowers the warfighter in defining the battlespace.

Integrating space operations into exercises is essential if using space is to become second nature to warfighters. An important step is using exercises to teach staffs how to use space-based capabilities. Teddy Bitner illustrates how space should be part and parcel of every exercise and simulation. Major Terry Torraca uses an excellent sketch from an actual exercise to show how Army space personnel can make a difference to the joint force commander.

Effective space operations cannot take place without skilled personnel to plan, resource, and execute these operations. Discussing the new space operations functional area, Brigadier General Richard V. Geraci neatly summarizes the qualities of the contemporary space operations officer. Major James Meisinger concludes with an imaginative article that takes a fanciful look at what future war might look like when enhanced by space-based capabilities.

The future—what does it hold? The best thinking about the future comes from those who have an appreciation for the past, a solid grasp of the present, and an enthusiasm for the future. *Military Review* intends to play a significant role in bringing the best thinking to military professionals.

MRR

Attack on AMERICA:

The First War of the 21st Century

David J. Shaughnessy and Lieutenant Colonel Thomas M. Cowan, U.S. Army

The terrorist attacks of 11 September 2001 rocked the nation in ways that will reverberate for years. The authors discuss how these attacks signal shifts in the modus operandi of international terrorism—shifts in purpose, organization, weapons, and capability.

Today, our fellow citizens, our way of life, our very freedom came under attack in a series of deliberate and deadly terrorist acts.

— President George W. Bush in his address to the nation, 11 September 2001

AS THE SOLE SUPERPOWER in a world increasingly defined by global markets, economic institutions, and societal norms, the United States is involved in world affairs to a degree unprecedented in its history. Its national success and prolific engagement, enacted within a framework of personal freedom, human rights, and Christian morals, have created resentment among other nations as well as religious, ethnic, and political factions in the world. Its national strengths—strategic location, economic strength, and military power—have served to protect it from conventional attacks resulting from these hostile views. However, its national character—democratic principles, individual freedom, and human rights—serve to increase its vulnerability to asymmetric, unconventional, or indirect actions. It remains clear that any campaign conducted against the United States, today or in the foreseeable future, will be a mix of asymmetric, adaptive, and conventional operations against the nation's vulnerabilities.

The 11 September 2001 terrorist attacks on the World Trade Center and the Pentagon, and the 2000 attack on the USS *Cole* are examples of asymmetric or asynchronous acts carried out by an adaptive and thinking opponent who continually studies the strengths and weaknesses of his perceived enemy and adapts his operations accordingly. These attacks were not without a larger purpose. They are part of an ongoing campaign that is likely to continue and expand.

The Nature of the Act

Terrorism is a tactical action that is designed to generate an operational or strategic effect. It is the creation of an event that has broader consequences than that created by the event alone. By its very nature, terrorism is asymmetric. It seeks to employ a capability that affords no defense or effective counteraction. This makes terrorism a viable means for less capable organizations to attack more capable opponents. At its very root, terrorism strikes at the will of the people, the credibility of the government, and the effectiveness of national security.

Terrorist acts can be linked together in the form of a campaign but will be more effective when employed as part of a strategy employing other elements of power in a more conventional framework.

This permits consistent operations that are continuous and complementary. The application of other elements of power need not be overt and in fact might be more effective when employed covertly. They could involve information operations, diplomacy, or economic leverage as well as more conventional military operations. For example, a state or organization that knows in advance that a significant event is going to occur could conceivably set economic conditions so as to profit from that event. It is the asymmetric nature of these tactics that affords the greatest opportunity for success against more powerful opponents, but it is their effect on conventional institutions that generates opportunity as a consequence of the event.

Terrorist tactics are normally employed in an asynchronous framework. It is their asynchronous character that gains the initiative for the terrorist. The terrorist picks the time and place of the event rather than having the time and place defined by its relationship to other operations. This represents an offensive framework that is driven by vulnerability, opportunity, and tailored capability rather than by fixed capability employed in a conventional construct. Because these events are asynchronous, however, does not mean that they are not part of a larger, more synchronized effort. In fact, it is becoming increasingly more likely that future terrorist tactics will be employed in a more synchronous operational framework. The ability to continuously choose the time and place of events allows the threat to control the operations tempo, thereby always retaining the initiative. To U.S. opponents, it is apparent that these tactics, planned and prepared in advance, allow a regional actor to keep a more capable adversary off balance without significant investment in visible and costly capabilities.

A Campaign Framework

History has demonstrated that single, isolated acts of terrorism may have profound effects on perceptions, policy, national strategy, or even national will; however, lasting effects involving significant change in the nature of government or long-term national goals have been unattainable through single acts. A long-term campaign with multiple lines of operation is required. This could be a campaign of asynchro-

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nous events to wear down and shape outcomes, such as the former Soviet Union sponsored events during the Cold War, or a campaign employing all elements of power in conjunction with and complementing terrorist acts.

As an accepted mode of operation, state-sponsored terrorism came of age during the Cold War when the Soviet Union guaranteed the survival of states that supported or conducted acts of terror against the United States and it allies. While today there are still states that sponsor terrorism, none do so overtly.

Terrorism remains a viable and effective tactic, but its use is less and less acceptable to the international community when employed in an asynchronous framework short of declared hostilities. Under conditions of limited warfare or in time of peace, it is a heinous act unacceptable to most nations. However, within a framework of total war, terrorism would be retitled asymmetric operations and become accepted for achieving national objectives. For this reason, many states hostile to the United States covertly support transnational organizations capable of conducting terrorist acts. These organizations are employed for campaigns short of war and permit distance and deniability by the supporting states within the international community. At the same time, these states are developing capabilities for employing asymmetric means and

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tactics should open warfare break out. Future operational environments will contain state as well as transnational organizations with the capability to conduct asymmetric operations both inside and outside the area of operations as part of an overall operational design.

As the nation grows stronger, the value of these operations increases, making them more likely to be a major part of any future military operation. Asymmetric operations are conducted within a campaign framework and strikes at the will of the American people, the perceived center of gravity of the United States, rather than at the fringes. Within the scope of unlimited war, all targets are justified: population centers, infrastructure, industry, and the military. The end state for the terrorist or asymmetric operation is achieving operational or strategic goals, including denial, exclusion, or defeat of the United States and its allies.

Adaptive operations. The decrease in numbers of terrorist acts over the past decade has more to do with the increasingly fixed mode or pattern of operation than desire or intent. While still difficult to detect, known actors, employing logical methods of operation and using recognizable capabilities, offer indicators that could be identified and targeted, which would reduce terrorists' opportunities significantly. Judging from more recent attacks, however, it appears that new and less predictable patterns are emerging. Rather than a fixed capability looking for an opportunity, the threat appears to be designing the capability to attack assessed vulnerabilities. This presents a significant problem in that the characteristics of each event are likely to be different. The pattern of operation is designed uniquely for the target that the terrorist plans to strike. A lack of predictability requires more resources for intelligence collection and analysis, and a broader range of protective measures to defend against a wider range of possibilities.

The attacks of 11 September represent a significant change in pattern and tactics, and fit the new emerging model. U.S. law enforcement has routinely and successfully monitored hazardous goods that may be employed as weapons, a practice strengthened by the Oklahoma City bombing. Recognizing this obstacle, terrorists adapted their attack means by smuggling explosives into the United States rather than attempting to obtain them from sources within the country. This approach met with only partial success and, in the process, increased border security and cooperation between the United States and its neighbors. Recognizing this new factor in the security environment, the methodology was again modified, this time creating the kinetic effect of explosives—a fully fueled, large aircraft—without the inherent intelligence indicators that could compromise the attack while bypassing personnel and vehicle control measures at the World Trade Center implemented after the 1993 attempt. In this instance, the organization leveraged U.S. resources to train pilots and provide the weapons. From air security protocols, terrorists devised a plan to smuggle low-metal-content weapons onto aircraft and used the pilot and crew training to cooperate with hijackers to gain control of the aircraft.

Leveraging sanctuary. Operating from dispersed locations in multiple countries provides a high degree of sanctuary from direct attack. Transnational terrorists rely on their strategically secure positions to deflect the conventional strengths the United States could otherwise employ to destroy their organizations. By seeking sanctuary in areas difficult to attack by using high-tech, precision standoff engagement, terrorist organizations protect themselves from forms of retaliation that they have limited means to counter symmetrically. In the case of Osama bin Laden's organization, it has embedded itself in a nation whose economic and physical infrastructure is too underdeveloped to threaten, yet

The destroyer USS *Cole* positioned on the deck of the Norwegian heavy transport ship M/V *Blue Marlin* during its 5-week trip back to a U.S. drydock. The 11 October 2000 attack off the coast of Aden, Yemen, killed 17 crew members and injured 39 others.

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is still capable of mounting a formidable defense on rugged terrain. This has provided a nearly ideal sanctuary that poses more dilemmas to the United States than can be countered from standoff precision targeting. Even successful attacks against elements in sanctuary may not defeat the network, that extends over a wide number of nations and nonnations and carries substantial risks to U.S. forces conducting conventional operations. From this position of relative security, bin Laden's group

has the flexibility and security to retain the initiative and remain on the strategic offensive.

The employment of sanctuary also uses international law and trade practices against the United States. Transnational organizations use international banking processes designed to encourage free trade to receive and disburse the funds needed to attack various targets while remaining nearly undetected. Transnational groups also hide behind international law, protecting themselves and their sponsors by

Chicago firefighters join the rescue effort at the World Trade Center site.

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demanding legally admissible evidence. This level of proof does not normally exist because of the manner in which terrorists are organized and operate; when it is available, it often cannot be presented to the public without compromising intelligence sources or methods.

If the United States elects to attack, transnational terrorists frustrate targeting by having a signature undetectable to high-tech collection systems, by dispersing into complex terrain, or blending into the civilian population. All these techniques are designed to defeat the United States' undisputed asymmetric advantage in high-tech, precision standoff weapons. U.S. security procedures have been de-signed primarily to detect, rather than to defend against, a determined attacker.

Information Operations

Regardless of whether he is responsible, the 11 September attacks raise bin Laden's prestige in the Muslim extremist world and attract additional followers and money to his cause. It also gives other organizations and states insights into U.S. vulnerabilities. The United States may appear weak to opponents if it is unable to respond to the attack effectively. The visibility of this event and its dominance in the media provide opportunities for a wide range of actors to take advantage of this act.

Photo not available

Transnational terrorists rely on their strategically secure positions to deflect the conventional strengths the United States could otherwise employ to destroy their organizations. By seeking sanctuary in areas difficult to attack by using high-tech, precision standoff engagement, terrorist organizations protect themselves from forms of retaliation that they have limited means to counter symmetrically.

Carefully planned and executed adaptive campaigns of terror attempt to demoralize the nation, frustrate U.S. policies for reaction and retaliation, reduce U.S. regional presence, and paralyze the national will by exploiting the vast U.S. information system. Information systems expand the impact of the event and create strategic effects. On the international scene, well-publicized, effective events may serve to fracture coalitions by focusing other nations inwardly.

Furthermore, consistent denial of responsibility is a new tack taken by transnational terrorists. It counters the information and diplomatic superior-ity of the United States and creates doubt. It allows nations to support terrorism without international repercussions.

A successful attack on the United States must be conducted against the systems upon which it relies for its dominance. This consists in large part of military and economic complexes that have formed pillars of U.S. foreign policy. The attacks on 11 September were more than symbolic; they targeted the command and control of the nation's economy and military. Normally, isolated attacks not part of a conventional campaign can be expected to focus on symbolic targets for their media value and strategic

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implications. When asymmetric or terrorist attacks are conducted as part of a more conventional campaign, they will more likely target operational or strategic capabilities. Within the framework of a terrorist campaign, terrorists understand that defeating the United States is not a matter of winning battles but rather of continuously applying psychological and physical pressure to damage the political, economic, and military foundations of power.

Access denial. Strategic preclusion attempts to deter or reduce the deployment of U.S. forces. Sympathetic or supporting nation states lend support to strategic preclusion efforts by calling for the use of diplomacy, citing the absence of proof that links the group to the act and imposing economic measures that threaten coalition partners' interests. These actions are often disguised as respect for international law or a desire for a peaceful resolution.

Operational exclusion attempts to prevent regional neighbors from allowing or assisting the deployment of U.S. forces. Adversaries have long recognized the United States' need for significant staging areas. The adaptive transnational terrorist threatens regional neighbors with attacks and terror in the event they cooperate with or provide staging areas for U.S. forces. State sponsors of transnational terrorism conduct diplomatic and information campaigns to persuade regional states that the United States is an unreliable partner and that cooperation will lead to regional economic and diplomatic isolation.

Thwarting U.S. intelligence. Terrorist organizations rely on secrecy to plan and prepare attacks. Compartmented organization, brutal enforcement of loyalty, and recruiting criteria based on political and religious reliability allow better protection of information than is possible in the nation states that terrorists attack. In a strategic defensive posture, the United States is unable to force its opponent into an activity that might compromise locations and intentions. Not only does asynchronous timing lend security to terrorists, but it also necessitates vigilance by U.S. intelligence organizations to discern terrorist activities and intentions. Furthermore, to counter the ability of intelligence operations to detect plans and preparations, the terrorists employ deception. This includes deliberately leaking false information and statements to the media to mask the true plan and to desensitize and confuse intelligence analysis.

The vast U.S. intelligence system was designed to monitor the former Soviet Union and is built around technology. Human intelligence has been relegated to secondary importance and used largely to support diplomacy. This imbalance has created predictability and limited depth of collection. Also, the United States has focused on states rather than on transnational organizations, and U.S. analysis was designed to assess the conventional capabilities adversaries possess and employ. Last, the intelligence community functions well during times of crisis but lacks the analytical and human intelligence underpinnings to sustain the necessary level of effort this new operational environment requires. Success in the long term against an adaptive and determined transnational opponent demands a less predictable process, combined technical and human systems engaged against all threats, continuous operation at peak performance, and engagement well before a crisis.

Implications

Transnational organizations retain the strategic initiative and bring to bear the means of adaptive attack by controlling operations tempo. Acts of terror rely on surprise to magnify the psychological impact of each event. Unconstrained by the need to retain terrain or to follow one success with another, either of which would provide a predictable pattern of operations, the transnational terror organization

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can select times and targets that suit its resources, planning abilities, and the security environment. The 1993 attack on the World Trade Center and the 2000 attack on the USS *Cole* had no effect on the long-term success of the campaign that eventually led to the highly successful 11 September attacks, nor was the timing of the attack related to any other tactical event, which made it impossible to determine a pattern or predict the next attack.

Terrorist actions are likely to be continuous in nature but not continuous in rhythm or frequency. Adaptive terror actions are not simply isolated events but are linked to other goals and operations—economic, political, and even military, when feasible. They are also likely to take many forms and contain several lines of operation working simultaneously or orchestrated in space and time. Terrorist activities will range from nonlethal activities such as information operations, to lethal activities such as direct action using varied conventional low- to high-technology means and weapons. Future terrorist actions involving weapons of mass destruction or effects cannot be discounted. Collection against these activities requires an intelligence system as flexible, proactive, and adaptive as the organizations it targets.

Unconventional attacks against the U.S. homeland are part of every future opponent's strategy and will be part of its force design and capabilities. Repeated attacks against the U.S. homeland change social, economic, and political behavior; limit personal freedom; impede free trade; inflict psychological stresses; and damage the nation's international standing as a world economic and military power.

Terrorists stress adaptation and flexibility to preserve their organization and ensure their continued power. They conduct strategic operations to degrade U.S. national will, fracture alliances and coalitions, and limit the scope of U.S. involvement abroad. Their ability to adapt faster than defensive measures can complicate U.S. efforts to remain in the strategic defensive. Operations conducted without discernible frequency or patterns require the United States to maintain a socially, politically, and economically expensive posture of constant readiness, which itself does not guarantee success. Intelligence operations assist in reducing the need for constant readiness but are not infallible and must be flexible, adaptive, and broad in scope. Taking the strategic offensive can eliminate an opponent, but it requires exceptional intelligence and an adaptive force capable of fighting on a battlefield of unprecedented complexity, fluidity, and lethality. These challenges can only be met by creating an adaptable military force capable of dominating this environment. *MR*

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U.S. SPACE COMMAND AND U.S. ARMY SPACE COMMAND

Space has come into its own as a medium in which to conduct military operations. Mastery of space doctrine and proficiency in employing the array of U.S. communications and surveillance satellites are the earmarks of the 21st-century warfighter. Without the capabilities of space systems to communicate, reconnoiter, surveil, and target, today's commander fights with one arm tied behind his back. This collection of articles from the United States Space Command (USSPACECOM) brings into focus how USSPACECOM supports the warfighter and what operational warfighters must know about space operations to be successful space users. Also, do not miss the space article in the Insights section of this issue.
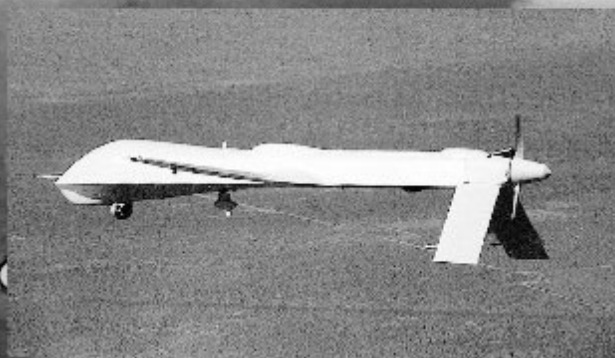
U.S. SPACE COMMAND:
Warfighters Supporting Warfighters in the 21st Century

Lieutenant General Edward G. Anderson III, U.S. Army

FUTURE HISTORIANS will know the 21st century as the century of "space and information." The U.S. Space Command (USSPACECOM) is the Department of Defense's (DOD's) key player in charting our nation's course in space and information.

Furthermore, USSPACECOM is the single point of contact for all military space operations. In the Unified Command Plan, the President of the United States directs USSPACECOM to advocate space operations and missile warning requirements for all commanders in chief (CINCs). USSPACECOM conducts space operations in the mission areas of space support, force enhancement, space control, and force application. It also plans for and develops requirements for strategic and tactical ballistic missile defense. Most recently, USSPACECOM was identified as the military lead agency for DOD's computer network operations (CNO) mission.

Ten years after the Gulf War, the huge advantage space brings to warfighting is apparent. Space provides time-critical information to frontline commanders. Space operations were crucial to success during air operations over Serbia. As a result, space-based capabilities have become an integral part of U.S. military operations. Similarly, the United States must protect its critical information infrastructure to assure information superiority as well as develop appropriate strategies to exploit the vulnerabilities of our adversaries' space and computer network capabilities.

The Importance of Space and CNO

Space is an economic center of gravity. The domination of space by the United States and the former Soviet Union ended with the fall of the Berlin Wall. Today, the international community has more than 700 active satellites in orbit; the United States owns and operates more than 300. In all, 31 countries and

USSPACECOM recently assumed the responsibility as the lead military organization for the CNO missions of Computer Network Defense (CND) and Computer Network Attack (CNA). . . . CND is USSPACECOM's first priority to protect and defend the DII from disruption, denial, degradation, or destruction. CNA complements CND by disrupting, denying, degrading, or destroying an adversary's information infrastructure.

12 international consortiums have some form of space program. During the next 10 years, predictions are that approximately 600 to 1,100 new satellites will be launched. The world's space industry has more than 1 million employees working in 20,000 companies and is expected to grow about 15 percent this year. In fact, entire new industries have been created around space applications. For example, the global positioning system (GPS) industry alone generated more than $8 billion in revenues last year. Direct Broadcast Satellite (DBS) services such as Direct TV and Dish Network drove the industry revenues to unprecedented heights in 2000. DBS revenues jumped to $31.5 billion in 2000, up from $22.5 billion in 1999. It is clear that space has evolved into an economic center of gravity.

Space is also a military center of gravity. The United States' ability to access and use space is a vital U.S. national interest. From precision-guided munitions using GPS to strike in any weather to early warning against enemy Scud launches, U.S. and allied commanders around the globe have recognized the importance of space in combat operations, peace operations, and training.

As the United States begins its fifth decade in space, the U.S. military realizes that space integra-

An Army Space Command soldier prints out a tactical map image downloaded from strategic satellite capability. This type of map is used to assist theater of operations commanders with the most current images as captured from the Earth's exoatmosphere.

US Army

Hand-held GPS receivers; missile warning DSP satellites; communications and weather satellites; and reconnaissance, intelligence, surveillance, and target acquisition, were space-based capabilities essential to victory in [Desert Storm]. Since then, we have integrated these capabilities into our terrestrial warfighting forces. Space is now better integrated with air, land, and sea operations to enhance the joint and combined warfighting team.

tion efforts have done two things. First, it has energized the information age, reduced time and space, and enabled instantaneous information. The U.S. military has leveraged this information advantage. But equally important, U.S. efforts have created a new set of weakly defended targets, which if destroyed or damaged, would drastically reduce the United States' ability to conduct diplomatic, economic, and military operations at home or abroad.

Cyberspace is another military center of gravity. Similarly, the explosive growth in information technologies has profoundly affected all sectors of modern society. The information revolution has fueled the United States' amazing economic growth, dramatically improved communications, and allowed businesses to compete more effectively than ever before. Information availability and integrity have become critical to the operational readiness of today's military forces. Nowhere is this more evident than in the U.S. military. Just like space, the United States depends on cyberspace to conduct successful military operations.

In the past, DOD relied on stovepiped systems, local area networks, and a limited number of users to protect its information. However, as DOD be-

comes more interconnected, it has created a shared-risk environment—risk assumed by one user is assumed by all users. In this shared-risk environment, the interconnected systems' security posture is only as good as the weakest system. The challenge is to maintain situational awareness and to actively defend the seams, or boundaries, that connect these systems so these interfaces do not become easily exploited.

The United States relies heavily on commercial systems and the associated telecommunications infrastructure to move information. These systems, along with unique military systems, comprise the defense information infrastructure (DII). Specifically, the DII is made up of approximately 10,000 local area computer networks and more than 2.5 million unclassified computers. The U.S. military relies on DII to move 95 percent of its communications traffic. Like space, our potential adversaries recognize the U.S. military's dependence on DII. It is not a case of defending against kinetic attacks anymore; we are now defending against "ones and zeros."

Today, we are at war. Daily, DOD identifies and records thousands of "cyberevents," some of which are determined to be attacks against computer systems and networks. These cyberevents are actions

Ministry of Defense and Aviation, Saudi Arabia

Patriot missiles intercept an Iraqi Scud missile fired at Dhahran, Saudi Arabia, during the Gulf War.

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that could lead to illegal access or denial of service. Over the past several years, there has been a dramatic increase in the number of detected events. In 1994, there were 225 detected events; by 2000, there were 23,662. The U.S. Air Force, U.S. Army, and U.S. Navy recorded a combined total of 600 cyberattacks in 1999 and 715 cyberattacks in 2000 against their systems and networks.

There are two primary reasons for this increase. First, we have improved our ability to identify these events through better intrusion and detection tools, organizational reporting, network hardening, awareness, and training. Second, our adversaries have improved their ability to gain unauthorized access through better hacking tools, organization, and politics. The cyberthreat ranges from inexperienced hackers to nation states. However, nation states are the biggest concern because there is limited knowledge on the types of capabilities they are developing.

USSPACECOM

Established in 1985, USSPACECOM is a relatively new organization. Its Commander in Chief (USCINCSPACE) reports directly to the U.S. National Command Authorities. USCINCSPACE is responsible for subordinate commands from the

three service components—Army Space Command (ARSPACE), Naval Space Command (NAVSPACECOM) and Space Air Force (SPACEAF)—as well as the Joint Information Operations Center (JIOC) and the Joint Task Force for Computer Network Operations (JTF-CNO).

Headquarters, USSPACECOM, and Cheyenne Mountain Operations Center are strategic operations centers located at Peterson Air Force Base (AFB) and Cheyenne Mountain in Colorado Springs, Colorado. ARSPACE is also located in Colorado Springs. The NAVSPACECOM is located in Dahlgren, Virginia, and our most robust organization, SPACEAF, is headquartered at Vandenberg AFB, California, with more than 11,000 people stationed around the world. Finally, the JTF-CNO is located at Arlington, Virginia, and the JIOC is located at San Antonio, Texas.

As stated earlier, the United States operates more than 300 active military, civil, and commercial satellites. These operations range from low-Earth orbit (LEO) to geosynchronous orbit (GEO). To put these various satellites into perspective, assume a basketball represents Earth. At Earth's surface, air-breathing aircraft operate in the denser portions of the atmosphere that extend out to about 20 miles

Data gathered from sources as diverse as UAVs, ground-based sensors, Guardrail, and JSTARS will be merged with intelligence from space-based resources to maintain information and decision superiority.

[USSPACECOM is] the military lead agency for DOD's computer network operations (CNO) mission. . . . USCINCSPACE's strategic objective is to operationalize CNO into the fifth domain of warfare separate and distinct, but fully integrate it into air, land, sea, and space across the full spectrum of conflict with the ability to leverage the computer network domain to achieve and maintain information and decision superiority for the joint force.

above the surface. Using the basketball-sized Earth, 20 miles would be about 1/50th of an inch above the basketball. By contrast, the closest satellite orbit to Earth, LEO, ranges from about 100 miles to 500 miles in altitude. This would be about 3/16th to 1/2 inch above the basketball. Most LEO satellites, as well as the space shuttle, operate at 100 to 250 miles, and our weather satellites, such as those in the Defense Meteorological Support Program, operate at 450 miles. GPS satellites fly at medium-Earth orbit (MEO) at 11,000 miles, or about 14 inches above the basketball. At GEO, we operate the Defense Support Program (DSP) and communications satellites. That represents approximately 28 inches above the basketball model, about 22,500 miles.

Current Operations

Operation Desert Storm was the first time U.S. and coalition commanders saw the largely unexploited military potential of space. Hand-held GPS receivers; missile warning DSP satellites; communications and weather satellites; and reconnaissance, intelligence, surveillance, and target acquisition were space-based capabilities essential to victory in the desert. Since then, we have integrated

these capabilities into our terrestrial warfighting forces. Space is now better integrated with air, land, and sea operations to enhance the joint and combined warfighting team.

Missile warning, both theater and strategic, continues to be USSPACECOM's top priority. It is a mature mission that grew up during the Cold War—USSPACECOM knows how to do it. Since Desert Storm, USSPACECOM has made much progress in reporting and determining the impact area. With the proliferation of theater ballistic missiles, USSPACECOM is working hard to field the Space-Based Infrared System (SBIRS) to replace our aging DSP satellites. SBIRS has improved detection capabilities that will enhance early warning and space surveillance capabilities, support future ballistic missile defense systems, and provide warfighters with better battlefield situational awareness.

GPS has truly revolutionized how U.S. and allied forces conduct warfare. It provides the necessary elements for precision strike — precise weapon location, weapon guidance, target location, and battlespace timing. The United States' current challenge is to deny its adversaries the use of these position and timing capabilities afforded by GPS dur-

A Fleet Satellite Communications Systems satellite in geosynchronous orbit. The United States is the only nation that actually detects, identifies, catalogs, and tracks all manmade space objects.
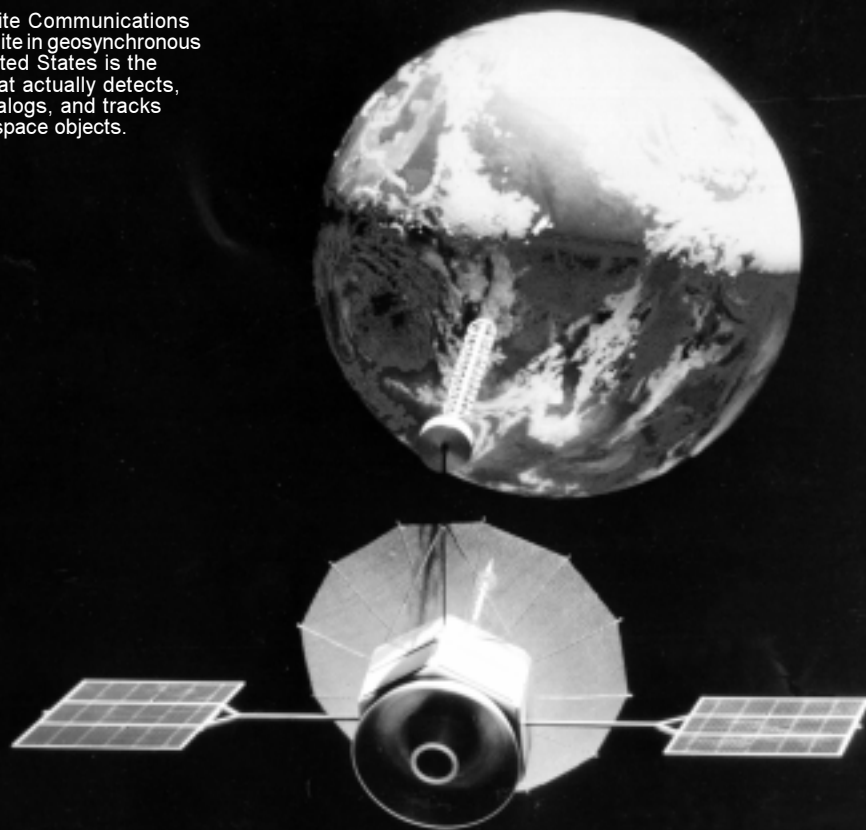
The United States operates more than 300 active military, civil, and commercial satellites. . . . Using a basketball-sized Earth [for comparison], 20 miles would be about 1/50th of an inch above the basketball. By contrast, the closest satellite orbit to Earth, low-Earth orbit (LEO), ranges from about 100 miles to 500 miles in altitude. This would be about 3/16th to 1/2 inch above the basketball. Most LEO satellites, as well as the space shuttle, operate at 100 to 250 miles. . . . GPS satellites fly at medium-Earth orbit at 11,000 miles, or about 14 inches above the basketball. At geosynchronous orbit, we operate the Defense Support Program and communications satellites. That represents approximately 28 inches above the basketball model, about 22,500 miles.

ing a conflict. A future generation of GPS, GPS III, will give us new navigation warfare (NAVWAR) capabilities to shut off GPS service to a limited geographical location while providing GPS to U.S. and allied forces.

As seen during Operation Desert Storm and Operation Allied Force in Kosovo, reliable and secure satellite communications (SATCOM) systems have been and will continue to be critical to military readiness. The United States' ability to leverage commercial SATCOM to satisfy growing communications requirements is an important dimension to this mission area. Today, USSPACECOM is developing the next generation of advanced military communications satellites to meet future communications requirements of bandwidth, protection, survivability, and interoperability with a blend of military, civil, and commercial systems.

Before we can provide these critical capabilities to warfighters, we must get to space and be able to

operate once we get there. Space support is the answer— it is our assured access to space. In its launch or spacelift role, SPACEAF operates the Western Launch Range at Vandenburg AFB, and the Eastern Range at Patrick AFB, Florida. The Western Range is primarily used to launch polar orbiting satellites and test intercontinental ballistic missiles, while the Eastern Range is used for other types of space launches.

As part of its satellite operations mission, USSPACECOM is responsible for controlling space systems once they are in orbit, making sure they are operating properly and avoiding other space objects or debris. USSPACECOM's worldwide sensor network of radar and optical systems, tracks and maintains a catalog of more than 8,300 space objects that range in size from a ballpoint pen to twice the size of a school bus. The United States is the only nation that actually detects, identifies, catalogs, and tracks all manmade space objects. Space

Minuteman III reentry vehicles streak through the sky near Kwajalein Atoll in the Ronald Reagan Ballistic Missile Defense Test Site.

US Army

Today, the United States does not have a robust architecture to defend its space systems from attack, nor does it have many options to deny space to others. As seen during Operation Allied Force, the United States needs more options than bombing a satellite ground station. Therefore, establishing a strategy and developing enhanced capabilities remains the primary space control goal.

surveillance is very important to USSPACECOM's emerging space control mission.

USSPACECOM recently assumed the responsibility as the lead military organization for the CNO missions of Computer Network Defense (CND) and Computer Network Attack (CNA). On 2 April 2001, USSPACECOM formed JTF-CNO to place the CNA and CND missions under a single operational commander. CND is USSPACECOM's first priority to protect and defend the DII from disruption, denial, degradation, or destruction. CNA complements CND by disrupting, denying, degrading, or destroying an adversary's information infrastructure. Since taking on these missions, the challenge is to stay ahead of the emerging threats to DOD networks, to keep abreast of rapidly changing technology, and to coordinate closely with other government agencies and civilian industries actively engaged in this mission.

Placing CNO under a single operational commander enables unity of command and effort, more efficiently uses available resources, eases coordination with the intelligence community, and establishes clearer interagency coordination. As USSPACECOM learns more about the mission and as the nation develops communications and information strategy, the JTF-CNO serves as a pathfinder organization that will adapt to changing threats and to its expanding mission. JTF-CNO may someday evolve into a subunified command.

USCINCSPACE's strategic objective is to operationalize CNO into the fifth domain of warfare, separate and distinct, but fully integrate it into air, land, sea, and space across the full spectrum of conflict with the ability to leverage the computer network domain to achieve and maintain information and decision superiority for the joint force. To achieve this, USSPACECOM has developed a multiphased CNO campaign plan to direct the planning, operational, technical, and programmatic integration activities to operationalize CNO. Today, we are planning for and working real-world exercises and contingency operations. The end state is a robust and threat-adaptive organization.

Space control involves ensuring the United States' use of space while denying its use to the enemy. Space control is and will be very important to maximizing the United States' warfighting capability. Today, the United States does not have a robust architecture to defend its space systems from attack, nor does it have many options to deny space to others. As seen during Operation Allied Force, the United States needs more options than bombing a satellite ground station. Therefore, establishing a strategy and developing enhanced capabilities remains the primary space control goal. Space control does not mean that the United States intends to dominate space. Rather, it means that the United

States will achieve control when, where, and for as long as needed.

Space control consists of four elements: surveillance, prevention, protection, and negation. The key to success will be improving our space surveillance capabilities. Effective space control is only possible by achieving space situational awareness and by knowing the operational environment. The United States must be able to prevent unauthorized access and exploitation of its systems and protect those systems from hostile acts and environmental hazards. Robust hardening and system redundancy are methods of protection, and the NAVWAR program is a good example of preventing an adversary's use of GPS.

Finally, if prevention or protection fails, the United States must negate the enemy's use of space to maintain space superiority. Negation options must cover the full spectrum from temporary, reversible effects, such as jamming or blocking satellite access, to more permanent options such as destroying an adversary's space capability. We are not there yet—much work needs to be done and more resources will be required.

