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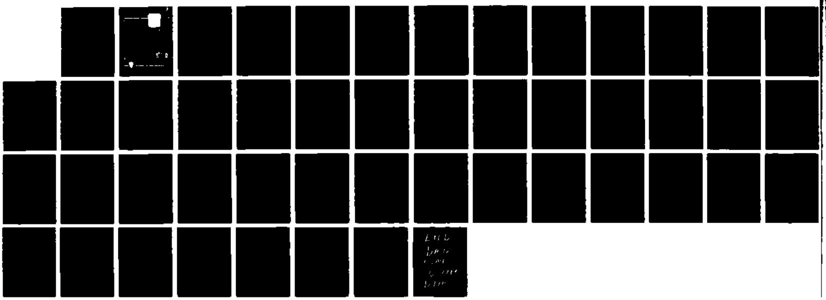

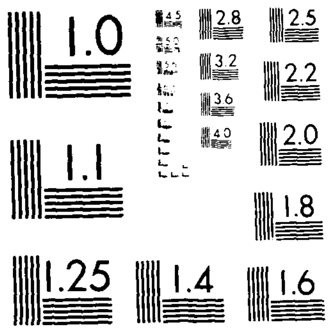
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STUDY PROJECT

WHAT TO DO ABOUT ASAT?

BY

Colonel Elvy Pettit, Jr., USAF

29 February 1988

U.S. ARMY WAR COLLEGE, CARLISLE BARRACKS, PA 17013-5050

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Although the Strategic Defense Initiative currently dominates the military space issue scene, the development of an anti-satellite (ASAT) program is another ciritical issue that must be reckoned with. This study addresses several of the outstanding questions, issues, and concerns about ASAT, including its rationality, military essentiality, impact on arms control pursuits, and relationship with Ballistic Missile Defense (BMD) initiatives. The purpose is to highlight the diversity and significance of the issues and opinions, and demonstrate the need for immediate and serious discussion and

resolution.

USAWC MILITARY STUDIES PROGRAM PAPER

WHAT TO DO ABOUT ASAT?

AN INDIVIDUAL STUDY PROJECT

by

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29 February 1988

ABSTRACT

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WHAT TO DO ABOUT ASAT?

CHAPTER I

INTRODUCTION

> Anti-satellite weapons (ASATs) have become a key point of contention in the debate over American defense policy.[1]

> The leading edge of the arms race in space is antisatellite weaponry.[2]

> Whether the United States should proceed with the development of antisatellite weapons is one of the most pressing and consequential defense issues facing the nation.[3]

> ASAT technology is infinitely simpler than "Star Wars" technology, and the development of ASAT systems is at a critical stage. The decision about whether to proceed is urgent.[4]

These quotations from current and contrasting literature on US space efforts attest to the significance and contentiousness of ASAT development. Although the Strategic Defense Initiative draws the majority of space-related headlines today, ASAT's potential and the outstanding and unresolved issues surrounding it demand immediate attention, too.

The purpose of this study is to present some of the leading issues, concerns, and questions related to ASAT development. Conclusions or recommendations relative to each are not included; rather, the intent of this paper is to highlight the controversy and import of the issues and convey the need for further national discussion and resolution. Background material for this study has been drawn entirely from unclassified, and publicly available, resources.

An overview of existing space satellite and ASAT systems will first be presented to set the stage, and will be followed by the exploration of major issues categorized into four themes: the weaponization of space; the military utility and implications of ASAT; the BMD/ASAT relationship; and the implications of ASAT to arms control pursuits.

ENDNOTES

1. Aspen Strategy Group, Anti-Satellite Weapons and U.S. Military Space Policy, p. IX.

2. John Tirman, ed, The Fallacy of Star Wars, p. 30.

3. Paul Stares, Space and National Security, p. IX.

4. Robert Bowman, "Arms Control in Space: Preserving Critical Strategic Space Systems Without Weapons in Space," in America Plans for Space, p. 120.

