Space and Power Projection

Commander Dale R. Hamon, US Navy, Retired, and Lieutenant Colonel Walter G. Green III, US Air Force, Retired

RECENT EVENTS have demonstrated our success in a realm that readily combines technological superiority, highly trained personnel and joint operations into a valuable means to extend the power-projection capability of US Armed Forces—that realm is space. Our technological sophistication has opened space to a variety of uses that directly enhance our ability to globally project national power. The unique characteristics of the space environment offer the United States rapid access to otherwise denied areas of the world, and space systems can contribute to supporting multiple regional terrestrial operations in real time or near real time. The military use of space came of age during the Gulf War. As a result of the demonstrated value of space in that conflict, the nations already possessing space capabilities began actively pursuing improvements to their warfighting effectiveness. Nations without space assets began seeking to develop or obtain these force enhancers for their own use. The capabilities that space provides to the modern combat unit are available to anyone willing to buy these services from an increasing number of available competitors. This reality must not be dismissed, else we could find ourselves on the wrong end of space forces employment.

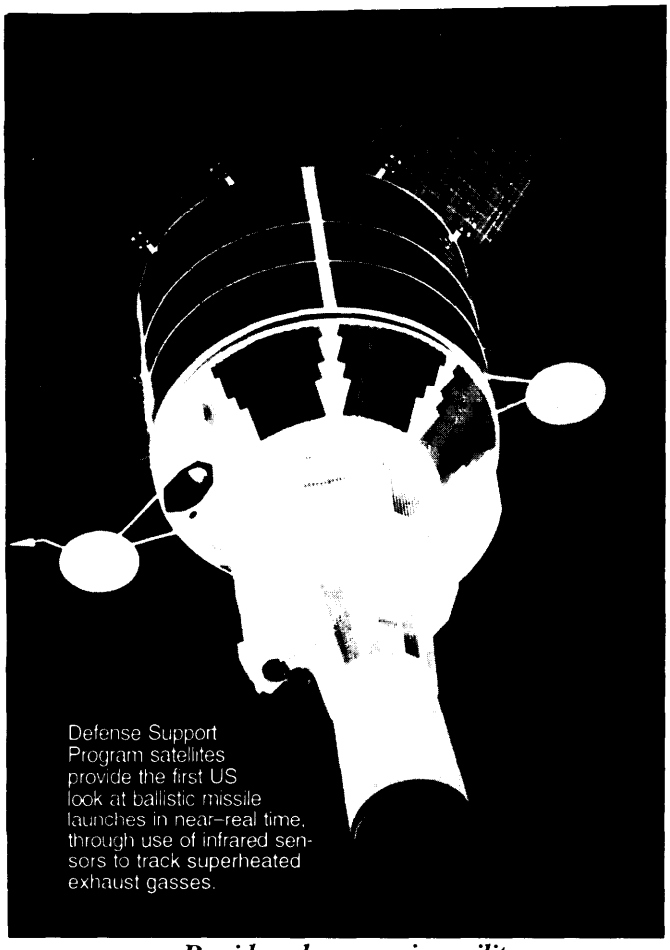
A new world order defines the strategic environment within which the United States pursues its national objectives. These enduring objectives are simple: ensuring survival of the United States as a free and independent nation; fostering a healthy and growing US economy; continuing cooperative relations with allies and friendly nations; and promoting a stable and secure world where political and economic freedom, human rights and democratic institutions flourish. Unfortunately, the instability of our modern world increasingly conflicts with these national objectives.

US national military strategy assigns four tasks to our Armed Forces. We must ensure strategic deterrence, exercise forward presence in critical regions, be able to respond decisively to crises anywhere and at any time and retain the capacity to reconstitute a larger force. . . . [Downsizing] constrains the power available to project into a crisis and stresses our ability to fulfill national objectives. Consequently, it is vital that [we] wisely use our limited assets.

Today's conflicts are no longer bipolar. Instead, the dimensions of conflict are expanding, as economic chaos, nationalism, religious and ethnic disputes and historic rivalries dominate many regions. Future combatants will not be limited to Third World weapons. Rather, any US intervention will face an increasingly sophisticated arsenal. The proliferation of modern weapons reduces the opportunity for easy success in such unpredictable future wars.

