

Protecting U.S. Space Systems

The Case for Weaponization

a. The Rumsfeld Space Commission Report

The National Defense Authorization Act for the fiscal year 2000 established a Commission to Assess National Security Space Management and Organization. It was chaired by Donald Rumsfeld. The report came to be known as the Rumsfeld Commission report (or alternatively as the Space Commission's report). The Commission's report was published in January, 2001, when Rumsfeld was about to take office as the U.S. Secretary of Defense. Below is a summary of its key findings.

In accordance with its charter, the Commission concentrated on military and intelligence space operations and asserted a critical need for "national leadership to elevate space on the national security agenda." It also stated its unanimous conclusions that "the United States has an urgent interest in promoting and protecting the peaceful use of space...."³

The Commission concluded that the relative dependence of the United States on space made its space systems a potentially attractive target for attack. It warned that such an action during a crisis or conflict should not be considered an improbable act and recommended that the nation must strive to reduce its vulnerabilities, if it were to avoid what it called a "Space Pearl Harbor."⁴

It concluded five key areas needed immediate attention. First, space should be made a national security priority. Second, disparate U.S. space activities should be merged, especially those of the DOD and the intelligence community. Third, there should be better cooperation between the Director of the Central Intelligence Agency and the Secretary of Defense. Fourth, conflict in space is

inevitable; it said that since every medium-air, land, and sea has become an arena for conflict, space will be no different. Given this virtual certainty, "the United States must develop means both to deter and to defend against hostile acts in and from space." Finally, the Commission urged better investment in science and technology and expansion of the technical talent pool in order to maintain leadership in space.⁵

The Commission's report also pointed out that the United States was facing competition in space and warned against potential attempts by other nations to restrict U.S. space activities through international regulations.⁶

The Rumsfeld report recommended that the United States should vigorously pursue space capabilities to ensure that the *President will have the option to deploy weapons in space...*⁷ It followed up this recommendation by arguing that a deterrence strategy for space must be supported by a greater range of space capabilities, *...including weapons systems that operate in space and that can defend assets in orbit...*⁸

The Commission further identified a number of areas that need improvement, including defense and power projection in space. It argued further for the U.S. military to carry out "live fire" exercises in space to gain proficiency in space operations and to test new capabilities.

The Commission urged the United States to assume leadership in shaping the international legal environment governing space. It emphasized that *"To protect the country's interests, the United States must promote the peaceful use of space."* Further, it said that the United States should also *"protect the rights of nations to defend their interests in and from space."*

Regarding testing of weapons in space, the report reiterated that *"there is no blanket prohibition in international law on placing or using weapons in space, applying force from space to earth or conducting military operations in and through space."* It said further that United States and most other nations interpret "peaceful" to mean "non-aggressive", which comports with customary international law allowing for routine military exercises in outer space, much like such activities on the high seas and in international airspace. However, the Commission felt that the United States needs to engage the international community to develop appropriate *"rules of the road"* for space.¹⁰

Finally, the Commission urged the United States to be cautious about agreements that are for a narrow purpose, but which, taken in the context of other treaties or regulations, may have the unintended consequences of restricting future space activities.

b. Space Weapons-Related Programs¹¹

- o **Near Field Infrared Experiment (NFIRE)** is a satellite designed to collect data to assist in distinguishing between a rocket body and a rocket plume. Recently the House voted to cut all funding for NFIRE, while the Senate has recommended keeping \$68 million to continue the program. NFIRE is tentatively scheduled to be launched into LEO in April 2005. In addition to conducting tracking tests, the NFIRE would contain a kill vehicle that will be fired at a test missile. For this reason NFIRE is viewed as crossing an important threshold for the United States, since it is a potential space-based anti-satellite weapon. The NFIRE onboard kill vehicle was stripped of the guidance needed to make it effective anti-satellite weapon. Nonetheless the Panel believes firing a kinetic kill vehicle in space, even on a test basis, would cross an important threshold and recommends canceling the program.

- o **Space-Based Interceptor Test Bed** is funded to develop and test plans for a lightweight space-based kinetic kill interceptor. The Missile Defense Agency (MDA) originally asked for \$119.5 million in FY 2005 to fund the test bed but received only \$10.5 million. Most of funds were redirected to land- and sea-based missile defense programs. The Panel recommends canceling the Space-Based Interceptor Test Bed in favor of sea- and land-based missile defense.

- o **Space-Based Laser** was formally cancelled as a program in 2002. The program was part of a Missile Defense Agency effort to test whether directed energy weapons could be used to destroy ballistic missiles from space. While this particular program has been cancelled, a number of directed energy initiatives remain scattered in various other programs. While the Panel feels that continued research into advanced laser capabilities is reasonable, it recommends that no space-based lasers be deployed.