Force application is another mission area that may someday play a major role in space control and ballistic missile defense. Force application is the capability to apply force using space-to-space or space-to-surface weapons. The United States currently has no weapons in space due to U.S. policy; however, the President has tasked USSPACECOM, through the Unified Command Plan, to plan for force application from space. It is working on solution technology and doctrine to employ such systems.

The United States enjoys an advantage over potential adversaries in space operations and CNO. Since Desert Storm, USSPACECOM has devoted considerable time and effort to operationalizing and integrating space into the military's day-to-day activities. Developing and maturing the force enhancement capabilities that provide critical information to the warfighter has eliminated the traditional space stovepipes. As a result, the U.S. military is more dependent on space and CNO than ever before, and this dependence has become a vulnerability. Potential adversaries recognize this and are seeking asymmetrical strategies or approaches to exploit U.S. weaknesses.

Fortunately, for the past 6 years, USSPACECOM has been looking to the future. USSPACECOM's vision for 2020 and the Long-Range Plan

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In 1994, there were 225 detected events; by 2000, there were 23,662. The U.S. Air Force, U.S. Army, and U.S. Navy recorded a combined total of 600 cyberattacks in 1999 and 715 cyberattacks in 2000 against their systems and networks. There are two primary reasons for this increase. First, we have improved our ability to identify these events. . . . Second, our adversaries have improved their ability to gain unauthorized access through better hacking tools, organization, and politics.

(LRP) has established a road for the military space community. Recently, through an effort known as the Strategic Focus, our staff and components examined the LRP elements, including newly established CNO capabilities, to see how well we have implemented our plan. We determined that our components and the services have demonstrated a strong commitment to realizing USSPACECOM's vision by meeting 80 percent of its LRP goals. While analysis has shown that the United States can maintain its overall lead in the future, we found that planning and funding for some systems and technologies require additional emphasis. Efforts are under way to make up shortfalls.

Today, we are at the crossroads. Space and information will be the foundation that will make possible the transformation of U.S. military forces—a critical enabler of decision superiority. There is much work to be done, but USSPACECOM is moving in the right direction to meet the space and CNO challenges of the 21st century. *MR*

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SPACE FORCES
Supporting Today's Joint Force Commander

Lieutenant Colonel Brian K. Anderson, U.S. Air Force; and
Lieutenant Colonel Robert H. Bogart, U.S. Marine Corps, Retired

OPERATION Desert Storm is often referred to as the United States' first "space war." At that time, there was no doctrine for centrally commanding and controlling space forces, and that remains true today. This dilemma has led to many debates on how to remedy the situation.

After more than 11 years of development, Joint Publication (JP) 3-14, *Space Operations*, was published in August 2001, and the concept of joint force space operations authority (JFSOA) was introduced to the joint force commander (JFC). JFSOA's purpose is to provide theater command and control (C2) of space support.

The JP outlines the JFSOA's role as belonging to one of the component commanders. This article suggests that the best answer is to give this support function to the J3's information operations cell. Few debate that when the United States has space-based weapons there will be a need for a joint force space component commander (JFSCC). Here, we will offer an interim command structure that not only serves the JFC today but also allows an easy transition to a JFSCC structure.

Standards in Terminology

Why are there so many differing opinions on how to lead and direct space forces? Is parochialism at the heart of the differences? Perhaps. We believe, however, the primary source of difference stems from how the military services think about space. At the root of differing space strategies and concepts lies a lack of standard terminology. For instance, U.S. Air Force (USAF) space terms do not align with Department of Defense (DOD) or joint terms. This is important because the USAF operates most of the unclassified space systems that support warfighters, and warfighters must clearly understand space terminology. Terminology affects the

> *At the root of differing space strategies and concepts lies a lack of standard terminology. . . . Terminology affects the way people think and the way they are trained, organized, and equipped. Key terms with varying definitions within DOD are "space," "space forces," and "space operations." Differences in interpreting these terms have led to various misconceptions.*

way people think and the way they are trained, organized, and equipped.

Key terms with varying definitions within DOD are "space," "space forces," and "space operations." Differences in interpreting these terms have led to various misconceptions. A misconception in the USAF is that air and space form one seamless medium. Within this context, space is retained in its status as a force multiplier or support commodity. Another misconception is that space operations and support from space are exactly the same, which they are not. This misconception blurs the line between space operations and certain intelligence functions, particularly collection management. However, no matter what the misconception, the JFC has to deconflict the differences these misconceptions can cause before he can synchronize operations.

Space defined. DOD's space policy states that "space is a separate medium like land, sea, and air within which military activities shall be conducted to achieve U.S. national security objectives. The ability to access and utilize space is a vital national interest because many of the activities conducted in the medium are critical to U.S. national security and economic well being."[1] Using this definition, some have proposed that the space medium warrants its

own service.[2] Other mediums have their own service, and space, after all, is a medium of vital national interest.[3] Others have suggested space should have a component command within a joint force command structure. The JFSCC would coordinate space operations and forces for the JFC in a structure similar to the existing air, land, maritime, or special operations component. Most would agree that, although certainly a potential structure for the future, the JFSCC structure could not support the JFC today.

JP 1-02, *DOD Dictionary of Military and Associated Terms*, does not define space. It does, however, define aerospace as "of, or pertaining to, Earth's envelope of atmosphere and the space above it; two separate entities considered as a single realm for launching, guidance, and control of vehicles that will travel in both entities."[4] The USAF has adopted this concept as the foundation for its aerospace and space warfare doctrine. USAF doctrine states that air and space constitute a seamless medium and that space capabilities should be fully integrated into air power.[5] Because both air and space provide theaterwide support to all JFC forces and since the USAF operates most space assets, USAF doctrine contends that the joint force air component commander (JFACC) is the natural choice to command and control theater space forces.[6]

DOD space policy and the Report of the Commission to Assess U.S. National Security Space Management and Organization states that space is a separate medium.[7] As such, a C2 structure that fully exploits space is necessary. The U.S. Space Command (USSPACECOM) has developed its own concept for C2 of space forces on this premise.

Space forces. DOD's space policy states that "Space Forces are the space and terrestrial systems, equipment, facilities, organizations, and personnel necessary to access, use, and if directed, control space for national security."[8] Personnel who access and use space include almost everyone on and above the battlefield. Similarly, USAF doctrine includes intelligence functions in space operations. Draft Air Force Doctrine Document (AFDD) 2-2, *Space Warfare*, states: "The ability of space units to achieve space superiority; to enhance force application; and to collect, process, and disseminate timely information on the enemy's forces is essential."[9] Most perspectives lean toward the view of space as a separate service under the C2 of its own service component commander or JFACC. It would take a large infrastructure to C2 all personnel and assets if so organized. We believe that it is more appropriate and manageable to define space forces by the functions they perform, specifically, space operations.

Space operations. DOD's space policy states that space operations is comprised of four sub-missions:

● *Space control*—"combat and combat support operations to ensure freedom of action in space for

> *When thinking of space forces in terms of space operations' sub-missions, there are two key points. First, space forces are not end users of space capabilities; they provide the space capabilities and services that support end users. Second, most space operations' functions are performed outside the JFC's area of responsibility.*

the United States and its allies and when directed, deny an adversary freedom of action in space. The space control mission area includes surveillance of space; protection of US and friendly space systems; prevention of an adversary's ability to use space systems and services for purposes hostile to US national security interests; and directly supporting battle management, command, control, communications, and intelligence."[10]

● *Force enhancement*—"combat support operations to improve the effectiveness of military forces as well as support other intelligence, civil, and commercial users. The force enhancement mission area includes intelligence, surveillance, and reconnaissance; tactical warning and attack assessment; command, control, and communications; position, velocity, time, and navigation; and environmental monitoring."[11]

● *Force application*—"combat operations in, through, and from space to influence the course and outcome of conflict. The force application mission area includes ballistic missile defense and force projection."[12]

● *Space support*—"combat service support operations to deploy and sustain military and intelligence systems in space. The space support mission area includes launching and deploying space vehicles, maintaining and sustaining spacecraft on-orbit, and de-orbiting and recovering space vehicles, if required."[13]

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> *Assigning control of space operations to a single component commander may not be in the JFC's best interest. . . . Establishing a component commander for space adds yet another commander in theater with whom the JFC must interface, and that may stovepipe space operations rather than integrate them into joint operational planning. . . . The JFC should control space forces and delegate JFSOA to the J3.*

JFC's area of responsibility (AOR). This is because space forces are best positioned to support a global mission and because the infrastructure is too complex to be moved. Functions such as assured access, space surveillance, protection of space systems, and force enhancement apply.

USSPACECOM's Role

Strategists and doctrinaires propose C2 structures for space forces based on how they interpret terminology. They appear to overlook that USSPACECOM, as designated by the 1999 Unified Command Plan, serves as the military focal point for space operations. It clearly states: "USSPACECOM will plan for and employ space forces to execute continuous military space operations (space control, force enhancement, force application, and space support) during peace, crisis and war, in support of the [National Command Authorities] NCA, [Chairman, Joint Chiefs of Staff] CJCS, Combatant Commands, Component Commands and other agencies, while denying like capability to adversaries."[14] USSPACECOM has developed the *Concept of Operations for Command and Control of Space Forces* and Unit Manning Document 38-2, *Space Support to Operations*, to show how to direct space forces and execute space operations.[15]

USSPACECOM provides a C2 structure for space forces and space operations through its component commands: Army Space Command (ARSPACE), Naval Space Command (NAVSPACE), and 14th Air Force (SPACEAF). As USSPACECOM's warfighting elements, these components plan for and execute space control, force enhancement, force application, and space support.

The USSPACECOM J3, as delegated by the commander in chief, USSPACECOM (USCINCSPACE), directs space operations.[16] Planning for space forces is centralized at USSPACECOM and carried out through its components. Figure 1 illustrates how USSPACECOM's global C2 structure supports the commander in a theater.
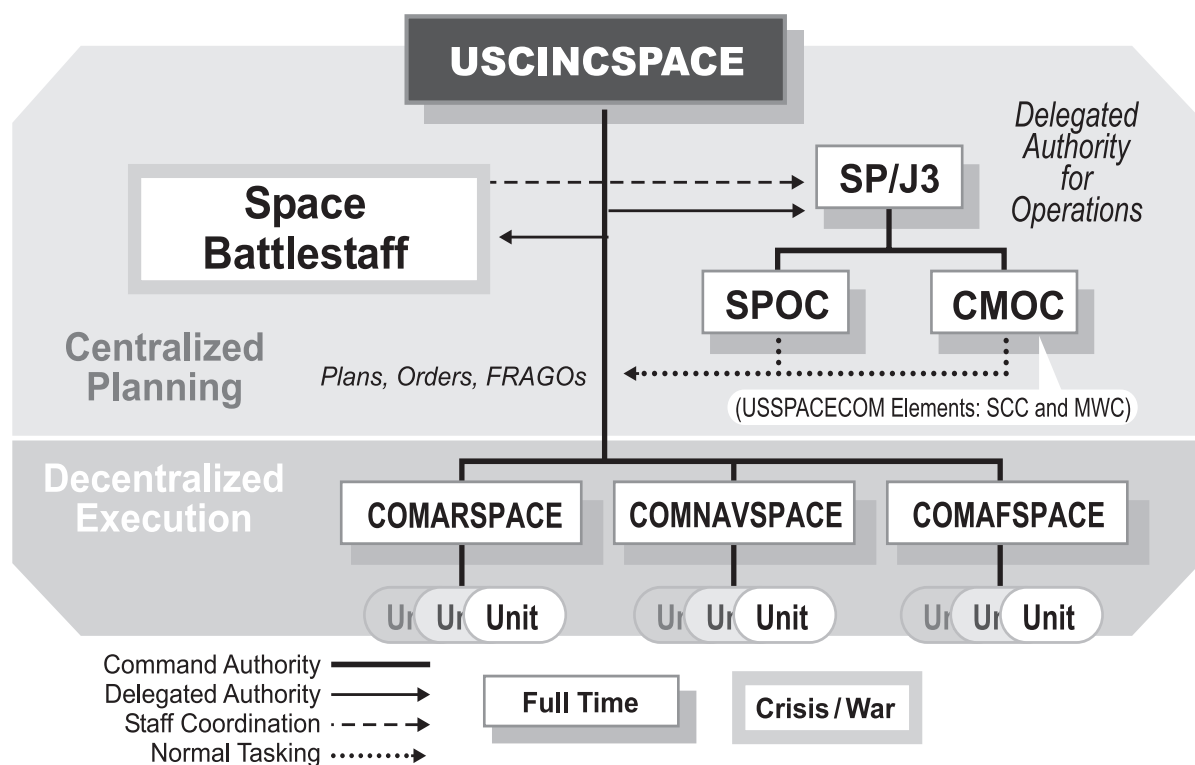

Figure 1. USSPACECOM C2 Structure

The space operations center (SPOC), along with the USSPACECOM battle staff, provides space operations support to the JFC during major exercises and throughout the spectrum of conflict. Since space operations are global missions, what occurs in a supported theater may impact another. Therefore, to keep other commanders in chief (CINC) informed of space operations events, the SPOC is connected with their operations centers through the Global Command and Control System (GCCS) and Intelink. Figure 2 depicts the joint relationship needed to provide space operations support to the theater commander.

Who's in Charge?

While the C2 structure outside the AOR is well established, the structure inside the AOR is still in question. Where should JFSOA's focus be on space operations in the AOR? The answer is wherever space forces can be exposed to the greatest number of mission areas across the spectrum of operations. Assigning control of space operations to a single component commander may not be in the JFC's best interest. Because space operations support is integral to components' mission areas and because it is in short supply, component commanders must compete for space operations support. Placing space forces under the C2 of a single compo-

USSPACECOM's component SSTs are organized and trained to meet the space operational needs of their corresponding supported component. For example, the ARSPACE SST supports the joint force land component commander. SSTs primarily focus on space operations sub-missions of force enhancement, assisting the warfighter with weather, communications, navigation, intelligence, and missile warning support.

nent may isolate space operations support to one medium and lead other component commanders to believe that they are not getting their share of support.

Establishing a component commander for space adds yet another commander in theater with whom the JFC must interface, and that may stovepipe space operations rather than integrate them into joint operational planning. It would enlarge the in-theater infrastructure at a time when the Armed Forces should be reducing high-profile organizations and moving toward a more virtual battlefield.

The best C2 apparatus for in-theater space forces can interface throughout the spectrum of operations and can prioritize space operations for the JFC.
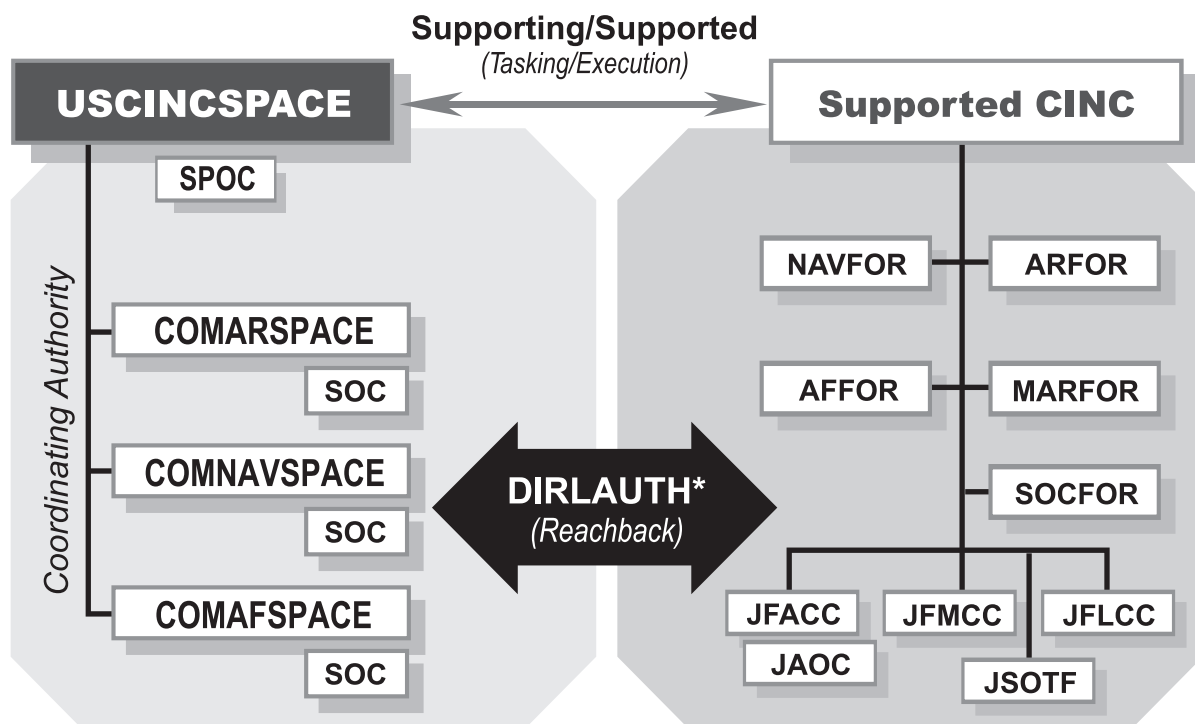
Figure 2. Joint Relationships

JP 1-02, **DOD Dictionary of Military and Associated Terms,** *does not define space. It does, however, define aerospace as "of, or pertaining to, Earth's envelope of atmosphere and the space above it; two separate entities considered as a single realm for launching, guidance, and control of vehicles that will travel in both entities." The USAF has adopted this concept as the foundation for its aerospace and space warfare doctrine.*

Therefore, the JFC should control space forces and delegate JFSOA to the J3. Many will object to this idea because the JFC staff does not execute operations. However, vesting the J3 with JFSOA efficiently prioritizes space operations, does not require a large infrastructure to execute, and allows the J3 to exercise JFSOA across the entire spectrum of operations.

As mentioned earlier, most space operations will be conducted by space forces that do not reside in the theater they actually support. USSPACECOM has already provided a C2 structure to manage this effort. What is needed in theater is orchestration and coordination rather than a C2 structure. This requires an in-theater interface with the USSPACECOM C2 structure external to the theater, a process referred to as reachback. USSPACECOM liaison officers (LNOs), joint space support teams (JSSTs), and component space support teams (SSTs) are postured to fill this requirement.

USSPACECOM's Reachback Support

USSPACECOM assigns LNOs in the grade of O6 to the following unified commands: U.S. Joint Forces Command (USJFCOM), U.S. Central Command (USCENTCOM), U.S. European Command (USEUCOM), U.S. Pacific Command (USPACOM), and U.S. Special Operations Command (USSOCOM). LNOs have an operational background and significant experience in space-related duties. They normally serve a 3-year tour with the command they support. They understand the space support requirements of the AOR and bring space operations to bear to meet those requirements.[17] They are the primary points of contact between the supported CINC's staff and USSPACECOM. LNOs work in the supported CINC's operations directorate and ensure that space operations capabilities are integrated into planning, operations, training, and execution.

During a crisis, USSPACE-COM LNOs receive augmentation from geographically dedicated JSSTs and component SSTs to accomplish their missions. LNOs and SSTs provide the liaison among the supported CINC, joint task force (JTF), component command staffs, and USSPACECOM. They also provide space expertise, recommendations, and assistance to the supported commander such as recommending space system targets and priorities; facilitating theater ballistic missile warnings; providing information on space systems' status and impact to current operations; space considerations to intelligence preparation of the battlefield; and developing support plans during deliberate and crisis-action planning.[18]

JSSTs and component SSTs provide space operations support to unified, subunified, JTF, and component commanders. SSTs working with the USSPACECOM LNOs address the supported command's space operations requirements by submitting situation reports to the USSPACECOM SPOC. This is how the reachback process works. It is the means by which the supported theater is connected to the USSPACECOM space forces' C2 structure. The SPOC is USSPACECOM's primary SPOC, providing 24-hour global and regional situation awareness for USCINCSPACE.

When the tempo of operations exceeds the SPOC team's on-duty capability, it will be directed to activate the battle staff. The battle staff is the primary instrument for crisis-action planning, including preparing operation plans and orders. It consists of a command group and a crisis-response cell (CRC) or a crisis-action team (CAT) as the situation dictates. Both the CRC and CAT contain current and future operations teams. The SPOC coordinates assigned responsibilities with higher headquarters, supported commands, USSPACECOM's battle staff, SSTs, the Cheyenne Mountain Operations Center, and USSPACECOM's component operations centers.[19]

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JSSTs support the unified commands and augment the LNOs. Each JSST has three core members and is augmented with additional expertise as the mission dictates. Both JSSTs and SSTs coordinate with the LNO and communicate their requirements to their respective parent command operations centers. LNOs and JSSTs coordinate with USSPACECOM directorates, SPOCs, and SSTs. All requirements reach the SPOC for information or action. In other words, the JTF commander and component commanders receive their space operations support primarily through the reachback process in coordination with the LNO. There is not a large contingent of space forces in theater requiring a C2 structure.

Information Operations

Assigning the LNO as the focal point for space operations and space forces within a theater allows space forces to support an array of mission areas, including information operations (IO). Today, space is the key enabler of IO, which "integrates the broad range of potential IO actions and activities that help contribute to the JFC's desired end state in an AOR."[21] The JFC usually assigns control of the cell to his J3. As part of the J3, the LNO supports the IO cell. The LNO interfaces with representatives from the JFC components, all in-theater IO disciplines, the primary staff, and the Joint Targeting Control Board, allowing the JFC to orchestrate and coordinate space operations and space force planning across the spectrum of operations.

Designating the LNO as the theater focal point for space forces and space operations gives the JFC a lean, efficient, flexible structure with which to

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maximize the use of space forces and to accomplish space operation objectives. Deliberating over who is in charge and reorganizing to accommodate the mission does not get the job done today, nor does it prepare for tomorrow.

Planning for tomorrow will require some revolutionary thinking. Today, most strategists continue to perceive space as a force multiplier. Even the USAF's "aerospace concept" integrates space into air power to make air power more lethal.[22] Graybeards speak of space capabilities as evolving; yet, thinking about space has moved little. When viewed as a support commodity, space is not revolutionary or even evolutionary. Revolutionary thinking requires that technology be pulled in the direction we want it to evolve, not the other way around.

For example, space operations executed to gain space superiority or to support IO may have the potential today to be a decisive force. Writer Timothy Thomas uses a good example: "General Wesley K. Clark, Supreme Allied Commander Europe, reportedly stunned a recent session of the Senate Armed Services Committee when he called for a complete rethink of Western strategy and questioned the need for the aerial assault on Serbia. General Clark noted that NATO could have used legal means to block the Danube and the Adriatic ports and could have used methods to isolate [Slobodan] Milosevic and his political parties electronically. If implemented and augmented with other measures, Clark added, the military instrument might have never been used."[23]

The United States is not the only one becoming acutely aware of the potential of space power. Indian Chief of Air Staff, Air Chief Marshall A.Y. Tipnis recently stated, "Though air power had

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become the overwhelmingly predominant factor in deciding the outcome of any conflict . . . information superiority could well relegate air superiority to the second position. . . . Air superiority to information superiority to space superiority is a logical progression for nations vying with one another. Imagine how soon victory will be to the side which denies existing space application to his adversary."[24]

Space operations will continue to assume a more dominant role. JFCs should begin to think space superiority before all else, and space campaign plans should be developed at the theater level to achieve this end. Recently, the Commission to Assess U.S. National Security Space Management and Organi-

zation stated in its report that "appropriate investments in space-based capabilities would enable the DOD to pursue enhanced protection/defensive measures, prevention and negation systems and rapid, long-range power-projection capabilities."[25] When these capabilities are obtained and deployed, the space medium will assume a different complexion. Most likely, the first course of action in any campaign will be to gain space superiority, establishing the high ground from which to inflict our will on an adversary.

The C2 structure we have espoused for space forces—the orchestration and coordination of space forces concept—provides a come-as-you-are structure that is dynamic yet simple. This C2 structure lends itself to an environment that is moving ever closer to the virtual battlefield by executing extratheater operations with minimum presence for intertheater coordination. By operating under the JFC/J3, through the IO cell, space operations capabilities are visible to virtually every commodity area supporting the commander's efforts. Thus, scarce space forces can be prioritized to support the commander's courses of action. This C2 structure is well-organized to meet today's requirements yet agile enough to adjust for tomorrow when space may be the supported warfighting medium. ***MR***

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SPACE CONTROL OPERATIONS AND THE U.S. ARMY

Lieutenant Colonel Brad Baehr, U.S. Army;
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THE U.S. ARMY's ability to achieve battle-field dominance critically depends on global information dominance (ID), the free flow of information to and from our forces while denying the enemy that same free flow. In today's battlespace, space superiority is a key ingredient of ID. Space systems provide critical force multipliers needed to conduct successful full-dimensional operations. To achieve ID, the Army needs communications satellites; navigation satellites; and reconnaissance, intelligence, surveillance, and target acquisition (RISTA) satellites. Achieving space superiority to protect space systems is of paramount importance to Army commanders.

Department of Defense Directive 3100.10, *Space Policy*, states that "the degree of dominance in space of one force over another . . . without prohibitive interference by opposing force" is dominant space control (SC).[1] Another document, Joint Publication (JP) 3-14, *Joint Tactics, Techniques, and Procedures for Space Operations*, defines SC as "ensur[ing] freedom of action in space for friendly forces while denying it to the enemy."[2] SC operations include space surveillance, prevention, protection, and negation. Effective SC actions help ensure the Army's ability to provide intelligence support to U.S. forces. It enhances a commander's situational awareness of the battlespace, ensures in-depth coverage of the battlefield, facilitates unit coordination and critical resource management, helps rapid force projection, and protects vital battle command functions. Effective SC also denies those same advantages to an enemy and helps create the foundation for swift victory.

As with any military capability, the Army has a vested interest in mastering SC. A land component commander's (LCC's) strengths will be magnified and weaknesses lessened by effectively applying SC measures. Protecting and defending

> *Protecting and defending space systems requires various applications. Protective measures encompass everything from perimeter defense around a ground antenna or control station to jam-resistant communications and data streams. Likewise, denying an enemy's access to space might include destroying a ground station, jamming the data stream or destroying the satellite itself.*

space systems requires various applications. Protective measures encompass everything from perimeter defense around a ground antenna or control station to jam-resistant communications and data streams. Likewise, denying an enemy's access to space might include destroying a ground station, jamming the data stream or destroying the satellite itself.

Most likely, depending on the threat and theater, the commander will employ a combination of organic assets and nonorganic capabilities from other services and national agencies using reachback. If these assets are unavailable through reachback, the theater commander must have his own organic capability to perform these functions.

According to U.S. Army Field Manual (FM) 100-6, *Information Operations*, "Information is an essential foundation of knowledge-based warfare. When transformed into capabilities, information is the currency of victory."[3] Space is today's high ground, and satellite systems provide critical information. The Army uses space systems to enhance force deployment, detect problems, provide early warning, fill information gaps, reduce vulnerability, and facilitate entry into a theater of operations. Space systems also provide assured communications, reliable intelligence and weather information, and

dependable and accurate positional data. The connectivity provided by satellite communications systems enhances the flexibility, agility, and battle command of Army forces. Satellite systems provide Army units with imagery and meteorological data to support mission planning, terrain analysis, and

> *The resources a theater commander or an LCC need for RISTA, for instance, are controlled by organizations at the national level. The Army does not control assets and capabilities that are essential to victory for land forces. Assets are limited, and their capabilities and products are a matter of shifting priorities that the Army has little control over. The Army has much to lose if these systems are not supporting the Army.*

mapping. Information—the currency of space operations—enables commanders to act before an enemy does and helps create conditions for victory.

Unfortunately, similar data may be readily available to an adversary on the open world market, much of which can be used for military purposes. The United States' advantages in collecting, processing, and disseminating military data are steadily eroding. Other nations openly share their satellite products, and commercial products can be purchased over the Internet.

Army's Vital Interest for SC

Successful operations require the ability to anticipate situations, respond with greater agility and capability than the enemy, and support a high operating tempo. Timely and accurate information is vital. Space-based systems have unrestricted access to battlefields and allow commanders to receive deep-operations information as quickly as they can receive close-operation information. Space systems enable Army forces to recognize critical events, influence the decisionmaking process, enhance intelligence preparation of the battlefield, and support total force positioning within the battlespace. Space systems help the commander establish conditions conducive to effective operations such as isolating the enemy force, detecting impediments to movement, and countering nontraditional threats. Space-based communications systems provide the global connectivity necessary to support command and control (C2) planning, coordinating, directing, and controlling. Tactical forces possess improved capabilities to target the enemy, coordi-

nate fires, conduct operational maneuver, assess the effects of previous operations, and anticipate enemy actions.

SC operations facilitate friendly freedom of action on the ground as well as in space. SC operations include surveying space systems, which provide both actual and predicted satellite positioning. This knowledge enables a commander to know when a threat system can view his operations. The commander then has options to counter the threat by hiding his forces, repositioning his forces, or allowing the enemy to see the forces arrayed against him.

The commander can also use satellite positional information to better plan his own operations. Space systems are one of the primary means of battle damage assessment (BDA). If quick-turn BDA is necessary, he can take that into account when planning force employment. Communications and global positioning system satellites might need to be in a specific configuration to fully support the operation.

Being able to ascertain a satellite's stability, operational parameters, and operational uses creates value for the warfighter. Even though a U.S. force might be in view of a threat satellite, if that satellite is unstable or offline, it might not really be a threat.

In an offensive counterspace role, SC operations help suppress and negate enemy space capabilities. The commander employs a counterspace capability to protect the force from enemy satellites and assure friendly access to space. If an adversary's ground forces cannot be neutralized due to political, economic, or other constraints, the commander must defeat the space forces or systems to support his own operations and to protect his force. If he decides to employ a weapon against the satellite, he will require an extraordinary fire control capacity. In such cases, the surveillance functions take on a new importance—space control becomes fire control.

Overall, SC capabilities are force multipliers for operational effectiveness. Robust SC capabilities mitigate the limitations of small, mobile forces such as brigade combat teams while increasing their lethality. Space systems provide a reachback capability to deployed forces to allow them to operate in an austere environment or to conduct split-based operations. Space systems enhance the Army's capability to conduct full-dimensional operations, exercise more effective battle control, meet deployment demands, and allow flexible responses in environments ranging from stability and support operations to decisive engagement.

Conducting SC Operations

Military applications of SC have solid foundations in military doctrine, starting with JP 3-14. The Army has developed the same doctrine in FM 100-18, *Space Support to Army Operations*, and clearly articulates its understanding of SC's importance and emphasizes the need to be a key player in carrying out SC operations; however, the Army is limited in its ability to influence the employment of these space systems.[4]

The U.S. Air Force owns and operates most DOD space systems and C2 capability. For example, the worldwide Space Surveillance Network (SSN), centered at Cheyenne Mountain Operations Center, Space Control Center, Colorado, tracks all manmade objects in orbit. The Satellite Control Network, headquartered at Schriever Air Force Base, Colorado, enables the Air Force to command and control many of the DOD payloads in orbit.

The resources a theater commander or an LCC need for RISTA, for instance, are controlled by organizations at the national level. The Army does not control assets and capabilities that are essential to victory for land forces. Assets are limited, and their capabilities and products are a matter of shifting priorities that the Army has little control over. The Army has much to lose if these systems are not supporting the Army. Defensive counterspace, those efforts that guarantee friendly access to space, is a limited toolset confined to surveillance, tracking, and C2. The Army depends heavily on these space systems but has no way to protect them. Also, the Army has no apparent capability to deny an adversary's access to space.

If the Army truly has the most to lose if these functions fail, then the Army has the most to gain by ensuring those functions are accomplished. For example, suppose the commander in chief is considering Operation Left Hook, a turning movement to outflank enemy forces. This plan needs satellite reconnaissance to detect resistance and confirm routes. At the same time, the plan needs satellite reconnaissance of the nation's littoral region to access resistance and map potential landing sites. In addition, the plan must ensure that the enemy does not detect the preparations for Operation Left Hook. Meanwhile, the National Command Authorities (NCA) have decided that controlling the burning oil fires in Kuwait is a national priority and that the entire area needs surveillance. With only one satellite capable of providing the resolution necessary to fulfill these intelligence needs, a tasking conflict arises.

Surveyors from the 30th Engineer Battalion use GPS survey receivers to establish precise positions during a Bright Star exercise.

US Army

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At the same time, the enemy is procuring images of allied forces from the Indian Remote Sensing (IRS) 1D satellite and trying to procure imagery from Space Imaging's IKONOS satellite and Israel's Earth Remote Observation Satellite (EROS) A1. But IRS-1D recently maneuvered its satellite, and the SSN has not found it yet. Based on previous passes, the SSN knows that IRS-1D might soon be over our immediate area, but we do not know exactly when or where. The United States cannot afford to have IRS-1D images of its marshaling areas passed to the enemy.

In this scenario, the LCC may simply be out of luck. If the NCA decide the oil fires are the highest priority, the LCC does not get his critical reconnaissance when he needs it. This will probably delay Operation Left Hook, which will increase the risk of discovery. Also, finding IRS-1D is problematic. Without tracking sensors in theater, there is no capability to locate that satellite. Consequently, IRS-1D is unrestricted and threatens to expose our forces

and plans. At this point, the United States has lost SC; denying the enemy access to space has failed.

To provide the necessary SC capabilities for the 21st-century Army, the Army Space Master Plan

> *The USASMDC should also create a dedicated military occupational specialty for space operations and a space additional skill identifier for warrant officers. If the Army wants to develop, acquire, and then operate organic SC capabilities, it must have trained soldiers. Functional area specialists, although valuable, will simply be insufficiently trained to meet the needs of day-to-day operations.*

(ASMP) and the U.S. Space Command Long-Range Plan offer a compelling vision of the future as it relates to SC. This vision of space supremacy and uncontested control of space defines four key SC objectives as the ability to:

- Surveil a region of space and achieve situational understanding.
- Protect our critical space systems from hostile actions.
- Prevent unauthorized access to and exploitation of U.S. space systems.
- Negate hostile space systems that place U.S. interests at risk.

Recommendations

With organic SC assets, tomorrow's LCC could fare better. Given an operational-level, DOD-owned, space-based radar system with C2 to task, control, and process the data, the LCC could have a theater-level space-based RISTA capability. The LCC should also have surveillance and tracking capabilities under his control. The tracking capability could also be used to track an uncooperative target like IRS-1D. The tracking function can also provide target acquisition that could direct the fires of the in-theater counterspace capability.

Clearly, a tactical SC capability to support the joint forces and LCC is a requirement. The primary objective must be to establish SC at the theater or operational level of war, both offensively and defensively, within the land component. The U.S. Army Space and Missile Defense Command (USASMDC) is the only agency with the charter and potential resources to implement such a capability. Deploying a fully capable SC "system of systems" will take several years; however, there are steps that could be taken to realize such an interim capability.