CHAPTER II

AN OVERVIEW OF SATELLITE CAPABILITIES AND ASAT SYSTEMS

This chapter will present a general overview of current space satellite and ASAT systems, addressing their missions, capabilities, and operating characteristics. It is intended to provide background information as a framework for the follow-on discussions on ASAT issues.

SATELLITES

Since the launch of Sputnik in 1957, space satellite capabilities have markedly progressed, and satellite use has significantly proliferated. Today, satellites perform many essential national security missions that include the following:

Surveillance: Space-based surveillance systems provide world-wide coverage using photoreconnaissance satellites, signals intelligence, and ocean reconnaissance satellites. The first group provides high resolution target photography; the second monitors military communications, radar frequencies, and ballistic missile telemetry data; while the third specifically locates and tracks naval shipping.

Early Warning and Assessment: These satellite systems use infrared sensors to detect ballistic missile launches and nuclear explosions. They assist in monitoring compliance with test ban agreements and could provide battle damage information in the event of war.

Communications: Satellites provide efficient, speedy, and inexpensive military communication support. More than two-thirds of the US long distance military communications are provided via satellite links.[1]

Navigation: Space-based systems provide unprecedented positional accuracy that enhances force projection as well as target acquisition capabilities.

Meteorology: Satellite weather coverage provides timely and detailed forecasting and real time weather information. Visual, infrared, and microwave sensors measure precipitation, plot wind speed and ice formations, and determine the impact of atmospheric conditions on radar and high-frequency communications.

Oceanography: Special satellite sensors detect ocean fronts, wind speed and direction, age and thickness of ice field formations, and sea surface temperature--all valuable information for naval operations.

Geodesy: Special satellite systems acquire precise data on the size and shape of the earth's surface and its gravitational fields. This information is essential for ballistic and cruise missile accuracy.

Satellites are usually launched into one of four broad categories of orbits, principally determined by the satellite's mission, the launch location, and the satellite's size and available booster thrust. Low earth orbits (LEO), from about 150 to 1500 KM and roughly circular in shape, are ideal for photoreconnaissance, meteorology, and geodesy missions; geosynchronous orbits are circular, high-earth orbits (HEO), at about 36,000 km and provide excellent platforms for signal intelligence, early warning, and communications; Molniya orbits are highly elliptical, about 400 km at perigee over the southern hemisphere and 40,000 km at apogee over the northern hemisphere, and are used for signal intelligence, early warning, and communications. (They are employed principally by the Soviets in lieu of HEO because of the extreme northern latitude of their launch sites); and semi-synchronous, circular orbits at about 20,000 km that are well suited for navigation systems.

Generally, the US satellite program has been characterized by an economy of launches employing relatively lightweight but sophisticated, multi-functional and durable payloads positioned in optimum mission orbits. In contrast, the Soviet program has had four to five times as many launches, deploying heavier payloads that are less sophisticated and durable. The differences are due, in part, to the disparities in geography, geometry, technology, and engineering styles between the nations.[2]

There were approximately 100 Soviet and 60 US military satellites programmed for orbit by the end of 1987.[3] About three-quarters of the Soviet total and one-third of the US total are in LEO or Molniya orbits. This is mentioned because

LEO and Molniya orbits are vulnerable to current ASAT capabilities, while HEO satellites remain outside ASAT range.

ANTI-SATELLITES

The development of dedicated anti-satellite weapon systems has been pursued by the United States and the Soviet Union since the late 1950's.[5] However, the current US effort began in 1977, while the current Soviet program began in 1968. As a result of this head start, the Soviet Union has developed an operational ASAT system that has been tested at least 20 times, while the current US effort is still in its early testing phase.

