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Air Force Space Command Perspective on Space Deterrence

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The Eisenhower Center for Space and Defense Studies embarked on an ambitious project when they tackled the subject of space deterrence. The end result is a comprehensive report that provides an excellent summary of changes in the strategic space environment, as well as a perceptive analytical framework for assessing deterrence options. The layered strategy – International Norms, Entanglement, Retaliation, and Denial – is an original model that nicely captures vital aspects of space deterrence. Closing out the report are recommendations that are practical and cogent, offering clear steps for improving the deterrent posture of the United States in space.

While one of the most complete studies on the subject yet produced, there exist areas of this complex discussion that are worth further exploration and additional debate. Most notably, the Eisenhower Center’s study does not address actions relating to subnational and nonstate actors and the tremendous impact they could have on national security concerns and economic well being. The study assumes the list of potential actors with the motive and capability to attack the U.S. in space is small, and that the most likely scenario is a state

using space attacks as a precursor to greater engagement in conflict. This approach clouds a critical element of space deterrence: namely, how do we deter the full spectrum of threats to the capability and benefits provided by space, not merely near-peer attacks on space systems themselves?

Subnational and Nonstate Actors

Our experience in war gaming shows space to be an attractive target for a wide range of actors. Terrorists, corporations that may pursue espionage and sabotage, and other states at war with each other – there are many possible scenarios where an adversary damages U.S. assets that are not on the field of battle. Effective space weapons can be acquired with relative ease and low cost. Subnational actors or individuals can build global positioning system (GPS) and mobile satellite communication jamming devices for less than \$7,500 from components on the open market.⁴² The subsequent effect of low-cost weaponry is vastly disproportionate as compared to the potential to damage millions of dollars of equipment and severely hamper U.S. power projection capabilities.

The rise of piracy in other domains suggests the likelihood that the same threat may affect the space domain.⁴³ Space piracy could take the form of stealing satellite communication

The United States Air Force established Air Force Space Command in 1982 with space operations as its primary mission, including command over space forces and nuclear forces. In 2008, the Air Force decided to place Air Force Cyber Command as a Numbered Air Force within Air Force Space Command and to establish a new command for nuclear forces – Global Strike Command. The opinions and conclusions expressed in this commentary are those of the authors, and do not necessarily reflect the views of Air Force Space Command, the Air Force, the Department of Defense, nor any other agency of the United States Government. Address correspondence to: Kurt Neuman, (719) 554-9128 (telephone), kurt.neuman.ctr@peterson.af.mil (e-mail).

⁴²See “Backyard Satellite Jammers Concern U.S. Air Force,” *ABC News in Science, Space and Astronomy*, 25 April 2000, http://www.abc.net.au/science/news/space/SpaceRepublish_120537.htm (accessed August 2009).

⁴³Kristen Chick, “Piracy ‘Surge’ Off Somali Coast,” *Christian Scientist Monitor*, 7 April 2009.

bandwidth or jamming a communications signal with the potential to inflict heavy costs on commercial providers; furthermore, just like pirates at sea, space pirates could extort ransoms from these companies to stop the attacks. The proliferation of low-cost technologies and the knowledge to use them in a potentially harmful manner make space piracy a real possibility.

In addition, attribution remains extremely problematic and it is likely that subnational actors would assume they could inflict significant harm without verifiable detection. In China, for example, the controversial Falun Gong spiritual group successfully jammed television broadcasts on multiple occasions, with one outage lasting eight days. During this time they were able to transmit propaganda messages over the hijacked communications satellite, including videos denouncing the government. The source of the jamming was never discovered.

The Eisenhower Center study also does not consider the possibility of a subnational attack on terrestrial-based space architecture. The significant cost of building, maintaining, and operating ground facilities often drives the decision to centralize the operations of multiple space systems into consolidated centers. Although such decisions decrease cost, they sacrifice survivability and increase susceptibility to attack. Ground antennas are often in remote locations, geographically spread across the globe, and difficult to secure. These factors make the ground architecture a tempting target and the U.S. must consider how it could deter an attack on these assets.