Challenges Facing the US Military

The battlefield of the future will be uncertain—we do not know when the next war will start, what the threat axis will be, whom we will



Defense Support Program satellites provide the first US look at ballistic missile launches in near-real time, through use of infrared sensors to track superheated exhaust gasses.

Rapid and responsive military power projection demands timely and accurate reconnaissance, reliable weather monitoring, precise navigation, accurate maps and ample communication linkages for command and control. Growing requirements necessitate a wide variety of space systems that require continual performance improvements made possible by a robust space infrastructure. . . . Space is the high ground we must control.

face or what their capabilities will be. The emerging threat may well ignore traditional approaches to deterrence. At the same time, modern weapons provide even minor nations the capability to achieve political results far beyond the obvious potential of their forces. For example, militarily insignificant Iraqi Scud ballistic missiles were politically significant and socially frightening.

To meet these challenges, US national military strategy assigns four tasks to our Armed Forces. We must ensure strategic deterrence, exercise forward presence in critical regions, be able to respond decisively to crises anywhere and at any time and retain the capacity to reconstitute a larger force if needed.

Implementing this strategy is complicated by the significant downsizing of our force structure. This constrains the power available to project into a crisis and stresses our ability to fulfill national objectives. Consequently, it is vital that our national leadership wisely use our limited assets to ensure success across the full spectrum of conflict.

An ambiguous threat and reduced force structure demand a more efficient means of projecting military power. We must significantly increase the combat effectiveness of our force structure through the synergism of capabilities that provide force multiplication. With the leverage this force multiplication provides, more capability is available to the theater commander to ensure mission success.

One means to achieve force multiplication is through technological superiority. For example, the widespread use of advanced munitions in Operation *Desert Storm* clearly demonstrated the return on US investment in high technology. Limited casualties and focused damage were the direct result. Another force multiplier is training—the high caliber of our All-Volunteer Force leverages combat power disproportionate to the numbers we bring to bear. The concept of joint operations is also proving to be an effective force multiplier. The synchronized use of diverse service capabilities during joint operations increases the overall effectiveness and significantly complicates an opponent's task. Space forces have repeatedly demonstrated force multiplication and are crucial to the achievement of US national security objectives.

Space Assets and Commanders

Given the availability of advanced weapon systems to potential opponents, extensive space capabilities are essential to the effective employment of US forces. Rapid and responsive military power projection demands timely and accurate reconnaissance, reliable weather monitoring,

1st Cavalry Division M2A2s and dismounts during the Gulf War.

Iraqi forces in the Gulf War were limited to known roads in their own country, while coalition forces freely roamed the featureless desert. Precise navigation supports other uses as well: minefield clearance, artillery fire support, assisting US forces in keeping out of each others' fields of fire, precision-guided munitions employment and covert missions. We need to deny this capability to our adversaries in future conflicts while maintaining the utility for ourselves, else we may find a crucial element of our force structure rendered ineffective, or even used against us.

precise navigation, accurate maps and ample communication linkages for command and control. Growing requirements necessitate a wide variety of space systems that require continual performance improvements made possible by a robust space infrastructure. The United States cannot afford to go to war today without full space support. Now, more than ever, space is the high ground we must control.

Space assets are available to US forces due to farsighted US leadership in the research and development of related technologies. We are able to use these sophisticated assets because our government had the wisdom and our industrial base had the resources to make the necessary investments in the future of space. Our forces need not look to foreign suppliers for critical space products, nor are we dependent on the world market to meet our space needs. It is important that the United States maintain its superior space capabilities.

Terrestrial Force Enhancement

Firmly embedded in the promise of space operations are distinct advantages afforded commanders in planning and conducting ground operations. Enhanced capabilities will be indispensable in the areas of reconnaissance, weather monitoring, navigation, mapping and charting and communications.

Reconnaissance. It is essential to success in any military operation that commanders know enemy force disposition, strength and the environment where combat will take place. Space-based reconnaissance elements allow global, timely operations not constrained by sovereignty concerns. The theater commander can enjoy real-time situational awareness in otherwise denied areas. Additionally, the commander must know of any changes within his area of operation to maximize force effectiveness during battle. Space assets provide this needed information to the theater with a level of detail that is useful from joint task force headquarters down to the foxhole. Satellites are available to support battlefield preparation, enemy force assessment, targeting, weapons cuing and battle damage assessment. We now need to provide this wealth of information to the operators as soon as they need it, without undue security limitations, and

in a form best suited to their need and level of operations.