The Soviet ASAT system consists of a high thrust SL-11 booster that launches a co-orbital interceptor satellite into the same orbital plane as the target satellite. After orbit, ground controllers maneuver the satellite so that after one or two orbits it is sufficiently close to the target to complete the intercept with its on-board homing device, and explode its warhead into pellets to hit the target. It is estimated that the system weighs more than 2000 kilograms and may be capable of intercepting satellites in orbits up to 5000 kilometers, although the highest intercept attempted in a test was 1600 kilometers.[6]

The current US ASAT system is known as the Air-Launched Miniature Vehicle, and consists of a terminal homing warhead boosted into space by a two-stage rocket launched from an airborne F-15 aircraft. The system has undergone only minimum testing and its maximum altitude has not been disclosed, although it is estimated to be between 850 and 1700 kilometers.[7]

In addition to dedicated ASAT systems, both the Soviet Union and the United States possess other weapon systems that have potential anti-satellite capabilities. These "residual ASAT capabilities" include the Soviet Galosh ABM system, the recently tested US Homing Overlay Experiment (where an interceptor destroyed a dummy warhead above 100 km), long range ballistic missiles with nuclear warheads, ground based lasers, and space vehicles like the US Space Shuttle and the Soviet Progrez Spacecraft. While these systems pose potential threats to satellites, there are several unknowns and drawbacks to their use as ASATs. For example, their efficiency and effectiveness as ASATs have not been tested; they may produce undesirable collateral damage; their use as ASATs would detract from the principal mission for which they were designed; and their use in space may be prohibited by treaty.

With this background and general information on military satellites and ASAT capabilities, the next chapter will address the first major issue related to ASAT development.

ENDNOTES

1. Thomas Brandt, MG, USAF, "Military Uses for Space," Air University Review, Nov-Dec 1985, p. 47.

2. Stephen Meyer, "Soviet Military Programs and the New High Ground," Survival, Sep/Oct 1983, p. 213.

3. Paul Stares, Space and National Security, pp. 9-12.

4. Ibid., pp. 16-17.

5. One of the first US ASAT programs was SAINT (Satellite Interceptor Technique) begun in 1957 and conceived as a system that would be launched to rendezvous with a target, inspect it for hostile intent, and conduct destructive action if appropriate. The project was cancelled in 1962 before reaching the testing phase. The second major US program, which was actually deployed between 1964 and 1975, combined a Thor rocket booster and a nuclear warhead that could be thrust into a satellite's path and detonated. The system was principally aimed against a Soviet orbital bombardment system that would deploy nuclear warheads on satellites in low orbit. However, the US system was deactivated in 1975 in compliance with the Outer Space Treaty that barred nuclear weapons in space.

CHAPTER III

SHOULD SPACE BE A SANCTUARY?

> Military conflict in space is not a matter for US policy choice today--the choice has already been made.[1]

> Damnation! Nationalism should stop at the stratosphere.[2]

The first outstanding ASAT issue involves the broad, almost philosophical, question of how, if at all, space should be militarily exploited. There are some who strongly oppose the weaponization of space and see space as a sanctuary from which weapons should be excluded.[3] They argue that ASAT deployment would be an irreversible first step in weaponizing space and will only increase the potential for the waging of war, and the destructive capacity of war. With ASAT, opponents cite the potential for an unconstrained arms race that would demand a high financial price and result in many lost opportunities. Moreover, in their view, an arms race in space is unwinnable:

> . . . even if the weaponization of space is feasible, it is far from obvious that such a US technological victory could be sustained. History teaches that military-technological competitions between states have a tendency towards rough equality in qualitative achievement.[4]

The following passage by Paul Stares encompasses many of the views on ASAT by those who oppose the weaponization of space.