- o **Space-Based Infrared Systems (SBIRS)** consist of a number of different space tracking systems designed to enhance space-based missile warning, missile defense, battlespace characterization, and technical intelligence. Though these programs are currently over budget, the Panel feels that developing advanced space situational awareness is an important step toward ensuring the security of the United States. The Panel recommends that future programs

should concentrate primarily on space surveillance and situational awareness, as opposed to enabling space-based missile defense, which the Panel concludes runs counter to the strategic interests of the United States.

c. Selected Arguments for Weaponization

An Excerpt from *Space-based Missile Defense: Has its Time Come?*¹²

Gregory Canavan is a well-known advocate of the space-based missile defense concept known as the Brilliant Pebbles, which consists of orbiting platforms hosting light-weight interceptors. The interceptors are designed to home-in on and collide with incoming ballistic missiles in the boost phase. Canavan was invited by the FAS to address the Panel, but declined the invitation. Henry Cooper, another well known advocate of space-based missile defenses, was scheduled to address the Panel, but could not do so due to a schedule conflict.

We decided to include the following brief remark by Canavan on space policy. He was asked: "If you were the Secretary of Defense, what space policy would you recommend?" His answer concurred with the Rumsfeld Commission report. He said that the statements included in the report were tantamount to policy, that the United States has legitimate needs for space; that it should be free to address those needs; that it should be free to protect access to space and its assets in space, civilian as well as military.

He also said that he believed that the United States was on the verge of recognizing that it has a responsibility in space which is very much like the one U.S. Navy has executed to maintain order on the high seas. "Taking that principle into space, we need to recognize that space is a vital area in which we have real interests; an area in which we are willing to cooperate with other countries that share our stewardship of space."

A Summary of *Space Weapons: Refuting the Critics*¹³ The author Steven Lambakis is a leading proponent of weaponizing space. Below is a summary of his arguments excerpted from one of his published articles.

Lambakis begins by asking a rhetorical question: Should space be treated any differently from the land, sea, or air? He answers in the negative by stating that in his view, despite physical differences between the earth and space

environments, there should be no difference from the point of view of policy and strategy. He also says that whether or not the United States chooses to put weapons in space, it is inevitable that some other country would.

He refutes the case against weaponization by challenging the validity of some tacit assumptions made by opponents. For example, he notes that opponents say space combat would be destabilizing. Lambakis counters this assumption by saying that there is no way of knowing whether placing weapons in space would be destabilizing since we have no experience in space warfare. He asks why shots in space would be any more harmful than shots on earth. He notes, for example, that it is not self evident that a sudden loss of a communications satellite would precipitate a wider-scale war.

Lambakis also finds fault with opponents' wish to "draw a line in space;" he argues that such a line is strictly conceptual. Nothing in the tactics and strategy of war-fighting nor the logic of deterrence says there must be such a line, he adds. The example of Soviet efforts to develop the MIRV was a case in point, he says. Many people argued at the time that the Soviet MIRV nuclear weapon was a direct response to the U.S. action in developing such a weapon. But Lambakis writes that the Soviets had embarked on the MIRV program on their own and would have exploited their innovation irrespective of the U.S. action. Could we stop the historical progression of weaponry at the edge of the earth, he asks. It is a political decision, he contends, adding that the absence of universal political will means there is no practical way to enforce any treaty or law.

As for critics' assertion that the United States will lose international support if it deploys space weapons, Lambakis offers the following rebuttal. He says that when the stakes are high, the United States must act in self-defense and that our allies will judge U.S. actions appropriately. For example, despite widespread anti-Americanism, the United States was able to put together a large coalition to fight the Gulf War in 1991.

Again, he calls such widely held assumptions as "ASATs are destabilizing" or "space must remain a sanctuary" as old-fashioned dogmas that should not stand in the way of implementing new security policies. He referred especially to Ballistic Missile Defense, which he says ought to be viewed in the "broader context of space power."

Finally, he adds an important caveat to his arguments for weaponization by making the following statement: *"Should military requirements warrant and cost permit, space weapons could be invited to join the rest of the arsenal...."*

Alternatives to Weaponization

a. Mitigating Vulnerabilities

A broad set of U.S. space vulnerabilities can be addressed by enhancing the robustness of critical space systems. This can be done by ensuring redundancy, utilizing multiple orbits and developing quick launch capabilities to replace lost satellites.

To address the threat posed by space mines, an international treaty governing the "rules of the road" for space should be established thus providing more lead time to respond to a hostile action. Improved space surveillance would greatly reduce the possibility of undetectable space mines fielded by a potential adversary.

All military satellites, particularly those in LEO, should be hardened against radiation, as suggested by the 2001 Defense Threat Reduction Agency study, "High Altitude Nuclear Detonations (HAND) Against Low Earth Orbit Satellites (HA-LEOS)."

b. Has Deterrence Changed?