One step is for the Force Development and Integration Center (FDIC) to begin drafting space operations doctrine and SC FMs. Working closely with the Space and Missile Defense Battle Lab (SMDBL), FDIC will study operations in an experimental environment. Doctrine and FM concepts can be evaluated before being finalized and instituted throughout the Army.

SMDBL would design demonstrations and experiments to develop and test SC technologies, doctrine, and concepts. Using results from experiments, SMDBL would work with FDIC to refine requirements that are already validated and to develop programs to acquire resources for future capabilities.

The Space and Missile Defense Technology Center and the Space and Missile Defense Acquisition Center, Army Space Program Office (ASPO), should immediately look to the services' and nation's research and development labs, the services' battle labs, academia, and industry for additional interim SC capabilities. The U.S. Army Space Command (ARSPACE) could use ASPO's accelerated acquisition authority to expedite integration of acquired short-term SC capabilities.

A large portion of this work will fall on USASMDC. The first order of business should be to refocus the ARSPACE integrated product team and make it responsible for supporting joint commanders, LCCs, and Army forces headquarters with tactical deployable SC capabilities for short and long term.

The USASMDC should also create a dedicated military occupational specialty for space operations and a space additional skill identifier for warrant officers. If the Army wants to develop, acquire, and then operate organic SC capabilities, it must have trained soldiers. Functional area specialists, although valuable, will simply be insufficiently trained to meet the needs of day-to-day operations. Just as specialized enlisted and warrant officer training is required in all other branches, so too will specialized training and expertise be required for SC.

Eventually, ARSPACE will operationalize the Army's SC capabilities and create organizations to employ these assets. The 1st Space Battalion Battalion would pursue C2 and tactical warning/attack assessment missions. The 1st Space Battalion would also command Army space support teams (ARSSTs) and would be the conduit for transferring new technologies from the SMDBL to the field. ARSSTs would deploy to division and corps levels and would be the Army space forces' primary C2 agents for Army space assets. They would also serve on the respective commanders' staffs as ARSPACE liaisons. The 1st Satellite Control Battalion would com-

The amphibious assault ship USS *Bataan* lies across a pier from a fast combat support ship in this image taken from the commercial IKONOS satellite orbiting 423 miles above the earth.

[Space control] operations include surveying space systems, which provide both actual and predicted satellite positioning. This knowledge enables a commander to know when a threat system can view his operations. The commander then has options to counter the threat, such as hiding his forces, repositioning his forces, or allowing the enemy to see the forces arrayed against him.

mand the joint tactical ground station and the defense satellite communications systems.

The 2d Space and Information Operations Brigade (2d SpIO Bde) would become the space combat arm of ARSPACE. Manning would include a large pool of Army space operations officers, warrant officer technicians, and noncommissioned officers. The 2d SpIO Bde will be a fully deployable unit, responsible for supporting the LCC in theater. Its missions are active space and information operations (IO) defense and any counteroffense the LCC may require. Once deployed, the 2d SpIO Bde would come under the operational control of the LCC and would require a highly technical skill mix that would work closely with the intelligence units that operate the tactical exploitation systems. The 2d SpIO Bde's subordinate units would include the 8th IO Battalion (Land Information Warfare Activity), the 9th Space Battalion (SC), and the 10th IO Battalion. The 8th would be responsible for all IO activities. The 9th Space Battalion would have space surveillance and negation capabilities. The 10th IO would be dedicated to electronic warfare, both terrestrial and space. The 2d SpIO Bde would also, when authorized, be able to directly support other components of ARSPACE's warfighting efforts.

The Southwest Asia scenario used earlier in this article changes when the new 2d SpIO Bde is added as the LCC's organic SC forces. As before, the commander in chief is considering Operation Left Hook, a turning movement to outflank enemy forces. He knows the enemy is procuring images of allied forces from the IRS-1D satellite and trying to procure imagery from IKONOS and EROS-A1 satellites. But the IRS-1D has recently maneuvered, and the SSN has not found it yet. Based on previous passes, the SSN knows that IRS-1D might soon be over our immediate area, but we do not know exactly when or where. The United States cannot afford to have IRS-1D images of its marshaling areas passed to the enemy.

Before forming the 2d SpIO Bde, the LCC was simply out of luck. He had no capability to detect, track, or counter the space threat. The 2d SpIO Bde has changed all that. ARSST members at division receive word that IRS-1D has maneuvered. They immediately relay the last confirmed position data to the 9th Space Bn with the task to locate and disrupt the satellite's operations.

The 9th Space Bn activates surveillance radar in search mode to cover the possible paths IRS-1D may take. The surveillance radar detects the satel-

lite and sends its position data to the 10th IO Battalion, whose tracking radar produces fire control-quality tracking data. Simultaneously, the 8th IO Battalion begins to reconnoiter the information domain. IRS-1D data is transmitted electronically, and the 8th IO Battalion prevents that imaging data from reaching the intended user.

Meanwhile, the 10th IO Battalion sweeps the electronic domain to ascertain the IRS-1D downlink frequencies. The 10th could, if tasked, jam the ground-based receiver site. The commander then decides which method to use to counter the threat. He has the resources to defend his own forces and to neutralize the space threat.

The 9th Space Battalion could employ its mobile laser dazzler to temporarily blind the satellite's cameras. If that were unsuccessful, the 10th IO Battalion would attempt to jam the downlink site to prevent images from downloading. Finally, if that failed, the 8th IO Battalion could intercept the successfully downloaded images during landline transmission. Regardless of the method, the commander's organic capability has neutralized the threat, maintained SC, and allowed the plan to continue.

The Army's ability to accomplish its missions around the world depends largely on guaranteed access to space systems. The force-multiplying effects of space systems allow for a small, lethal force that can deploy quickly with assured knowledge of the battlespace and the enemy. Space systems allow

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split-based operations and the C2 necessary to manage dispersed forces. Space systems also provide the means to know more than an adversary and to be able to act before he does. Access to space can only be guaranteed by applying effective SC measures. Surveillance and tracking, satellite control, and counterspace operations are the fundamental capabilities the Army must have to guarantee access to the information necessary for swift victory. An organic organization within the Army dedicated to SC and ID could implement the necessary capabilities for full support. Mastering space is no longer an optional competency left to a single agency. **MR**

NOTES

1. Department of Defense Directive 3100.10, *Space Policy* (Washington, DC: U.S. Government Printing Office [GPO], TBP).
2. Joint Publication (JP) 3-14, *Joint Tactics, Techniques, and Procedures for Space Operations* (Washington, DC: GPO, TBP).
3. U.S. Army Field Manual (FM) 100-6, *Information Operations* (Washington, DC: GPO, 27 August 1996).
4. FM 100-18, *Space Support to Army Operations* (Washington, DC: GPO, 20 July 1995).

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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,

> *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.*

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.

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.
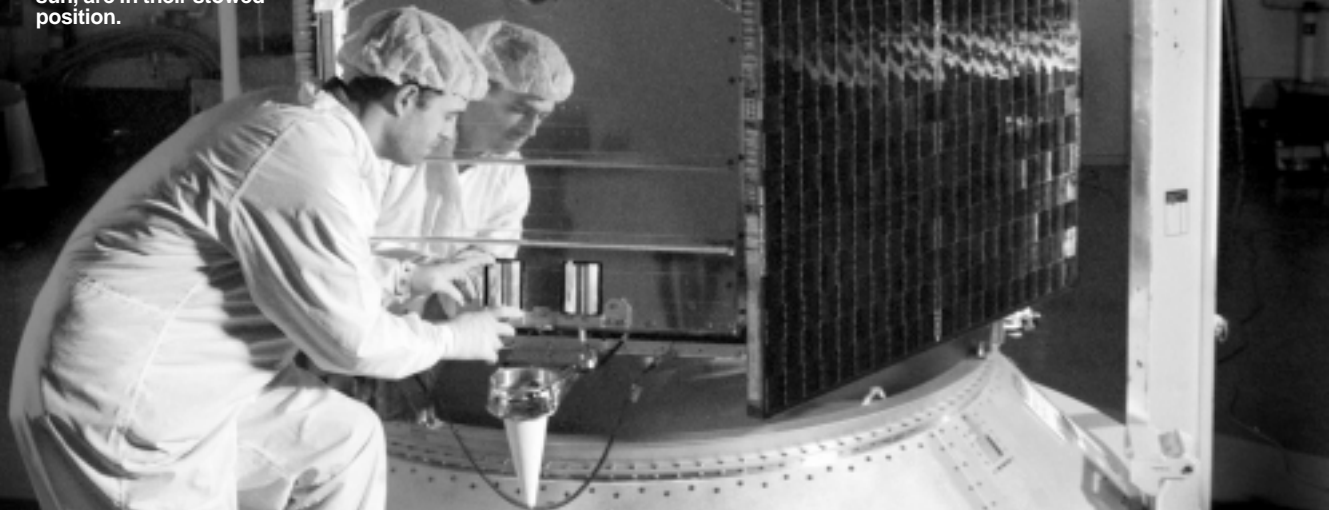
spaceimaging.com

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.
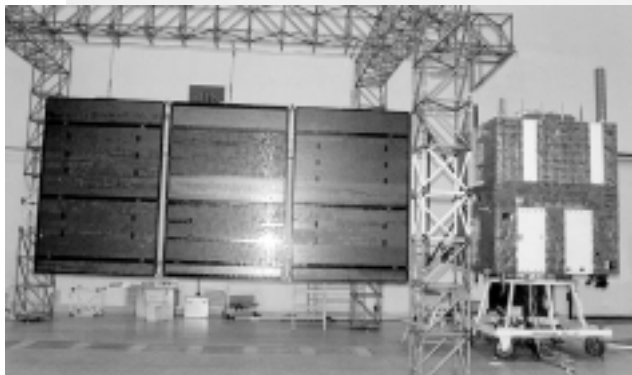
National Institute for Space Research, Brazil

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.

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,

> *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.*

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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SPACE:
Enabling Army
Transformation

Lieutenant Colonel Brad Baehr, U.S. Army;
Lieutenant Colonel Thomas D. Houston, U.S. Army, Retired; and
Major J.G. Byrum, U.S. Army Reserve

INCREASING LETHALITY, mobility, and sustainability are key to Army Transformation, but increasing lethality while exchanging heavy divisions for mobility raises questions. The answers are increasingly found in space. Space assets and the capabilities that they bring to the warfighter will reduce the logistics footprint in theater, allow U.S. forces to outmaneuver the enemy, and inflict devastating firepower on opponents before they can target U.S. or friendly forces.

Fighting in the Transformation Environment

The United States has obvious capability and power advantages over potential adversaries. To offset those advantages, adversaries may attempt to exploit perceived U.S. weaknesses by using asymmetric operational strategies, tactics, and techniques using urban terrain and information operations. Operational boundaries along traditional fronts may be a thing of the past. The forward line of own troops (FLOT) is more likely to be a circle than a line. Where is the "rear"? It could just as easily be in an adjacent country as in theater. Potential enemies will attempt to keep U.S. forces disjointed, complicate resupply, degrade communications, and disrupt coordination.

Nearly 45 percent of the world's population resides in urban settings. The U.S. Marine Corps Intelligence Activity anticipates urban populations will increase by 60 percent within the next 10 years.[1] Adversaries may use urban areas and complex terrain to negate technological advantages the United States holds in intelligence, maneuver, and precision fires to create strongholds, find sanctuary, or prolong conflict. Such areas degrade weapon system standoff, target acquisition, situational awareness, and accuracy. Our adversaries realize that complex terrain is troop and supply intensive and further complicates applying firepower in an effort to avoid collateral damage and noncombatant injuries. Urban terrain reduces combat actions to the basic level—the dismounted infantry assault—thus leveling the playing field significantly.

Only recently have we begun to think of battle damage being inflicted via methods other than just steel on target. Even more foreign is the idea that steel, combined with electrons at the right place and time, can have a more devastating effect than just more steel.

Robust command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities and high mobility will enable the objective force to develop the situation out of contact, to maneuver rapidly to positions of advantage, and to initiate contact at the commander's choice of time and place. Reconnaissance, surveillance, and target acquisition (RSTA) organizations are key to developing the situational understanding required in this complex environment.

Army Transformation forces must be equipped with appropriate Army Battle Command System (ABCS) or ABCS-like systems down to platform level if they are to support robust command and control (C2). The C4ISR networks and computers must be able to receive and disseminate large volumes of voice and video data rapidly to adjacent, higher, joint, and allied units in complex terrain environments. Long-range, nonline-of-sight (NLOS) tactical systems will become the principal means of communication.

Rules of engagement (ROE) define the circumstances and limitations under which U.S. forces will initiate or continue combat engagement. As demonstrated in the Balkans, restrictive ROE can constrain or delay U.S. combat power. Adversaries may attempt to exploit indecisiveness or restrict U.S. combat capabilities. The ability to beam U.S. battles in near real time to American living rooms continues to increase. Images, both still and video, might influence the development of ROE. Adversaries may exploit the media or conduct information operations to attack U.S. national will or upset coalitions. Saddam Hussein used this tactic following the U.S. and British air strikes against Baghdad.

1st Infantry Division vehicles staged at the Greek port of Thessalonika in support of Operation Joint Guardian, July 1999.

The easiest tactic to prevent massing U.S. combat power is to deny entry into a theater of operations. Adversaries will attack APODs and SPODs using coordinated operations conducted by police, paramilitary, special purpose, guerrilla, mercenary, terrorist, and conventional forces. Using long-range surface-to-surface missiles (SSMs), cruise missiles, and other WME will also give U.S. forces a nonlinear, simultaneous battlespace.

Potential adversaries study U.S. capabilities in detail and may seek to degrade them by using lethal and nonlethal means to strike C4ISR capabilities and platforms. Proliferating commercial technology with military applications and the associated vulnerabilities of attempting to achieve information superiority through space technology virtually ensure future combat operations will emphasize information warfare. Secure access to space capabilities is so important that the U.S. Navy is ready to spend more than $100 million upgrading its ability to track space objects or debris from its ground stations. Improvements that allow the United States to track potato-sized objects will not only help prevent debris collisions, but it will also help detect parasitic satellite attacks on U.S. satellites.

The interim brigade combat team (IBCT) has no organic space-qualified soldiers assigned to it. The first appearance of space operations personnel is in the interim division (IDIV) with a cell of four officers and two noncommissioned officers (NCOs). In the interim, Army space support teams could augment the IBCT, but is that enough? Could the reconnaissance, intelligence, surveillance, and target acquisition (RISTA) squadrons also use this expertise to cover the huge areas to which they will be assigned now that brigades are responsible for what

divisions used to cover? Will we pull space operations officers from staffs throughout the Army to use as augmentees? Will that upset the tactical operations center's staff procedures? How will they get there? What equipment will they bring? Where will their equipment go?

The enemy's interdiction of air and sea lines of communications was once believed to be the major threat to U.S. power projection. However, a recent intelligence assessment outlines a shift in focus to attacks against aerial and seaports of debarkation (APODs and SPODs) as a more advantageous tactic.[2] Future adversaries are expected to invest in capabilities for special operations forces and weapons of mass effects (WME) for just such operations.

In reaction to the worldwide explosion in information technology, there is an increasing migration of capabilities to space. The relative advantage the United States enjoys in satellite reconnaissance, communications, and navigation will erode as the number of countries capable of using space-based programs for military purposes increases. In addition, commercializing space makes these capabilities available to all. Apart from the United States losing its asymmetrical advantage in this area, access to commercial systems will allow even low-tech forces to employ information-age capabilities.

The southern tip of San Francisco's financial district, viewed from a commercial satellite. Military satellites obtain considerably more detailed imagery in low-Earth orbit.

spaceimaging.com

Knowing the size and scope of the urban battlespace improves troop and asset planning. Are the buildings one story or five? Do they have basements? Is undetected movement possible?... Reducing uncertainty for the ground commander saves troops, assets, and time while enabling accurate planning for lethal and nonlethal precision engagement.

Key Operational Concepts

Intelligence collection systems, satellite communications, situational awareness tools, global positioning systems (GPS), and space-based weather satellites are real technologies that the United States dominates. That dominance, however, slips slightly every day. The U.S. military must seek leap-ahead technologies and applications to retain its dominance and properly equip the Objective Force.

Space is a transparent force multiplier and enabler whose use is largely unnoticed. Casual observers are unaware of what capabilities really affect them from space. Whether in the open deserts of Iraq and Saudi Arabia or the complex terrain of Sarajevo, satellites increasingly link soldiers and units to headquarters, bases, and families back home. Satellite communications, GPS, and accurate weather and terrain data are the norm for today's force.

Vital to maintaining the technological advantage is controlling space. Superior technology alone will not carry the United States very far if the assets it depends on are at risk. Jamming, spoofing, or destroying our space-based assets are real threats. As U.S. forces depend more on GPS, situational awareness, and overhead imagery, space control becomes even more significant to soldiers on the ground. The last thing the United States can afford in terms of

dollars and lives is huge investments in space-based technologies and programs only to fall victim to a "space Pearl Harbor." Examining key operational concepts for Army Transformation with a "space eye" illuminates some areas ripe for contributions to the Objective Force.

Strategic Responsiveness and Maneuver

The U.S. military is not deployed in all areas of the world where future regional conflicts might be fought. Therefore, the United States must be able to project and sustain power over time and distance. The easiest tactic to prevent massing U.S. combat power is to deny entry into a theater of operations. Adversaries will attack APODs and SPODs using coordinated operations conducted by police, paramilitary, special purpose, guerrilla, mercenary, terrorist, and conventional forces. Using long-range surface-to-surface missiles (SSMs), cruise missiles, and other WME will also give U.S. forces a nonlinear, simultaneous battlespace.

Such threats may deny the United States access to U.S.-friendly countries or at least delay U.S. entry through protracted negotiation, hostage-taking, or appearing to modify policy to conform to U.S. demands. Adversaries already are adept at manipulating international media to criticize U.S. intervention,

decrease international resolve, and affect deploying U.S. forces' ROE and force mix.

During the deployment phase of an operation, U.S. forces at APODs and SPODs are more vulnerable to attack than at any other time. A well-placed SSM or cruise missile at the right time could effectively shut down an airfield, isolate or denigrate U.S.

Proliferating commercial technology with military applications and the associated vulnerabilities of attempting to achieve information superiority through space technology virtually ensure future combat operations will emphasize information warfare. . . . The relative advantage the United States enjoys in satellite reconnaissance, communications, and navigation will erode as the number of countries capable of using space-based programs for military purposes increases.

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forces already on the ground, or significantly reduce American political resolve at home. How can the United States protect its forces from such attack?

One defense is to develop a light, deployable theater missile defense (TMD) tactical operations center (TOC) to alert and defend deploying forces from attack. This TMD TOC cannot be a multiple-sortie, Taj Mahal package with 24 high-mobility, multipurpose wheeled vehicles (HMMWVs). It must be a small package suitable for shipment on one or two transport aircraft and able to provide early warning defense for deploying forces. It can deploy into the APOD behind the assault force to protect inbound forces as they debark and assemble. Manned by the space support element (SSE), the TMD TOC gives the commander immediate access to C2 nodes for global communications. The TMD TOC can also be the focal point for coordinating APOD/SPOD operations. Surveillance assets can feed in data and imagery directly.

This front-loaded, minimal-capability, light TOC could also link inbound aircraft with commanders needing en route mission planning information during deployment. The assault TMD TOC can be a two-way conduit to push forward or reachback for information, operations, and synchronization with joint forces.

In conjunction with the assault TMD TOC, it is important to develop a smaller, active TMD capability for APOD or SPOD assurance that provides an offensive response to missile threats. This force protector might have four to six HMMWVs mounted with advanced medium-range air-to-air missiles (AMRAAMs). AMRAAMs have a shorter range than a Patriot or theater high-altitude area defense, but they provide a smaller deployment footprint. Emphasis would initially be on securing the APOD or SPOD, not the entire theater.

Simultaneous Engagement and Distributed Operations

Space contributions in imagery, communications, and situational understanding will help the Transformation force commander focus on the most important aspects of the enemy's operations. Advances in precision targeting and increased ranges will achieve mass fires and effects without massing weapon systems. GPS is integrated into most of our long-range munitions, greatly improving the probability of first-round kills. GPS is, however, vulnerable to jamming. Technologies to alleviate GPS degradation include space-based and terrestrial solutions.

Advanced precision will allow higher payoff targeting when executing operations. Multiple targets simultaneously attacked by deployed forces will deplete scarce, critical enemy resources in the battlespace. Precision targeting helps the commander keep ground forces out of unnecessary contact.

Bomb damage assessment (BDA) has always been a subjective, inexact science. BDA estimates from Operation Desert Storm, the Balkans, and Iraq show that BDA accuracy seems to degrade over time. BDA is time-consuming and drains scarce human and mechanical assets and platforms. Space-based assets can play a major role in getting timely and accurate BDA to decisionmakers while limiting the degradation of human and unmanned aerial vehicle assets.

Complex terrain poses problems for movement, cover, concealment, and target detection. Clearing small pieces of this terrain can be time-consuming. Adding to the confusion in the complex urban battlespace is the presence of noncombatants. Besides the local populace, there may be nongovernment organizations or private volunteer organizations. A smart enemy will use the organizations' presence to impede U.S. forces.

Knowing the size and scope of the urban battlespace improves troop and asset planning. Are the buildings one story or five? Do they have basements? Is undetected movement possible? Can we develop a space-based technology that provides a subterranean picture? Reducing uncertainty for the ground commander saves troops, assets, and time while enabling accurate planning for lethal and non-lethal precision engagement.

Maps are only as accurate as their latest update, but three-dimensional mapping and fly-throughs provide realistic rehearsals for operations. Com-
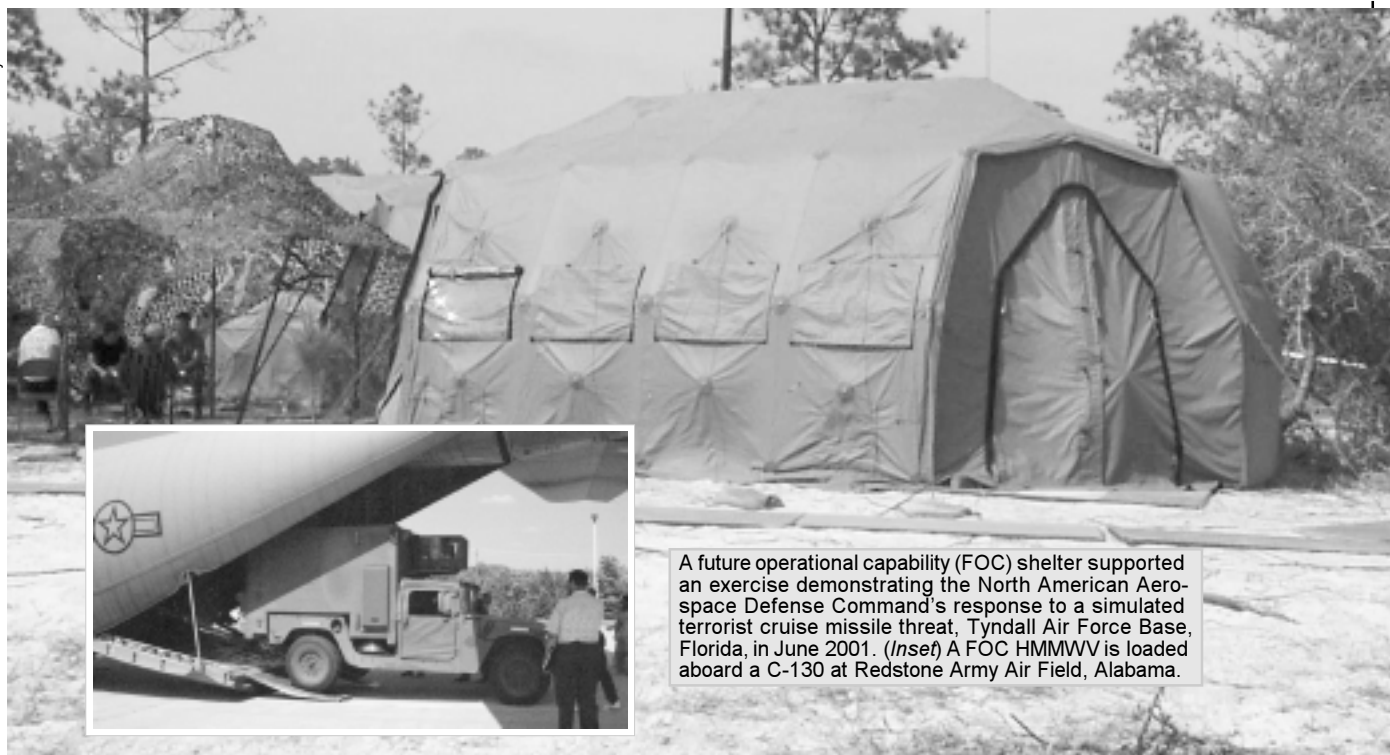
A future operational capability (FOC) shelter supported an exercise demonstrating the North American Aerospace Defense Command's response to a simulated terrorist cruise missile threat, Tyndall Air Force Base, Florida, in June 2001. (*Inset*) A FOC HMMWV is loaded aboard a C-130 at Redstone Army Air Field, Alabama.

During the deployment phase of an operation, U.S. forces at APODs and SPODs are more vulnerable to attack than at any other time. . . . One defense is to develop a light, deployable theater missile defense (TMD) tactical operations center (TOC) to alert and defend deploying forces from attack. . . . It must be a small package suitable for shipment on one or two transport aircraft and able to provide early warning defense for deploying forces.

manders can use fly-throughs to conduct planning and rehearsals in or out of theater to increase force protection and lethality and to allow them to focus on the real fight.

Never before has so much information been passed in so many ways. This is true for both military communications and traditional commercial systems such as cell phones. Electronic intelligence collection from nontraditional, unclassified messaging sources—cell phones, satellite communications, wireless local area networks—gets the most from limited communications intelligence assets. Locating emanating sites, particularly if they are of unusual size or location, can reveal significant intelligence about enemy capabilities and intentions.

Effective Response to a Multidimensional Adversary

The Objective Force must also coordinate with and gain cooperation from other agencies. Subject matter experts from agencies outside the Department of Defense (DOD) may bring nonlethal expertise to the table. The Objective Force will be designed and trained to meet the multidimensional challenge of simultaneous conventional and unconventional force operations.

Information operations, in its full breadth, brings a new suite of coordinated attack weapons to the commander's arsenal. Space operations officers and Army space support teams coordinate lethal and nonlethal effects of information attack weapons for the commander. Now the commander can coordinate all effects whether they originate in fire support, in civil affairs, or on a console in the Pentagon.

The Army Battle Command System (ABCS) does not address synchronizing full-spectrum information operations, but lethal and nonlethal fires must be synchronized. Only recently have we begun to think of battle damage being inflicted via methods other than just steel on target. Even more foreign is the idea that steel, combined with electrons at the right place and time, can have a more devastating effect than just more steel.

When required, the commander can inflict quick, violent, simultaneous attacks at the right time and place to exploit and defeat enemy centers of gravity. How we integrate and formulate the plans to make such attacks can rely heavily on space for success.

The ability to pass information, imagery, and data directly to soldiers in contact can bring the battlespace simultaneously to soldiers and commanders. Linking space to individual soldiers to provide near real time information by NLOS expedites decisive planning. Only space-based assets can provide this conduit.

As the battlespace becomes less and less contiguous, the need for NLOS communications to pass voice, data, and imagery from point to point increases almost exponentially. Distance, weather,

terrain, and bandwidth significantly hamper line-of-sight (LOS) communications. Blue force tracking technology relies heavily on LOS. Equally important is a reachback capability that allows deployed

> *In a dangerous game of one-upsmanship, computer hackers challenge each other to sophisticated attacks against U.S. computer networks. DOD systems alone receive more than 30,000 detected probes a year. . . . These breaches are not necessarily hostile. Often, they result from U.S. citizens pushing their personal and professional limits to see just how far they can go and what they can get away with.*

forces to communicate with their higher headquarters. Only a robust space capability that pushes information to the commander on the ground can support reachback.

The concept for an effects coordination cell is to manage and coordinate all lethal and nonlethal effects for the force. This will require using previously abstract weapons in the battlespace arsenal. Perhaps we "prep the battlespace" by destroying indigenous broadcast towers using a hardware-crippling virus on the primary government local area network as we launch heliborne psychological operations or civil affairs missions to influence the local population. Only by precise, integrated, coordinated planning will the commander be able to most efficiently employ all assets. This can only be accomplished with uninterrupted space-based links from sensor to platform.

Continuous Operations and Overwhelming Operations Tempo

The Objective Force will bring formidable firepower at a rate and speed that will overpower any adversary. The key to success is to overwhelm the enemy's ability to respond. One way to achieve this is to conduct simultaneous, noncontiguous operations. Continuous planning cycles requiring varied, complex, and detailed information are necessary. The next generation of the En-route Mission Planning and Rehearsal System could include receiving orders and conducting plans with one higher headquarters and then, due to change of mission, finish coordinating and executing that plan with a different headquarters. Can we do this inside the theater? What if we used C-130s like we use Black Hawks? Can we put a company on an airplane and move it to a different operation within the theater with most of the planning and rehearsal being conducted on the aircraft? Can we push that much information that

quickly? Only space-based assets have the potential capacity to allow the commander to simultaneously coordinate and integrate NLOS communications, simulation tools, and situational awareness while in flight from potentially nonparallel over-the-horizon flight paths.

To overcome the enemy's ability to respond, the commander must be able to manage information. The best intelligence or information is useless if the person who needs it does not receive it. Conversely, information overload is equally crippling. We can manage information flow from the source to the commander and staff by filtering incoming information so the right person is the ultimate receiver.

The Objective Force division has a modular SSE of four officers and two NCOs. Half of the SSE will reside in the G3 plans cell of the main command post (CP); the other half is assigned to the tactical CP's G3 maneuver cell. Depending on the mission, any portion of the SSE could be task organized to a battalion combat team; thus, the SSE must be modular to plug into the CP architecture.

Situational Understanding and Information Superiority

Advanced capabilities in the areas of situational understanding and information superiority will significantly reduce the decision cycle, thereby overtaxing the enemy's ability to respond to U.S. actions. ISR assets organic to the Objective Force teamed with joint or theater assets will expand situational awareness of Army battlespace capabilities. RISTA forces and unmanned surveillance assets will provide a more comprehensive battlespace picture and allow commanders to effectively deploy and commit forces and enhance survivability.

Reliance on these assets and the intelligence they produce can lead to vulnerability for all users of space-based assets and information. How easy is it for an operator to detect an electronic attack when his display appears fine? Is the information he sees real? Has it been electronically altered to lead the commander to make a wrong decision? This greatly concerns the U.S. Space Command.[3]

Jamming technology is prevalent and cheap. Technological advances in miniaturization are leading to the development of micro- and nanosatellites. These satellites can shadow or intercept friendly space assets and be programmed to disrupt or destroy their targets on command. As these get smaller, detection will become increasingly difficult. Still more dangerous is the threat of an electromagnetic pulse generated from space. The effects of a small-yield blast could affect every satellite in low orbit almost indefinitely. Once disabled, there is no quick fix to reestablish a satellite network.

In a dangerous game of one-upsmanship, computer hackers challenge each other to sophisticated attacks against U.S. computer networks. DOD systems alone receive more than 30,000 detected probes a year. In the past 12 months, 85 percent of U.S. government agencies and Fortune 500 companies have reported security breaches resulting in $400 million in financial losses.[4] These breaches are not necessarily hostile. Often, they result from U.S. citizens pushing their personal and professional limits to see just how far they can go and what they can get away with. To them, it is a game; to the banking industry, the Federal Communications Commission, the Federal Aviation Administration, and DOD, it is not.

Denying the enemy's use of GPS for targeting, tracking, and situational awareness is key to the survival of U.S. forces deployed in theater. By denying GPS access to the enemy at key points in an operation, the friendly commander could disrupt enemy C2 and other operations and gain the advantage.

GPS jammers are relatively low-cost, low-tech tools. Confusion in the battlespace can influence the battle's outcome. We must ensure that technological advances reduce friendly battlespace confusion. Urban and complex terrain pose special situational awareness problems. GPS does not perform well there. Technologies used in conjunction with 911 cellular services could provide a solution to this problem. Soon, all newly manufactured cell phones must enable police to locate cellular 911 callers. Lucent Technology is preparing to deliver a system that can track the locations of all cell phone users within a few feet.

Rapid, violent, integrated, simultaneous military

> *Complex terrain poses problems for movement, cover, concealment, and target detection. . . . Adding to the confusion in the complex urban battlespace is the presence of noncombatants. . . . A smart enemy will use the organizations' presence to impede U.S. forces.*

operations conducted speedily in locations that will overwhelm the enemy's decision cycle and response time will defeat the enemy with a minimal loss of American lives. The battalion combat team's centerpiece is dismounted infantry assault. Vital to the success of the assault is integrating the land warrior into the battlespace. Land warriors should be privy to information and technology never before imagined. Integrating and protecting that flow will require space-based assets and will allow the United States to overwhelm the enemy's ability to counter the Objective Force. Providing intelligence and updates to soldiers on the move will be critical to the land warrior's success.

The U.S. Army Space and Missile Defense Command is uniquely positioned to be the linchpin for Army Transformation. Many of the innovations that the Objective Force requires rely on space-enabled capabilities and technologies. The Space and Missile Defense Battle Lab, Force Development and Integration Center, Army Space Program Office, Army Space Command, and Missile Defense Command are poised and ready to bring space and space integration to the battlespace and the Objective Force. **MR**

NOTES

1. U.S. Marine Corps Intelligence Activity, *Marine Corps Midrange Threat Estimate, 1997-2007* (Quantico, VA: U.S. Government Printing Office [GPO], 1997).
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3. Statement by General Eberhart, Commander, U.S. Space Command, *The Washington Times*, 29 March 2001.
4. Condoleeza Rice, "National Security Adviser says Cyber Security Will be U.S. Priority," *Defense News*, 22 March 2001.

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Getting Space-Based ISR Data to Warfighters

William Messer

AS THE ARMY transforms itself into the Objective Force, the need for and importance of timely and accurate intelligence will increase exponentially. Dispersed, highly mobile forces equipped with the latest weapons will require an intelligence system that is flexible, robust, and reliable. Automated processes must supplement or replace many of the traditional "human-in-the-loop" activities to manage the vast amount of intelligence data available to warfighters. Intelligence, surveillance, and reconnaissance (ISR) sensors will quickly pass intelligence to commanders who are engaged with the enemy throughout the length and breadth of the battlefield.