> The advent of antisatellite and other space weapons will be akin to opening the mythical Pandora's Box. The putative benefits of such weapons will be short-

lived or, more likely, illusory. Instead, the superpowers will become locked into a never ending, ever demanding search for security in space that will leave them worse off than before. The opportunity costs both in financial and operational terms will be immense. More worrisome is that it will add yet another potential source of conflict to an already overtaxed international system. In short, outer space will never be the same again.[5]

In contrast, proponents for the weaponization of space cite the potential military payoffs from space systems. For example:

> Conceptually, space-based offensive systems have many military desirable characteristics. From their relatively high altitude they have broad geographic access, unconstrained by conventional defenses or national boundaries. Within their access area they could respond essentially on demand to bring force to bear on a target.[6]

Or, as Arthur Downey points out:

> . . . space has evolved from a minor military mission to "*the new high ground*" . . . a theater of operations that must be exploited because of its tremendous military potential. Von Clausewitz stated that control of the high ground offered the commander three strategic assets: greater tactical strength, protection from access, and a wider view. Certainly control of space would provide these assets--or military advantages--in an unprecedented manner.[7]

Proponents go on to argue that man's natural inclination is competition and conflict, and it would be folly to assume that space could be a sanctuary from conflict:

> . . . it was inevitable that the exploitation of space would become embroiled in the politics of the cold war. The adversarial relationship between the United States and the Soviet Union not only provided the incentives to exploit the medium but also the means to carry it out.[8]

Furthermore, Colin Gray supports this view this way:

> . . . it is critically important that US policy makers and policy commentators disabuse themselves of the notion that outerspace will be, or can be, a sanctuary. In the event of a general war, the super-powers will fight in and for control of space as they will fight everywhere else.[9]

Advocates of the weaponization of space also cite the immediate and specific Soviet threat. For example, according to the current CNO, Admiral Carlisle Trost: "Despite our successes in the past, despite our superior technological base, we are today farther behind the Soviet Union in the military applications of space technology than we were when Sputnik first went up."[10] Interestingly, over 25 years ago, President Kennedy declared a similar challenging theme: "If the Soviets control space they can control the earth, as in the past centuries the nations that controlled the seas dominated the continents."[11]

The noted scientist, Herman Kahn, supported weapons in space with this rationale:

> Many people are appalled at the very idea of having this kind of competition in space. They feel that since the military competition on earth is bad enough, it should not be exported to space. Indeed, they tend to think that it is all to the good to set up obstacles to any expansion of the arms race to any new area. Both of these propositions could be completely wrong. The real problem is to protect people on earth, and to make the costs and risks of war or appeasement as small as possible. To the extent that the arms race is a competition between the NATO alliance and the Soviet bloc, I want the United States and its allies to be clearly ahead--and transferring many activities to space could sharply improve the arms race from this viewpoint.[12]

Additionally, proponents of space weapons argue that space systems could help relieve the nuclear threat. According to Barry Smernoff: "Military use of space will not be a quick fix for resolving the problems of nuclear war once and for all, but it could go a long way toward reducing the awesome role that nuclear weapons and the unprecedented threat of nuclear holocaust have played in postwar history."[13]

Then, there are other supporters of weapons in space like Robert Anderson, Chief Executive Officer of Rockwell International Corporation. He declares that it is inevitable for space to be exploited with weapons, so it is much better if the United States takes the lead rather than someone else. Moreover, he proposes that the American people as a nation approve such a pursuit, and that there will be significant and beneficial spin-offs for the country by doing so.[14]

Finally, from an historical perspective, proponents argue that space exploitation is a rare opportunity like only a few throughout the ages, and it is imperative that it not be dismissed: "History has often been changed by the nation that first grasped the advantages offered by developing the military potential of the newest medium."[15] Or, according to General Kelly Burke, space weapons "have a transcendental flavor, a little like gun powder. We ignore them at our peril."[16]

This concludes a brief look at the question of whether or not space should be exploited with military weapons, like ASAT. The next chapter will address issues on the military utility of ASAT.

