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Key Points

- ◆ The North Atlantic Treaty Organization (NATO) is an alliance enabled by space. NATO operations increasingly take advantage of space, but potential adversaries are seeking to negate that advantage.
- ◆ In Libya, during Operation *Unified Protector* in 2011, satellites helped to acquire targets and attack them with precision. In Afghanistan, satellites help International Security Assistance Force troops map their routes and look over the next ridgeline. Off the Horn of Africa, satellites help NATO maritime forces track shipping and conduct antipiracy operations.
- ◆ While NATO is critically dependent on space, its doctrine and planning have not kept up. NATO doctrine and planning need to evolve in order to preserve the operational benefits afforded by space-based capabilities and to minimize vulnerabilities.

Protecting NATO's Advantage in Space

by Gregory L. Schulte

During the Cold War, space was the private reserve of the two superpowers. But American allies drew great benefits from U.S. investment in space. For the United States and the North Atlantic Treaty Organization (NATO), it was the “high frontier” from which we could support collective defense and project power with near impunity.

Today, space is a shared domain in which we operate together with more and more countries—friends and allies as well as potential adversaries. It is a domain that is increasingly challenged, and the nature of these challenges can be characterized by “three Cs”: congested, contested, and competitive:

- ◆ *Congested*: There are over 1,100 active systems in orbit, and an additional 21,000 pieces of trackable debris. Radio frequency interference is also a concern, with more than 9,000 satellite transporters expected in orbit by 2015.
- ◆ *Contested*: China demonstrated a direct ascent antisatellite capability in 2007 and is developing other capabilities to disrupt and disable satellites. Iran and others have demonstrated the ability to jam satellite signals. Our reliance on space tempts potential adversaries to see it as an exploitable vulnerability.
- ◆ *Competitive*: A total of 11 countries operate 22 launch sites. More than 60 nations and government consortia operate satellites. This not only creates new challenges but also opens opportunities for international cooperation—including within NATO.

A New Strategy for Space

To address these challenges, the U.S. Secretary of Defense and Director of National Intelligence approved the inaugural National Security Space Strategy in 2011.¹ The first objective of the strategy is to strengthen safety, stability, and

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security in space. The second is to maintain and enhance national security advantages that space affords the United States and its Allies.

Three key aspects of the strategy are promoting responsible use of space, operating with Allies and partners, and deterring and protecting against attacks on space capabilities.

"The now-ubiquitous and interconnected nature of space capabilities and the world's growing dependence on them mean that irresponsible acts in space can have damaging consequences for all of us."

—2010 National Space Policy

Promoting Responsible Use of Space. Under the new strategy, the United States continues to lead in promoting responsible use of space. Every day, U.S. Strategic Command (USSTRATCOM) tracks the growing number of objects in space and, when necessary, provides warning to owner-operators in order to help avoid collisions. Over the past year, USSTRATCOM's Joint Space Operations Center provided over 1,300 warnings to satellite operators across the world. USSTRATCOM has been providing these warnings on an emergency basis, but was recently authorized to negotiate agreements for sharing space data on a more regular basis.

The United States is also leading efforts in several fora to strengthen international norms of responsible behavior.² Earlier this year, the United States decided to join with the European Union and other space-faring countries to develop an international code of conduct for outer space activities. A transparent and widely subscribed code could encourage responsible space behavior and single out those who act otherwise, while reducing the risk of misunderstanding and misconduct.

Operating with Allies and Partners. In the past, space was a domain in which the United States operated largely alone or with only a few Allies. Under the new

strategy, we plan to operate increasingly in coalitions, as we do routinely in other domains.

More and more Allies and partners are developing space capabilities, and all our armed forces are increasingly reliant on space. We need to ensure that operations in other domains—land, sea, air—can be effectively enabled by the space assets of individual Allies. Moreover, we need to ensure that we can effectively coordinate the use of these assets in support of combined operations.

Cooperative programs can play an important role. The U.S. Air Force's Wideband Global SATCOM system is a good example. Six partners—four of them NATO Allies—have invested in the system. This increases the size and capacity of the constellation while sharing the expense.