Regardless of the data source, Army Tactical Exploitation of National Capabilities Program (TENCAP) systems will play a vital role in any future U.S. conflict. Sensors will include the familiar signals intelligence (SIGINT) and imagery intelligence (IMINT) systems, and an added category called measurement and signature intelligence (MASINT). MASINT sensors may operate beyond the spectrum of traditional SIGINT and IMINT sensors and use special processing and data-combining techniques to provide intelligence information. The U.S. Army Space and Missile Defense Command's Army Space Program Office (ASPO) is providing leading-edge, tactical ground stations that bring this critical intelligence data to warfighters at the forefront of any conflict.

ASPO was established in 1973 to integrate the TENCAP, to serve as a unique technical and fiscal interface with the national program offices, and to manage the TENCAP materiel acquisition process. TENCAP is charged with exploiting the current and future tactical potential of national capabilities and integrating these capabilities as rapidly as possible into the Army's tactical decisionmaking process.

National systems are designed to support strategic requirements. ASPO leverages national technol-

ASPO was established in 1973 to integrate the TENCAP, to serve as a unique technical and fiscal interface with the national program offices, and to manage the TENCAP materiel acquisition process. . . . ASPO leverages national technology to take information from strategic [SIGINT and IMINT] systems and provide it to tactical levels.

ogy to take information from these strategic systems and provide it to tactical levels. During planning and execution, this data gives tactical units an accurate and current picture of both the enemy and the terrain. Combining national data with data from other sources significantly enhances intelligence preparation of the battlefield (IPB) and demonstrates the ability to support maneuver and target development, especially for deep operations. For example, in Haiti, TENCAP systems provided the primary source of imagery directly to the joint task force (JTF) commander's analysts, enabling them to plan the operation and execute the initial assault. During Operation Desert Storm, TENCAP systems provided support for targeting deep operations and imagery for IPB for both XVIII and VII Corps. Army soldiers controlled the U-2 sensors, processed the imagery, and via a tennis shoe interface, provided vital data to Air Force analysts for future targeting.

TENCAP systems also provide significant support to humanitarian efforts. After Hurricane Andrew, TENCAP systems provided the relief effort's task force commander with a rapid and detailed damage assessment. TENCAP's secondary dissemination and intelligence broadcast capabilities also foster continuing awareness through all phases of operations, enabling the tactical commander to see, hear, and target deep on today's battlefield and then to assess the effects of shooting deep.

The most recent system in the TENCAP inventory is the tactical exploitation system (TES), which is currently being fielded across the Army. It is replacing earlier systems now designated as legacy systems at division, corps, and higher echelons. TES is incorporated into the U.S. Navy's Littoral Surveillance System, and the Air Force is acquiring certain TES functions to support dynamic battle management at air operations centers. TES garnered high-level joint interest during the Navy's Joint Fleet Battle Experiment–Echo at Camp Pendelton, California, in March 1999 and during the Air Force's Joint Expeditionary Force Experiment 99 at Nellis Air Force Base, Nevada, from August to September 1999. During both experiments, TES successfully demonstrated joint interoperability and promoted innovative concept development among Army, Navy, and Air Force ISR systems. TES was also used during the Navy's Joint Fleet Battle Experiment–India in June 2001 to demonstrate joint support to the Naval Fires Network concept.

Army TENCAP systems are an integral part of the G2's taskable assets. Typically, TENCAP assets are physically located at the corps tactical operations center and are assigned to the corps military intelligence brigade. Intelligence collection requirements are generated at the corps G2. The G2 collection manager plans for and tasks TENCAP assets in accordance with established processes.

Military Intelligence Organization and TPED

ISR activities involve the tasking, processing, exploitation, and dissemination (TPED) process. Army TENCAP systems at corps and above are used in each step of the process. The system architecture provides for receiving, processing, exploiting, storing, and disseminating combat intelligence from national and selected theater collectors. The equipment consists of various intelligence and electronic warfare communications and processing components that are integrated to provide theater commanders and tactical units with timely targeting, battle planning, and battle damage assessment information.

TENCAP systems can task national and theater ISR assets with varying levels of interaction and sensor control. The equipment can generate requests for national imagery products and then transmit it through the chain of command to the collection manager. With respect to the imagery sensors onboard the U-2, the TES has level 4 control, which means both the flight plan and sensor target deck

can be modified in near real time. This capability is used to perform a detailed examination of an area to resolve potential target identification.

In addition to tasking collection assets, TENCAP systems also receive preprocessed ISR data from several national and theater sensors. The benefit of preprocessed data is that it can be processed to respond to the commander's intelligence information

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During Operation Desert Storm, TENCAP systems provided support for targeting deep operations and imagery for IPB for both XVIII and VII Corps. Army soldiers controlled the U-2 sensors, processed the imagery, and provided vital data to Air Force analysts for future targeting. . . . The most recent system in the TENCAP inventory is the tactical exploitation system (TES), which is currently being fielded across the Army. It is replacing earlier systems now designated as legacy systems at division, corps, and higher echelons.

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needs. Data types that can be processed into the corps' TENCAP systems include national imagery and signal external information. Intelligence reports from national and theater sensors can also be parsed into the appropriate databases.

Software tools on the computers and workstations in TENCAP vans facilitate exploiting the ISR data. Imagery files are processed by electronic light table (ELT) software and displayed for the imagery analysts. The analysts use ELT and other exploitation tools available at their workstations to conduct first-phase exploitation, to annotate the images, and to produce secondary imagery dissemination (SID) products.

Intelligence products from the TENCAP system are disseminated primarily through the All-Source Analysis System (ASAS) at the same echelon. The information can be transmitted using terrestrial links such as the Secret Internet Protocol Router Network (SIPRNET), Joint Worldwide Intelligence Communications System (JWICS), Automatic Digital Network (AUTODIN), Data Management System (DMS), point-to-point, tactical area communications, and dial-up.

TENCAP units can communicate with other TENCAP units at the same level or across echelons to support their operations; they have ultrahigh frequency (UHF) line-of-sight and UHF satellite communications (SATCOM) capability for this purpose. Annotated imagery of a target area, SID products,
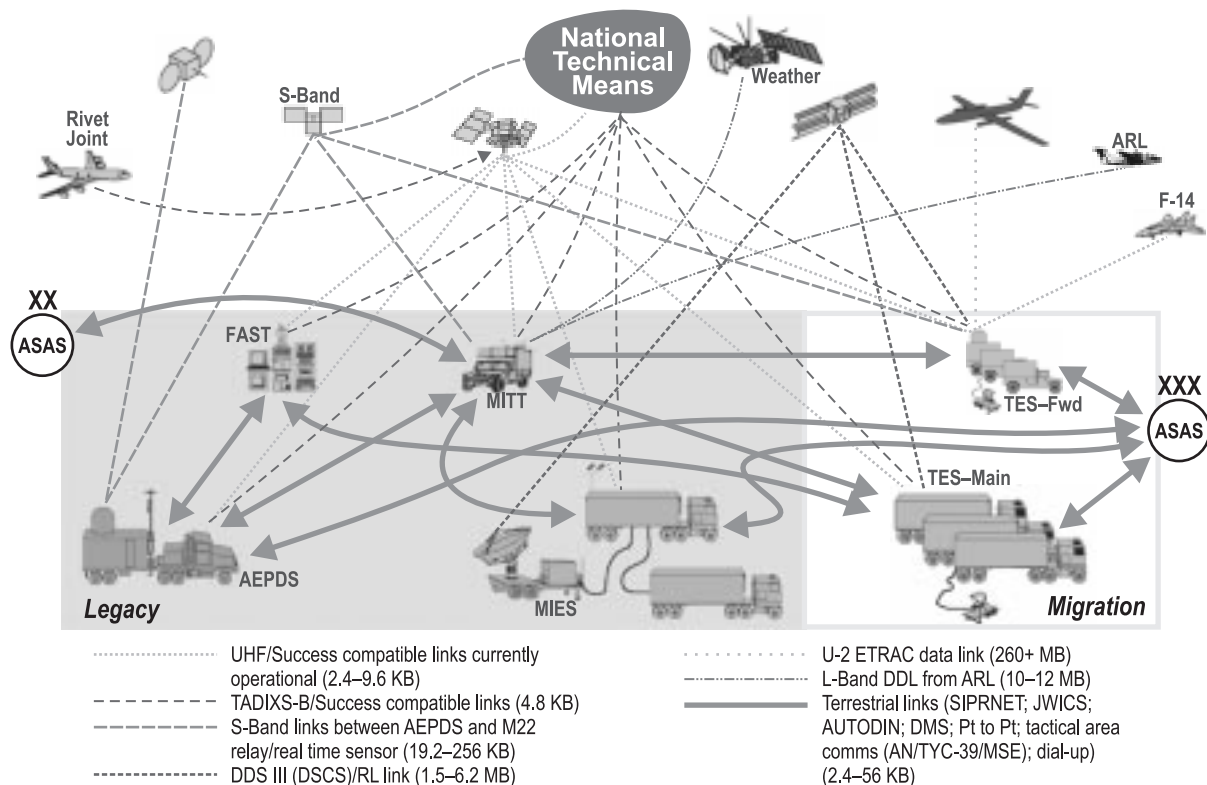
Figure 1. TENCAP Architecture

Links legend:

- UHF/Success compatible links currently operational (2.4–9.6 KB)
- TADIXS-B/Success compatible links (4.8 KB)
- S-Band links between AEPDS and M22 relay/real time sensor (19.2–256 KB)
- DDS III (DSCS)/RL link (1.5–6.2 MB)
- U-2 ETRAC data link (260+ MB)
- L-Band DDL from ARL (10–12 MB)
- Terrestrial links (SIPRNET; JWICS; AUTODIN; DMS; Pt to Pt; tactical area comms (AN/TYC-39/MSE); dial-up) (2.4–56 KB)

> *[Intelligence products] can be transmitted using terrestrial links such as the Secret Internet Protocol Router Network (SIPRNET), Joint Worldwide Intelligence Communications System (JWICS), Automatic Digital Network (AUTODIN), Data Management System (DMS), point-to-point, tactical area communications, and dial-up.*

and electronic order of battle files are often sent from the corps to the division for required retransmission to the division ASAS and for intelligence professionals to use. TENCAP personnel can post the intelligence analysis results to JWICS or SIPRNET. The analysis can include both IMINT and SIGINT information associated with an area of interest.

Finally, the opportunity to pass time-critical information via landline still remains. On several exercises in recent years, vital information that was needed by units was provided by telephone directly from the TENCAP system officer in charge to the respective S2 or G2 of the unit in contact.

Current TENCAP Systems

The TES is designed for split-based operations. A TES is composed of two operational nodes: TES-forward and TES-main. Each node has identical functional capabilities but with different packaging. The two have different numbers of workstations, different mobility capabilities, and different antennas.

The TES-forward operates a modular interoperable surface terminal (MIST). The TES-forward is equipped with six high-mobility, multipurpose wheeled vehicles, one of which carries the MIST, and an M1085 cargo truck for towing the MIST antenna. TES-forward can be transported on six C-130s or three C-141s and can be driven on and off the aircraft.

The TES-main operates a triband satellite communications subsystem (TSS). The TES-main is equipped with a main tactical mission vehicle, a main communications vehicle, a TSS vehicle, a main tactical support vehicle, and a main generator vehicle. It uses the TSS antenna mounted on a 5-ton truck. TES-main is housed in air-transportable, 40-foot vans. The TES-main can be transported on four C-141s, three C-17s, or one C-5 and can be driven on and off the aircraft.

The mobile integrated tactical terminal (MITT) is a small, compact, highly mobile, self-sufficient system that provides the division commander with TENCAP capabilities. The MITT receives, processes, and disseminates multidisciplined informa-
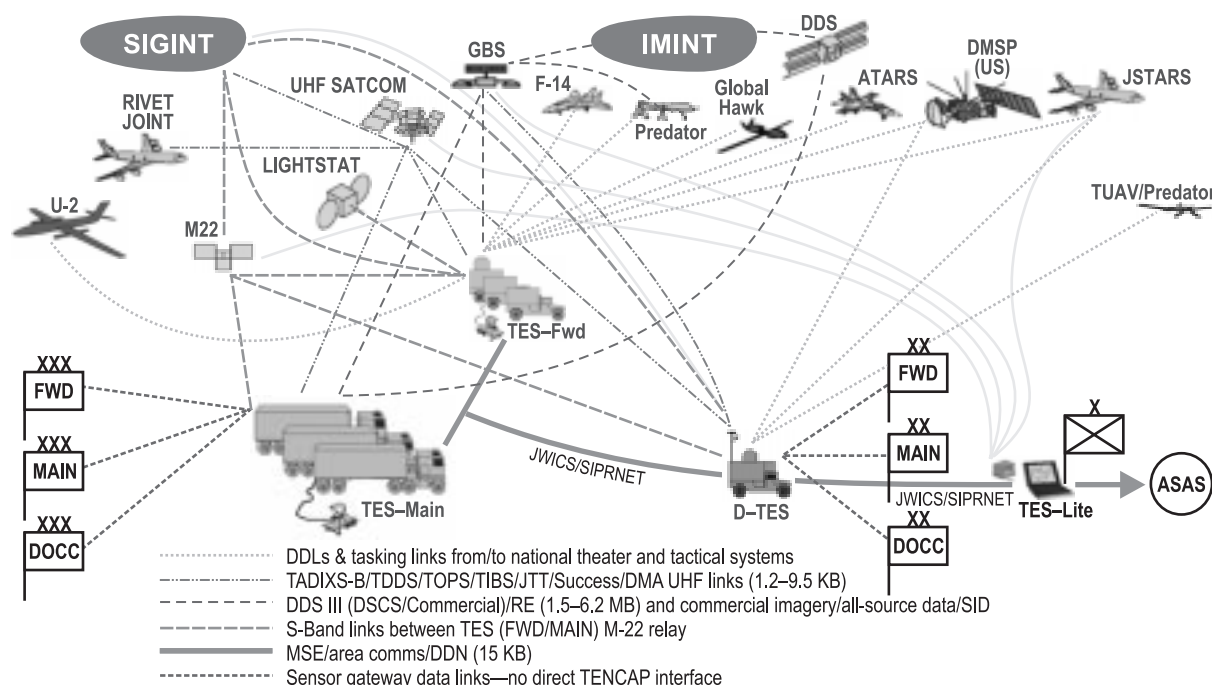
Figure 2. Tomorrow's Architecture

tion to the user's location in the required time. It also provides the commander with full operations support and enhanced command and control capabilities. While in travel configuration, the MITT can receive UHF broadcast and imagery. The MITT's ability to receive and process national- and theater-level data, coupled with its easy mobility and small size, make it an outstanding support system for early entry operations.

The forward area support terminal (FAST) is a transportable, modular, survivable, stand-alone TENCAP system designed specifically to support the separate brigades. The FAST receives, correlates, integrates, and disseminates multidisciplined information to the users' location in the required time. It provides MITT functionality in transit case configuration. The FAST links national and theater intelligence with early entry forces, small JTFs, and separate brigade-sized units.

TENCAP is supporting the interim brigade combat teams (IBCT). The IBCT at I Corps, Fort Lewis, Washington, has been enhanced with an MITT (E-MITT) system for early entry operations. The E-MITT adds to the intelligence and communications capabilities of the standard MITT with functions such as receiving, processing, and displaying weather information collected by Defense Meteorological Support Program and National Oceanic and Atmospheric Administration satellites. ASPO is continuing to monitor Transformation concepts and add equipment to respond to the commander's intelligence requirements.

Future System—DCGS-A

The Army is responding to future intelligence requirements via distributed common ground station-army (DCGS-A) architecture. This architecture integrates existing and future ISR ground processors to produce a common network-centric, modular, scalable, multi-intelligence architecture that is interoperable with other service intelligence ground stations. The DCGS-A architecture will also accommodate future intelligence requirements using a block-implementation approach. This architecture will be filled at corps, division, brigade, and battalion levels and then scaled to fit the respective echelon. Achieving this goal will improve operator proficiency, advance technology enhancements, and reduce operations and maintenance costs. *MR*

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Integrating Space Into Training Simulations

Colonel Teddy Bitner, U.S. Army, Retired

LIEUTENANT Commander Pete McVety envisions a future Navy reliant upon light, highly versatile, unmanned aerial vehicles (UAVs) to perform remote sensing, act as communications relays, and function as attack platforms.[1] Because of today's emphasis on technology to increase the reach and capabilities of U.S. weapon systems, the U.S. Navy employs a mix of current and emerging technology. In fact, the space systems required to implement McVety's vision exist now—lightweight satellite communications (SATCOM) and global positioning system (GPS) receivers. Across the services, evolving command, control, communications, and intelligence (C3I) systems' reliance on space-based systems becomes increasingly transparent to operators but ever more critical to successfully operating those systems. Training commanders and operators to exploit the space capabilities supporting their C3I systems and to mitigate potentially debilitating degradations due to natural causes or threat activity is a progressive challenge as reliance on space becomes increasingly transparent.

Space applications at the operational level exploded into the Army's consciousness during the Persian Gulf War. Once seen as the domain of national capabilities, tactical commanders could exploit space products at an unprecedented level during that conflict. For example, it is difficult to overstate the impact of precision navigation that GPS receivers provide in the desert or their ability to detect and warn people of incoming Scud missiles. Recalling the near-revolutionary impact of GPS on maneuver warfare during the conflict, the official history records: "The appearance of GPS during Desert Shield obliged combat units to change tactics and operating procedures in order to realize the full potential of precision locating devices."[2] More recently in Kosovo, the U.S. Air Force used the multiple-source tactical system in the cockpit to provide crews unprecedented situational awareness by integrating GPS, SATCOM, and space-based sensors.[3]

> *Most of the space-based capabilities integrated into tactical units' day-to-day operational systems are not included in the simulations used for Army training. In short, commanders generally lack the opportunity to train units to work through the space systems degradation they are likely to experience during deployments or to fully exploit the space products available to them.*

Yet, most of the space-based capabilities integrated into tactical units' day-to-day operational systems are not included in the simulations used for Army training. In short, commanders generally lack the opportunity to train units to work through the space systems degradation they are likely to experience during deployments or to fully exploit the space products available to them.

Evolving Space Capabilities

Space operations officers are being trained and will form space support elements (SSEs) at corps and division levels. SSEs will provide unprecedented expertise to integrate and synchronize space within those units. Army space support teams (ARSSTs) from the U.S. Army Space Command supported corps commanders and their staffs for most of the past decade. The combination of a dedicated SSE and an ARSST manned by experienced space operators and deployed with specialized equipment will provide a robust, focused capacity to leverage both government and commercial space systems and organizations. Specifically, they will improve the space force enhancement aspect of space operations, defined as "any operation from space with the objective of enhancing, enabling, or supporting terrestrial operations in peacetime, conflict, and war."[4] Doctrinally, elements of force enhancement include communications, position and

VII Corps elements deploying along Tapline Road, 11 February 1991. During the Gulf War, GPS allowed units to cross featureless desert terrain with absolute confidence.

"The appearance of GPS during Desert Shield obliged combat units to change tactics and operating procedures in order to realize the full potential of precision locating devices." More recently in Kosovo, the U.S. Air Force used the multiple-source tactical system in the cockpit to provide crews unprecedented situational awareness by integrating GPS, SATCOM, and space-based sensors.

navigation, weather, terrain, environmental monitoring, and surveillance.[5] Theater missile warning is commonly included in this list as well.[6]

Exploitation of force enhancement elements has been aptly demonstrated in recent years, particularly during operations in the Balkans, and include bulk data transmission using the Global Broadcast Service (GBS) to predict space weather that affects satellite and terrestrial communications, and commercial high-resolution imagery. Beyond force enhancement is an emerging space capability known as "space control." Space control ensures the availability of space capabilities to friendly forces while denying it to the enemy.[7] Examples of specific activities include physically protecting ground facilities, jamming uplinks and downlinks of enemy systems, or denying commercial space services. This aspect of space operations is emphasized in U.S. Army Field Manual (FM) 3-0, *Operations*: "Although the U.S. may have an advantage in surveillance assets, commanders should assume that enemies also have adequate surveillance means. For example, an enemy may purchase high-resolution imagery from commercial spaced-based systems."[8]

Given this increased space operational capability available to corps commanders and potential threat forces, simulating existing and future space capabilities to the degree necessary to train at the corps and division levels becomes increasingly important. U.S. Army Regulation 5-11, *Management of Army Models and Simulations*, defines models and simulations as: "The development and use of live, virtual and constructive models including simulators, emulators, and prototypes to investigate, understand, or provide experimental stimulus to either (1) conceptual systems that do not exist or (2) real life systems which cannot accept experimentation or observation because of resource, range, security, or safety limitations. This investigation and understanding in a synthetic environment will support decisions in the domains of Research, Development, and Acquisition (RDA) and Advanced Concepts and Requirements (ACR), or transfer necessary experiential effects in the Training, Exercises and Military Operations (TEMO) domain."[9]

This article focuses on training simulations, specifically those simulations used in training at the U.S. Army corps level. For example, current

simulations used by the Battle Command Training Program (BCTP) at Fort Leavenworth, Kansas, include the venerable Corps Battle Simulation (CBS) and the Brigade/Battalion Battle Simulation (BBS). Adapted, updated, patched, and expanded, CBS has been a mainstay for many years for training corps and division commanders and staffs. CBS also forms the core for the Joint Training Confederation used for joint staff training.[10] A complementary

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simulation for training at lower levels, BBS is designed to be a low-cost capability to train maneuver brigade and battalion commanders and their staffs.[11]

Because it was developed before there were common space applications at the operational and tactical levels, CBS does not deliberately model space capabilities. For example, within CBS, unit location information reported to the training audience is actually ground truth. A scenario using GPS spoofing or jamming to achieve a stated training objective cannot be modeled within CBS because the simulation cannot readily deviate from reporting unit locations as actually maintained within the simulation without extensive manual interface. Likewise, "space effects" required to initiate a corps staff planning process by replicating an enemy with a credit card and Internet access are generally not replicated in current training simulations. Consider the potential of a Mohamed Aidid using the Internet to gain high-resolution commercial imagery in hours, to exploit GPS to rapidly move his forces, or to purchase commercial SATCOM systems and access. These kinds of scenarios must be created by using manual workarounds.

Converging Point—Bringing Together Space Operations and Simulations

There are two challenges to integrating space scenarios into training simulations. First, manual integration processes usually require intensive and focused effort by a qualified team developing scripted inputs consistent with the commander's training objectives under an exercise director's control. Second, future simulations require true integration of space capabilities so that ground component commanders receive realistic effects—both positive and negative for operational decisions they make during exercises.

Space and current simulations. Currently, space integration into BCTP warfighter training exercises (WFXs) requires manually injecting space products and effects. To facilitate this process, The U.S. Army Space and Missile Defense Command (USASMDC) and BCTP executed a Memorandum of Agreement on 22 June 2001 that detailed specific activities and requirements for providing space effects during future WFXs. The focus of this effort is at corps level and includes a specialized space integration team that provides manual event inputs by using stand-alone models, when applicable, with descriptions of the desired effects and anticipated unit reactions, and an observer/controller. These capabilities are in addition to the capabilities provided by an ARSST and, when manned, the SSE located at the corps headquarters.

GPS location and timing are familiar capabilities to most and are, therefore, used here as an example of how a corps WFX manual workaround is injected. Accurate positions provided by GPS depend on the number of satellites in view of the GPS ground receiver. These satellites are susceptible to a number of space weather conditions. For example, atmospheric and ionospheric scintillation can cause GPS timing errors, and ionospheric scintillation can also cause GPS signal loss or positioning errors. A reduction in the number of satellites in view due to ionospheric scintillation will reduce accuracy. If a space weather prediction projects a specific impact on the GPS constellation during a deep attack that depends on GPS for precise navigation, that fact must be considered in deep strike planning. Consequently, the commander may require the SSE to project a period when GPS accuracy is not degraded.

GPS can be jammed, and effective jammers are available to those willing to pay for them. If a threat force is willing to sacrifice GPS accuracy to degrade friendly force capabilities, it may employ GPS jamming to desynchronize friendly actions or support a specific threat operation. The commander will depend on the SSE, in conjunction with the G2 and G6, to keep him informed of such situations and to recommend how to mitigate this threat.

During the WFX, the USASMDC team working with BCTP will identify potential space events consistent with the commander's training objectives and propose injects to the exercise director. A typical event might be to create a situation in which the threat would implement GPS jamming to degrade friendly force accuracy or GPS timing of communications systems, with a primary training goal of causing the corps staff to recognize the threat and respond.

A soldier monitors her real time display
during a battlefield simulation exercise.

US Army

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and Internet access are generally not replicated in current training simulations.*

As indicated earlier, CBS assumes perfect positioning in the simulation, thus it is unable to simulate the degraded accuracy of a perceived unit location vis-à-vis ground truth. This requires a manual workaround to affect the scenario, usually by text message, to develop the situation and to attain the training objective. This is but one example of a means to overcome simulation shortfalls to provide realistic training.

Not all exercises demand manual workarounds. Several excellent commercial or government-produced, stand-alone space models exist to perform various functions. These models include those that provide satellite orbital data, space-based radar, imaging, GPS accuracy and jamming, and missile launch detection. Exercise directors may federate and integrate some of these models to provide specific space capabilities within an operational demonstration or training event. The Mounted Maneuver Battle Lab's (MMBL's) future combat command and control experiment (FCC2) during May 2001 is a good example. During FCC2, the Space and Missile Defense Battle Lab linked several models to provide a space-based radar capa-

bility in support of future brigade operations. This diverse federation seamlessly integrated with the One Semiautomated Force (OneSAF) testbed, the overall simulation driver used by MMBL. The federation included an asset scheduler (to optimize satellite scheduling), Descriptive Intermediate Attributed Notation for Ada (to exploit synthetic aperture radar information), a moving target indicator version of virtual surveillance target attack radar (a joint surveillance target attack radar system emulator), and an overall model integrator. These linked models formed a distinct, compact sensor capability with variable time and accuracy reporting through a replicated ground station to representative command and control systems within the brigade. In this case, manual workarounds were virtually nonexistent because the federation interface with the simulation driver interacted automatically with the training audience.

Space integration in future simulations. During 1999, USASMDC established a team to build the foundation for integrating space into BCTP. Although the immediate focus was integrating space into warfighter simulation, the intent was to develop

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functional descriptions universally applicable to all future training simulations. The team uses the functional description of the battlespace (FDB) process. FDB is a research and development effort funded by the U.S. Army Training and Doctrine Command and managed by the Simulation, Training, and Instrumentation Command in conjunction with the National Simulation Center.[12] The FDB holds a repository of documents used by software engineers to develop future simulations consistent with the Army's organization; doctrine; and tactics, techniques, and procedures (TTP). Space FDB documents focus on activities of space operations officers in the corps SSE, but the document's focus will expand to include elements of the 1st Space Battalion (ARSST and the Joint Tactical Ground Station), U.S. Army Space Command, and generic space capabilities.[13] Specific examples include space weather effects on operations; availability and impact of commercial imaging for friendly, neutral, and threat forces; availability and accuracy of satellite orbital data; theater missile warning architecture; degradation; and SATCOM. All these documents describe space architectures in a way that a ground component simulation can integrate

seamlessly with joint-level simulations describing the same capabilities. As they are developed, space subject matter experts can review the documents. However, it is important to remember that although simulations can be jointly integrated, they must describe an environment in which the ground commander's use of space products and effects of space on ground operation are faithfully replicated.

Most readers have seen film footage of pre-World War II soldiers training with cardboard-covered automobiles as tanks, sticks as machineguns, and metal tubes as antitank guns. In a sense, that is where the Army is today when it comes to space integration in current corps- and division-level simulation. Increasing operational dependence on space and growing availability of space products to potential adversaries demand realistic training for U.S. Army forces.

Greater reliance on simulations to create that training environment presents challenges and opportunities. Challenges in the near term include improvising manual workarounds and federating models so that commanders' immediate training objectives are achieved. Another challenge is educating commanders and staffs about space capabilities. Opportunities present themselves as trainers establish requirements for simulation-driven training environments. To ensure that low-technology training is not conducted amidst advanced command and control capabilities when attempting to train soldiers to exploit space, the Army must build space operations into future training simulations—simulations that cause positive or negative outcomes based on commanders' decisions. Soldiers must encounter the unexpected in training and not on the streets of a hostile city. **MR**

NOTES

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11. Ibid, 65.
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SPACE
Meets Sand
At Lucky Sentinel

Major Terry Torraca, U.S. Army

WARFIGHTERS ARE DEPLOYED in the dirt, in the mud, and recently, in the case of the U.S. Army Forces, U.S. Central Command (ARCENT), in the sand. Bringing space to the sand were two elements of the U.S. Army Space Command (ARSPACE)—the Army space support team (ARSST) from 1st Space Battalion, Colorado Springs, Colorado, and the space operations officer permanently assigned to the ARCENT staff.

Just how important is space to our national and global interests? The 11 January 2001 Report of the Commission to Assess U.S. National Security, Space Management, and Organization states: "The security and economic well being of the United States and its allies and friends depends on the nation's ability to operate successfully in space. To be able to contribute to peace and stability in a distinctly different but still dangerous and complex global environment, the United States needs to remain at the forefront in space, technologically and operationally, as we have in the air, on land, and at sea. Specifically, the nation must have the capability to use space as an integral part of its ability to manage crises, deter conflicts, and, if deterrence fails, to prevail in conflict."

ARSPACE, U.S. Space Command (USSPACE-COM), and U.S. Army Space and Missile Defense Command (USASMDC) lead the Army's efforts in harnessing this evolutionary component of battle-space. ARSPACE supports warfighters in several areas, including the Defense Satellite Communications System (DSCS), theater missile defense, and overall space support. The ARSSTs and the space officers who lead them provide space support directly to warfighters. Their efforts in Lucky Sentinel 01 clearly demonstrated progress in the continuing process of integrating space into operations.

The ARSST is the primary force-projection resource for ARSPACE. ARSSTs provide space sup-

ARSSTs assess the capabilities, limitations, and status of space-based systems as they apply to the tactical situation. Applied operationally, the teams perform space assessment, fully exploit space force enhancements, and provide commercial imagery and terrain products to the supported commander. Leading each ARSST is a new breed of officer—the functional area 40, space operations officer.

port to various echelons, ranging from the land component commander to special operations forces teams. ARSSTs provide rapidly deployable space-based operational support across the spectrum of military and civil operations. The teams are organized identically to support the corps; however, their organization is routinely modified to meet mission requirements. Narrowly defined, ARSSTs assess the capabilities, limitations, and status of space-based systems as they apply to the tactical situation. Applied operationally, the teams perform space assessment, fully exploit space force enhancements, and provide commercial imagery and terrain products to the supported commander. Leading each ARSST is a new breed of officer—the functional area (FA) 40, space operations officer.

To fully integrate space capabilities, Transformation forces will need space-literate personnel who can provide enhanced access to information derived from military, national, and commercial space segments. In 2000, the Army established FA 40 to provide a career path for officers specializing in space literacy. These officers provide space expertise to tactical, operational, and strategic staffs and articulate Army space requirements and capabilities in both joint and national forums. There are several categories of positions for space operations officers, ranging from joint positions at USSPACECOM

Lowered GPS accuracy can have a detrimental effect on operations during low visibility or in a desert environment.

The ARSST produces graphs 72 hours in advance for a given 24-hour period that depict the predicted accuracy of systems that rely on GPS. . . . The graphs show time along the horizontal axis and predicted GPS error along the vertical axis. The GPS error can be displayed in different units of measurement, depending on the command's requirements; however, the most common errors depicted are spherical error of probability and circular error of probability.

to Army positions at USASMDC, ARSPACE, the National Aeronautical and Space Administration, and one at each corps- and Army-level headquarters. As the two critical elements in integrating space, the ARSST and resident space operations officer were brought together as a space cell to support Third U.S. Army, ARCENT, during Lucky Sentinel 01.

Lucky Sentinel is an annual exercise held in Kuwait in early April. It is designed to improve readiness and demonstrate U.S. commitment to the Gulf region's security and stability. The resident space operations officer, who has been assigned to the command for approximately eight months, and an ARSST that deployed from Colorado Springs pro-

vide the space support. The space operations officer assigned to the ARCENT staff is aligned with the C5/J3 plans section. By being assigned to the plans section, the space operations officer stays abreast of current operations, participates in the military decisionmaking process (MDMP), and provides space-related information during future plan development. The space operations officer also oversees all staff sections through routine planning meetings and ongoing contact with each primary staff section through its representative within the operations planning group. The ARSST is collocated with the resident space operations officer to facilitate support operations. This organization of space elements and capabilities proved efficient during the execution of Lucky Sentinel and overall space support operations.

During Lucky Sentinel, the resident space operations officer and ARSST provided space awareness, expertise, products, and analysis to the ARCENT commander and his staff. U.S. Army Field Manual (FM) 100-18, *Space Support to Army Operations*, describes the mission, architecture, characteristics, and applicability of space resources to support Army operations. The team provided support in five proven space force-enhancement areas: position and navigation; communications; missile warning; reconnaissance, intelligence, surveillance, and target acquisition (RISTA); and weather, terrain, and environmental monitoring (WTEM). The team also contributed to intelligence preparation of the battlefield (IPB) by providing and continually updating a space intelligence estimate and responding to space-related requests for information.

Position and navigation. The ARSST produces graphs 72 hours in advance for a given 24-hour period that depict the predicted accuracy of systems that rely on global positioning systems (GPS). Currently, there are several joint computer applications that produce these graphs, including space battle management cores systems and the operational model to exploit GPS accuracy. The graphs show time along the horizontal axis and predicted GPS error along the vertical axis. The GPS error can be displayed in different units of measurement, depending on the command's requirements; however, the most common errors depicted are spherical error of probability and circular error of probability, both given in meters. Data shown on these graphs are potentially crucial to critical navigation and precision-guided munitions systems. The rule of thumb is "don't strike during the spike," which is when the predicted error is highest. The graphs show predicted accuracy of systems that rely on GPS, the

The MILSTAR is a joint service satellite communications system that provides secure, jam-resistant worldwide communications.

DOD

The space weather phenomenon is based on solar bursts and occurrences in the Earth's ionosphere. Systems that are most vulnerable to these events include ultrahigh frequency and super high frequency SATCOM and radar, but space weather may also affect navigation and intelligence systems. The extremely high frequency band supported by the military strategic and tactical relay (MILSTAR) constellation is the least vulnerable to space weather, jamming, and nuclear electromagnetic pulse.

health and status of individual satellites within a constellation, the geometry of the constellation, and predicted error based on a given location in the world.

In general, lowered GPS accuracy mostly affects guided munitions, deep attack operations, and ground maneuver during low visibility or in a desert environment. The ARSST first provides GPS accuracy information to the G3, current operations. This enables the current operations staff to disseminate information quickly and immediately mitigate the risk to ongoing operations. Likewise, the deep operations coordination cell uses the information to mitigate the risk to ongoing deep operations, to assess impact to near-term operations, and to identify limitations during planning for future deep operations. Other staff sections, such as logistics and intelligence, use the information to counter possible effects of degraded GPS accuracy.