ENDNOTES

1. Colin Gray, American Military Space Policy, p. 49.

2. Robert Heinlein, "The Man Who Sold the Moon," quoted in Henry Stine's, Confrontation in Space, p. 6.

3. The "militarization" and "weaponization" of space are important differentiations. While it is generally accepted that space has been "militarized" for many years with space systems that provide or enhance some military functions, it has not yet been "weaponized" with the deployment of actual space weapons. However, ASAT is seen as the transition from "militarization" to "weaponization."

4. Colin Gray, "Space Is Not a Sanctuary," Survival, Sep-Oct 1983, p. 195.

5. Paul Stares, The Militarization of Space, p. 253.

6. James Beale, LTC, USAF, Morality to Strategy: Perspectives on Offensive Weapons in Space, p. 9.

7. Arthur Downey, The Emerging Role of the U.S. Army in Space, p. 13.

8. Stares, p. 236.

9. Gray, "Space Is Not a Sanctuary," p. 203.

10. Carlisle Trost, ADM, USN, "The Potential of Space and Anti-Submarine Warfare," Defense Issues, July 1987, p. 3.

11. President John F. Kennedy, quoted in Robert Rankine, "The Military and Space . . . Yesterday, Today and Tomorrow," Royal United Services Institute for Defense Studies, June 1987, p. 7.

12. Herman Kahn in the Introduction to Henry Stine's Confrontation in Space, p. XI.

13. Barry Smernoff, "A Bold Two-Track Strategy for Space," in International Security Dimensions of Space, ed. by Uri Ra'anan and Robert Pfaltzgraff, p. 29.

14. Robert Anderson, "US Leadership in Space: Three Reasons Why," Aerospace, Summer 1987, pp. 2-5.

15. Thomas Brandt, MG, USAF, "Military Uses for Space," Air University Review, Nov-Dec 1985, p. 51.

16. Kelly Burke, GEN, USMC, quoted in Beale, p. 18.

CHAPTER IV

IS ASAT JUSTIFIED?

> Is there an absolute need for a US ASAT, resting both upon the value of US and Soviet assets and upon the character of US and Soviet doctrine? The answer almost certainly is yes.[1]

> . . . is it prudent to encourage the development of a weapon that in itself threatens the very systems that are vital to US national security and military operations generally?[2]

This chapter will focus on the justification issues surrounding ASAT development. Included in the discussion are aspects like threat, vulnerability, military utility, deterrence, and potential benefits and drawbacks.

Opponents of ASAT development are quick to point out that for years the US ASAT policy was to negotiate a ban on ASATs if at all possible. In 1975, they contend, the US dismantled a nuclear-armed ASAT system that had been operational for 12 years, recognizing the fact that "we were more secure in a world without ASATs than with them, even if ours were superior to the Soviets." However, they go on, "this truth is now being ignored."[3] Moreover, since 1982 opponents contend the Soviets have observed a unilateral ASAT test ban, demonstrating their commitment to limit the development of this weapon system, and the United States should follow suit.

In response, the proponents of ASAT argue that while the United States government demonstrated restraint on ASAT development during the 1970s, it was intended as a quid pro quo for Soviet restraint.[4] However, when the Soviets continued to test ASAT, the potential imbalance could not be tolerated.[5] Moreover, they attest that space systems have become increasingly more important in supporting military forces, and the technology for space conflict is rapidly maturing.[6] Additionally, "the much touted technology advantage of the United States over the Soviets in space development has narrowed markedly . . ." Consequently, ASAT supporters declare that circumstances warrant a US policy in favor of active ASAT pursuit.