The stand-off between the former Soviet Union and the United States was the hallmark of the Cold War. For the United States, this unified threat scenario has been replaced by a diffuse set of threats from a few less militarily powerful nations. These new threats are militarily asymmetric as opposed to the relative parity of the Cold War stand-off.

The Cold War was characterized by deterrence, which discouraged both superpowers from preemptively attacking each other. Huge nuclear arsenals on either side ensured that significant forces could survive a nuclear first strike by the other and then deliver a devastating retaliatory strike. As unsettling as this mutual deterrence was, attempts to escape the situation were judged not only to be

impossible but also to increase the danger. This realization was a key justification for the Anti Ballistic Missile Treaty of 1972, which prevented the fielding of missile defenses that could potentially undermine the retaliatory capability that was seen as integral to preventing catastrophe.

Some have argued that the concept of deterrence is no longer valid because the leaders of rogue states may not be rational. Even if they are hopelessly mismatched in military strength, they may strike out in unpredictable ways without fearing the consequences of their actions. This argument was one of the factors in the U.S. decision to withdraw from the ABM treaty.

Even if fielding space-based missile defenses is not as destabilizing to deterrence as it once could have been, the Panel maintains that the United States should avoid deployment because of the negative repercussions they could have on U.S. space security. The Panel feels that the overwhelming military power of the United States remains a powerful deterrent against states of concern.

It is feared that North Korea, which may have a small arsenal of nuclear weapons but has no satellite assets to lose, could detonate a nuclear weapon at high altitude to inflict a large amount of damage to U.S. satellites. This scenario is invoked by some as a motivation to field space-based missile defenses.

The Panel feels that, even for a country such as North Korea, the likely retaliatory strike from U.S. forces is the principal and best deterrent against an attack on U.S. satellites. The Panel recommends as a better strategy for removing this threat, that the US satellites in LEO are radiation-hardened, that the United States have the capability to strike North Korea's liquid-fueled rockets before they are launched, and that it pursues effective and tested land- and sea-based missile defenses.

The United States is not entirely unprepared for the effects of a high-altitude nuclear explosion (HANE). Nuclear response planners during the Cold War prepared for a Soviet first strike that included an "EMP lay-down," another term for a high-altitude nuclear explosion. Consequently, much care has been taken to minimize the vulnerability of military assets in space and of the supporting infrastructure on the ground from the electromagnetic pulse effect. Survival of military satellites in a nuclear environment is a routine requirement for both critical infrastructure and equipment.

c. International Rules of the Road for Space

The Panel was unable to examine this topic in detail, but feels that it is urgent for the United States to start a dialogue with other nations in order to establish rules of the road for space. The panel therefore finds itself in agreement with the Rumsfeld Commission's recommendation that *"the U.S. must participate actively in shaping the space legal and regulatory environment."*

A good start to developing a useful space treaty can be found in a series of studies undertaken by the Canadian Ministry of External Affairs and International Trade between 1987 and 1991. One of the reports it published, which is entitled "Satellites Harming Other Satellites", focused narrowly in assessing the harm that one satellite can do to another.¹⁴ It also explored ways in which to make "keep out zones" in space workable and cautioned against overly simplistic models.

The panel believes that the United States should conduct detailed technical studies to define the parameters of a workable space treaty. Verification of treaty compliance will not be complete, but having an internationally approved non-proliferation regime that allows for intrusive inspections on the ground, at launch sites, and possibly in orbit, will go a long way to reduce the threat posed by space mines and allow satellites to coexist peacefully.

d. Improve Space Surveillance

One of the United States' highest priorities should be to establish a fully space-based network of satellites dedicated to tracking space objects. The recent addition of a space-based sensor to the NORAD space-tracking network has remarkably improved space awareness. Given the importance to the U.S. economy of communications satellites, this system should have the explicit requirement of scanning the entire space environment out to geostationary orbit at least once every 5½ hours, the time it takes for the transfer from a low-Earth "parking" orbit to a geostationary orbit. Such a system was analyzed by the Congressional Budget Office in 2000 and estimated to cost approximately \$550 million over ten years, including operating costs.

Organizational changes are just as important as developing a new constellation of space-surveillance assets. Currently, the U.S. space surveillance

network is tied into the U.S. early-warning system. There is, therefore, a prudent reluctance to introduce new technologies (it took seven years to approve the space-based sensor currently used in the NORAD system) into the space-surveillance network. But in light of the change possible in space weapons, any new system must be able to update quickly and should therefore be separated from the system that triggers a U.S. nuclear response. Separating such a space system from our nuclear trigger would also allow the U.S. to share its observations with other countries, if such sharing is determined to be beneficial.