Communications. The ARSST monitors the status of all satellite communications (SATCOM) systems. This service can be as general as learning a constellation's health status or as specific as fre-

quencies affected by adverse solar weather. The team can also act as a liaison between the supported unit and ARSPACE assets worldwide, including the DSCS regional signals intelligence support center and DSCS operations center for SATCOM. This allows the team to help the G6 address issues directly related to the DSCS SATCOM constellation. The team also provides an early entry communications capability with international maritime satellite telephone terminals.

ARSST communications support also helps the G6 by determining which satellites support the communications network, tracking the status of satellites down to the channel level, assisting in resolving issues with support, requesting activation of residual or marginal capabilities, and identifying scheduled and unscheduled outages.

Missile warning. The ARSST maintains an operational knowledge of the theater event system and the joint tactical ground station (JTAGS) component for theater ballistic missile early warning. This includes probability of detection, ellipses for predicted

impact points, and deployed elements' daily status. The ARSST can assist the supported unit in troubleshooting early warning networks, optimizing coverage, and assessing early warning system limitations. There are three early warning systems that

> *[ARSST monitoring] can be as general as learning a constellation's health status or as specific as frequencies affected by adverse solar weather. . . . ARSST communications support also helps the G6 by determining which satellites support the communications network, tracking the status of satellites down to the channel level, assisting in resolving issues with support, requesting activation of residual or marginal capabilities, and identifying scheduled and unscheduled outages.*

comprise the theater event system—the National Tactical Detection and Reporting System, JTAGS, and the U.S. Air Force's Attack and Launch Early Reporting to Theater System. JTAGS is the U.S. Army and U.S. Navy's deployable shelter that deployed forces use in theater. It injects data directly into the theater's tactical computer applications, the theater data distribution system, and the tactical information broadcast service network to disseminate the earliest possible warning to U.S. troops. This is a distinct advantage over other early warning systems.

The ARSST missile warning support enhances the efforts of the unit's air defense element. It tracks the operational status of both JTAGS and Defense Satellite Program (DSP) satellites. These systems are key to providing early warning beyond the limits of ground-based systems. The team will also coordinate the optimization of DSP coverage for mission requirements.

RISTA. The ARSST deploys with a joint software application called the satellite and missile analysis tool that simulates Earth-orbiting objects and satellites in near real time. The team uses the tool to create text or graphical reports that help staff sections use satellite reconnaissance advance notice data. This data provides information on potential threat satellites and their capabilities to monitor friendly operations.

ARSST RISTA support affects the unit's operational security, deception planning, and battle damage assessment (BDA). The ARSST will determine the unit's vulnerability to enemy collection by using space-based systems and will identify both passive and active countermeasures. This information is also useful in planning and executing deception operations. The team will also use information from friendly systems to facilitate using commercial imagery for general requirements and BDA.

WTEM. The team monitors space weather, assesses its impact on current operations, and advises the command on methods to counter effects. Space weather has the potential to affect many Department of Defense systems. The space weather phenomenon is based on solar bursts and occurrences in the Earth's ionosphere. Systems that are most vulnerable to these events include ultrahigh frequency and super high frequency SATCOM and radar, but space weather may also affect navigation and intelligence systems. The extremely high frequency band supported by the military strategic and tactical relay (MILSTAR) constellation is the least vulnerable to space weather, jamming, and nuclear electromagnetic pulse.

Also part of WTEM is the team's ability to produce both two- and three-dimensional satellite-imagery products using panchromatic, multispectral, and hyperspectral imagery. The ARSST can reach back to the Multi-Spectral Imagery Lab in Colorado Springs, Colorado to fill shortfalls by providing additional imagery requirements, scene rectification, and hard- and soft-copy production. The facility's digital imagery processing capabilities include multispectral and hyperspectral radar; creating and editing digital elevation data; and integrated geographic information systems processing. The team deploys with preloaded data sets that include archived national and commercial imagery. Two-dimensional imagery products are produced using IMAGINE software published by Earth Resources Data Analysis System. These products may vary in resolution from 1 to 30 meters and may be nadir or perspective views. This two-dimensional imagery may be imported into another software program—Edge, published by Autometric—to create a three-dimensional animated fly-through. These flights may be generated along a predefined route on the ground or from various perspectives such as for an air IPB. Fly-throughs can be created for various speeds and altitudes, and they can be exported to a compact disk-read only memory, an 8-millimeter tape, or a vertical helix scan (VHS) tape for the supported unit to replay later.

The ARSST has a limited but unique ability to predict and assess space weather effects on the supported units' operations. This ability is essential to ensuring communications support to critical opera-

The deep operations coordination cell synchronizes the employment of guided munitions, deep attack operations, and ground maneuver.

US Army

The ARSST first provides GPS accuracy information to the G3, current operations. This enables the current operations staff to disseminate information quickly and immediately mitigate the risk to ongoing operations. Likewise, the deep operations coordination cell uses the information to mitigate the risk to ongoing deep operations, to assess impact to near-term operations, and to identify limitations during planning for future deep operations.

tions and establishing countermeasures to solar weather effects. In the area of imagery support, the ARSST enhances the unit's topographical team by increasing its production capability. The team also assists in retrieving current and archived imagery. This improves the quality of the warfighter's imagery and expands the distribution of imagery within the staff.

During Lucky Sentinel, the support described in the five space force-enhancement areas proved to be a combat multiplier to the ARCENT staff and helped develop key information for the MDMP. The warfighter's requirements continually change the type of space support provided, the space support doctrine, and the tools used to develop the support.

Space operations enhance combat operations and play an increasingly critical role in ensuring U.S. military forces can see, shape, and dominate the battlespace in the coming decades. In truth, the Army cannot achieve the Objective Force's characteristics or its Transformation goals without fully exploiting space. Space assets provide capabilities to a rapidly moving force while minimizing the logistics tail and deployed infrastructure. Today, space assets deploy where needed and when needed. Tomorrow, space assets must respond to the highly mobile warfighter and be tailored to the Objective Force's needs. Only through the continued efforts of all space operations elements can space-based products enable warfighting. Lucky Sentinel 01 proved that timely, accurate space products can ensure warfighters' success. The 1st Space Battalion, USSPACECOM, brings space to the warfighter. ***MR***

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The Space Operations Officer

Brigadier General Richard V. Geraci, U.S. Army

SIMPLY PUT, the U.S. Army needs a cadre of officers specifically trained in and knowledgeable about space capabilities to address space-related warfighting. To satisfy this requirement, the Army has established a space operations functional area. As the Army identifies requirements and develops capabilities for the space-empowered Objective Force, the Army is integrating these space operations officers into current operations, future planning, research and development, and acquisition positions at all organizational levels of the Army and Department of Defense (DOD). This is a concerted effort to integrate space operations throughout all Army operations and activities.

Our nation's success across the full spectrum of military operations in the 21st century requires officers and leaders who can apply space-based capabilities to warfare. Senior military leaders must understand what space operations officers do and why they are critical to Army and joint operations. Space operations officers are trained to educate leaders and their staffs on all aspects of space operations.

The Army is the world's largest user of space-based capabilities for military purposes. Consider the half-million global positioning system (GPS) receivers on Army systems. The Army also uses space for many other force enhancement capabilities such as long-haul communications and command and control (C2) systems; terrestrial and space weather information; environmental monitoring; positioning, navigation, and timing; intelligence; reconnaissance and space and terrestrial surveillance; critical high-resolution imagery; missile early warning; and advanced targeting capabilities.

Clearly, today's Army operations are significantly enhanced by and often are critically dependent on satellites. Although some officers in other functional areas and basic branches have specialized space-related knowledge, only Army space operations officers have the focused technical space training and

> *Space control is critical during all phases of military operations and must be integrated into campaign planning, operations orders, and mission execution. Controlling space is essential if the Army is to deny its adversaries the ability to see, target, and harm U.S. forces. The protection afforded U.S. forces by information dominance coming from control of space assets will enhance the protection of our lighter, more deployable future combat systems.*

the broad space planning skills to provide comprehensive support to the warfighter.

Tomorrow's Objective Force commander requires battlespace knowledge and understanding to maximize the full combat power of his force. This drives the requirement for information reachback and push forward. As the Army continues to experiment, there has been progress in leveraging space to meet commanders' requirements. For example, space technology can provide deploying units the means to exchange critical information via satellite in near real time during en route mission planning. It also provides improved C2 to operate in compartmented and urban terrain as well as timely access to commercial imagery for a clearer battlefield picture.

The Army's increased dependence on space has made our forces vulnerable. This has increased the importance of space control, which includes preventing others from denying us the use of space and preventing them from using space-based capabilities against us.

Space control is critical during all phases of military operations and must be integrated into campaign planning, operation orders, and mission execution. Controlling space is essential if the Army is to deny its adversaries the ability to see, target,

and harm U.S. forces. The protection afforded U.S. forces by information dominance coming from control of space assets will enhance the protection of our lighter, more deployable future combat systems. Space control is yet another venue to which the space operations officer brings invaluable expertise.

Space operations officers provide products and services to support the National Command Authorities, national agencies, the U.S. Space Command, all other unified commands, and the operational warfighting elements of all services. They represent the Army in organizations related to space such as the National Reconnaissance Office; the National Security Space Architect; and the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence. Within these organizations, Army space operations officers are space advocates and staff experts for their supported commanders. They are equipped with a broad understanding and knowledge of space-based capabilities, limitations, and vulnerabilities.

Space operations officers facilitate the integration of Army space support teams (ARSSTs) and Joint Tactical Ground Station (JTAGS) units into daily operations. The ARSSTs provide worldwide, on-call, space-based products, services, and expertise that support civil and military operations. The JTAGS provides theater commanders with direct early warning of incoming missile attacks by working with national reconnaissance organizations. Both units provide critical information to the commander and support integrated missile defense operations.

Space operations officers specialize in integrating space operations into the military decisionmaking process (MDMP). They synchronize, optimize, and deconflict the use of space-based resources with the commander's staff and across the battlefield operating systems. Space operation officers provide commanders the space intelligence preparation of the battlefield (IPB), the space intelligence estimate of the situation, and highly technical tools to support operational planning. They prepare the space annex for operations orders and address specific issues from commanders and their staffs concerning enemy space capabilities. Addressing these specific issues improves MDMP by giving the commander and his staff information to conduct IPB and to develop courses of action within the integrated battlespace where we will fight future wars. The space officer's input to courses of action and decision support templates help present a clearer battlespace for the commander.

Army space operations officers work to complement the actions and responsibilities of the

Even soldiers in the field benefit from the union of lightweight computing devices and space-based capabilities.

Roger's Communications

Space operations officers specialize in integrating space operations into the military decisionmaking process. They synchronize, optimize, and deconflict the use of space-based resources with the commander's staff and across the battlefield operating systems. Space operations officers provide commanders the space IPB, the space intelligence estimate of the situation, and highly technical tools to support operational planning.

signal, intelligence, information operations, and engineering staff officers. They are trained to understand, enable, and improve on how to use space and to know the space-based products that they require and produce. Not only do they understand the capabilities and needs of the other services, but they also understand other government agencies and how they use space. A space operations officer complements and focuses space-related activities across all the battlefield operating systems as well as the battlefield functional areas that the Army is addressing in its Objective Force.

This space expertise, coupled with operational and tactical expertise, clearly marks space operations officers as important members of the commander's staff.

Space-based capabilities support the Army across the full spectrum of military operations, from humanitarian operations through high-intensity

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During training for a disaster relief mission, an ARSST—led by a space operations officer and specializing in exploiting commercial satellite imagery—worked with I Corps at Fort Lewis to release maps and satellite imagery to coalition forces that normally do not have access to national imagery. During the summer of 2000, an ARSST provided this same service to the U.S. Forest Service when it was fighting fires in the western United States.

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conflict. For example, during training for a disaster relief mission, an ARSST—led by a space operations officer and specializing in exploiting commercial satellite imagery—worked with I Corps at Fort Lewis, Washington, to release maps and satellite imagery to coalition forces that normally do not have access to national imagery. During summer 2000, an ARSST provided this same service to the U.S. Forest Service when it was fighting fires in the western United States.

To help protect American peacekeepers in Kosovo, Army space forces deployed space support teams to provide Joint Task Force (JTF) Hawk's commander with space expertise and space-based products. The team created three-dimensional "fly-through" training aids for the JTF's aviation unit. It also developed a space battle update briefing and provided a daily satellite update for all mission areas.

Since Desert Storm, the Army has used space assets in high-intensity conflict exercises and wargames. During one such exercise, a space operations officer identified the impact of a solar event on signals intelligence (SIGINT) collection. Before deployment, he coordinated with the U.S. Air Force's space weather squadron for daily space weather support. The squadron also provided information on the very high frequency (VHF) and high frequency (HF) propagation windows to achieve the maximum and minimum usable frequencies for VHF and HF during the forecasted atmospheric conditions. Understanding the enemy's vulnerabilities and knowing when a significant solar event would severely degrade HF communications allowed the space operations officer to recommend a course of action to enhance the intelligence staff's SIGINT collection.

Army space operations officers provide the link between the field and the combat developer. They contribute to the development of space doctrine and space tactics, techniques, and procedures. They ensure that operational, planning, and training documents that address space adequately and accurately support the warfighters. Because the Army has unique space requirements, space operations officers assist in identifying Army space requirements across all components, branches, and battlefield operating systems. They focus on turning the latest space technology into unrivaled capabilities for commanders and soldiers in the field.

While the goal of Army leadership is to normalize space and military operations across the Army, the nearly 120 space operations officers are the only officers solely dedicated to space operations. Space operations officers can contribute to the evolution of domestic and international space policy. That policy can be translated into effective joint and Army doctrine and concepts for defensive and offensive actions to support our regional commanders in chief.

Since Desert Storm, the Army and DOD have made significant progress in understanding space and warfare. Army space operations officers understand how to maximize the use of space-based assets and identify new requirements to enhance our Army's warfighting capabilities. These officers are trained and prepared to be an integral part of the Army's Objective Force. They form a space-smart cadre able to exploit space for the Army today and in the future. The addition of space operations officers has better prepared the Army to deal with space and its effect on 21st-century warfare. **MR**

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MR Insights

Space Wars: A.D. 1990-A.D. 2030

Major James R. Meisinger, U.S. Army

In the last half of the 20th century, the rate of technological progress went nonlinear. Political, economic, and social change went from sporadic to constant, and a new era—the Transformation Age—was christened. However, the rift has widened between those who have prospered and those who have not. The world now faces a new definition of war. Wars will be shorter and have limited objectives, but they will be more violent. In the spirit of the new definition of warfare, I offer the following scenario.

A.D. 2030

I just got off the phone with my son, an anti-satellite platoon leader in the U.S. Space Corps. He called to tell me about recent action in the conflict in central Asia. To be quite honest, I found his account hard to follow. As I get older, it is harder for me to understand warfare.

When I was commissioned in the 1980s, the world was so much simpler. We knew who the enemy was, and we knew what to do if he crossed the line. Then someone erased the line.

As I reflect on my years of service, I see that I was a transition figure. My career began in combat arms during the Cold War, continued through the beginning of the U.S. Army's transformation, and ended in space command. I knew as much about space when I was a lieutenant as Billy Mitchell knew about air power when he was a lieutenant in 1904.

It took warfighters over a quarter of a century and a world war to figure out the basic principles governing air warfare, and it took them almost the same length of time to understand space warfare. Here is how it happened.

A.D. 1990

During Operation Desert Storm in the Persian Gulf War, I often wondered exactly where I was. Company headquarters had a global positioning system (GPS) receiver somewhere in the mortar section, but only the mortar section fire direction center specialist knew how to use it. He was the ultimate techno-weenie, and the commander always gave him any new toys to play with first.

Once, when I asked the specialist for a pinpoint location, he told me there would not be enough satellites overhead to get a location until later that evening. My exact location did not really matter. In the desert I could wave to adjacent units from anywhere in my platoon sector, and I could see farther than I could shoot with any of my organic weapons.

If I called for fire, I could be 500 meters off and still adjust onto the target quickly. The 1:100,000-scale map in my pocket had a contour line every 50 kilometers or so. Platoon graphics were about the size of my fingernail at that scale.

Once when visiting the battalion tactical operations center, I was surprised to see a small satellite radio antennae. The battalion signal officer (SIGO) and a noncommissioned officer (NCO) were huddled over it, trying to get it to work. The SIGO said it did not matter if it worked or not; they did not need satellite communications anyway—maybe a brigade or division did, but not a battalion.

I learned all about Scud launches and frequently participated in launch-reaction drills. I had no idea how warnings got to my company sector. I wondered how many seconds of warning I would get in the event of an actual launch. My company commander did not know either, but thought it was at least a few minutes.

During an intelligence briefing, the battalion S2 passed around some pictures of potential target areas. The pictures were stamped SECRET. The captain explained that these were satellite photographs and could not be shown to allies. He also said to refer to them as images rather than photographs and that no one could have copies.

A.D. 2010

As the director of Space Operations on the Central Command (CENTCOM) staff, I again found myself in the Middle East. I was visiting the commander of U.S. peacekeeping forces in the Israeli theater of operations.

I was there to ensure the general staff was getting all the space products and support it needed. The commanding general was glad to see me and wasted no time in telling me his concerns. He specifically asked me to look at the missile warning system and the computer network defenses.

The senior Space Forces officer, an Army lieutenant colonel (LTC), had been a Space Forces officer since being promoted to major. His cell consisted of one space operations (functional area (FA) 40) major, three space operations captains, and four FA 40-series NCOs.

The captains were new to space, having been assessed as Space Forces officers under a new process borrowed from the acquisition corps. Space Forces operations had broadened so much that the Army was considering moving to the branch-detail concept to begin building space experts even earlier in their careers. I hoped branch-detail officers would be able to keep their muddy boots foundation.

The LTC briefed me on the situation. Position navigation and timing (PNT) was not a problem. The GPS satellite constellation was still healthy, and the availability of other PNT assets added considerable

redundancy. The receivers could process signals from multiple systems and were small enough to be worn on one's wrist. Every key leader could determine at any moment his position within 20 meters. And, without having to synchronize his watch, he knew what time it was to the exact second.

Once diplomatic hurdles were cleared, fiber optic lines were to be installed, possible within 24 months. Until then, the force was using the venerable mobile subscriber equipment system and the single-channel ground and airborne radio system for most of its communications.

Key officers were issued global-access voice/data cell phones. The phones were small and rugged, but Department of Defense (DOD) users could easily push the system to capacity with high-band-width demands. The space section was working communication disruption contingencies for the upcoming solar max. However, satellites were much tougher than they used to be, so it was low priority.

The Space Forces control officer then briefed me on the command's space control operations. He and his NCO did not usually participate in space control missions. They were the space forward observers responsible for calls for fire. From their workstations they could contact any space control operator and request a mission. U.S. Space Command (USSPACECOM) performed as the space fire direction center, clearing most fires or gaining clearance from the National Command Authorities and sending the mission to the firing unit.

The computer network operations (CNO) officer, who had a master's degree in computer science, was a natural at his job. He briefed the network's intelligence preparation of the battlefield and gave a full ran down of the defenses in place throughout the command. I thought he was a little too eager to mix it up with the enemy, as junior officers often are. I tried to impress on him the significance of a network "shot fired in anger" despite the fact that there were no bloodshed or graphic television images.

I was somewhat familiar with the array of offensive weapons, but I did not feel comfortable with my knowledge of CNO. Congress was on the verge of creating a new CNO unified command. CNO had grown from a small joint task force to a huge national effort, and the commander in chief (CINC) of space operations (CINC-SPACE) was ready to spin it off.

The team's missile warning officer described the linkages between CENTCOM missile warning assets and command posts in theater. There were no hardwire linkages from the CENTCOM missile-warning element to task force headquarters, but broadcast messages, coupled with ground-based radar enhancements, were quite reliable. Each soldier in the theater carried a missile warning pager, which considerably shortened the warning time. The missile warning officer suspected the general's discomfort arose from some of the test results of the pager system. There were always a few soldiers who were not carrying their pagers, who forgot to turn them on, or whose pagers had dead batteries.

The final brief was from the noncommissioned officer in charge (NCOIC), who also headed the team's imagery production. Imagery production had changed dramatically in the last 10 years. The latest software automatically searched every imagery database in DOD and automatically tabulated the "collects" available for a specified time in the future. All the NCOIC need do was enter search criteria, and within a few seconds, thumbnails of every image— some only 10 minutes old—would appear. High-quality images could be printed in less than two minutes.

In an outbrief with the commanding general, I suggested that the pager-system problem could be one of leadership and training rather than being solely equipment related. I assured him that the CNO officer's enthusiasm for offensive operations had not hurt defensive preparations, which were up to doctrinal standard. He asked me to work with the CENTCOM staff to determine how to exercise computer-network defenses without disrupting real-world operations.

On the flight back to McDill Air Force Base, I realized that I would probably never return to Southwest Asia. My thoughts drifted back to my days as a lieutenant during the Cold War. Things had turned out differently than I had expected. What would the world be like in another 20 years?

A.D. 2030

My son always listens politely to my stories of the Army's good old days. During those days, lieutenants carried laminated paper maps and magnetic compasses and talked on radios so heavy another soldier had to carry them. Today, he told me he would have appreciated such simple tools of war. He is on his second job in the U.S. Space Corps, which supports the U.S. Air Force in the "Space Littoral."

The United States had resisted the temptation to weaponize space until China surprised the world by employing a space-based laser against a terrorist missile headed toward Beijing. China's action broke the dike of public opinion, and the United States released the flood of its technological and industrial might to produce an amazing series of offensive and defensive weapons.

My son's first assignment had been to a microsat fleet control unit. The boring shift work made him long for the type of adventures I had always described. He wanted to see the effects of his actions with his own eyes instead of on a screen or holograph.

His career had gone well. He had applied to the elite 1st Space Composite Wing, which was composed of one squadron of space planes with space-to-space and space-to-ground capability, one squadron of weather controllers, and one squadron of ground-to-space weapons. Active combat in space and from space was no longer unusual.

On his last operation, his unit had flown a transport plane to Antarctica. His platoon's mission: to conduct a space ambush against "Molniya" orbiting satellites while they were in low orbit over the South Pole. To succeed, his platoon had to temporarily cripple communications with mobile launch units spread across

the Asian continent

Every member of my son's platoon carries equipment with which to communicate worldwide by voice and data, to collect intelligence, to compute data, and to maintain nearly perfect situational awareness (SA). All communications devices are completely secure and unjammable. However, top minds commanding top dollars are working hard to develop technology that could intercept and disrupt such messages. CINCCNO and CINCSPACE operate continuously, keeping regional CINCs informed but often after the fact.

I had spent my entire career chasing the "perfect SA" only to see it happen after I had retired. My son tries to explain how decisions are just as hard to make now despite the fact that commanders know the location of every friendly and most enemy units. Enemy intentions remain unknowable, even when it is possible to have a fairly accurate picture of unit locations and movements, when it is possible to eavesdrop at will on enemy communications, and when it is possible to read enemy plans almost as soon as they are written. If the enemy reacted logically and there was no chaos, the mission would be easy. But humans are not logical, and battlefields always have friction.

My son also can tap directly into spaceborne reconnaissance assets and "sense" any part of the world in real time across the electromagnetic spectrum or by radar. Requesting and tasking are things of the past. If clouds block an area, the weather control squadron can fix it. Unfortunately, deception efforts have also become much more creative.

Although the missile versus missile defense arms race cost nearly a trillion dollars, the United States can now disable ballistic and cruise missiles at any time from seconds after launch to seconds before impact. A group of engineers at one of the country's most prestigious institutes of technology is working on a space weapon that could electronically hijack a cruise missile in flight and redirect it. But, there are no guarantees, and the cost of a single failure is dramatic.

The United States used a missile "defense in depth" with reconnaissance, warning, and active defenses that included many different weapons systems. The principles of war still applied. **MR**

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Operation Assistance: Canadian Civil Power Operations
Colonel W. Semianiw, Canadian National Defence

Canada's military forces have a long history of coming to the aid of civil powers during national emergencies. In every instance, military forces cooperated closely with civil authorities to accomplish necessary tasks. This was also the case during Operation Assistance, when Canadian Forces (CF) gave support to the Manitoba government during the flood of 1997—Canada's "flood of the century."

The First Battalion Princess Patricia's Canadian Light Infantry of Calgary, Alberta, deployed to an area of approximately 500 square kilometers south of Winnipeg, Manitoba, north of Grand Forks, North Dakota. The area included five regional municipalities (RMs) each with its own elected rural official (Reeve). Each RM, under the direction of its Reeve, was the lead agency in local operations. All CF units were to support and assist the RMs. The operation provided many lessons learned from aiding civil powers during a natural disaster.

Players and Boundaries

At the tactical level, the players during the flood crisis included varied groups of government and nongovernment, civilian, and commercial interests. In Manitoba this included the Reeve, his public administrator, the local fire department, the Royal Canadian Mounted Police (provincial jurisdiction), the Ministry of Natural Resources, Manitoba Hydro, Manitoba Telephone, Manitoba Highways, Manitoba Emergency Measures Organization (EMO), and the mayors and councils of affected towns. That lines of operation crossed municipal, provincial, and federal jurisdictions quickly became evident. Each agency had its own area of responsibility and coverage, but areas often overlapped, thus increasing the strain on coordination. However, agencies that aligned along municipal boundaries or in congruence with the lead agency found their support efforts simplified and streamlined.

The tasks the military were to perform centered on general duties such as filling sandbags, building dikes, or performing rescue, traffic control, or escort duties. Because large urban and county areas would be uninhabited, providing armed security was, at first, viewed as a probable task. However, this did not prove to be necessary. Sufficient police resources were available and were deployed effectively to permit or deny access to controlled areas.

To achieve the tasks expected of them, the military organization of company, squadron, and battery, with their inherent mobility, communications, and general-purpose soldiers, proved to be best suited for the tasks that were to be conducted.

Military Force Organization

During the staff planning process, planners arrived at two options for the organization of military forces in support of civil authorities. Military forces could take a centralized approach in which the unit would

control and allocate resources to civil authorities based on the task, or they could take a decentralized approach in which each RM would be assigned a slice of the pie. Situation analysis revealed that a decentralized approach would be best because it best fulfilled the need for simplicity, time, and space; unity of effort; and unity of command and control.

Rifle companies "in support." Rifle companies were allocated in support to RMs. Major towns, where dikes had been built before the flood, received as a military point of contact, a liaison officer (LO), who was generally a senior noncommissioned officer.

Twining a rifle company with an RM and placing an LO in each town proved to be effective. Civil authorities in each RM and the towns preferred to work with the same commander for all aspects of the operation. Local officials and military commanders developed relationships and dependencies that proved beneficial. Also, military commanders became versed in the nature of the crisis and the needs associated with their RMs and towns.

Each RM and town had its own way of fighting the flood and supporting its residents. Personnel stability in civilian and military associations and cooperation was vital. The situation required a military force that was flexible in dealing with differing needs, requirements, and demands within the same military hierarchical level. Military companies were employed in various and differing tasks at any given time.

Platoons "in reserve." German military philosopher Carl von Clausewitz's principle of maintaining a reserve at the tactical level for unforeseen events seems to be incongruous when applied to a natural disaster.[1] However, the need for a reserve to meet unexpected crises was evident. The enemy was the water, which hourly continued to cause more suffering and create more crises. A large force could not sit waiting for a task when there was so much suffering and so much to do.

The solution was to designate a single platoon-size reserve to be used extensively during the operation. In addition, each rifle company would have the task of supporting any of the other rifle companies and RMs, if needed. To achieve this second requirement, rifle companies passed platoons from one company to another, as required, which allowed the losing company headquarters to remain with its designated RM to maintain the critical military-civilian link throughout the operation. Doing this also allowed a surge capability, if needed, in any one of the RMs.

Decentralized Command and Control

With a decentralized approach to organization came a decentralized approach to command and control, which in Canadian doctrine is known as mission-type orders, or *Auftragstaktik*.[2] Subordinate commanders needed maximum flexibility since demands within each RM were specific to that particular RM because of social and geographical reasons.

The tasks encountered focused on the small-party tasks of team or section size. In most cases, commanders operated in isolation and were expected to make decisions at a moment's notice without referring to a higher authority. Therefore, a decentralized approach that provided broad guidance—or "left and right of arcs"—was the only viable solution.

The only limitation in supporting a particular RM was that lives were not to be put into jeopardy for equipment. This broad guidance allowed commanders to react to the various situations on an hour-to-hour basis.

Preparing task lists and prioritizing tasks was the responsibility of the lead agency and the applicable Reeve of the RM, with advice from the EMO representative—not the military. The task list then passed to the military commander for action. This chain of command mechanism ensured that the command and control relationship was maintained. Not doing so would have had legal ramifications.

Within this framework, the military provided advice and planning assistance for preparing the task lists. That the military's planning abilities and capabilities were just as useful as labor and materiel support quickly became evident.

Coordination

With so many government and nongovernment agencies involved, coordination of activities became paramount. Each RM and major town organized a flood-control center. Although called by different names and organized in their own way, the centers served the same purpose—to coordinate all aspects of flood assistance and relief.

The flood-control centers quickly became the focal point for disseminating information. It was not uncommon to find residents boating for an hour on a daily basis to visit the flood-control center to learn the latest news or to contact friends and neighbors.

To ensure effective coordination, military headquarters collocated with flood-control centers, which allowed an effective interface with various government and nongovernment agencies. Doing so ensured that resources were not double-tasked but pooled and shared for maximum use. For example, Manitoba Natural Resources and the Royal Canadian Mounted Police used their own boats and helicopters to augment military resources.

Force Multiplier

In many respects, tactical airlift by helicopter proved to be the operation's greatest force multiplier. Without it, support to civilian authorities would have been delayed and, many times, not possible. Although an agency might have had resources available, to be effective the resources had to be at the right place at the right time. During a natural disaster, seconds and minutes determine an operation's success. Helicopters reduced reaction times substantially.

Helicopter tasks included reconnaissance, liaison, rescue, and airlift. The Jet Ranger/Kiowa and the Labrador/Chinook were the workhorses of the operation at the tactical level. They greatly helped all government and nongovernment agencies complete tasks, and they ensured the mission's timely completion.

One of the most startling conditions RMs faced was the peculiar and difficult-to-understand phenomenon of residents' reluctance to leave their

homes, even when threatened with the loss of life. Residents have strong attachments to the homes that represent their lives and livelihoods. Counteraction of this reaction demands a prepared and rehearsed rescue plan that includes the continuous monitoring of civilians in threatened areas.

Lessons Learned

The key lessons learned during the operation included the following:

● Military boundaries should be aligned with the boundaries of the civilian government that is being supported.

● Tasks should focus on general-labor tasks, in which the company, squadron, battery, and general-purpose soldier will prove the most effective.

● Stability in civilian-military personnel relationships during such operations is necessary.

● Civilian and military authorities must maintain continuous liaison.

● A reserve must be designated.

● Commanders must receive broad guidance within which to work in order to accomplish the many tasks they will encounter.

● The lead agency should be responsible for preparing and prioritizing task lists.

● One body that includes all government and nongovernment departments should coordinate, effect support, and direct overall actions from one location.

● All agencies should share equipment.

● Tactical airlift in the form of the helicopter should be used extensively as a force multiplier.

● Evacuation plans should be prepared and rehearsed and include daily monitoring of civilians in threatened areas. *MR*

NOTES

1. Carl von Clausewitz, *On War* (New York: Random House, 1943), 155.
2. For the definition of Canadian Forces mission-type orders, see B-GL-300-002/FP-000, *Land Force Tactical Doctrine*, 1-9.

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Shaping Leadership Skills in Poland's Army

Lieutenant Colonel Andrzej Bujak and Major Zdzislaw Sliwa, Polish Army

Issues connected with leadership are among the main dilemmas of the military method of commanding troops. Since the dissolution of the Warsaw Pact, Poland's armed forces have experienced many changes. Therefore, leadership issues are especially important and challenging. Poland's joining the NATO alliance structure, with Poland's new political situation and all past and present problems as well, necessitates a new look at the Polish army's leadership.

Education is Key

The most important issue is the gap between the present understanding of theories and the practice of leadership. Major changes in understanding leadership must occur among professional soldiers in military units at every level as well as in the military-education system. The Polish army must create opportunities to educate future leaders on how to meet current challenges as well as future expectations. Only by educating leaders can we be confident that we can provide good leaders to fight future battles, participate in peace operations, deal with natural disasters, and be prepared to face any challenge. Good, professional leaders, educated to international standards, are key to military success during peace or war.

Polish commanders now have much broader access to international literature then when Poland was part of the Warsaw Pact. Because of this, Polish soldiers have gained language skills and received education in NATO, United States, and other Western institutions.[1] As a result, Polish army leaders are learning more about effective leadership. However, it is still too early for the army to completely implement new procedures for developing and preserving leadership, at least in regard to preserving a standard the army wants among commanders at all organizational levels. Especially difficult is the practical implementation of the desired attitude among leaders and soldiers. The overall leadership problem is often comprised of a lack of knowledge of leadership theory, a lack of understanding of the tools of leadership, and a painful lack of taking the leadership problem seriously enough.

Command and Leadership

Understanding the definitions of the words *command* and *leadership* is essential for commanders.[2] Is command the same as leadership? In general, command is defined as an authority that is assigned formally: a commander is nominated to the function of commanding a group of soldiers. He has a right and obligation to command, but by his actions he must perform according to regulations, adopted schemes, and procedures.

On the other hand, leadership is a type of authority based on personal characteristics; that is, it is the way the commander influences soldiers' behavior. Effective leadership results in the voluntary, unforced honoring of a commander's authority by subordinates. A great leader can convince soldiers of his competence, professionalism, and creativity. Moreover, such a leader usually earns soldiers' unrestricted support.

Commanding is a bilateral relationship of mutual influence between at least two people, and there is a clearly defined dependence between them. The leader is a person who leads other people. Followers follow the leader because of internal motivation or necessity, not because of formal requirements.

The most important element that defines a natural leader is the skill to organize people around him to

achieve clearly defined goals accepted by all participants. Because each person in the group identifies with the goals, it should be guaranteed that each team member would perform more than expected to achieve common goals. Good leaders can often influence people to cross the barrier of their personal interests and capabilities to tap into latent values and energy.

The Practice of Military Leadership

Compared with the past, the new Polish army has demonstrated much greater interest in the practice of military leadership. However, its focus is still not strong enough. The lack of clearly defined rules of personal management is clearly a drawback. Also, the average standard of living of Polish professional soldiers, and the discomfort they experience, is a challenging factor. Even "some of our (Polish) regular military cadres experience some economic inadequacy and, sometimes, find better earnings outside the armed forces."[3]

Neither problem is easy to solve in a short time. As a result, some characteristics necessary for good leadership, such as commitment, are still difficult to achieve by many Polish officers and noncommissioned officers (NCOs).