Proponents of ASAT also argue that there is a legitimate Soviet space threat reflected in Soviet behavior and doctrine that justifies ASAT. According to General Robert Herres, first CINCSPACE, ". . . all the evidence suggests that the basic Soviet objective in space remains the attainment of military superiority."[8] Further on this point, Admiral Carlisle Trost, CNO, has said: "In short, the Soviets are prepared to go to war, in space, and we're not. They've thought about it, they've developed a competitive strategy that exploits their advantages, they've procured the hardware to execute that strategy, they've organized, and they're getting better."[9]

Major General Thomas Brandt, former Chief of the Joint Planning Staff for Space in the Office of the Joint Chiefs of Staff, contends that "the Soviets have clearly grasped the military advantages that will accrue to a nation that is able to gain and maintain control over space."[10] He goes on to say: "Furthermore, with the development and employment of an orbital antisatellite weapon more than a decade ago, the Soviet Union clearly signalled its recognition of space as an arena for weapons."[11] Finally, he argues that the Soviets view space as a "fundamental strategic medium, one providing unparalleled opportunities and fulcrums for applying national power to achieve permanent advantage. They see space as geopolitical high ground."[12]

Soviet literature is also referenced by ASAT supporters to demonstrate Soviet intent to militarily exploit space, without reservation. For example, this excerpt from Soviet Military Thought: ". . .the mastery of space is a prerequisite for achieving victory in war."[13]

Attesting further to the Soviet space threat, General John Piotrowski, Current CINCSPACE, had this to say:

> . . . the Soviets currently possess the largest and most responsive space infrastructure in the world. It is the military capability of that infrastructure--when coupled with their obvious goal to dominate space and their growing and largely stolen technology base--that causes me concern--great concern![14]

He also noted that "last year, of 600 world space and missile test launches, 500 were Soviet."[15] Given the vast Soviet space infrastructure, the General warns: ". . . in a crisis the Soviets could significantly increase their launch rate while--with their operational antisatellite (ASAT) weapon--simultaneously reducing our own on-orbit forces." Consequently, he goes on, it is imperative for the US to develop a "space control capability"--the cornerstone of which is an air-launched antisatellite system.[16]

A significant Soviet space threat is also noted by Nicholas Johnson, author of Soviet Military Strategy in Space. Johnson writes, "For several years to come, the USSR will be holding the high cards in any space engagement, and it is unlikely to refrain from calling an American bluff." In fact, in future crises, he submits that "with its superior position by virtue of its proliferated satellites, replacement capability and operational ASAT, the Soviet Union might consider a limited attack on American satellites a risk worth taking."[17]

Colin Gray also cites the potential threat of Soviet ASATs this way.

> As can best be predicted, looking out over the next two decades, the Soviet military establishment would prefer to destroy, or degrade severely, US military assets in space, at the risk of losing its own, rather than treat space as a sanctuary for mutual exploitation.[18]

Gray carries this thought a step further in postulating a rationale for Soviet pre-emptive use of ASATs:

> Soviet military doctrine lays heavy stress upon the value, and feasibility, of pre-emptive action. In Soviet perspective, there is good reason to anticipate that ASAT capabilities of several kinds may be able to achieve successful pre-emptive destruction or degradation of both certain US space weapons and the US spacecraft these weapons were based upon.[19]

Gray cites other factors in support of ASAT development, too. First, he asserts the technology and tactics of space conflict are in their initial stages and both the US and Soviet Union now use and intend to use space in critically important ways. Therefore, unless the US develops disincentives for the Soviet Union, the threat of space conflict will remain. Second, alternatives for ASAT, including passive defense techniques, are not certain to succeed. Finally, given the criticality of "close look" surveillance capability via satellites in crises and war, it is in the US interest to pursue methods to destroy very threatening enemy ASAT and surveillance capabilities.[20]

It can also be argued that ASAT development is essential not only for near term threats, but for likely increased satellite capabilities of the future. Potential satellite missions such as laser target designation, real time surveillance and battle management, and satellite shoot back capabilities will only be offset by an ASAT. It is essential, therefore, according to this argument, to develop ASAT capabilities now so that they can mature to meet the future threats.[21]