Partnership must also extend to planning and operations. USSTRATCOM is transitioning the Joint Space Operations Center to a Combined Space Operations Center, incorporating those Allies ready to commit space capabilities. Air Force Space Command invited NATO to participate in its recent Schriever Wargame.³ The objectives of the wargame centered on:

- ◆ examining options of how to optimize space efforts from participating Allies and Australia in support of a notional NATO expeditionary operation
- ◆ identifying ways to increase the resilience of space capabilities in a contested environment through expanded international and private-sector cooperation and coordination
- ◆ determining operational challenges associated with defense of space capabilities employed in support of the operation
- ◆ examining the operational integration of cyber into defense of the space domain
- ◆ expanding understanding of the operational benefits of broader international participation in combined space operations.

Approximately 270 military and civilian experts from more than 30 agencies around the country as well

as from Australia and NATO nations participated in the event.

Detering and Protecting against Attacks on Space Capabilities. NATO's Strategic Concept warns about the deployment of technologies that threaten allied capabilities in space.⁴ A number of countries outside the Alliance are developing and fielding capabilities that range from jammers and lasers to direct ascent antisatellite missiles. Some capabilities, such as jammers, are readily available on the commercial market and have been used by countries such as Iran to disrupt commercial satellite broadcasts. The same countries developing counterspace capabilities are also actively developing cyber attack capabilities that could be turned toward space.

Under the new National Security Space Strategy, the United States is pursuing a four-layered approach to deterring attack on space assets critical to national security. The first layer of deterrence is the establishment of norms of responsible behavior. This helps separate responsible space-faring countries from those that act otherwise. The second layer of deterrence is the establishment of international partnerships. This forces a potential adversary to contemplate attacking the capabilities of many countries, not just one. The third layer of deterrence is increasing the resilience of our space-based capabilities and our ability to operate in a degraded environment. Demonstrated to potential adversaries, this reduces the assessed benefit of attacking our space capabilities and thus the incentive to do so. The fourth layer of deterrence is a readiness and capability to respond in self-defense, and not necessarily in space. This further complicates the calculus of a potential adversary contemplating an attack on our space assets.

Resilience is critical to both enhance deterrence and to protect our ability to operate in a degraded environment should deterrence fail. Under the new strategy, resilience is to be incorporated into all U.S. architectures for the full range of space missions, from missile warning to communications.

Resilience can be achieved in many ways: dispersing capabilities across larger number of satellites, aug-

menting national capabilities with the capabilities of Allies, hosting military payloads on commercial satellites, backing up key capabilities with cross-domain solutions, and heightening the information assurance for our space systems.

Strategic Approaches:

- ◆ Promote responsible use of space
- ◆ Provide improved space capabilities
- ◆ Partner internationally and commercially
- ◆ Prevent and deter aggression against space assets
- ◆ Prepare to defeat attacks and operate in a degraded environment.

Protecting Our Advantage Under Budget Constraints

The January 2012 Strategic Guidance for the Department of Defense (DOD) includes operating effectively in space as a key military mission.⁵ The guidance builds on and reinforces the 2011 National Security Space Strategy with an emphasis on:

- ◆ promoting a rules-based international order
- ◆ operating when possible with allied and coalition forces
- ◆ improving resilience and supporting access in an antiaccess/area-denial environment
- ◆ supporting combined-armed campaigns across all domains.

The new Strategic Guidance also foreshadows an era of budget constraints, which are projected to include cuts of almost \$500 billion by 2020. The guidance clearly reflects the need for DOD and the military to adapt in order to proactively address the changing

nature of the security environment and to reflect new fiscal realities.

As DOD develops architectures for future space-based capabilities, affordability will be important. Future architectures will need to leverage commercial and international capabilities and incorporate such concepts as distributed sensors and hosted payloads in order to provide responsive and resilient space capabilities while also reflecting new budget realities.

Cooperative approaches such as the Wideband Global SATCOM system and coalition space operations can help maintain our collective advantage while making the most of individual country investments.