Other problems connected to the commander's role are moral issues within Polish society and a general lack of respect for authorities. These are a legacy of the last social system and the changes the country is continuing to experience. Such attitudes are particularly serious for young citizens. They must by law serve in the military as conscripts. Because of social changes, the young people treat this obligation rather perfunctorily.

Given such an atmosphere, leadership is quite difficult, especially when trying to mobilize, incorporate, and motivate soldiers for extra effort. Trying to force young soldiers to manifest initiative, responsibility, or innovation in all kinds of military activities is difficult.

The desired effect of a leader's influence on his soldiers is to cause them to conquer the barriers of self-interest to work for the common purpose of squad, platoon, or company. Simultaneously, soldiers should work effectively for their self-development. To gain such results, the commander must find appropriate methods to inspire and encourage soldiers to additional effort. The leader must challenge them to a higher level of expectations and requirements and show his confidence in their knowledge, skills, and responsibility. Unfortunately, we more often see a lack of confidence in subordinates' skills than we see help and trust.

In this rather new and difficult situation the Polish armed forces are trying to find appropriate solutions and approaches. Based on research in the Polish Army, especially by Colonel Bogdan Szulc of the National Defense Academy in Warsaw, there are specified personal matrices and characteristics a good commander must have. Among those characteristics are the following:[4]

- Behavior and attitude.
- Moral and personal courage.
- Self-confidence that builds confidence.
- Initiative.
- Honesty and credibility.
- Objectivity when judging subordinates and situations.
- Common sense in decision-making.
- Loyalty.

In addition to these, every real commander should be experienced in and capable of influencing his surroundings. The skills mentioned above are not permanent gifts given a person; they must be developed during service. Good theoretical knowledge in leadership has critical value to the successful application of the skills.

To perform their duties successfully, leaders must strive for these skills. Therefore, it is vital to identify such characteristics in young leaders. Shaping competent leaders is possible, but doing so requires the student-leader to have received appropriate education and training during all types of soldier-development activities, such as during instructor-commander courses.

According to assumptions, cadets in Polish military academies and schools receive instruction in some leadership skills beginning on their first day of education in a military academy or school and continuing throughout the education process. The process is based on shaping obedience; self-discipline; physical skills and resistance; patriotism and respect for national values; ethics and morality; and skills connected with interpersonal communication.

At present, the theoretical basis or foundation of a few courses that concern leadership is changing in Polish military academies and schools. The idea is to broaden knowledge in the area of human behavior.[5] Such topics include such soft-science disciplines as psychology, sociology, and pedagogy; organization and management; ethics; and history and politics.

Changes are generally accepted in military schools, but they are much more difficult to implement in the field. The proper way for a major change to take place would be to change educational doctrine as soon as possible, shifting the emphasis from adaptation education to creative education. This transition would be connected to deep changes in the content of education values and would not be the only issue.

The success of reforms is strictly related to conditions within three main areas:[6]

- Nationwide educational reforms.
- Significant changes in shaping personal politics.
- Senior leader acceptance.

These proposed changes should be implemented to facilitate the inculcation of creative leadership skills and to enhance leadership positions in the Polish army.

When implementing a new model of leadership, one pragmatic purpose is important: creating such a style of command by Polish officers and NCOs will meet basic NATO standards. This is of great importance in international partners' view of Polish soldiers. We strongly believe that Polish troops, who have served in international missions, have shown they are good soldiers. Currently, the most important fact is that creative leadership has been found to be a critical and valuable tool for future leaders.

Command and leadership are substantial issues for every army. U.S.

Army Field Manual 22-100, *Army Leadership,* states: "For you as an Army leader, leadership in combat is your primary mission and most important challenge. To meet the challenge, you must develop character and competence while achieving excellence."[7] In the case of Poland's armed forces, the issue is ever more important because its force is shrinking.[8]

According to Chief of Staff of the Polish Armed Forces General Henryk Szumski, "Our reform envisages that our Armed Forces be 50% professional. This means that the number of regular and on-contract soldiers will be between 80,000 and 90,000 while among the conscripts there will be between 16,000 and 18,000 reenlisted men. The structure of established strength will be 30% officers (1/3 senior officers), 30% senior NCOs, 40% other NCOs. Therefore, in the future, the number of positions for officers will be considerably reduced. It will be necessary to discharge from 12,000 to 15,000 officers in the course of five years and to enroll between 15,000 and 20,000 regular NCOs, doubling the size of the latter category."[9]

Leadership education and training is crucial, especially during a time when the officer corps is being downsized. To compensate for fewer officers, a stronger, more capable NCO corps must be created, educated, and trained. Well-educated and well-trained NCOs can support officers in all efforts of the Polish armed forces to face new challenges during the new century. **MR**

NOTES

1. Enrico Magnani, "Poland: the New Army," *Rivista Militare,* no. 1, 1999, 26. According to the Chief of Staff of the Polish Defense General Henryk Szumski, approximately 5,000 soldiers speak English and more than 1,000 can speak it fluently.
2. Based on J. Lagodowski, "Military leadership—essence, education," Warsaw, 1997. ("Przywodztwo wojskowe—istota, ksztalcenie," Warszawa, 1997)
3. Magnani, 31.
4. B. Szulc and L. Kanarski, "Leadership in Commanding the Troops. Shaping Leadership Characteristics, Research, Officer-3," National Defense Academy, Warsaw, 1998. (Przywodztwo w dowodzeniu wojskami. Ksztaltowanie cech przywodczych, pk., Officer-3," Akademia Obrony Narodowej, Warszawa, 1998). Other characteristics include firmness, unfailingness, perseverance, resistance to hardship, enthusiasm, legitimacy, tact, and lack of private interest.
5. B. Szulc, "Leadership in Commanding the Troops," Warsaw, 1995. ("Przywodztwo w dowodzeniu wojskami," Warszawa, 1995)
6. Ibid.
7. U.S. Army Field Manual 22-100, *Army Leadership* (Washington, DC: U.S. Government Printing Office, 31 August 1999), 1-2.
8. Compared with 400,000 in the 1980s, future predictions of 180,000 make a big difference.
9. Magnani, 31-32.

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MRAlmanac

Kosovo, 15 December 1998: The Battle That Wasn't

Lieutenant Colonel James K. Morningstar, U.S. Army

Every breaking headline makes it clear that today's soldiers are swimming in a sea of chaos. They must face warring factions, criminals, religious sects, and terrorists, becoming forlorn philosophers seeking to bring order to a disorderly universe. Too often they grab for the newest worldview, a *Weltanschauung,* as a lifeline to make sense of their environment and to allow them to place clear, precise arrows on a map to guide their operations. More often than not such theories, like philosophies, are easier to discuss than to apply.

Recent peacekeeping missions exemplify the chaotic environment of modern military operations, and many peacekeepers cling to information operations as a lifeline to order and success. Unfortunately, these operations have become, like Mark Twain's definition of a classic work of literature, something everyone owns and no one reads. There are many articles relating theoretical views, sometimes contradictory and often incomplete, on information operations in a peacekeeping environment.

This article, which adds to that slim body of lessons gathered through practical experience, documents the successful application of information operations in the chaotic peacekeeping operation in Brcko, Bosnia, by Task Force (TF) 1-8 of the U.S. Cavalry from September 1998 to March 1999.

Situation

In late summer 1998, TF 1-8's mission was to keep the peace among Serbs, Croats, and Muslim Bosnians near the divided city of Brcko in northern Bosnia. Goradze, Sarajevo, and Brcko were at the heart of issues that threatened to scuttle the Dayton Peace Accords. U.S. Ambassador Richard Holbrooke said, "As tough as the first two [city arbitrations] were [to settle peacefully], we suspected that Brcko would be the most difficult of all."[1] He was right.

Competition for Brcko. When Bosnia was divided—however temporarily—between the Serbian Republik of Srpska (RS) and the Bosnian-Croatian Federation of Bosnia-Herzegovina, no one could agree on who "got" Brcko, so the final arbitration for carving up the city was delayed. In a geopolitical sense, Brcko was a vital 3-kilometer-wide link between the two halves of the Republik of Srpska.

The international community created a special supervisory position in the Office of the High Representative (OHR) to be held by Robert W. Farrand of the United States. Farrand

was vested with vast powers to oversee the implementation of the civilian aspects of the General Framework Agreement for Peace (GFAP).

By the time TF 1-8 arrived, the arbitration had been twice delayed, and disagreement over the city's fate remained acute. The competition for Brcko threatened to destabilize the Peace Accords. In many ways Brcko was the test case for peacekeeping in all of Bosnia because it was where Farrand sought solutions for problems that faced the entire country.

Brcko's population was predominantly Bosnian before the war, but afterward, the Bosnians were mostly displaced by Orthodox Serbs. Although the OHR had some success in returning displaced Bosnians to their prewar homes in outlying suburban areas, the city remained home to Serbs who opposed resettlement. Despite this, Farrand succeeded in creating a roughly hewn multiethnic administration (MEA) within the city government, police department, and judiciary. Although many non-Serb MEA members still owned homes in Brcko, the Serbs who had been forced out of other parts of Bosnia still occupied those residences.

During the first few years of peace, the international community organized and enforced resettlement. Now, in Brcko, Farrand wanted the native authorities to take charge of resettlement. As early as 24 August 1998, Farrand asked Brcko municipal authorities to take the lead in returning non-Serb MEA members to their homes. Sadly, but not unexpectedly, Serb authorities tabled his request. As a result, Farrand, exercising his authoritative powers, issued orders on 3 November that directed municipal action to ensure the returns.

The OHR's orders were carefully worded to address two concerns. The first was to end the practice of multiple occupancy, whereby one family inhabited several properties that belonged to absentee owners. Second, the OHR wanted specific municipal action to return MEA members to Brcko. The OHR set three deadlines: 15 November 1998, for a report on compliance from municipal authorities; 30 November, for a

special review panel; and 15 December, for the demonstration of complete compliance.

Although these actions were in accordance with the agreements RS authorities had signed and authorized, potential existed for a backlash. Task Force 1-8 planners could foresee that Serbs employed by the municipal government might stage events to cast blame on the international community for the eviction of war widows onto the snowy streets before the holidays. Such propaganda moves, captured on television and in newspapers, could play on Serbian feelings of victimization and stir up popular national sentiments before the final arbitration.

While task force leaders worked with the international community through the OHR to help implement the orders, another act played out on the Bosnian stage. On 13 November, the Stabilization Force (SFOR) evicted Yugoslavian Vice President Vosijlav Seselj from Bosnia. Seselj's history of personal opposition to the GFAP and his calls for violence had made him *persona non grata* to forces for peace.

Within two days, Seselj made more inflammatory comments, promising, "I will return to the RS. I will get hold of 10,000 baseball bats if need be. We will batter the SFOR with arms they won't be able to reply to."[2]

On 24 November, about 50 people from an association of Serbian war veterans rallied near the war memorial in central Brcko and marched on city hall. Task Force 1-8 was caught by surprise. In Bosnia, war veterans are particularly prized as supporters by hard-liners on all sides of the issues. This demonstration lasted about an hour and was designed to protest a lack of local government support for veterans' benefits. Although the rally remained nonviolent, it ended with an announcement that they, the demonstrators, would return in greater numbers on 15 December.

At that time, the fifteenth of any month in the Republik of Srpska was significant. At noon on that day of the month, by agreement with SFOR, the republic conducted a nationwide test of emergency sirens. In Brcko

there were 14 sirens, the use of which instantly recalled the war to locals' minds. In August 1997, instigators in Brcko employed the sirens to agitate crowds in anti-Dayton Accords riots. The alignment of a veterans' demonstration and a siren test on the day when the municipal government had been told to show progress in enforcing OHR orders began to take on increasingly ominous overtones.

On 30 November, in the nearby town of Bijelina in the Russian sector 30 kilometers east of Brcko, another veterans' organization of over 400 people gathered in protest. What was announced to be a march for veterans' rights became a vocal protest against proposed property laws. Leaders marched the crowd to the vicinity of the international police task force's (IPTF's) local headquarters—the only Westerners in town—where they displayed several anti-American signs and chanted accompanying slogans.

This march coincided with Farrand's special review panel in Brcko where municipal authorities were to explain the system they would use to ensure resettlement. Instead, they produced a variety of excuses and finger-pointing accusations to justify no action at all. Furious, Farrand adjourned the meeting with an admonition to the Serbian representatives: "I see no progress, and I must tell you this is serious. Between yourselves, figure it out!"[3]

Within days another event occurred, unrelated to Brcko but having possible serious repercussions for task force operations in the town. On 2 December, while traveling from Bijelina toward Brcko, SFOR troops apprehended RS 3d Corps commander General Radislov Krstic, who was implicated in war crimes. The next day the task force received word that local Srpska Army units had been ordered to minimize contact with SFOR. The local Serbian commander became unreachable. The soldiers of an infantry brigade stationed in Brcko now became possible demonstrators themselves.

Shortly after Krstic's arrest, intelligence sources and IPTF members reported the arrival in Brkco of seven

known criminals from other Serbian areas. These thugs moved into a cafe located across the street from the OHR building, driving out the cafe's owner. To a military mind this development indicated a pre-positioning of hard-line Serbs in preparation for future actions. The situation did not improve; the international police reported unusually large numbers of military age males arriving in the regular bus traffic from Belgrade and Bijelina during that week.

An intelligence report on 4 December further darkened this picture. Sources said Seselj planned to appear at the Brcko rally on 15 December. Seselj had been condemning SFOR as an occupation force, a charge that recalled in the local population memories of the Nazis. The task force believed Seselj would try to infiltrate into town, appear among Serbs protesting their victimization, and dare SFOR to act. If he was thrown out, the occupation-force charges would be confirmed. If he was allowed to stay, he would claim victory over an impotent SFOR.

Justice for Brcko. That same day, at exactly the moment when the federation government convened its new session, events to the south added fuel to the fire. Bosnians staged demonstrations under the banner "Justice for Brcko" in Tuzla, Srebrenica, Sarajevo, and several smaller towns. Their demands were echoed among the Bosnian displaced persons camps throughout the task force sector where patrols were accustomed to the displaced Bosnians' litany of complaints—no water, fuel, or medical care. The Bosnians had increased threats to block SFOR supply routes, attack Bosnian Serbs, and even blow up their own homes in Brcko along with their Serbian occupiers. Now, they revealed a plan to go to Brcko en masse to visit their old homes—on 15 December.

The coincidence of the federation rallies occurring on 15 December, at the same time the government convened, brought to mind another motivation for violence. The Serbian veterans' rally would coincide with the scheduled discussion of Brcko by the international community at the 1998 Madrid Conference.

Planning

For operations in Bosnia, TF 1-8 found valuable advice in Chinese military philosopher Sun Tzu's words, "The supreme excellence in war is to attack the enemy's plans. . . . Next best is to disrupt his alliances. . . . The next best is to attack his army."[4] U.S. Army TF 1-8 commander Lieutenant Colonel Mike Ryan paraphrased this guidance in simple words: defeat a situation before it begins.

In October, TF 1-8 faced its first antiresettlement demonstration, which was conducted by approximately 40 people in the suburb of Ivici, just outside Brcko, where the day before 12 women and children protested peacefully. The task force flooded Ivici with patrols whose objective was to identify the cause and intent of the demonstration. The patrols learned that the Serbian inhabitants had been told by some "shadowy" figure that they were soon to be evicted in favor of returning Bosnians and that Farrand would soon arrive to discuss the evictions. Forty Serbs gathered to greet Farrand only to meet a busload of Bosnians Muslims who had come peacefully to clear the rubble from their former homes. The situation was a ready-made confrontation.

Defusing the situation. An analysis of the situation revealed a striking similarity with Serbian behavior documented in the spring. Small gatherings grew larger over time and eventually resulted in two and one-half months of unrest that left one person dead and several buildings damaged. This time, TF 1-8 and the OHR deconstructed the Ivici Serbs' motivations and averted further violence. Rubble-clearing operations were suspended. TF 1-8 patrols and OHR representatives repeatedly met with local leaders to keep them calm. The message was twofold: locals would not be victimized, and the shadowy figures were liars who hoped to cause trouble.

Following the events in Ivici, TF 1-8 stepped up contacts with grassroots leaders. In November this effort helped the task force stay ahead of events. Task force representatives, attending a town meeting in the suburb of Dizdarusa south of Brcko, spotted several agitators spreading false information about resettlement and inciting violence, going so far as to boast of intentions to kill Bosnians. Were these the shadowy figures at work?

The task force responded with an aggressive presence operation designed to suppress demonstrations before they began. Task force personnel were armed with cameras and took photographs of the agitators. The next day, the company commander responsible for the Dizdarusa sector visited the homes of the photographed agitators and told them politely that the SFOR would not tolerate threats to peace.

The agitators went to the OHR to complain of SFOR Gestapo tactics, but Farrand knew better. Ryan went to local leaders known to hold influence over the agitators and told them they would to be held personally responsible for getting agitators in line. Patrols continued to say hello to each of the agitators when encountered, and once the light of notoriety began to shine on them, they ceased to agitate.

Lessons learned. Task force planners learned many lessons from these experiences and tried to apply them to the potentially inflammable convergence of events in December. In Ivici, the task force had reacted to events; in Dizdarusa, it responded to indicators. Now, TF 1-8 wanted to set the conditions to prevent threats to peace from materializing. The test would come on 15 December.

The task force learned to view the "peacekeeping battlefield" in depth as or before events occurred. Serious events nearly always resulted from orders by the power players in Banja Luka or Belgrade. They often indicated their intentions through the local media. Local leaders set events in motion long before they were to occur. Agitators spent days drumming up local popular support. Finally, the event itself required a logistical support process that required time and effort to unfold. Knowing what to look for helped the task force interdict the process of violence and prevent an event from occurring.

One of the primary lessons from

these earlier operations is that no events that threatened the peace in Brcko occurred by accident. Just as with the military, "soldiers"—the people on the street—took orders from higher authorities, who set conditions on the battlefield by manipulating public opinion. The public's mood formed the tactical center of gravity, where information operations are essential.

To be effective, information operations must be more than simply passing information. A message affects various audiences differently. The message that "all current *legal* occupants of residences will not be evicted" might be encountered with suspicion, but it would put an end to demonstrations. The message that "only *illegal* occupants will face the possibility of relocation to alternate housing" limits protest to a certain portion of the population. The message that "your city government, not the international community, is executing this action" would direct any protest toward the city government, not toward the international community. In Brcko, the messages were tailored to achieve particular reactions from various segments of the population.

The task force also learned that an audience's willingness and ability to accept and transmit information is proportional to a combination of message characteristics—the type of media used, the population's bias, the message's simplicity, and the messenger's credibility. For decisive results, planners must carefully consider and identify these factors within an intelligence preparation of the battlespace report before the execution of information operations.

In fluid dynamics, flow can be laminar or turbulent. The same can be said of information flow. Messages, delivered independently by several messengers to a population, will travel with various speeds and might be accepted or rejected by the receiver. Because each messenger and the means used to relay the message have unique characteristics, turbulence is guaranteed. Laminar results grow from a united effort to deliver the right information to the right audience by the right means.

Achieving the optimal reaction from information requires that all messengers and their messages are coordinated. This necessitates a common, synchronized direction of effort not possible when actors in each environmental subsystem go their own way.

Information operations are only part of peacekeeping operations. Credible force, the most effective message on the field, results from the ability and willingness to use force, and from time to time, this ability must be demonstrated. Peacekeeping forces must also conduct operations designed to promote credibility of *intent.* Humanitarian operations and other physical manifestations of good will reinforce influence over the collective mood of the people.

Operations

Before the veterans held the 24 November rally, TF 1-8 was already on the battlefield of public opinion. Events in Ivici and Dizdarusa proved that this was where the center of gravity lay for mission success or failure.

Information operations campaign. In Brcko, OHR orders added urgency to the everyday battle against disinformation in the general population. Before agitators could begin to distort the effect of the orders, the task force began an information operations campaign to deliver the truth to the people of the city. Working closely with the chief of resettlement from OHR, the task force crafted its messages, deciding not to completely stop popular will to protest. After all, in democracies, demonstrations are proof of freedom of speech. Rather, the task force tried to influence local perception by emphasizing several key points through a tailored, four-point message:

1. The GFAP, as signed by RS authorities, guaranteed individuals the freedom to choose their location of residence and their right to return to prewar homes.

2. The supervisory orders required the municipal government to enforce existing RS laws and to take control of housing units from illegal occupants.

3. Any Brcko resident who illegally shared another family's prewar residence or illegally resided in the prewar home of a multiethnic government employee was to be *relocated* (not *evicted*) from their current residences *to another home.*

4. Farrand would stand by his commitment not to evict but to relocate any legal temporary residents *only* if sufficient alternative housing was not available.

The task force sought contact with people on the street to identify popular misperceptions, then correct them. The task force maximized use of local television, radio, and public meetings with local authorities to defeat any disinformation campaign before it could begin. The goal was to *inoculate* the population against agitators.

Seselj's eviction in mid November could have complicated local efforts. He was a popular figure in some quarters and a symbol of Serbian nationalism. His comments threatening SFOR, however, were of great aid to the task force's cause by helping the higher command focus on the deep fight.

When the veterans announced their planned march, the task force passed along concerns that Seselj might choose this time to return to Bosnia. When the task force received intelligence reports indicating Seselj harbored just such an idea, it voiced its concerns and learned of higher level efforts to discourage national figures from using the march for troublemaking purposes.

Benefits of cooperation. To defeat attempts by agitators to portray SFOR as an occupation force, the task force stepped up efforts to advertise the benefits of its presence to the general population. Presence patrols, civil affairs sections, and psychological operations teams visited schools, homes, and other locales where citizens gathered, donating goods and supplies. The task force also began long-overdue repairs to the road between Camp McGovern and Brcko—a section of road many locals traveled. At Thanksgiving the task force played host to local authorities, prominent citizens, and other leaders at a gala dinner in the military dining facility. Besides fostering communication between lo-

cals, the visit impressed them with the task force's professionalism and readiness.

While the task force's main effort was in Brcko, it also conducted a deliberate effort in the displaced persons camps south of the inter-entity border line, where it delivered a message designed to cut off trouble before it began. Presence patrols visited all camps, actively sought out complaints on the resettlement process, and identified and photographed agitators and leaders. Camp residents' concerns were passed to proper international organizations, and the task force delivered a message tailored for the leaders: avoid actions that will harm your cause.

The task force explained also the ongoing resettlement and arbitration process; showed that the process was working, although slowly; and explained that any acts of violence would destabilize the process. It warned that SFOR would not tolerate acts of violence or disruption of main supply routes. Finally, the task force told displaced persons that a mass resettlement in Brcko would not be allowed on 15 December if doing so would evoke a violent response from the Serbs.

The veterans' rallies in Bijelina at the end of November drew considerable task force attention. Although the task force could not personally collect intelligence on the demonstrations, the joint commission officers in Brcko were able to pass descriptions of the rallies they received from their counterparts in Bijelina. IPTF officers delivered additional reports. From this information, TF 1-8 could template the anticipated demonstration in Brcko on 15 December and identify several of the demonstration's leaders in Bijelina. If these same leaders appeared in Brcko, the task force would know that the demonstration would not be about local issues but for some other purpose. Their presence would serve as an early warning to trigger preventive actions by the task force.

Following the 24 November rally, the task force began to set the conditions for success on 15 December. The task force stepped up meetings with local government and law en-forcement officials, letting them know they would be held responsible for any failures to avoid violent demonstrations.

Ironically, efforts to coerce assistance were reinforced by Krstic's arrest. The task force found that all local leaders were terrified about the existence of a "secret PIFWC [persons indicted for war crimes] list." Almost all of them had personal reasons to fear that their names might be included.

At the time of Krstic's arrest, the task force was about to host a major agricultural seminar in Brcko. In the wake of Krstic's arrest, the task force received instruction to minimize its presence. *This was exactly the wrong thing to do.* Such action would have indicated temerity about potential threats and would have displayed defensiveness about SFOR's action. The task force's credibility depended on its willingness to act. To demonstrate resolve, the task force had to project the message that there was nothing unusual about a war criminal being apprehended. With higher headquarters' approval, the task force held the agricultural seminar, albeit with extra precautions, and stepped up presence operations and contacts with local authorities.

To defuse potential trouble, the task force intensified operations to ensure the safety of persons designated for protection. The task force achieved unprecedented success in bringing many international community members into the base camp for protection during crises.

The task force also investigated every siren in town, all of which were controlled, by physical or authoritative means, from the office of the local minister of defense. The task force S3 visited and warned the minister not to use the sirens on 15 December. When the minister argued that a national law required the tests, the S3 told him that any use of the sirens would be perceived as a threat to the SFOR and that he would be held responsible. The minister contacted his superiors and agreed that a siren test in December was unnecessary. However, the task force prepared contingency plans to physically turn off or destroy sirens if necessary.

A serendipitous event played into the task force's preparations. The division had planned a training event, called Exercise Joint Resolve, in the Brcko area of operations to exercise the movement of reserves in support of contingencies. The exercise enabled the task force to bring the Multinational Specialization Unit and several allied companies to the Brcko area. Division headquarters agreed to employ these reserves on 15 December in a manner that would discourage violent demonstrations. As soon as the exercise was confirmed, the task force began to advertise it as a means to further deter violence. If the worst happened, SFOR was prepared to handle it.

With all the pieces in place, the task force spent the days before the demonstration focusing on the veterans. The task force commander began bilateral discussions with leaders of organizations like the Chetniks, who had great influence over the veterans, and task force civil affairs sections also met with the veterans.

On 14 December, the local veterans' group leaders called off their protest. Intelligence sources reported that approximately 50 veterans from out of town had arrived for the march and were intent on continuing. Still, the task force deemed this number to be too small as to embarrass someone like Seselj if he appeared.

On 15 December, hundreds of multinational SFOR personnel were deployed around Brcko as part of Exercise Joint Resolve. Division and brigade leaders operated tactical command posts within a stone's throw from the task force's operations center. Local police were alert and ready for trouble. Contingency patrols stood ready.

No demonstrations materialized. The day passed as quietly as any other. There was order in place of chaos.

The Battle That Wasn't

To the task force, 15 December turned out to be the battle that wasn't. Afterward, some leaders wondered if the task force had overreacted. In fact, the task force had done its job, reaching a high level of proficiency in prepping the peacekeeping

battlefield with a high volume of tailored information operations. Less than three months later, such methods proved their value.

Within days of the announcement of the final Brcko arbitration, the OHR removed the duly elected SR president from office. The task force seized huge quantities of Serbian military weaponry being smuggled through Brcko, and a Serbian civilian was shot and killed by nearby U.S. forces. Experts predicted the Serbs in Brcko would explode in violence. Instead, task-force operations had inoculated the population from the germ of agitation. Small groups of protesters demonstrated on several consecutive afternoons, but they could get no traction among the local population. Only then did the task force know for certain that it had, indeed, successfully conducted its peacekeeping mission. **MR**

NOTES

1. Richard E. Holbrooke, *To End a War: The Inside Story from Sarajevo to Dayton* (New York: Random House, 1998), 273.
2. Ibid.
3. TF 1-8 notes, Special Review Panel, 30 November 1998, Brcko, Bosnia.
4. Sun Tzu, *The Art of War* (New York: Delacorte Press, 1989).

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_{MR} Review Essay

The Transformation of U.S. Air Power
Major Tom James, U.S. Army

Certainly the face of war has changed since the Vietnam War. Two informative, well-researched books that chronologically depict and discuss events involved in this change in regard to the U.S. Air Force were published in 2000. They incorporate the most up-to-date gathering of current historical research material and issues of debate on their topics.

Benjamin S. Lambeth's book, *The Transformation of American Air Power* (Cornell University Press, Ithaca, NY, 2000), chronicles the considerable advances in the evolution of air power capabilities over the last two decades. The book establishes a foundation for Lambeth's assertion that Air Force assets in and of themselves "can now set the conditions for victory even from the outset of combat if applied to [their] fullest potential."

Wayne Thompson's book, *To Hanoi and Back: The U.S. Air Force and North Vietnam, 1966-1973* (Smithsonian Institution Press, Washington, D.C., 2000), looks in depth at political, geographical, and technological circumstances that affected U.S. bombing strategy and execution during the Vietnam War. Thompson explores a less normative vein than does Lambeth, concentrating with little conjecture on recounting facts. However, the final chapter, which correlates with Air Force operations in the 1990s, suggests some lessons for the aspiring military strategist. In many ways, Thompson's book represents a microcosm of Lambeth's subject.

Thompson, chief analyst at the U.S. Air Force History Support Office, served in the intelligence branch of the Army during the Vietnam War, where he was assigned to an Air Force intelligence station in Taiwan. Thompson participated in Operation Desert Storm as a member of the Checkmate planning group that devised what would become the foundation for the air campaign against Iraq.

Thompson later served as the senior historical adviser for the 1993 *Gulf War Air Power Survey.* Coupled with his detailed research of the Vietnam era, Thompson's experience gives him a unique, in-depth, first-hand perspective on how the Air Force had been transformed.

Like Thompson, Lambeth is a highly regarded military and air power academician who maintains close ties with the military, especially the Air Force. He was a senior staff member of RAND, the Santa Monica, California, think tank, for 25 years. From 1988 to 1990, he was RAND's Director of the International Security and Defense Policy Program.

Through his military affiliation, Lambeth has flown in many military aircraft for many types of missions, including operational training missions and live-fire exercises. He also attended the preeminent air tactical schools of the Air Force, Navy, and Marine Corps.

Both authors appear to have conducted extensive research on their projects. Thompson seems to have maximized the use of primary sources. Lambeth tends to favor secondary sources, relying heavily on air power journals and periodicals. This weakens his argument's credibility on interservice issues by appearing one-sided.

Lambeth and Thompson can easily be described as members of the Air Force establishment and warrant suspicions of touting the Air Force line. To counter this accusation, and to their credit, both quite openly and actively solicit review and input from interservice and political experts. In an effort to ensure his book provides a fair, accurate depiction of his subject, Lambeth subjected his work to an especially grueling pre-publication shakedown. The effort was less than successful.

Lambeth chronologically reviews the Air Force's transformation as it

has tried to unshackle itself from the specter of the Vietnam War. As it began the transformation, the Air Force and the Department of Defense could see the fallacy of an all-or-nothing nuclear strategy that paid little attention to the conventional use of air power.

Lambeth attempts a balanced approach in examining motivations of the post-Vietnam Air Force that struggled to develop organizations and doctrine to meet the strategy of defeating the Warsaw Pact threat in Europe. He thoroughly details how Air Force and Army elements established effective, though often strained, working relationships to flesh out what would become the Army's AirLand Battle Doctrine. The dividends from the Air Force and Army's close bond in developing the organization, doctrine, and technology to achieve effectiveness were realized during the Gulf War. Lambeth attributes impediments to using air power to its full potential in the Balkans to misunderstanding and misapplication of the lessons learned from Vietnam and Desert Storm.

Current Air Power Issues

The heart of Lambeth's book is about current air power issues and what the transformation of air power means to military strategists. He wonders whether "air and space assets should continue to be viewed as support for surface forces." Or, can they "achieve strategic effects directly and thereby set the conditions for victory in joint warfare" in some circumstances?

These questions represent the essence of the tone and flow of Lambeth's book; it is diluted with qualifiers, filled with unvoiced but readily apparent insinuations, twisted with incongruent logic, and peppered with the fawning use of "joint" as a not-so-thick purple camouflage for strains of air power omnipotence. Such criticism should not be flippantly cast, but the more thoroughly I reviewed the book, the more examples I found that support my contention.

Lambeth packages his story of air power transformation with schizophrenic tension. On one level he seems to be an air power zealot reminiscent of Billy Mitchell, albeit in a more tactful manner. On another level, he extols the virtue of jointness, watering down air power's perceived effectiveness. He attempts to resolve this tension by carefully, almost painfully, choosing words and qualifiers in addressing the issues. Unfortunately, this muddles the important portion of his message: advances in technology provide the military with a more potent military force. The effect of which was readily apparent for the Air Force during Desert Storm for many contextual reasons.

His assertion that air and space assets "continue to be viewed as support for surface forces" establishes his own straw man argument. (Ironically he uses the straw man accusation, with merit, to counter the purported argument that the Air Force cannot guarantee success in all military situations as an independent force.) His statement begs the question: Viewed by whom? Politicians and ground force commanders have demonstrated time and again their understanding of the importance of air superiority and the strategic potential of air assets in quest of military objectives. Such generalizations reveal much about the biases in Lambeth's writing.

Ironically, Lambeth labels space as being incorrectly perceived by surface forces as a support asset. Many critics level this charge against the Air Force for stifling space expansion by viewing space as support for air power efforts. Lambeth takes some liberties in assuming air and space assets are inseparably linked, as though they should be considered as one. He even asserts that air power is accepted as shorthand for air and space power. The view that Air Force advocates vie for control of space assets and a more equal place at the Quadrennial Defense Review table is a popular one. However, abundant data exist which show that the trend of thinking about operations in space as applying to all services is not tied to only air assets.

Lambeth admirably concludes the chapter on space by noting that distinctions between air and space will continue to diminish with advancements in technology. As this occurs, space will become more integrated into terrestrial joint-force objectives. I would also apply these assertions to ground, sea, and air operations as space becomes more integrated.

Defining Air Power

I was encouraged to see Lambeth tackle the daunting task of defining air power. He offers a description of air power, using three bounding rules, but ultimately, he falls into the same incongruent, convoluted diatribe as before. His correlation of air power with doctrine, organization, training, and other attributes is certainly not uniquely applicable to air assets; it applies to all forms of warfare. He chastises "laymen and professionals alike" for imaging air power in terms of combat aircraft exclusively. Then, he thoughtfully includes Army attack helicopters and missiles in the air power equation but thoughtlessly omits Army transport, aeroscout, and early warning aircraft. These examples are indicative of the continued incongruent logic and subtle hypocrisy that fill the book.

What makes Lambeth's incongruent approach all the more frustrating is its distraction from his enlightened and eloquent treatment of issues surrounding the transformation of air power and, more important, military power in general. His discussion of "gratification without commitment" on the use of advanced technology weapons systems as a seductress to strategies of gradual escalation offers a valuable warning to all strategists. Lambeth's attacks on gradual escalation seem justifiable and dovetail well into arguments Thompson presents.

Lambeth offers insight into the problem of labeling air power targets in classical strategic and tactical terms based on platforms and spatial relation in the area of operations instead of on their desired operational effects. He expands this line of reasoning to offer convincing justification for declaring population and counterindustrial targeting as diminished in relevancy to modern air power strategy.