Proponents contend, too, that ASAT is critical because the US is more dependent on satellites to perform important military functions. They point out that the US has global security commitments and force deployments worldwide, while the Soviet Union has few forces committed outside the Warsaw Pact and Cuba; the US must provide C^3 for global and oceanic command while the Soviet Union can rely more on landlines and over the horizon radar links; the US does not have the launch capability to reconstitute satellites like the Soviet Union and, therefore, the United States is more dependent on individual satellites; and, the US must rely on space surveillance to gather information on the "closed society" of the Soviet Union, while the Soviets can take advantage of the United States' "open society."[22]

Proponents can also cite a 1986 study by the Aspen Strategy Group, a bipartisan committee co-chaired by Dr. William Perry, former Under Secretary of Defense, and LTG Brent Scowcroft (USAF Ret), former Assistant to the President for National Security Affairs, that "underscored the value of maintaining the limited existing ASAT capability."[23] However, in response, opponents might point out that this study also concluded that "there are risks in pushing the development of ASATs too far or too fast."[24]

Finally, ASAT supporters argue that a viable US ASAT capability is needed for deterrence. They contend the only way the Soviets could be deterred from attacking US satellites is if the United States has the capability and willingness to retaliate for attacks on US space assets. In fact, the 1982 US Space Policy asserts: "The primary purposes of a United States ASAT capability are to deter threats to space systems of the United States and its allies and, within such tenets imposed by international law, to deny any adversary the use of space-based systems that provide support to hostile military forces."[25] Moreover, the recently revised DOD Space Policy reinforces this position by declaring that all DOD space efforts, of which ASAT is a part, will "contribute to the national security objectives by 1) deterrence, or if necessary, defense against enemy attack, . . ."[26]

Opponents of ASAT present numerous arguments in an attempt to refute many of the preceding claims. In the first place, they assert that ASAT will be destabilizing:

> As long as there are nuclear weapons and delivery systems for them, the United States and the Soviet Union will need space surveillance systems to provide some measure of stability. To allow these systems to be threatened by anti-satellite weapons is reckless and fool-hardy.[27]

They also view an extensive ASAT capability as increasing "the likelihood of accidental and uncontrollable nuclear war. Because the eyes and central nervous system of the high strung nuclear forces are already in space, every satellite malfunction will have to be treated as the harbinger of surprise attack."[28] Moreover, opponents argue an effective ASAT threat will be dangerous to the national security of both the Soviet Union and the United States:

> . . . the national security of both rivals will inexorably erode. Any threat to satellites, whether real or potential, will undermine confidence in the ability to deter attack. By the same token, an awareness that satellites are at risk will tend to destabilize a crisis. Even in time of peace, a keen rivalry in the development and testing of ASAT weapons is certain to cause friction, increase suspicion, undermine confidence in the ability to deter attack, and perhaps inadvertently spark a conflict.[29]

Opponents of ASAT do not view the current Soviet ASAT capability as threatening. They contend it has several shortcomings, such as the need for the target's ground track to come close to the ASAT's launch site and the limited number of launch sites available for such large boosters. Further, they assert it is susceptible to jamming, deception and evasive maneuvering.[29] They also cite the 1979 remarks on the Soviet ASAT capability by General Lew Allen, then CSAF:

> I think our general opinion is that we give it a very questionable operational capability for a few launches. In other words, it is a threat that we are worried about, but they have not had a test program that would cause us to believe it is a very credible threat.[31]

To the opponents of ASAT, these remarks remain valid since, they contend, no progress has been observed in the Soviet ASAT systems since General Allen spoke.