Implications for NATO

Over half of the NATO Allies have space capabilities. While the United States possesses the bulk of these, other Allies have a wide range of capabilities, including space-based Earth observation and radar mapping, space-based communications, and ground-based surveillance of space. These capabilities are increasingly important to NATO operations in other domains.

NATO doctrine and planning have not kept up. A key lesson from space support for Operation *Unified Protector* was the need for improved understanding, integration, and planning at all levels. To make this more of a challenge, Alliance planners must recognize that operations to date have taken place within a space environment that has been relatively benign. NATO must also prepare for future operations when its use of space is actively challenged, whether by direct attacks on satellites, jamming of their signals, or cyber attacks on their command and control.

To benefit fully from space, while protecting the advantage it derives, NATO should:

- ◆ continue to build the expertise and capacity to conduct operations enabled by space
- ◆ ensure that doctrine, requirements, and planning account for the operational advantages

provided by space as well as the risk of a degraded space environment

- ◆ adapt exercises and training to ensure forces can effectively exploit space-based capabilities but still operate successfully in the face of adversary interference.

At a strategic level, NATO is uniquely positioned to bolster deterrence in space. With the Alliance increasingly reliant on space for its collective defense and economic prosperity, an attack on the space assets of any one Ally impacts the security of all Allies. A unified approach to protecting NATO interests in space, to include enhancing the resilience of allied capabilities there, can send an important deterrent signal and complicate the decisions of any country contemplating interference with our space-based capabilities.

“A number of significant technology-related trends—including the development of laser weapons, electronic warfare and technologies that impede access to space—appear poised to have major global effects that will impact on NATO military planning and operations.”

—Active Engagement, Modern Defence

At an operational level, space needs to be reflected in NATO planning and command structures. Space capabilities should be incorporated into Alliance processes for requirements development, force generation, and command and control. A dozen countries contribute space capabilities to International Security Assistance Force operations in Afghanistan; building on this experience, NATO needs an agreed and tested concept to harmonize the use of allied space capabilities in future operations.

At a tactical level, NATO personnel need to be trained and exercised to exploit space capabilities while also operating in a degraded environment. While a “day

without space” might be considered unlikely, NATO exercises should still include such worst-case scenarios. The goal is to “stress” not only allied space operators, but also the aviators, sailors, and soldiers who depend on space, sometimes more than they realize.

“NATO is increasingly reliant on space to support operations. NATO’s doctrine and plans need to be updated to deal with the vulnerabilities of Allied space capabilities to disruptions.”

**—Defense Secretary Leon Panetta,
April 18, 2012**

³The Schriever Wargame, set in the year 2023, explores critical space issues and investigates the integration activities of multiple agencies associated with space systems and services. Schriever Wargame 2012 International Game included international partners from Australia, Canada, the United Kingdom, and, for the first time in its history, country representatives within the NATO Alliance from Denmark, France, Germany, Greece, Italy, the Netherlands, and Turkey.

⁴*Active Engagement, Modern Defence: Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organization* (Brussels: NATO, 2010), 14, available at <www.nato.int/strategic-concept/pdf/Strat_Concept_web_en.pdf>.

⁵*Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Department of Defense, January 2012), available at <www.defense.gov/news/Defense_Strategic_Guidance.pdf>.

Conclusion

NATO is an alliance enabled by space. Alliance doctrine and planning must reflect this reality, and the new challenges of a space environment that is increasingly congested, contested, and competitive.

In updating its doctrine and plans, NATO must take full advantage of the Allies’ individual space capabilities. And it must retain the ability to operate successfully even if these capabilities are contested by future adversaries.

Notes

¹An Executive Summary of the National Security Space Strategy is available at <www.defense.gov/home/features/2011/0111_nsss/>.

²Gregory L. Schulte and Audrey M. Schaffer, “Enhancing Security by Promoting Responsible Behavior in Space,” *Strategic Studies Quarterly* 6, no. 1 (Spring 2012), 9–17.

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