He correctly asserts that advances in technology allow the Air Force to gear attacks toward the enemy's

ability to wage war, which will often mean attacking the enemy's fielded forces. That technology provided the capability to effectively attack fielded forces in the Gulf War is indisputable. The same cannot be said for attacking camouflaged and covered fielded forces in Kosovo.

Intuitive to me is that, as Lambeth says, in some circumstance air power can set conditions for victory. However, I do not believe Lambeth provides a convincing argument to his basic premise. In the end, he seems insincere in his attempt at neutralizing parochial biases.

In keeping with the tenor of the book, I offer this bit of twisted logic. If the Air Force's technological advances are indeed so much greater than those of the other services and of presumed adversaries, it would seem reasonable to exploit this situation by shifting funding to the other services to help them advance so they would be on par with the Air Force. Or perhaps, it would be logical to more aggressively fund the shortcomings recognized in space and airlift within the Air Force itself. Lambeth's logic seems to support this notion.

A Clearer View

Thompson's detailed recounting of the air campaign against North Vietnam from 1966 to 1973 offers no startlingly new revelations about the political and military context of the Vietnam War. The book's importance lies in the use of previously classified documents and Thompson's personal involvement with primary sources from both wars. His skillful blending of source material provides riveting, informative coverage of the subject.

Thompson's close working relationship with air power heavyweights and Vietnam veterans is of particular value. His book is a well-developed, credible reinforcement of the circumstances involving the use of air power in North Vietnam. He proposes that air power could have "set the conditions for victory . . . from the outset of combat if [it had been] applied to its fullest potential." But, he concludes, this did not happen, mainly because of political constraints which the administrations of

Lyndon B. Johnson and Richard M. Nixon imposed. Thompson focuses in particular on Robert McNamara's approach of graduated escalation and how it affected bombing efforts by allowing North Vietnam time for adaptation.

The essence of Thompson's book is in his examination of how the U.S. military, in particular the Air Force, could best tackle the unique puzzle the war presented. This was, namely, how to achieve success "within constraints imposed by technical capabilities, by the physical geography of Southeast Asia, and by the changing complexity of the world's political geography."

Solutions to these problems were exacerbated within the military by a failure to establish a true single manager for air assets and for partitioning the area of operations into route packages. These actions led to artificial limitations in coordinating the most effective use of air assets.

The political implications of maintaining domestic and international support while not provoking China or Russia resulted in virtual zones of sanctuary around Hanoi, Haiphong, and along the Chinese border. North Vietnam realized the benefit of locating key elements of its air defense systems, including interceptor aircraft, in these zones. In this view of the Vietnam War as a limited war, U.S. politicians ceded air superiority in these critical areas. Political constraints formed a more effective barrier to U.S. air power in North Vietnam than did the Third Reich's integrated air defense system in Europe in 1942-1943.

Thompson admirably connects how political positioning and political opinion affected McNamara's hopeless strategy of gradual escalation during Operation Rolling Thunder. Other limitations hampered this strategy as well, including a lack of technical capabilities to fully exploit the strategy, a formidable North Vietnamese threat, rugged terrain, and an economy and fielded force less logistically dependent than most industrialized nations.

Ending with Johnson's term, Rolling Thunder gave way to struggles to bring the North Vietnamese to the negotiating table under Nixon's "se-

cret plan," which included intensive, so-called covert, bombings in Cambodia. Under the guise of protective reaction, Nixon encouraged a policy of more aggressive bombing in the Red River Valley, leading to the Linebacker operations.

Thompson deftly weaves together the military and political fibers of the story of the Vietnam War, inferring the cause and effect by explaining the action, then stepping back to look at the circumstances leading to it, then evaluating the effect on both sides. In particular, he examines the U.S. view through the eyes of key political figures, generals, and pilots. Thompson seems to approve of Nixon's enthusiastic embrace of an aggressive bombing of the Red River Valley and key targets in North Vietnam. By stripping away many of the limitations that had been placed on air assets, air power finally came close to its full potential.

Technology's Effect

Throughout his review, Thompson examines the introduction of new technology and its effect on strategy and tactics. Laser-guided munitions provided better precision and more destruction per sortie. However, precision weapons in many ways exacerbated the problem of defeating the weather. They required good conditions for accurate delivery. Thompson shows that B-52s were effective all-weather night platforms whose introduction finally brought the effects of bombing to a level that convinced the North Vietnamese to undertake serious negotiations.

The painstaking evolutionary process of politics, strategy, doctrine, and technology led to a U.S. force more able to exploit the potential of air power. This culmination did not prevent South Vietnam's fall, but it did shake the Air Force loose from its focus on a single integrated operational plan, which helped the United States to be better prepared for the challenges of Desert Storm and the Balkan campaigns.

I question Thompson's implications that aggressive strategic bombing earlier in the war would have forced more substantial or timely negotiations. His research does not

show a strong causal relationship. He comes closer to the mark in his defense of the argument against gradual escalation on all fronts in the effort against North Vietnamese aggression toward South Vietnam. These issues are reconcilable under Lambeth's notion of focusing on fielded forces. Such thinking might serve as a justification for using B-52s in support of Khe Sanh rather than in the Red River Valley.

Perhaps one of the most memorable aspects of Thompson's book is his ability to humanize the stories of politics and the air campaigns. The book reads like a novel without losing its credibility as a historical accounting. I commend him for often memorializing crew members for heroism and sacrifice, although doing so adds little to the overall thesis. Yet, it brings alive the human dimension of his story, a facet often ignored in bodies of war research.

Recommendations

The strength of Lambeth's book lies in his enlightened, insightful commentary and consolidation of important air power issues. Although it is tainted by parochialism, his work is important. Unfortunately, I cannot recommend it to the busy military enthusiast. Readers should be on the lookout for a more clear-eyed, less-tortured telling of the story of the transformation of air power.

I enthusiastically recommend Thompson's book. His detailed analysis of the tremendous transformation of air power strategy, doctrine, and technical capability over the short time span of the Vietnam War offers an informative, fact-based, engrossing look at the bombing effort in North Vietnam. His ability to meld primary sources into a backdrop of heroism and sacrifice reinforces the justification for this book to be on every military professional's bookshelves. *MR*

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Waging Modern War: The Future of Conflict

Major John A. Nagl, U.S. Army

The Kosovo conflict might well be the first war fought almost exclusively from the air. Ground forces arrived on the scene only as police forces. The conflict was also the first time a war was fought because of an international country's inhumane treatment of its own citizens.

General Wesley Clark, the Supreme Allied Commander of Europe during the conflict, relates his part in NATO's first war in his book *Waging Modern War: Bosnia, Kosovo, and the Future of Conflict*.[1] Although the book will win him few friends in the U.S. Army or in Washington, D.C., it might serve as a catalyst for change in both.

The majority of Clark's difficulties during the war in Kosovo sprang from just one of NATO's 19 countries—the United States. Clark highlights the twin difficulties of the Pentagon's inappropriate strategic culture and the U.S. government's lack of strategic vision.

Don't Want to Fight There

With a sense of resentment and amazement, Clark reports that Army leaders did everything they could to *not* fight the war in Kosovo. They resisted Clark at every step. After noting that success in war is often a matter of persistence, he ruefully states, "I would have preferred the target of my persistence to have been only the enemy, rather than the Pentagon as well."[2]

The problem goes back, as does so much in recent U.S. military history, to Vietnam. In military minds, the defeat in Southeast Asia was the result of politicians forcing U.S. Armed Forces to fight with one arm tied behind their backs and of a liberal media that turned the U.S. populace against the war. That explanation was soothing, but the truth was more complicated. The shibboleth of "no more Vietnams" demanded full national support for future conflicts. That, Clark says, would "seem to be a kind of naïve throwback to an earlier, simpler era of warfare that saw a relatively clear separation between the political and the military."[3]

The Persian Gulf War was just such a fight. Marked by military freedom to accomplish clear political objectives and remarkable public support at home, it became the model for how U.S. Armed Forces visualized the future of conflict. In Clark's words, "It gave us the only road map we could see clearly in the new, post-Cold War world."[4]

As military leaders at the Pentagon wrote war plans for that world (ironically, a task Clark performed in 1995 while serving on the joint staff), they prepared for renewed conflict in the Persian Gulf and on the Korean peninsula in a strategy known as "two major regional conflicts (MRCs)." The strategy focused on re-fighting the last war—in the Persian Gulf—and the one two wars before—in Korea. The strategy explicitly ignored the war in between—in Vietnam.

Vietnam had been a nasty fight with no easily identifiable enemy, no clear political guidance, no public consensus at home, in a battlefield complicated by the presence of noncombatants. The military was determined not to engage in such a conflict again. Unfortunately, U.S. adversaries refused to cooperate. Rather than providing the type of conflicts the U.S. military had prepared for, warfare in the post-Cold War world more closely resembled the Vietnam War than it did the Persian Gulf War.

Yet, the Department of Defense prepared inexorably for the kinds of conflicts it wanted to fight. In fact, when Clark wanted ground forces in

Kosovo, Vice-Chairman of the Joint Chiefs General Joe Ralston refused, citing the necessity to be prepared for an outbreak of war in Korea and in the Persian Gulf. Clark's incredulity is palpable: "The Chiefs were seriously considering withholding forces to be ready for the two nearly simultaneous hypothetical major theaters of war elsewhere, however unlikely, even if it caused the United States and NATO to lose the actual war in Europe."[5]

Clark expected the Army to be a strong advocate of a ground option when Serbian President Slobonan Milosevic's forces proved more resistant to air strikes than NATO had first believed likely. Clark was mistaken. Chairman of the Joint Chiefs of Staff General Hugh Shelton and Chief of Staff of the Army Dennis Reimer were Clark's biggest foes as he struggled to develop a ground threat to increase the pressure on Serbian forces. In fact, in late 1998, when Clark warned Reimer that war might be brewing in Kosovo, Reimer remonstrated: "But we don't want to fight there!"—as if the war was Clark's idea rather than the result of Milosevic's policies.

Clark blames the Army's reluctance to risk being drawn into a war it did not want to fight for the failure to use Task Force Hawk, the Apache helicopter unit he deployed from Germany to Albania. The Apaches' intended use was to conduct direct attacks on Serbian ground forces engaged in ethnic cleansing in Kosovo, which were difficult targets to strike with cruise missiles or from aircraft. However, Pentagon leaders continually refused permission for the use of the Apaches.

Late in the war, Clark desperately wanted to use the Apaches to support the Kosovo Liberation Army (KLA) that was fighting to maintain control of Mount Pastrick, which would have been key terrain should a ground invasion of Kosovo prove necessary. Permission was again denied. Clark attempted to accomplish the same mission with air power, noting to a subordinate, "We're going to pay in blood, with our sol-diers' lives, for any ground they lose over that crest."[6] Although the KLA ultimately held the hill with the help of allied air power, the outcome was in greater doubt and more costly in human lives than it should have been.

Running in Loose Sand

Because of a fear of excessive casualties, the U.S. Marines never conducted an amphibious assault against Saddam Hussein's forces in Iraq in 1991. Yet, their presence in the Persian Gulf tied down a substantial portion of Iraqi armed forces, thinning the line at the actual point of the allied invasion. Similarly, a ground force mobilizing for an invasion—even one that was never carried out—would have forced Milosevic to mass ground forces in defense. Massed ground forces make good targets for air attack, and forces that are dug in against a threatened attack do not have much time to conduct ethnic cleansing.

U.S. President Bill Clinton took these strategic advantages off the table. In a nationally televised address on the first night of the war, he announced that there was no intent to deploy U.S. ground forces against the Serbian army. Clark dryly notes that the statement became "an impediment within the U.S. channel to commencing ground force planning."[7]

Clark's superiors did not approve of the way he had waged NATO's first war. He was ignominiously fired just six weeks after winning the war. Ralston, the leading proponent of allowing air power to win the war without any use of ground troops, replaced Clark.

Other examples of how Clark was treated litter the book. One of the most telling scenes occurred at NATO's fiftieth anniversary summit in Washington, D.C., during a critical phase of the bombing campaign. Secretary of Defense William Cohen, concerned that Clark would want to bring up ground options in the event that the air war failed, tried to prevent NATO's supreme commander from attending the summit. NATO insisted that he attend any-way. After being blocked from the official receiving line, Clark became the center of an unofficial second line as European heads of state gathered around him to discuss the conduct of the war. Clark is remarkably restrained when he describes his fate: "Operating without a clear, agreed strategy or a strong, unified Washington . . . was like running in the loose sand on the beach."[8]

Waging Modern War

"Modern war" is war in which vital national interests are not at stake, but in which democracies intervene to safeguard human rights or to prevent the spread of conflict in civil wars or in failed states. Clark believes that these conflicts are far more likely in the post-Cold War world than are MTWs on which U.S. national military strategy is currently based.

The 30 September 2001 Quadrennial Defense Review, released in the wake of the 11 September attacks on America, modifies U.S. strategy substantially. The new policy requires the military to fight and win one major war, hold the enemy in another conflict, protect the continental United States, and engage in smaller peacekeeping contingencies. A military able to perform these tasks will likely look quite different from today's military. It might be larger, more expensive, and more capable of waging and winning the modern wars the military would prefer not to fight. *MR*

NOTES

1. Wesley Clark, *Waging Modern War: Bosnia, Kosovo, and the Future of Conflict* (New York: PublicAffairs, 2001).
2. Ibid., 321.
3. Ibid.
4. Ibid., 19.
5. Ibid., 313.
6. Ibid., 335.
7. Ibid., 206.
8. Ibid., 248.

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MRBook Reviews

EASTWARD TO TARTARY: Travels in the Balkans, the Middle East, and the Caucasus, Robert D. Kaplan, Random House, New York, 2000, 364 pages, $24.95.

The New York Times Book Review describes Robert D. Kaplan as "an American master of travel writing from hell." And, reading *Eastward to Tartary: Travels in the Balkans, the Middle East, and the Caucasus* is not a prescription for feeling good about the future of what Kaplan calls "the new Near East." Nonetheless, Kaplan's extraordinary sense of history and appreciation for the realities of power politics places this book on the must-read list for today's Army officers.

Kaplan steps into the remains of the Ottoman and Russian empires from Budapest. The region contains 70 percent of the world's oil, 40 percent of the natural gas, and "too much history," which when mixed with a steadily increasing population of 15 to 30-year-old men, poses potential trouble for the West: "Follow this age group to find the path of future conflict."

Increasing urbanization throughout the region has shattered traditional loyalties and created a rootless, volatile class of unemployed youth. Yet, traditional governments have not evolved to meet the needs of their better educated, more demanding population. "Powder keg" is not a sufficient metaphor; think "house of cards."

But if the Middle East is a disaster waiting to happen, the Caucasus is a cataclysm. Georgia, Azerbaijan, and Armenia have experienced ethnic conflict in the last decade that easily equals the horrors of the fall of Yugoslavia. The region's distance from Europe and proximity to Russia diminished Western attention to that genocide, but "now, because of the natural gas fields . . . , this area is again worth a war."

Kaplan provides a necessary correction to the prophets of globalization as international salvation; he is in some ways the anti-Friedman. In the New Near East, democratization does not inevitably increase stability; the opposite is more likely. He says, "Freedom and democracy certainly make for the strongest states, but with so little to build upon in this part of the world, civil society will likely be introduced only by force and Machiavellian tactics. . . . Even so, the chances of success are not great." In much of the region, only autocratic leaders are keeping the façade of statehood together in the absence of a free press and a middle class.

The preface to *Balkan Ghosts: A Journey Through History* (St. Martin's Press, NY, 1993), Kaplan's best-known work, concludes: "Throughout the 1980s I tried—usually to no avail—to interest editors and the general public in the Balkans and the brewing trouble there. It is sadly ironic that my worst fears have proved correct."

I am willing to bet that in 10 years U.S. troops will have fought a war and still be deployed in several of the countries Kaplan describes in *Eastward to Tartary.* Any takers?

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AMERICAN AIRPOWER STRATEGY IN KOREA: 1950-1953, Conrad C. Crane, University Press of Kansas, Lawrence, 2000, 252 pages, $35.00.

In early 1950, U.S. Air Force commanders believed they could use strategic bombing to destroy critical North Korean infrastructure and break the North Koreans' will. In reality, the United States faced an enemy who resisted at all costs, so the Air Force had to learn new ways to fight. The result was improved acquisition and targeting systems, which enhanced U.S. military status

as a superpower and led to the Air Force's transformation. The lessons learned are still relevant.

MAJ Barry J. Williams, USA,
Fort Leavenworth, Kansas

PATRIOT HEARTS: An Anthology of American Patriotism, William T. Coffey, ed., Purple Mountain Publishing, Colorado Springs, CO, 2000, 430 pages, $23.95.

William T. Coffey, an Army Reserve major, has been collecting quotes, anecdotes, personal stories, speeches, poems, and reminiscences for 17 years. He tucked them into his professional kit bag to serve as his personal collection of thoughts that exemplify the highest standards of what it means to be an American and the sacrifices men and women make to defend the country. He has chosen well, organizing the disparate selections into topical chapters to make them easy to read and reference. Of additional help are the short introductory paragraphs to each chapter. They define the chapter's theme and help readers understand why he chose a particular set of ideas (duty, integrity, and discipline; training, honor, and honoring) and what these ideas mean to him in the context of patriotism.

The most compelling and evocative parts of the book are the words of the men and women who have "been there." The readers should savor Colonel Dandridge "Mike" Malone's piece called "Soldier," which contains an excellent description of "all these wondrous things, which thousands of us share in whole or in part" as soldiers. "The Courage of Sam Bird" is one of the finest tributes to leadership at the unit level I have ever read. There are also lighter moments, as in "War is tough; it's tougher if you're stupid," and the profoundly simple, "When fear kicks in, training takes over."

I am reluctant to make critical

comments about this fine book, but I would offer some suggestions for a future volume. Coffey cites the source for each of his selections, usually with the author's name and the source's date, but many have no other descriptions. One asks, Who are these people?

I would be leery also of taking Internet quotes at face value. For example, "America: The Good Neighbor" was not written as recently as one might believe: A Canadian wrote it in 1974. I would also recommend ensuring that quotes are researched. The "poem recited at the dedication of the U.S.S. *Arizona* memorial in 1962" is actually from Shakespeare's *Henry V* about the Battle of Agincourt.

Despite these things, this book is truly a keeper. The sentiments and convictions are timeless and will make you realize the importance of words that capture the spirit of the moment and that can truly inspire action.

COL Peter V. Huisking, *USA, Retired, Sierra Vista, Arizona*

EDUCATING THE U.S. ARMY: Arthur L. Wagner and Reform, 1875-1905, T.R. Brereton, University of Nebraska Press, Lincoln, 2000, 297 pages, $45.00.

Arthur L. Wagner, one of the principal architects of the U.S. Army during the 20th Century, graduated a lackluster fortieth out of 43 in the West Point class of 1875. Only later did he emerge as the Army's leading intellectual force.

With other progressives of the time, Wagner was dedicated to professionalism and reform. His forward-looking thinking helped guide the Army through a period of rapid, tumultuous change. But, first and foremost, Wagner was an educator who advocated an integrated, progressive system of Army schools. He also was instrumental in elevating the Leavenworth school from a "kindergarten" to a college. T.R. Brereton paints a bleak picture of the Leavenworth curriculum before Wagner's arrival, illustrating effectively the content and methodology that turned the school around. Wagner's key to instruction was the "applicatory method," which today would be called the "practical exercise."

Wagner, who had a gift for effective writing, wrote two textbooks that guided officer education for 20 years. He succeeded in describing not only "what" but also "why." As a practical historian, he rooted doctrinal teachings firmly in historical experience. His greatest gift to the evolution of Army doctrine was a redefinition of combined arms. Wagner pushed hard and successfully for the abandonment of close-order, massed infantry in favor of "extended order" (dispersed) infantry tactics. In discussing these innovations, Brereton demonstrates a sound grasp of battlefield dynamics and the interrelationships between technology and doctrine.

There are several similarities between Wagner's era and that of today. Then, as now, the Army faced a cloudy future dominated by technological change and complicated by questions over the Army's mission. As Brereton demonstrates, Wagner's invaluable contribution to innovation involved the legitimization of education and intellectual pursuits, along with a forceful insistence that the Army's proper mission was warfighting on a modern battlefield. There is much to be learned from the transformation of 1900 that can illuminate current efforts at transformation. Reading this book is a place to begin.

Christopher R. Gabel, *Combat Studies Institute, Fort Leavenworth, Kansas*

KOSOVO: War and Revenge, Tim Judah, Yale University Press, New Haven, CT, 2000, 348 pages, $37.50.

Tim Judah wrote the prize-winning book *The Serbs: History, Myth, and the Destruction of Yugoslavia* (Yale University Press, New Haven, CT) in 1997. His recent book, *Kosovo: War and Revenge,* although having received some acclaim, has a few problems. For example, he refers to the Kosovo Liberation Army (KLA) as "the most successful guerrilla movement in modern history." Yet, his narrative leads the reader to a quite different conclusion.

In the beginning, the KLA, which had only 150 active members, did not have an overall commander or a coherent strategy. Its numbers grew when village militia suddenly emerged and took the KLA name, even though they often acted because of local politics and clan motivation rather than directives from KLA's leadership.

In 1998, the Yugoslav army drove most Albanian guerrillas into the mountains; only the October 1998 Holbrooke Agreement allowed the Albanians to reoccupy lost territory. Eventually KLA leaders claimed to have forced the Yugoslav army out of hiding and into the open for destruction by NATO bombers. This claim, Judah notes, appears to be sheer myth. In short, the KLA is far from being today's most successful guerrilla movement.

Ending on a negative note, the book reinforces the popular view of the Balkans as a reservoir of centuries-old communal hatreds. Serbs have commemorated the 1289 Battle of Kosovo for 610 years, and Judah suggests that their capacity for revenge can endure another 610 years. Such a bleak picture suggests that little good can come out of current actions.

Overall, Judah provides much information on the KLA's rise, the Rambouillet Conference, and the Allied Force. He also discusses the stirrings of a Kosovar Albanian identity distinct from the general Albanian population. The book complements Noel Malcolm's *Kosovo: A Short History* (New York University Press, 2000) and Marc Weller's *The Crisis in Kosovo, 1998-1999* (International Documents and Analyst Ltd., Cambridge, MA, 1999), where Albanian perspectives on the Kosovo problem receive ample coverage.

George W. Gawrych, *Combat Studies Institute, Fort Leavenworth, Kansas*

COVERED WITH GLORY: The 26th North Carolina Infantry at Gettysburg, Rod Gragg, HarperCollins Publishers Inc., New York, 2000, 320 pages, $27.50.

Covered with Glory, by award-winning historian Rod Gragg, is one of the most dramatic combat narratives ever written. Not only does Gragg concentrate on one of the best known units of the Army of Northern Virginia, he concentrates the story on a three-day period in July

1863 when the unit suffered 687 casualties. That equates to a staggering 85 percent casualty rate.

This history is also the story of the unit's charismatic 21-year-old Colonel Henry King Burgwyn, Jr., the "Boy Colonel of the Confederacy." Burgwyn graduated at age 18 with top honors from the University of North Carolina. Two years later he graduated from the Virginia Military Institute. Gragg chronicles Burgwyn's meteoric rise from drillmaster to commander of the 26th North Carolina Infantry to his premature death from a bullet that entered his side and pierced both lungs during the successful capture of McPherson's Ridge by the Tarheels. His death deprived the Confederacy of one of its most promising field officers.

Gragg's ability to put the reader on the battle line with the soldiers is phenomenal and is the book's greatest attribute. The book is literally impossible to put down. Its meticulously detailed notes and bibliography guarantee historical accuracy and illustrate the depth of Gragg's research, making this a valuable addition to any military professional's library.

COL James L. Speicher, *USA, Shawnee, Kansas*

IN VALIANT COMPANY: Diggers in Battle—Korea 1950-51, Ben O'Dowd, Queensland University Press, Australia, 2000, 212 pages, $19.95.

Ben O'Dowd is a former Royal Australian Regiment (RAR) company commander commissioned on the field of battle. O'Dowd's book, *In Valiant Company,* highlights his unit's actions in Korea and is a testament to the men who served so valiantly.

After conducting "bandit suppression" operations, O'Dowd's regiment moved north into the main forces' drive to the Yalu. Airlifted from Taegu airstrip to Kimpo in C-119 "flying boxcars," the regiment continued north to Kaesong, joining the 8th Army as it pursued the shaken North Korean Army. When the 8th Army slowed to catch its breath, units went into nearby hills to confront the enemy.

After flitting in and out of the area, the Chinese finally appeared en masse. Aided by the severe Korean winter, the Chinese assault was successful. The RAR began its retreat, stopping only when it was back in South Korea. As the slow, agonizing movement north began again, the RAR recovered lost ground and moved toward a fairly stable line.

Although O'Dowd centers on what he and his company did, he still provides the bigger picture. The book easily shows why leadership is so important.

Peter Charles Unsinger, *San Jose State University, California*

AMERICAN GENERALSHIP: Character is Everything—The Art of Command, Edgar F. Puryear, Jr., Presidio Press, Novato, CA, 2000, 365 pages, $34.95.

American Generalship is an excellent update of Edgar F. Puryear, Jr.'s noted 1971 work *Nineteen Stars: A Study in Military Character and Leadership* (Presidio Press, Novato, CA, 1997). *Nineteen Stars,* a comparative study of the leadership styles of Generals George C. Marshall, Dwight D. Eisenhower, Douglas MacArthur, and George S. Patton during World War II, examines how and why they became generals and details their leadership styles.

Although *American Generalship* repeats some of the information in *Nineteen Stars,* its focus is on post-World War II military leaders: Admiral William J. Crowe, Generals Colin Powell, Norman Schwarzkopf, John Meyer, Gordon Sullivan, David Jones, and W.L. Creech.

The characteristics and qualities Puryear identifies as absolutely essential for successful leadership are as follows:
● Selflessness.
● Willingness to accept responsibility.
● Possessing and developing the quality of "feel" or sixth sense.
● Aversion to yes men.
● Genuine consideration and concern for troops and others.
● The ability to delegate.
● Character, which Puryear feels is the most important.

Other important characteristics of good leadership are integrity, ambition, showmanship, loyalty, and professional reading and study. One of the significant commonalities among World War II and post-war senior officers is a love of reading, particularly of history and biography.

Whether leaders are born or made is often questioned. The general consensus is that people can be trained in most of the attributes required for leadership. Dedication is the prerequisite; it includes the willingness to make the sacrifices a military career demands.

My major criticism of the book is that it does not address some of the less-attractive aspects of the modern officer system—careerism, service politics, and "plain old" luck. However, everyone who aspires to leadership positions in the military should read this book. It has much to offer and is an excellent roadmap for individual officers.

LTC John A. Hardaway, *USA, Retired, Leavenworth, Kansas*

CRUCIBLE OF WAR: The Seven Years' War and the Fate of Empire in British North America, 1754-1766, Fred Anderson, Alfred A. Knopf, New York, 2000, 862 pages, $40.00.

As Winston Churchill once pointed out, the Seven Years' War was the first true world war. In fact, it was more of a global war than was World War I; the latter was waged primarily in Europe, where France, Italy, Belgium, the United States, and Britain and its Commonwealth decisively defeated the Austro-German alliance. The Seven Years' War was waged in Europe, India, Africa, the West Indies, and North America, where it was called the French-Indian War and where it was truly decisive.

The French-Indian War began in 1754 when a young Virginia militia officer named George Washington tried to remove a small French encampment from disputed territory on the Ohio River. It was the fourth war in North America between Britain and France. The first three ended in truces and restoration of the status quo ante bellum and, except as personal tragedies, spilled blood, and spent treasure, had no real impact on history.

Author Fred Anderson adopts a politically correct, multicultural perspective on the Seven Years' War. For example, he portrays Marquis Louis Joseph Montcalm as being guilt-stricken by the way his Indian and Canadian allies tortured prisoners and killed noncombatants. His guilt came from imposing his Eurocentric views of warfare on Indians and Canadians. They were skilled in irregular operations but doomed to failure by the hopeless task of trying to fight at a numerical disadvantage and still win a conventional war.

Perhaps the greatest grand strategist in British history, William Pitt dramatically increased the size of the British Empire because he was not an imperialist at heart. Whereas others tried to dictate to the Americans, Pitt won their heartfelt support and cooperation because he treated them as allies, not subjects of the Crown.

Pitt mobilized New World manpower and money as none of his predecessors could and promised local legislatures reimbursement for expenses in the common cause. According to Anderson, the irony lies in the fact that Pitt was the one who sowed the seeds of destruction throughout much of the empire he created or preserved: Americans expected to be reimbursed, not taxed, after the war.

One can take issue with Anderson's multiculturalistic approach to the subject. Pitt to the contrary, the English army was not a multi-cultural institution. Still, I highly recommend this book.

Michael Pearlman, *Combat Studies Institute, Fort Leavenworth, Kansas*

HAP ARNOLD AND THE EVOLUTION OF AMERICAN AIRPOWER, Dik Alan Daso, Smithsonian Institution Press, Herndon, VA, 2000, 314 pages, $29.95.

Hap Arnold and the Evolution of American Airpower is the compelling biography of one of the architects and pioneers of the modern U.S. Air Force. When Henry H. Arnold graduated from West Point in 1907, his desire was to become a cavalryman. Thirty-nine years later, he commanded history's greatest aerial war machine and, in retirement, became

the first and only General of the Air Force.

Author Dik Alan Saso, a career Air Force officer, paints a balanced portrait. Arnold was a complex, unassuming yet professional, officer who possessed great vision and imagination.

MAJ M.R. Pierce, *Combat Studies Institute, Fort Leavenworth, Kansas*

THE KINDER, GENTLER MILITARY: Can America's Gender-Neutral Fighting Force Still Win Wars? Stephanie Gutmann, Scribner, New York, 2000, 300 pages, $25.00.

As stated in Stephanie Gutmann's introduction to *The Kinder, Gentler Military,* "One of the projects mesmerizing the brass throughout the nineties was the integration of women" into the military. She goes on to admit that "surely women have been in the forces . . . forever . . , but something new happened in the nineties in respect to the way the military handled women issues." That something, Gutmann claims, is that the U.S. military is being used as a social experiment for gender integration. Her premise is that this social experiment is counter to what the military intended—fighting the nation's wars in defense of its vital interests.

This book is a devastating critique of the military's sex-integration efforts. It reports how the U.S. Department of Defense allowed women "to come into basic training at dramatically lower fitness levels . . . climb lower walls, throw shorter distances, and carry lighter packs when they got there." After reading this book, it is difficult not to take a side on the issue of whether women should be in the military. It leaves me questioning if military readiness and national security has been trumped by the U.S. Armed Forces' gender integration.

This controversial book offers hard facts surrounding making the "force look like America." Gutmann presents arguments that are hard to refute. In the end, her plea is to allow males and females to live in a "real world" devoid of political correctness. According to Gutmann, the real world is one free of sexual recruitment quotas, gender-specific

standards, and a restoration of time-proven warrior cultures. Only then, she submits, can we truly test the military's gender integration. Whether Gutmann is right or wrong, all military leaders should read this book.

LTC Dominic J. Caraccilo, *USA, Fort Benning, Georgia*

THE NAPOLEON OPTIONS: Alternate Decisions of the Napoleonic Wars, Johnathan North, ed., Stackpole Books, Mechanicsburg, PA, 2000, 221 pages, $34.95.

The Napoleon Options, written by 10 international authors, presents several great "maybes" of the Revolutionary and Napoleonic Wars. The book focuses on a few pivotal episodes, gives them a historical twist, and explores in detail a possible alternate sequence of historical events. Rooted firmly in reality and projected from entirely factual events, these possibilities are played out as though they actually happened in dramatic narratives. The thoroughness and believability of the alternative futures keep readers engaged and eager to see what will happen if Napoleon succeeds at Waterloo.

Because Napoleon had such an impact on the formation of the modern world, these scenarios illustrate how alternate events might have shaped a radically different world. They graphically illustrate the role that chance plays in history and how even minor changes can have far-reaching consequences.

The military strategist will find this work of significant use only if he is grounded in the specifics of the actual events. Without a historical understanding of the Revolutionary or Napoleonic Wars, the reader can become confused as to what is historical fact and what is historical fiction.

A positive aspect for the military strategist is the realization that pivotal events can alter the strategic environment and that the ability to identify pivotal events marks the difference between a strategist and a novice. *The Napoleon Options* provides all military professionals with a common message—use caution: men in conflict shape the future.

MAJ Paul R. Walter, *USA, Pulaski, New York*

^{MR}Letters

Of Arab Descent

The date 11 September 2001 will be forever in the nation's collective emotion. All of us will remember what we were doing when we heard the news of the tragedy. We will all have stories to tell.

As a U.S. Naval Officer of Arab descent, I happened to be waiting at the south side of the Pentagon for the 0940 bus taking folks to Bolling Air Force Base. As the bus approached, I saw the tail of a plane plunging into the Pentagon. My mind did not register what had happened until a forceful wind shook the bus, and the driver floored it toward the air base.

Because I could not believe my own eyes, I had to ask other passengers if indeed that was a plane. Immediately, like many others, I thought of friends who were in the building, including a U.S. Air Force Episcopalian chaplain who was entering the Pentagon as I left to catch the bus. He said, "Hi, Youssef," as we passed each other. The chaplain and I had ridden the public transportation together for two weeks and had gotten acquainted. After the attack, I was truly worried about him. I found out later that he was safe. Thank God!

Many people ask me if I have been a target of harrassment. The following story sums up my experience. I was riding the Metro in uniform, as I do daily to go to work. A World War II Army veteran was among the passengers. He looked over my khakis, medals, and name tag, then said, "I know you are Arab-American, and I want to thank you for serving our nation." The gentleman noticed a few U.S. Army ribbons on my chest, and he recounted his service with contruction brigades during World War II. He wished he was younger so he could take part in the coming fight.

Walking to Anacostia Metro Station, Gallery Place, and other stations to get around Washington, I hear ordinary Americans say, "Good morning, Sir!" "Go get'em, lieutenant!" Such encounters make me darn proud to be an American in uniform and desire nothing more than to get on, alongside other Americans and colleagues, with the business of fighting this new war against humanity.

LT Youssef H. Aboul-Enein, *USN, Middle-East/North Africa FAO*

Editor's note: Lieutenant Aboul-Enein is a frequent contributor of book reviews and essays to the Military Review.

Millett versus Patrick: *A War to Be Won*

If I didn't respect your journal and your readers, I'd hardly bother to answer the peculiar review you published of the book Williamson "Wick" Murray and I wrote about World War II. We hope your readers will use their own judgment in evaluating *A War To Be Won: Fighting the Second World War* (Harvard University Press, New Haven, CT, 2000). Fortunately, there are many favorable reviews your readers can consult.

