The Limits of Space Power

Terrestrial Superiority still Requires Terrestrial Power, but Space makes Winning it Efficient

By Ed Zehner

A time-honored battle of ideas is being waged among and within the military Services. Over the centuries the relative importance of sea power, land power, and more recently air power have been debated and then proven in various wartime and battlefield venues. Over the last 50 years, and particularly in the last 15, Space has become an additional topic of the debate. Born into DoD by the Army, now shepherded mainly by the Air Force but heavily used by all the Services, Space holds a prominent place in the battle of ideas. As Space capabilities and importance grows, we find several historical lessons from the development of airpower that teach us to get as much from Space as possible — and to stop right there. To prevent expecting the unreasonable, a carefully directed development approach is required. I believe the right approach is to use architectures.

Space is a domain, like sea, land, and air, but unlike them it is not heavily populated and not even heavily trafficked, relatively speaking. It has therefore been treated mostly as a mission, rather than a domain or place. Either way, its topography is as important as its terrestrial counterparts in that it is what has been termed "the ultimate high ground." The value of Space can hardly be summarized in this short article, but our knowledgeable readership already knows it provides a high and, when properly protected, relatively safe vantage point for communications transponders, navigation, and timing signal transmitters, ISR sensors, environmental monitoring sensors, and missile warning sensors. These force enhancement capabilities provided by Space-based equipment are the basis, along with miniaturization of computer electronics, for the ongoing revolutionary transformation of modern warfare. We are moving quickly from dependence upon armor and mass to decisive use of information and precision facilitated by effective use of Space.

MG Michael Hamel, the commander of 14th Air Force — operational headquarters responsible for bringing Air Force Space capabilities to their warfighters — said the immediate role of Space is that it sets the conditions under which terrestrial combat is waged. Hamel makes this statement in part to emphasize the need to continue to build Space smartly and to protect the capabilities we have as well as to provide the ability to negate adversary Space capabilities and prevent adversaries from using our own Space capabilities. In other words, he emphasizes the need to do Space control. Clearly, however, his statement is also a reminder of the limitations of Space. Space ultimately does not win the terrestrial battle although it can make winning much more efficient. The point is, winning and holding a land mass requires a land force, establishing sea and air superiority requires sea and air power. All benefit greatly from wise use of Space, but terrestrial superiority requires terrestrial power, and even in this age of transformation, we must never forget it.

While it is simply irresponsible not to get the most we can from Space power, we should keep its limitations in mind. In "The Limits of Airpower," Mark Clodfelter draws similar lessons from the American bombing of North Vietnam. For the airpower case he writes of the consequences of capitalizing on the "tremendous rush of technology" which has resulted in astounding U.S. military airpower but is also applicable to other modern American weaponry.

Clodfelter warns "What [technology] has done … is to create a modern vision of air power that focuses on the lethality of its weaponry rather than on that weaponry's effectiveness as a political instrument." In the Vietnam case "They never fully realized that air power's political efficacy varies according to many diverse elements … " Space capabilities will grow ever more powerful, and as they do, we need to keep in frank perspective their real impact and potential.

This does not mean the right approach is to relegate Space to an unaggressive minor role. The maturing of

Space is a domain, like sea, land, and air, but unlike them it is not heavily populated and not even heavily trafficked, relatively speaking. It has therefore been treated mostly as a mission, rather than a domain or place.

airpower offers another lesson built on the Vietnam heritage. The Honorable Peter B. Teets, Undersecretary of the Air Force and Director of the National Reconnaissance Office, cites the decisive influence of air power in the Kosovo campaign to support "the principle of applying the capabilities of a new medium — not only integration into other existing forms of warfare, but also development of entirely new ones conceivably capable of winning wars on their own." The lesson is to drive Space power into every military endeavor it can support. We need to be creative, forceful, and open-minded about new ways to employ Space, to eventually include potentially lethal and even decisive Space power.

While it will certainly be some time before Space force application could reach the level of lethality that Clodfelter and Teets are discussing, as lethality enters the lexicon of Space weaponry, we should shape our thinking of Space in terms of "apply[ing] capabilities of the new medium to all conceivable forms of war fighting" and in terms of its "effectiveness as a political instrument." Space has not had a particularly strong start along these lines, but it is quickly gaining momentum. DoD should pay close attention to getting the most from Space capabilities and potential capabilities, without creating unrealistic expectations. Fortunately, we have a trustworthy method to do this: architectures.

Architectures are very effective means to describe systems and relationships, and they are being institutionalized in DoD system development, acquisition, and operation. According to a definition based on IEEE STD 610.12, an architecture is the structure of components, their relationships, and the principles and guidelines governing their design and evolution over time. Architectures are not to be arbitrarily structured. To this end, a DoD Architecture Framework directive is nearing approval and specifically describes required structure and content of DoD architectures.

Architectures provide needed structure, balance

Architectures carefully developed and thoughtfully implemented, can guide DoD and national agencies to strike the right balance between applications of Space power in all possible venues, and using it toward the maximum national security and political advantage. Architectures provide the structure to steer Space zealots and their corporate Services and agencies toward maximizing what we can get out of Space while maintaining the maxim that winning terrestrial wars requires terrestrial power.

Systems in the architecture are functionally derived; they are needed capabilities fully compatible with the other capabilities in the architecture. New systems should be built only if they occupy a defined role in the architecture. Developing and integrating this architecture across DoD and IC Space mission areas is the National Security Space Architect mission. The NSSA Space architecture reflects the appropriate balance of Space systems within the system-of-systems, and since the architecture is responsive to OSD, the IC, JCS, and the Services, it is integrated with the larger system-of-systems they develop. In other words, a balanced approach is developed, driven by the National Security SpaceAarchitecture, which is in turn driven by DoD and national guidance. The new CJCSI 3170.01C describes Functional Capabilities Boards which will "Ensure that the integrated architecture(s) (when available) is updated as required and accurately reflects the operational, systems, and technical attributes of the functional area across the range of military operations and through time." We encourage the use of architectures for all functional areas and an overarching architecture specifically developed to describe structure, inter-relationships, and principles and guidelines for development and evolution of functional areas.

Ed Zehner supports the Space and Missile Defense Command Force Development and Integration Center in Colorado Springs, Colo. He retired from the Air Force in 2001 after a tour on the Joint Staff. He commanded two launch squadrons at Vandenberg AFB, Calif., was a satellite operator at Falcon AFB, Colo., and a Minuteman III ICBM launch officer at F.E. Warren AFB, Wyo.