Weather monitoring. Weather–observation assets used by military forecasters literally reduce the fog of war by identifying and monitoring weather phenomena. In many situations, earth–sensing satellites provide the only means of assessing field conditions in support of mission planning before the commitment of forces. During the Gulf War, the Department of Defense (DOD) and commercial meteorological satellite systems were the principal means of acquiring reliable weather data over Iraq. This information was used to determine how best to configure in–theater reconnaissance assets, which precision–guided munitions to employ and when and where a unique–capability force should strike. Also, it would have helped predict movement of chemical or biological agents had they been used by the enemy. The critical data provided by space–based meteorological systems makes our advanced weapon systems more effective and gives commanders the freedom to exploit the weather as a component of decisive action.

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Navigation. Timely, accurate and three–dimensional navigation information from space on a common, worldwide grid reference system solves the age–old problem of the field commander knowing where he is and where he is going. The Global Positioning System satellite constellation enables US forces to maneuver using all–weather, day–night accurate positioning, navigation, timing and velocity data. Iraqi forces in the Gulf War were limited to known roads in their own country, while coalition forces freely roamed the featureless desert. Precise navigation supports other uses as well: minefield clearance, artillery fire support, assisting US forces in keeping out of each others' fields of fire, precision–guided munitions employment and covert missions. We need to deny this capability to our adversaries in future conflicts while maintaining the utility for ourselves, else we may find a crucial element of our force structure rendered ineffective, or even used against us.

Mapping and charting. Earth resource satellites provide the information needed to develop current maps of almost any region in the world to a degree previously unobtainable. For example, maps of Kuwait were over 30 years old and required immediate replacement; space systems allowed us to respond to this need before *Desert Storm* began. However, the US system is limited, and we had to purchase additional images from France to fulfill warfighter requirements. In addition to maps, these resources allowed theater commanders to plan amphibious and airborne operations, track the movement of Iraqi forces and prepare for and practice strike operations. As foreign and domestic satellites are upgraded with extensive multispectral imaging capabilities, they will provide improved and more timely mapping and charting products tailored to the forces they support. It is essential that the United States ensure its lead in this crucial technology to avoid dependence on foreign sources.

Communications. Commanders require real–time, assured connectivity to deployed forces to execute battle plans. One of the lessons of *Desert Storm* was that in–theater communications systems were unable to meet commanders' needs because a modern communications infrastructure was simply not available. However, satellite communications systems have the capacity to handle large volumes of traffic accurately and on time. In the Gulf War, over 90 percent of US communications requirements into, out of and within the theater were supported by military and commercial communications satellites. These links were not targeted by enemy jamming—we

A ground-based electro-optical deep space surveillance system used to track man-made objects in space. The 40-inch telescope searches wide areas for faint, high-altitude objects while the 15-inch telescope searches lower altitudes for objects traveling at faster relative speeds.

A theater commander must know when an adversary's space system threatens his operations and be able to decide on an appropriate response. The current network uses ground-based sensors deployed throughout the world. In the future, we need to field less vulnerable space-based systems to reduce the possibility of foreign interference.

must not expect similar freedom of action in future conflicts. Essential satellite communications capabilities must be available regardless of the level of conflict. This will require a survivable, on-orbit communications network with multiple data links, to include electromagnetic protection. For maximum benefit to our forces, small tactical terminals need to be deployed to link individual units with overhead networks. By using capabilities of both military and commercial satellite communications systems, US forces will be provided connectivity where and when needed.

Ballistic Missile Warning and Defense

It is unlikely the United States and Russia (the Ukraine or China) will fight a nuclear war in the foreseeable future. However, high-tech weapons of all types are available in increasingly alarming quantities in the international marketplace. Proliferation of chemical, biological and nuclear weapons, as well as modern long-range delivery systems constitutes a grave threat to US security interests. Small countries can now arm themselves with weapons of mass destruction. By the turn of the century, well over 30 nations may possess nuclear, chemical and/or biological weapons. Many of them, particularly in the Middle East, are actively shopping for missiles and other delivery systems to extend the reach of their new arsenals.

Warning. The space-based ballistic missile warning function includes sensors that provide timely, worldwide detection, identification, tracking and attack assessment of both strategic and tactical missiles. Space warning assets provide a much larger warning and intercept envelope than ground-based radars, enabling the theater commander to take effective action earlier. In *Desert Storm*, the experiences of the infrared sensors of the Defense Support Program showed a shortfall in capability against the modern

theater ballistic missile with a short burn time.