First, I am baffled by your choice of reviewer—a retired professor of chemistry at a Virginia college who happens to be a World War II veteran and something of a self-appointed historian and literary critic. Surely there are officers and scholars at Fort Leavenworth who have a better grasp on the subject.

Apparently, our major sin was not mentioning that James B. Patrick's engineer combat battalion won the Battle of the Bulge, but a close reading of his review produces another, more damning conclusion: he did not read the book. Some of his criticism is so bizarre that it defies reasoned response. For example, he criticizes us for somehow holding the Axis to a higher moral standard than we do the Allies when it comes to killing innocents and committing crimes against humanity. I think we certainly expressed our reservations about firebombing cities, the leveling of Manila by an American army, and every aspect of Soviet war making.

Patrick is incensed that we did not adequately evaluate the role of SIGINT in the war, yet the book is full of such commentary. Others have questioned our judgment (we give too little credit to the SIGINT impact), but not our willingness to deal with the subject.

As for our commentary about commanders of every nation, these judgments, however harsh, are based on a measured evaluation of the principals and are hardly novel or unfair to anyone who has kept up with the literature. For example, my hard judgment on General Douglas MacArthur is based on sympathetic work on him by Gavin Long, D. Clayton James, William Leary, and the biographers of every one of MacArthur's principal subordinates like George Kenney, Thomas Kinkaid, and Robert Eichelberger.

If Patrick really followed the literature, he would know that the charges by "Suvorov" that Josef Stalin set up his own army have been discredited years ago. Any evaluation of the Russo-German War must now be based on the work of Colonels David Glantz and Johnathan House and others (including the Russians) who have had access to Soviet military archives. Even the late General Dimitrii Volkaganov, biographer of Stalin and Lenin as well as victim of the Red Army purges, could find no convincing evidence of Stalin's cooperation with the Nazis.

In addition to basing his understanding of the war on Winston Churchill's self-serving classic, *The Second World War* (Houghton Mifflin, New York, 1986, boxed edition), Patrick's own notes demonstrate his incompetence. For example, he attacks George C. Marshall (who "had never fought a battle," which will be news to students of the AEF from Cantigny to the Meuse-Argonne) for the Army's replacement system. While in the theory of command this may be so, the issue is a bit more complicated than Marshall's personal bias, and it is thoroughly discussed in the U.S. Army's official history of the war and several books—including two by my own students—in the last decade.

As for attitude, Murray and I apparently are not sufficiently paranoid since we don't take conspiracy theorists seriously enough, nor are we properly reverential to the men and women who fought World War II. The last charge is particularly

aggravating. I guess Patrick didn't read the dedication as well as most of the book. While I am not prepared to judge Patrick's military service or avocational interest in military affairs, I doubt that he has given quite as much service to the United States as two retired reserve officers (colonel, USMCR, and lieutenant colonel, USAFR), and professional historians who have dedicated their entire adult lives (and we are on the verge of drawing Social Security) to getting military history right. Happily, the World War II veterans who write us think we've done pretty well.

Allan R. Millett, *Mason Professor of Military History, The Ohio State University, Columbus*

In response to Allan R. Millett's intemperate attack on my review of his and Williamson Murray's book, I need to revisit a few points. The first concerns the petty squabble about turf: how dare a mere chemist criticize the work of two celebrated history professors? The answer is simply that I was there and they were not. I have been reflecting on these events, reading what I could find about the war, and talking with other veterans since before Millett and Murray were in knee pants. No one can claim a complete understanding of that titanic catastrophe of Western civilization, and I certainly do not. But, as in most things, eyewitness testimony is not to be scorned, even by Ohio State University professors of history.

Millett claims to have given my review "a close reading," but he somehow reaches the astonishing conclusion that I think my engineer combat battalion won the Battle of the Bulge. We were not in it at all: we were in the 7th Army. Millett tops that whopper by claiming that I had not even read his book. I am distressed to see a distinguished scholar become so infuriated by a less-than-obsequious review that he could not read the review clearly.

Millett alleges that I am "incensed" that he and Murray "did not adequately evaluate the role of SIGINT." I am not only *not* incensed, I can find nothing in my review that concerns SIGINT except for a mention that the index has no entries for Enigma, Ultra, Magic, Purple, or Venona. I blame the publisher, not Millett and Murray, for not compiling a better index. When I said that Millett and Murray were "weak in their appreciation of the effects of intelligence," my examples were Richard Sorge's spying and James Klugmann's false reports.

In Millett and Murray's evaluation of the various commanders, there is room for reasonable disagreement. However, vilification such as calling the formal Japanese surrender on the U.S.S. *Missouri* "general-dramatist MacArthur's bit of *kabuki*" is simply contemptible. Such cheap shots have no place in serious scholarship.

Millet misunderstood Viktor Suvorov's thesis. Suvorov (Victor Rezun) never claimed that Russian leader Joseph Stalin "set up his own army." Rather, Suvorov postulated that Stalin intended a surprise attack on German dictator Adolf Hitler in 1941 but was beaten to the punch. Millett alleges, with no supporting reference, that this was "discredited years ago," but it is, in fact, still an open question. Gabriel Gorodetsky, in *Grand Delusion* (Yale University Press, New Haven, CT, 1999), briefly argues against the possibility, but acknowledges that Russian historian V.A. Nevezhin supports Suvorov's thesis. Nevezhin's book on the subject has not been translated and is unavailable in the United States. I understand that R.H.S. Stolfi, a former professor at the Naval Postgraduate School in Monterey, California, claims in *Hitler's Panzers East: World War II Reinterpreted* (University of Oklahoma Press, Norman, 1991) that Stalin intended to initiate a Soviet "Barbarossa," but the Germans hit before it could be launched.

I have not yet read Stolfi's book, and I doubt that it will settle the question. However, I still believe that my comment that this thesis "makes more sense than the usual view of Stalin—of all people—as a gullible simpleton who was outfoxed by the crafty Hitler" is a reasonable one.

On the other hand, I fail to see the relevance of Millett's assertion that Dmitri Volkganov "could find no convincing evidence of Stalin's cooperation with the Nazis." Until June 1941, Stalin certainly did cooperate extensively, but after Barbarossa was launched, no one in his right mind would claim that he did. So, where's the beef?

Millett continues: "In addition to basing his understanding of the war on Winston S. Churchill's self-serving classic, *The Second World War,* Professor Patrick...." I regret that Millett was evidently so blinded by rage that he failed to recognize my distinctly negative assessment of Churchill's opus. Millett's characterization of it as a "self-serving classic" expresses my view quite well.

Millett continues by attacking my comment on U.S. General George C. Marshall by saying that I said Marshall "had never fought a battle." Millett continues that "this will be news to students of the AEF [American Expeditionary Force] from Cantigny to the Meuse-Argonne." What I actually said was that Marshall "had never fought *in* battle." Marshall was a staff officer. I do not disdain staff officers; they serve an essential purpose, and I was an adjutant shortly before I left the service in 1947. But, I cannot imagine Marshall as a staffer nicknamed something like "Old Blood and Guts," and try as I will, I cannot picture Marshall in a muddy uniform. Maybe that is unfair, but I wish Millett had read my review more carefully before calling down his barrage.

Millett's last paragraph is especially painful to contemplate. He seems to be reduced to the juvenile "nya, nya, I've got more service than you've got!" I hope that when he cools down we can get beyond such behavior.

Let me make it clear: I consider *A War to be Won* a good book, and I respect Millett and Murray. But the book is not as good as it could be, precisely because the authors are eminent authorities from whom something much better should be expected. As any unbiased reader of my review can see, much of my criticism was aimed at the book's publisher, who did not provide the clear maps, thorough proofreading, and complete index that a work of this scope and authoritative authorship demands.

Also, Millett and Murray were excessively flippant, not as complete in their coverage as they might have been, and overly judgmental in some instances. But, I understand that academics, like everyone else, have off days. If this book goes to a second edition—and I hope it will—the authors will have another opportunity to provide that elusive product—the definitive history of World War II. I hope that their resentment of my *lèse majesté* will not deter them from seizing that opportunity.

James B. Patrick, *Professor, Mary Baldwin College, Staunton, Virginia*

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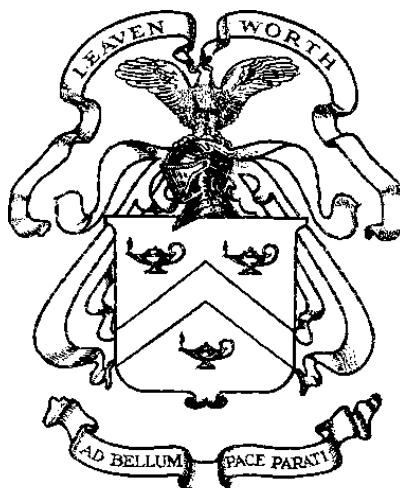
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September 11, 2001 marked a pivotal change in our lives, our Army, and our country. When terrorists commandeered four U.S. airliners and used them as weapons, they changed the world forever. They not only struck at America but at those in the world who deplore such barbaric cruelty and sacrilege. Before the sun set on that day a strong and willing coalition was already coming together to declare a war on terrorism—a war that will not be won quickly. We cannot stop with the destruction of terrorist military strongholds. This is only the opening campaign in a very long war. Nations around the globe are bringing to bear all diplomatic, economic, intelligence, and military resources to root out and destroy all terrorist networks and create an environment that will not support their resurgence. Subsequent campaigns will be aimed at both terrorist organizations and those states that support or harbor them. Our nation is leading the fight, the role of the Armed Forces is crucial, and the American people are staunchly behind us.

**Colonel Melanie R. Reeder
Editor in Chief**

Secretary of the Army's Remarks to Soldiers

My fellow field soldiers all over the Army, from Kosovo to Korea, wherever you may be pulling your duty: As you all know by now, our nation, this department, and the United States Army were attacked on 11 September.

I want you to know that we have survived that attack. That attack has made us stronger, and we are now engaged in what our President has called the first war of the 21st century. We will win that war.

Now the war is not going to be won in a single day, or a single raid, or a single event. We are engaged in a campaign against a cowardly enemy. And it will take us a while to root him out. But let there be no question about our resolve, our discipline, our professionalism, our tenacity; and in the end, the result of that war.

It started at a point in time dictated by the enemy. It will end in a point in time—as the President has said—of our choosing.

It won't be easy. But few things that are truly worth doing ever are. This is our challenge: to preserve the freedoms that make America what Abraham Lincoln called the 'last best hope on earth.' And I can assure that the civilized people in countries of the world have united in support of our cause.

You and I, the American soldier and the veteran, now carry the hopes of the American people on our shoulders. I know that you will do your duty. I have every confidence in that as does the Secretary [of Defense], the Chief, and the President of the United States.

America expects no less of you and I, and we can do no more. And always know that wherever you are, your nation stands behind you with absolutely solid support.

The Chief, General Shinseki, and I extend our condolences and ask God's tender mercies on our former comrades and their loved ones. We have 74 people unaccounted for in our headquarters. We will mourn them and we will shed our tears. They are part of our family. But once that's finished, we will go forward, with anger and with purpose in our hearts, to see this campaign through to the end.

Tuesday, September 11 has already been described as the darkest day in American history. I say to our adversaries, be very, very careful, for you are going to experience the finest hours of the United States Army as we prosecute this campaign against you.

God bless you; God bless the Army; God bless our great nation.

Terrorism and Crabgrass

Lieutenant Colonel Peter J. Schifferle, US Army, Retired

Terrorism, like crabgrass, can never be completely eradicated. We can choke it out by persistently strengthening the resolve of the world not to tolerate it.

THE WAR ON terror may be better understood if considered in light of a metaphor—a comparison with an everyday experience that might help frame the operational and strategic issues of this new type of war.

Consider the homeowner whose lawn is afflicted with a bad case of crabgrass. His object is to replace the crabgrass with healthy grass. To achieve his object, he needs a program that destroys individual crabgrass plants and simultaneously replaces the crabgrass with a healthy, vibrant lawn. The most important part of the homeowner's program is growing strong healthy grass where crabgrass cannot thrive. In this metaphor, the international community of nation-states can be compared to the homeowner's lawn, with crabgrass being terrorists and healthy grass being antiterrorist nations. The goal of the international community is to root out terrorists and to grow nations opposed to terrorism. Furthermore, the international community must create an environment where terrorists cannot thrive. Without national sanctuaries—fertile, open soil in which to grow—terrorists cannot thrive. Just as crabgrass withers when exposed to harsh sunlight, denied water, and vigorous uprooting, so too will terrorism wither when exposed to the heat of international censure, denied support from sympathetic governments, and attacked and vigorously rooted out from its sanctuaries.

The most important requirement in combating crabgrass is good soil preparation. Good soil preparation requires the coalition opposing terrorism to be perceived as friendly to Islam. If the soil preparation is inadequate, that is, if the greater Islamic community believes the United States and the nations of the coalition threaten the existence of Islam, no effort can ever establish a healthy lawn—the United States and the coalition will never win. The United States would need to sterilize the lawn, import new topsoil, and start over. This is within the United States' capability as a superpower, like starting over is within the capability of many homeowners, but in both cases, the costs are extravagantly high.

Fertilizer and water contribute to good soil preparation. Fertilizer needed to assist seed germination can be likened to the protection given friendly nations from foreign aggression because of their membership in the coalition. The water that keeps the healthy grass alive can be compared to support from a broad coalition of friendly nations given to nations opposed to terrorism. This healthy grass seed—antiterrorist nations—cannot prosper without adequate water—economic aid, diplomatic initiatives of treaty structures, assistance with health care and education, and the development of a healthy nation-state moving confidently into the future.

Crabgrass—terrorists—must be destroyed using the combination of two strategies. One strategy is the periodic and consistent application of pre-emergent, or chemical weed killer. Pre-emergent can be compared to the unswerving defeat of any nation-state government that supports, harbors, funds, or otherwise helps any terror group. This minimizes the growth of new terrorist groups and inhibits the revival of remnants of old terrorist groups.

The second strategy is the removal of the plants' roots. The prudent homeowner never just pulls the tops off the crabgrass. Such a practice is futile because the roots remain. Crabgrass is by its very nature designed to survive that type of attack and grow

back. To eliminate the terrorist threat, the international community cannot settle for simply hunting down, bringing to justice, and executing individual terrorists. Such a strategy is akin to the homeowner who pulls the tops off the crabgrass in his lawn. Rather, nations involved in the war against terrorism must attack terrorists and their infrastructures persistently. They must attack not simply the terrorist but the organizations that provide direction and guidance and the supporting nations that afford the terrorist sanctuary and freedom of action. The antiterror war must pull terrorists up by the roots: destroy organizations through local counterterror intelligence operations, precise military strikes, and occasionally the forceful occupation of territory.

The appropriate and proper operational posture in this war against terrorism:

● Destroy the al-Qaida terror group worldwide. This is the equivalent of pulling out the old crabgrass by the roots. It will work against the old crabgrass, but does little to prevent its reemergence.

● Remove the Taliban from governance in Afghanistan and replace them with any form of government desired by the people of Afghanistan, the only requirement being this government does not support or harbor terrorist groups with global reach. This is the same as an initial application of chemical weed killer. However, in a good crabgrass control regimen, additional applications of pre-emergent are needed every season.

● Support the post-Taliban government of Afghanistan with massive infusions of American foreign assistance, humanitarian aid, support from the United Nations, nongovernment organizations, and private volunteer organizations. Grant Afghanistan favorable trading relations with all nations of the coali-

Terrorism ≈ *Crabgrass*

Terrorism, like crabgrass, can never be completely eradicated. However, we can choke it out by persistently strengthening the resolve of the world not to tolerate it.

Fertilize the Grass
Support cooperative nations against their enemies

Apply Preemergent
Defeat harboring nations

Quality Grass Seed
Nation-states that do not support terror

Pull-up by the Roots
Kill the terror organization

Soil Preparation
US friendly to Islam

Water the Lawn
Full DIME support to friends

But, like defeating crabgrass, you never just pull the tops off
(Just kill individual terrorists)

tion. The model for this aid should be the Marshall Plan, the U.S. economic aid package that rebuilt Europe after World War II. It is also possible that irredentist populations could be satisfied with significant adjustments of international borders. In the crabgrass analogy, this measure equates to fertilizing new grass.

● Be prepared to take military action against nation-states that show signs of supporting international terrorism. This harsh, but necessary step, is the seasonal application of pre-emergent.

● Be prepared to provide nation-states that have been the subject of military action stemming from their support of international terrorists aid and relief packages as that provided the post-Taliban government in Afghanistan.

This seems a tall order, but any alternatives are worse. Indecision, hesitation, undue deliberation—any of these will delay the day when the international community of nations ends the reign of international terrorism. With this infusion of quality grass seed, and with frequent watering, the new grass will flourish, and terror with global reach will be choked off by prosperity, freedom, and tolerance. *MR*

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Americans are asking, "How will we fight and win this war?" We will direct every resource at our command— every means of diplomacy, every tool of intelligence, every instrument of law enforcement, every financial influence, and every necessary weapon of war to the destruction and to the defeat of the global terror network. Now, this war will not be like the war against Iraq a decade ago, with a decisive liberation of territory and a swift conclusion. It will not look like the air war above Kosovo two years ago, where no ground troops were used and not a single American was lost in combat. Our response involves far more than instant retaliation and isolated strikes. Americans should not expect one battle but a lengthy campaign unlike any other we have ever seen. It may include dramatic strikes visible on TV and covert operations secret even in success.

President George W. Bush

What we're engaged in is very, very different from World War II, Korea, Vietnam, the Gulf War, Kosovo, Bosnia—the kinds of things that people think of when they use the words "war"'or "campaign" or "conflict," Rumsfeld told reporters in the Pentagon. *It is very different (from) embarking on a campaign against a specific country within a specific timeframe for a specific purpose.*

Secretary of Defense Donald Rumsfeld

You don't do it with just a single military strike, no matter how dramatic. You don't do it with just military forces alone, you do it with the full resources of the U.S. government. These [terrorists] try to hide, but they won't be able to hide forever. They think their harbors are safe, but they won't be safe forever. I think one has to say it's not just simply a matter of capturing people and holding them accountable but removing the sanctuaries [and] removing the support systems. And that's why it has to be a broad and sustained campaign. It's not going to stop if a few criminals are taken care of.

**Deputy Secretary of Defense
Paul Wolfowitz**

On behalf of all the members of America's Army, I'd like to express my condolences to the families of U.S. citizens killed or injured in the terrorist attacks conducted against the United States on September 11, 2001. I urge all members of the Army to remain vigilant against possible future attacks. Rest assured, America will prevail in the fight against terrorism—and our Army is prepared to do its part!

Secretary of the Army Thomas E. White

No other single action more clearly demonstrates the national resolve than to mobilize the National Guard and Reserve forces of America, . . . These guardsmen and reservists are just the first to be put on partial mobilization orders. They're joining thousands of other Reserve forces members who

immediately answered the call, either in a state active duty or federal volunteer status. I know I join millions of Americans in saluting them as they leave their jobs and communities to assist in the wake of last week's hideous acts of terrorism in New York, Pennsylvania, and Washington.

Principal Deputy Assistant Secretary of Defense for Reserve Affairs Craig Duehring

It was more than just an attack against the United States, it was an attack against all who embrace the principles of peace and freedom and democracy. . . . Our non-negotiable contract with the American people is to fight and win the

nation's wars, decisively. . . .We expect you to remain trained and ready. Respond quickly and professionally when called. Thank you for what you do to make this Army the magnificent Army that it is. . . . Take care of each other. Be safe. God bless each and every one of you. God bless the Army. God bless America.

Chief of Staff, US Army, General Eric K. Shinseki

We are now facing a challenge unlike any we have known in our history, but we will deal with it in the same way that our armed forces have always responded in times of crisis—confident in our profes-sionalism, resolute in purpose and ready to accomplish our National mission. Here at the U.S. Army Command and General Staff College, we will continue to train and grow leaders

for America's future. Our steadfast committment to the highest standards of institutional leader de-velopment will best prepare our officers for this new operating environment and the demands of full spectrum operations.

**Deputy Commandant, USACGSC,
Brigadier General David H. Huntoon, Jr.**

Vulnerability Assessments for Antiterrorism Force Protection Operations

Colonel Clinton J. Ancker III, U.S. Army, Retired

UNTIL THE 11 SEPTEMBER terrorist attacks on the World Trade Center and the Pentagon, we viewed force protection, and especially antiterrorism, as integral parts of all operations. In addition, most of the guidance for installation security is contained in Army regulations. This is in keeping with the division of responsibility where regulations deal primarily with the administrative side of the Army and Field Manuals deal with how the Army conducts operations. The 11th of September may change some of that. One proposal is to make force protection a separate task in the Army Universal Task List and provide the commander and his staff with doctrine on how to execute this new tactical task. As the Army works through the shift in thinking about domestic force protection operations, it has developed some preliminary ideas on how it might adapt existing operational concepts to this task. In addition, the doctrine community is looking at how the Army needs to adjust its thinking about vulnerability, based on the significant change in our enemy's pattern of attack, unveiled by the 11 September attacks. What we are after is a vulnerability analysis methodology that will allow Army forces to better deter, defeat, and manage the consequences of terrorist attacks.

The attacks on the World Trade Center and the Pentagon demonstrate that the Army's force protection must change. Previously, force protection focused on deterring or defeating low-level attacks against point targets.

The 11 September attacks combined two familiar methods of operation—suicide bombing and aircraft highjacking—in an unexpected asymmetric attack to produce mass casualties and a worldwide media event. The organization that conducted these attacks is well organized, well disciplined, and well funded. The attacks were well planned and synchronized. The targets were chosen carefully. The actions of all involved, including the anticipated actions of the aircraft passengers and crew, were thought through. The 11 September attacks established a new terrorist threat paradigm. The Army's approach to force protection must change to meet that new paradigm.

A key aspect of this change is to refocus how the Army conducts vulnerability assessment. Many of the fundamental principles of military operations are still valid, but the tactics, techniques, and procedures used to apply them to this type of threat are different. The concepts of commander's critical information requirements (CCIR) are made up of priority information requirements (PIR), friendly forces information requirements (FFIR), and essential elements of friendly information (EEFI) familiar to anyone who has used the military decisionmaking process (MDMP). By adapting these terms to vulnerability analysis for force protection against terrorism, we leverage familiar concepts at the same time we move beyond their conventional meanings.

Commanders visualize, describe, and direct actions across the range of operations and spectrum of conflict. Central to MDMP, and particularly important for installation force protection (FP), are CCIR and EEFI. The doctrinal application of CCIR and EEFI are just as relevant to installation FP as they are to battlefield operations; however, applying these concepts to installation FP differs in some significant ways from applying them in combat.

The commander needs accurate, timely information to visualize, make decisions, and direct action. CCIR are vital to this process. CCIR are elements of information required by commanders that directly affect decisionmaking and dictate the successful execution of

military operations. CCIR drive and prioritize the information collection plan, subsequent allocation of collection resources, and analysis efforts. Many, if not most, CCIR are directly linked to decision points. Thus, answers to CCIR enable the commander to anticipate required decisions in a timely manner. In domestic FP, the decisions that the commander makes must balance the threat, operational effectiveness, and the resources available.

Developing CCIR for installation FP begins as the commander visualizes the operation and, particularly, the battlespace. The commander has to visualize the factors within the battlespace. From an initial visualization, the commander describes the operation and issues planning guidance. One component of planning guidance is CCIR. To understand the threat, the commander needs to determine several things—these may become PIR.

PIR focus on information about the enemy, terrain, and weather. In installation FP, PIR focus on threat assessment. During times of normal activity, they are broadly stated and address a variety of possible threats. Collection against PIR for FP relies much more on civilian agencies than on organic assets. The Army is largely prohibited from collecting information on domestic threats. Good relations with local and national civilian agencies are critical when installations collect against domestic threats. Therefore, solid relationships with these agencies are critical. The result will be a forecast about terrorist operations and an estimate of potential terrorist targets. Armed with these elements, commanders can make some estimates that can be applied to the formula above. Thus, realistic PIR for installation FP aims at understanding what the enemy is attempting to do and then determining how friendly forces can respond. In essence, the PIR steers the vulnerability analysis.

The episodic nature of the terrorist threat, lack of a clearly defined enemy, lack of organic collection assets, and a diverse set of sources make obtaining PIR a significant challenge. Developing the ability to reach out and tap into information sources is a critical skill for installation staffs.

Because of the inability to direct this PIR collection, the installation must devote significant assets to analyze the available information in an attempt to predict possible threats based on available intelligence. This requires extremely skilled analysts who can deduce threats from information that is often incomplete and unreliable. An additional challenge remains the lack of sufficient numbers of trained intelligence and security personnel at the installation staff level to analyze and refine collected information. Critical considerations to focus PIR for these types of operations are:

● *Determine the terrorists' objectives.* We must understand the terrorists' immediate and long-term objectives. From these we can infer the effects they hope to achieve and identify targets that would allow them to achieve those effects.

● *Determine the terrorists' capabilities.* This step involves determining the most likely methods terrorists might use to attack the target. It involves an analysis of methods used previously, but also requires imagining ways to combine methods in new ways or inferring totally original approaches.

● *Determine the terrorists' intentions.* We must imagine how the terrorists are most likely to use their resources to achieve both their long- and short-term goals. Analysts must be steeped in terrorist philosophy, thinking, and culture. As threats become more defined, the PIR are changed to focus in on suspected threats and to determine both their potential targets and the means to attack them.

FFIR are those elements of information that the commander and staff need about friendly forces. In installation FP, FFIR has two major categories: installation vulnerability and installation response capabilities. First, the commander and staff need information about the vulnerability of the installation to terrorist attacks. During routine operations, this takes the form of general awareness vulnerabilities. Vulnerabilities must be assessed against known patterns of terrorist operations, but should also be assessed against criteria of what would cause the most damage should a terrorist target it. While the first is fairly straightforward and based on an analysis of past terrorist actions, the second is much more difficult to ascertain. Determining vulnerabilities requires both imagination and the ability to think from the perspective of a terrorist planning to attack the installation asymmetrically and unconventionally. This vulnerability analysis must be an ongoing process.

As with PIR, when a more specific threat is identified, the commander changes his FFIR to focus on specific means and known targets of the suspected terrorist. The installation commander must then direct execution measures to eliminate or mitigate the threat's capabilities in regards to the suspected vulnerabilities.

The second area of FFIR for FP is the command's ability to respond to a terrorist attack. During routine operations, FFIR must be broadly focused on the command's ability to respond to a wide range of threats. When threats begin to take definite form, FFIR must focus on the command's ability to deter or respond to the threat.

The installation commander uses the answers to PIR and FFIR to make decisions. For the most part, his decisions on FP fall into two categories: implementation of security measures and execution of a response to a terrorist attack and its aftermath.

During routine operations, the commander assesses

his security posture based on known and suspected threats. Security measures are based on balancing the ability of the command to conduct normal business and the probability of an attack. The goal is usually to minimize disruption of daily life, consistent with the threat. Other decisions concern improving the command's ability to respond to terrorist threats. If an analysis of past terrorist actions and potential future actions requires specific kinds of response teams, such as teams capable of resolving a hostage situation or of cleaning up after a biological attack, the commander must assess if he has teams with the necessary training and equipment available. Because potential threats will always outstrip available resources, the commander must use answers to PIR (potential threats) and FFIR (potential vulnerabilities) to determine where to place scarce resources. In addition to these decisions, the commander must establish EEFI.

Once the installation has determined its vulnerabilities, the commander will use EEFI to protect as much critical information as possible. EEFI are critical information about friendly forces that if known by the enemy would compromise, lead to failure, or limit success of the friendly force. Operations security (OPSEC) is the process commanders follow to protect EEFI. Under normal conditions OPSEC consists of actions necessary to prevent a broad category of useful information from falling into the wrong hands. While most soldiers and Department of the Army civilians are familiar with standard OPSEC procedures for combat operations, we have not created the same kind of awareness of OPSEC for antiterrorist measures. EEFI for domestic FP against terrorism is also a derivative of vulnerability analysis. Guided by the vulnerability analysis, the commander and staff attempt to forecast the likely effects of information compromise on the security of the installation, and then devise measures to protect this information from disclosure.

As answers to PIR clarify the threat, the commander will reach decision points relating to implementing OPSEC and physical security measures against the specific threat. This will include establishing higher states of access control, guarding key personnel and assets, and possibly rehearsing response drills. In addition, based on a specific threat, the commander will revise the EEFI to protect information that would assist the terrorist in carrying out an attack.

An integral part of MDMP is risk analysis. Risk analysis gives the commander a tool for balancing FP requirements with mission accomplishment. Shutting down the installation and creating a "fortress" would provide near-airtight security. For every set of security measures, there remains a residual risk. If the residual risk is excessive, the commander must implement additional measures to further reduce it. Residual risk is always balanced against the need to continue operations.

Past practices are not necessarily the solution to future threats. It is possible that the 11 September attackers used our well-established procedures for dealing with highjackings against us. Previous highjackers had used aircraft and passengers as bargaining chips rather than bombs. The assumption that the 11 September highjackings would follow that model may have resulted in passengers not resisting the highjackers until too late. Assume your enemy is thinking as hard as you are, is conducting after action reviews, and is looking for ways to turn your protective measures into new vulnerabilities.

Vulnerability assessment must examine possible weakness that might arise from an installation's responses. Countering terrorist attempts to use our security measures against us requires looking at secondary and tertiary effects of these measures, and assessing how predictable they are. Look at each measure from a terrorist standpoint to determine how a terrorist might turn a measure we implement against us. For example, lining up thousands of military people outside installations while searching all vehicles makes them easily identified stationary targets. Measures that make it difficult to get onto post might also make it difficult to evacuate the post in case of a chemical or biological attack. Our predictability in our responses is a weakness in itself. Terrorists are creative, thinking opponents.

Over the past decade, we have focused much energy on protecting the United States from weapons of mass destruction and from cyberattack. That these have not occurred is not to say that they will not, or that we should not take measures to deter or respond to them. Rather, our focus on these high-tech threats may have diverted our attention from less sophisticated but still deadly means of attack. This is not a matter of scale, but of asymmetric approaches. Deterrence or response in one scenario may be useless or counterproductive in another. Vulnerability assessments must examine a broader range of threats. They need to look not only at the worst case scenario, but at threats that range from high- to low-tech and from simple to complex.

Force protection of our installations will be an important part of our lives for the foreseeable future. We will have to be as creative as our adversary if we are going to be successful. We cannot simply rely on what has worked in the past. A systematic approach to developing PIR, FFIR and EEFI, developed by creative thinkers and targeted against a creative enemy, will help in this mission. *MR*

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A New Kind of War

Secretary of Defense Donald H. Rumsfeld

PRESIDENT BUSH is rallying the nation for a war against terrorism's attack on our way of life. Some believe the first casualty of any war is the truth. But in this war, the first victory must be to tell the truth. And the truth is, this will be a war like none other our nation has faced. Indeed, it is easier to describe what lies ahead by talking about what it is not rather than what it is.

This war will not be waged by a grand alliance united for the single purpose of defeating an axis of hostile powers. Instead, it will involve floating coalitions of countries, which may change and evolve. Countries will have different roles and contribute in different ways. Some will provide diplomatic support, others financial, still others logistical or military. Some will help us publicly, while others, because of their circumstances, may help us privately and secretly. In this war, the mission will define the coalition—not the other way around.

We understand that countries we consider our friends may help with certain efforts or be silent on others, while other actions we take may depend on the involvement of countries we have considered less than friendly.

In this context, the decision by the United Arab Emirates and Saudi Arabia—friends of the United States—to break ties with the Taliban is an important early success of this campaign but should not suggest they will be a part of every action we may contemplate.

This war will not be waged by a grand alliance united for the single purpose of defeating an axis of hostile powers. Instead, it will involve floating coalitions of countries, which may change and evolve. Countries will have different roles and contribute in different ways.

But if this is a different kind of war, one thing is unchanged: America remains indomitable. Our victory will come with Americans living their lives day by day, going to work, raising their children, and building their dreams as they always have—a free and great people.

This war will not necessarily be one in which we pore over military targets and mass forces to seize those targets. Instead, military force will likely be one of many tools we use to stop individuals, groups, and countries that engage in terrorism.
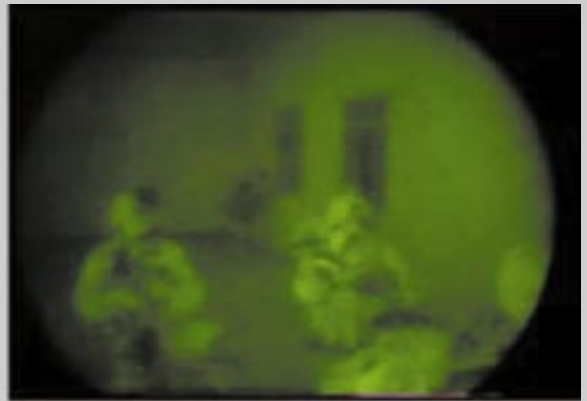

Our response may include firing cruise missiles into military targets somewhere in the world; we are just as likely to engage in electronic combat to track and stop investments moving through off-shore banking centers. The uniforms of this conflict will be bankers' pinstripes and programmers' grunge just as assuredly as desert camouflage.

This is not a war against an individual, a group, a religion, or a country. Rather, our opponent is a global network of terrorist organizations and their state sponsors, committed to denying free people the opportunity to live as they choose. While we may engage militarily against foreign governments that sponsor terrorism, we may also seek to make allies of the people those governments suppress.

Even the vocabulary of this war will be different.

When we "invade the enemy's territory," we may well be invading his cyberspace. There may not be as many beachheads stormed as opportunities de-

nied. Forget about "exit strategies"; we are looking at a sustained engagement that carries no deadlines. We have no fixed rules about how to deploy our troops; we will instead establish guidelines to determine whether military force is the best way to achieve a given objective.

The public may see some dramatic military en-

gagements that produce no apparent victory or may be unaware of other actions that lead to major victories. "Battles" will be fought by customs officers stopping suspicious persons at our borders and diplomats securing cooperation against money laundering.

But if this is a different kind of war, one thing is unchanged: America remains indomitable. Our victory will come with Americans living their lives day by day, going to work, raising their children and building their dreams as they always have—a free and great people.*MR*

"The battle is now joined on many fronts. We will not waver,
we will not tire, we will not falter, and we will not fail.
Peace and freedom will prevail. . . .
To all the men and women in our military, every sailor,
every soldier, every airman, every coast guardsman, every marine,
I say this: Your mission is defined. The objectives are clear.
Your goal is just. You have my full confidence, and you will have
every tool you need to carry out your duty."

President George W. Bush