Even the proposed strategy of entanglement could be a high motivational factor for a nonstate actor. In general, the goal of extremist groups, such as al Qaeda, is to disrupt Western influence and harm

industrialized states. The economic interdependence of developed states may offer an attractive target at a disproportionately low cost.

The significance of such actions to U.S. interests is that even a persistent harassment campaign could have an impact to national security and economic well-being. As is often noted, over 80% of US military satellite communications in theater is carried over commercial satellites.⁴⁴ U.S. banking and transportation systems are heavily dependent on GPS capabilities. Even something as seemingly innocuous as a single individual on a corporate sabotage campaign could result in widespread national economic and global impacts. When considering terrorists that may attempt to systematically harm the U.S. economy and national security, the repercussions could be even greater.

The conventional wisdom is that most nonstate actors cannot be deterred as they hold little of value beyond extremist ideology. However, some would argue that “irrational” actors can be deterred with a holistic approach considering all elements of national power. As Lani Kass explains, “the lack of readily apparent pressure points does not mean nonstate actors are unable to weigh costs and benefits, it simply means new pressure points need to be discovered or developed.”⁴⁵ Once found, the appropriate capabilities coupled with manifest intent must be applied, creating perception in the minds of nonstate actors that costs outweigh benefits – in classical deterrence theory fashion.

⁴⁴*World Demand for Commercial Satellite Communications by the U.S. Government and Military Markets* (Frost and Sullivan, Research and Markets, April 2009). For this report refer to: <http://www.researchandmarkets.com/reports/998169> (accessed August 2009).

⁴⁵Lani Kass, “Rethinking Deterrence,” *High Frontier 5*: 2 (2009): 20, www.afspc.af.mil/shared/media/document/AFD-090224-115.pdf (accessed August 2009).

Cooperation and Military Entanglement

The authors provide an outstanding discussion of economic, technological, and physical entanglement, but further examination can be focused on “military entanglement.” The Wideband Global Satellite (WGS) system provides a real-world example. In return for a percentage of the system’s bandwidth, Australia provides funding for one additional satellite. In this case, an attack on the U.S. portion of WGS would equally be an attack on Australia as well. It is not clear whether this improves the deterrent posture of the U.S., but the development and use of common satellite communications standards, protocols, and equipment will certainly make for a more effective and ready coalition force, which, in turn, contributes to the deterrent calculus.

Military entanglement and an effective international governance mechanism could also provide leverage to quell potential conflict prior to escalation, communicate the consequences of irresponsible behavior, and demonstrate a credible threat of repercussion. If sufficient international support was garnered in a space-related coalition, responses could be expanded to the extent of cooperative global denial of access to space services (international launch facilities, industry and manufacturing capabilities, global sensors, and space debris collision analysis, etc.) and the multitude of benefits space provides.

In addition to traditional engagement with our allies, there may be deterrent value through purposeful entanglement with those states generally considered to be adversaries. For example, sharing transponders on a commercial communications satellite with Iran or North Korea may deter those countries from jamming attempts to avoid interference with their own signal. Furthermore, the pervasiveness of GPS equipment in foreign

military systems is another example of military entanglement, as other states may be reluctant to jam signals that would degrade their own capabilities. Providing assurances for GPS signal availability to our friends and allies will discourage the development of competing systems, while remaining ambiguous with potential adversaries increases the U.S. space deterrence posture.