Defense. In addition to responsive warning, a ballistic missile defense system is required to provide protection against intentional, accidental or unauthorized ballistic missile launches. A layered defense of both ground– and space–based systems needs to be developed and deployed. Our initial capability, as demonstrated in the Gulf War, is the Patriot system. Patriot provided a limited, ground–based point defense and was assisted by space–based assets with launch information and impact point prediction. The next step is to add longer range weapons, specifically designed to counter theater ballistic missiles and provide protection for larger areas. Larger, more capable, ground–based ballistic missile defense systems are required for limited protection of the United States against the larger intercontinental and submarine–launched ballistic missiles. The long–term goal is to add a space–based defensive layer that will extend the coverage umbrella to anywhere in the world with its capability of destroying attacking missiles in the boost, post–boost and midcourse phases.

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Rendering hostile space systems ineffective ensures greater freedom of action for our terrestrial and space forces. Today the United States has no such capability. . . . This shortfall severely limits the range of options available to national decision makers in times of crises.

Space–based warning and responsive defense systems will allow our forces to engage the threat while it is still over the launching country and return the intercepted debris to its originators. A high probability of a successful defense will significantly impact the decision to use such weapons and greatly reduce their potential political leverage. Once a credible, effective defense has been demonstrated and fielded, the United States will be able to discourage nations from acquiring and stockpiling weapons of mass destruction and their delivery means.

Control of the Space Realm

The first step in controlling space is knowing what needs to be controlled. Space surveillance focuses on detecting, tracking and identifying all man–made objects and events in space. A theater commander must know when an adversary's space system threatens his operations and be able to decide on an appropriate response. The current network uses ground–based sensors deployed throughout the world. In the future, we need to field less vulnerable space–based systems to reduce the possibility of foreign interference. Using these resources, the friendly and hostile space orders of battle can be provided to the commander in time to take action to minimize the effectiveness of an enemy space system.

The second component of space control is negation of enemy space systems. Rendering hostile space systems ineffective ensures greater freedom of action for our terrestrial and space forces. Today the United States has no such capability against satellite systems or antisatellite systems, limiting counterspace operations to attacks against the terrestrial infrastructure. This shortfall severely limits the range of options available to national decision makers in times of crises. The United States needs a full–featured set of systems able to neutralize enemy space capabilities while protecting ours. These features include soft kills such as jamming, deception and interference and hard kills that disable or destroy space systems.

Launch. As more space capabilities are integrated into combat operations and training, a reliable and effective launch infrastructure to put

satellites into the proper orbits becomes more critical. In light of rising international competition, the need for cheaper launch operations is even more acute. The congruence of DOD needs for responsive launch and commercial interests in a competitive low–cost launch service demands improvements in our decaying launch infrastructure and the development of new lift vehicles. Current heavy– and light–lift vehicle needs are well met by in–place systems, but these constitute only 18 percent of our requirements. Our supply of medium–lift capacity is sorely lacking, and space employment rests on our nonresponsive, high–cost and decaying launch infrastructure. With a civil, commercial and defense partnership, the United States can operate an affordable and internationally competitive space–lift capability that meets the needs of our nation.

Satellite control. Control mechanisms for telemetry, tracking and commanding our satellite constellations are evolving as an integrated satellite control network. This will reduce duplication of effort and accompanying costs, link all control systems to ensure continuity of operations during crises and provide necessary satellite mobility to support theater operations. Ultimately, the ability to task a satellite and receive vital mission data will move into the theater of operations for direct support systems.

Space is fundamental to implementing a national strategy calling for global commitment; military power projection in regional crises; rapid response under conditions of uncertainty and instability; high mobility with minimized forward presence; and maximum efficiency in achieving operational goals.

The space vantage point provides our forces information necessary for the planning and execution of military operations. In helping to prepare the battlefield, space systems characterize the terrain, weather conditions and disposition of enemy forces. As the crisis develops, space forces assist decisive force employment at critical points. The ability to detect and react to changes on the battlefield more rapidly than an opponent greatly enhances the combat effectiveness of US forces.

Space systems will always be first on the scene. Although silent and unseen, these systems continuously and reliably support soldiers, sailors, Marines and airmen deployed around the world. Because of the growing dependence of our forces on space–based capabilities, we must continue to take the necessary steps to ensure the requirements of the warfighting commanders are fulfilled by the space systems we field. Further, military space initiatives must be closely coupled to civil and commercial efforts to ensure all receive the benefits of advanced technology investments while increasing our national competitiveness in the world market. Only with a focused, integrated approach to space will we be able to operate superior space forces.

Space uniquely provides the US forces essential capabilities that will mean the difference between mission failure and mission success. ***MR***

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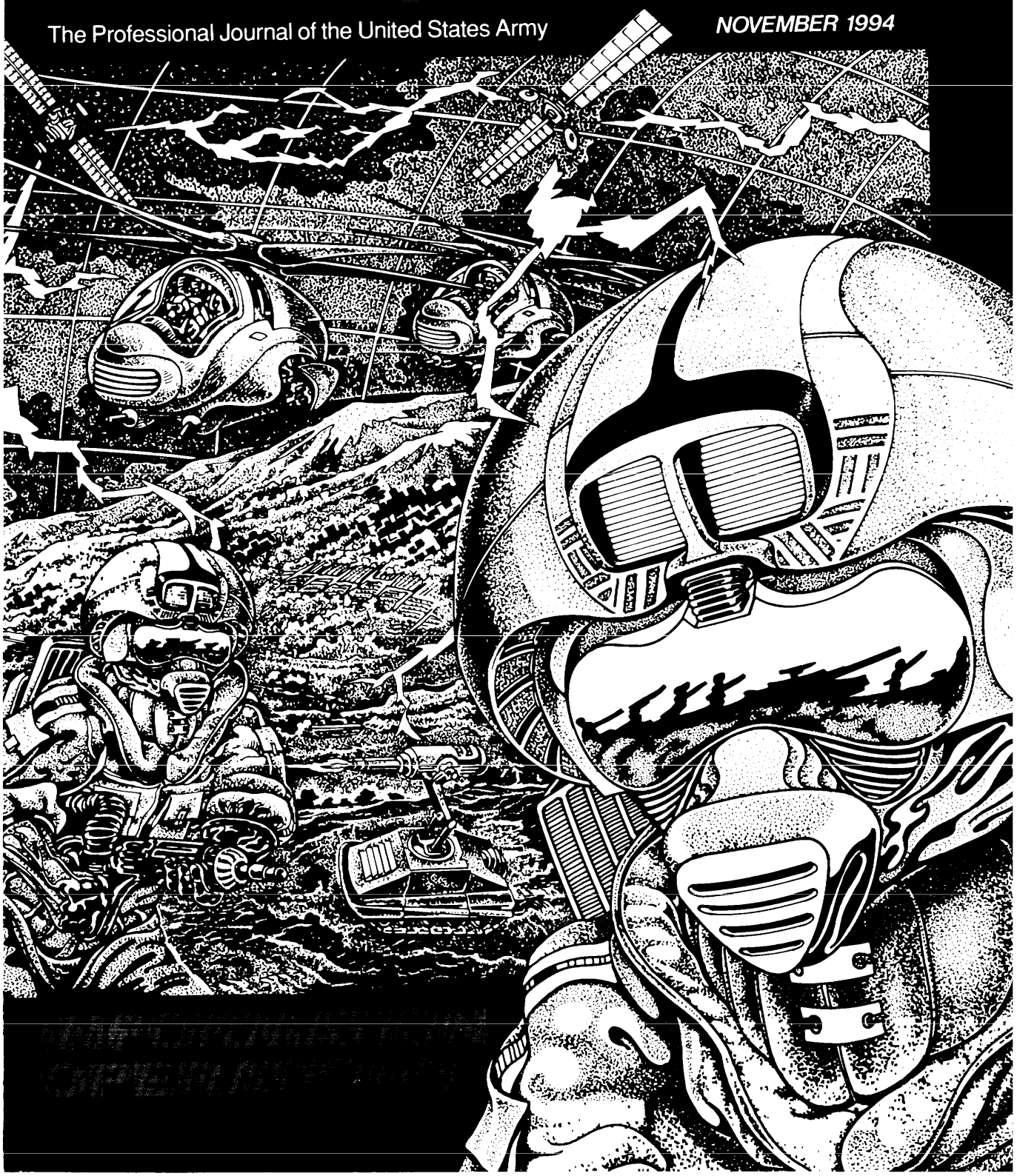

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