United States Industrial Base

Industrial base concerns are briefly mentioned in the report; however, a more in-depth examination of the relationship to deterrence is beneficial. Currently, International Traffic in Arms Regulations (ITAR) limits the exportation of sensitive satellite technology.⁴⁶ While these provisions were intended to protect U.S. technological advantage, they have eroded U.S. competitiveness in foreign markets and provided a catalyst for development of foreign space manufacturing capability.⁴⁷

The U.S. must foster greater dependence on domestic manufactured goods, while continuing to protect those “crown jewels” of highly advanced technological innovation. The need to strengthen the U.S. industrial base is a common thread that runs through all four layers of the study’s deterrence model. The consolidation of the U.S. aerospace industry resulted in fewer companies competing for fewer contracts, and employing many less engineers and scientists. Recent studies have gone so far as to say that American defense and aerospace companies are quickly approaching a day when they can no longer

⁴⁶Congress (U.S. House) passed legislation (Foreign Relations Authorization Act for 2010 and 2011) that would ease export restrictions and provide the Obama Administration authority to remove commercial satellites from the U.S. Munitions List. The bill waits (as of August 2009) Senate consideration.

⁴⁷Thomas Young, et. al., *Health of the U.S. Space Industrial Base and the Impact of Export Controls* (Center for Strategic and International Studies, February 2008).

deliver the kinds of combat systems needed by the military.⁴⁸

Reduction in the number of space experts and restrictions in export controls have also led to difficulty in maintaining effective production in the foundational parts and supply sectors of the Aerospace/Defense industry. The second-tier and third-tier vendors have been particularly affected, driving some sources of critical parts to be manufactured overseas.⁴⁹ Numerous instances of substandard parts have impacted delivery schedules, resulting in higher program costs and delays. A weak industrial base tends to discount perceptions that the U.S. will have the ability to act unilaterally in space in the future, leading to a weak deterrent posture. Meanwhile, bolstering the industrial base sends a clear signal that the U.S. will be the long-term leader in innovation, technology development, and space expertise.

Counter-Value Strategy

In the future, it will be necessary to develop a more holistic approach to space deterrence that leverages the complete set of national capabilities – economic, diplomatic, legal, social, information, and conventional military forces. Allowances must be made for deterrence across a complete spectrum of threats, from radical subnational actors to nuclear armed states. A range of options is needed, as solely an in-kind response to an attack on U.S. space systems is unlikely to be in our best interest. In the case of subnational or nonstate adversaries, they would most likely not have any space assets of their own

and the US would not be able to retaliate in a similar manner.

Instead, the U.S. must develop some form of “counter-value” strategy for retaliation that takes advantage of all instruments of national power. The study only briefly mentions the possibility of responding in terms of non-space capabilities, when in fact a non-space response would be the most probable starting proposition. Michael Krepon presents an excellent argument for conventional strikes in retaliation to an attack on U.S. space systems.⁵⁰ The arguments for whole-of-government responses tailored to each adversary must move to the forefront of thinking as they represent the most likely scenario when confronting hostile actions in space.

Conclusion

The complexities of today’s world have exposed the limitations of traditional deterrence theory. The breakdown of bipolarity and the subsequent dispersion of global power centers, to include the resurgence of nonstate and subnational actors, have multiplied both the objects and the mechanisms of deterrence. While it is true that the essence of deterrence has not changed – it is still the product of capability, will, and perception – the new multiplicity of variables have rendered old strategies inadequate.⁵¹

Deterrence strategy is often more art than science. In the case of space deterrence, failure could have wide-ranging and highly destructive effects. This relationship points to

⁴⁸See the following: “The Unseen Cost: Industrial Base Consequences of Defense Strategy Choices” (Aerospace Industries Association, July 2009), http://www.aiaerospace.org/assets/report_industrial_base_consequences.pdf (accessed August 2009).

⁴⁹Ibid.

⁵⁰Michael Krepon, *Space Assurance or Space Dominance: The Case Against Weaponizing Space* (The Henry L. Stimson Center, April 2003), <http://www.stimson.org/pub.cfm?ID=81> (accessed August 2009).

⁵¹Lani Kass, “Rethinking Deterrence,” *High Frontier* 5: 2 (2009): 20.

the importance of continued debate and in-depth examination of the topic. The study and work of the Eisenhower Center provide a solid foundation for this debate and a strong analytical framework for further analysis.