It is also argued in disfavor of ASATs that continued ASAT development will spark an escalated arms race in space. According to Daniel Deudney, "the exploitation of ASAT technology could open up an expansive and volatile new dimension to the arms race."[32] Moreover, William Durch asserts, "each improvement in US and Soviet ASAT capability will, in turn, spark efforts at defensive satellite countermeasures, but the competitive edge will almost certainly remain with the offense."[33] However, as any unconstrained ASAT race continues, the United States will be placed at a more distinct disadvantage, according to opponents:

> Once antisatellite capabilities become too threatening greater reliance would have to be placed on backup systems such as sounding rockets and airborne C^3 facilities. Such a development would be to the disadvantage of the US, which has its military forces spread around the globe and has come to rely heavily on space-based systems.[34]

Moreover, pointing to US reliance on space systems and its limited reconstitution abilities, opponents argue the

United States is significantly more sensitive to attack on its space military platforms. Hence, "in a world with United States and Soviet ASAT weapons, it is the United States' military position that is threatened with the greatest specific and overall degradation."[35] Finally, an unrestrained ASAT competition would make the effectiveness of self-protecting initiatives such as hardening, maneuvering and deception, less likely.[36]

Opponents of ASAT also refute the contention that a US ASAT capability will be a deterrent. Again noting the significant US dependency on space systems, they assert "it is still questionable whether the superpowers' respective levels of dependency on space systems will ever be sufficiently balanced for deterrence to work."[37] Stating this position another way, Stephen Meyer has said: "Existing asymmetries of dependency indicate that of the many factors that would contribute to deterring the Soviet Union from attacking US satellites, the threat of a reciprocal ASAT attack on Soviet satellites by the US would be one of the least important."[38] Hence, to opponents the idea of "tit for tat" with satellites does not make sense, and the United States will not be able to deter Soviet ASAT attacks by posing an analogous threat. Moreover, even if the United States' ASAT capability were significantly greater, deterrence might not be effective if the Soviet military placed a higher value on the destruction of US space systems than on the preservation of their own.[39]

Opponents of ASAT further argue that the likely use and effectiveness of ASATs are, respectively, remote and suspect when considering the spectrum of potential conflicts. In regional conflicts, for example, ASAT use seems implausible because of the risks of escalation, and the existence of less provocative alternatives to demonstrate commitment (e.g., advisors, logistical support, aircraft surveillance). For widespread conventional warfare, ASATs would provide no significant advantage: any ASAT attack would raise the nuclear alert level and provoke retaliation in kind; ASATs alone could not totally destroy or impede intelligence, communications or surveillance; and there are less provocative methods to counter satellites, such as jamming, spoofing, etc. For any nuclear confrontation, ASATs might impair the other sides' ability to launch a coordinated counter strike, but ASATs would not significantly alter the course of war; ASATs could not provide total surprise, since any extensive loss of an opponent's early warning system would be considered as a pre-emptive attack; ASATs would increase the likelihood of nuclear war, or deter its termination, since destroying communications' capabilities would make it difficult to restore forces or order cease fire; and ASATs would complicate war termination by denying surveillance satellites to monitor enemy activities. Even in crisis situations, ASATs would degrade stability since both sides would have to anticipate an "out of the blue" ASAT strike, and decisions would be made hastily and with a great potential for serious miscalculations; and, finally, an increased ASAT threat would exacerbate the inherent C^2 instability of increasing alert levels--the tempo and response of each sides' changes would be accelerated by the anticipation of ASAT use and could result in unauthorized actions and inadvertent war.[40]

Finally, ASAT opponents argue that "the most important concern for the US is to ensure that its satellites can carry out their tasks even in crises or conflict. Using an ASAT to shoot down Soviet satellites would not protect or restore US satellites."[41] Overall, ASAT opponents contend that ASAT weapons produce no net military utility; they contribute nothing to deterrence; nor do they eliminate or alleviate enemy ASAT threats. In general, the large number of satellites used in Soviet constellations and the high launch rates used to maintain them make them fairly insensitive to discrete kills by limited ASAT attacks, according to ASAT opponents. Consequently, active disruption by jamming, spoofing and other forms of counter-measures may be more efficient, effective and timely.[42]

ALTERNATIVES

In concluding this chapter, it is appropriate to mention several initiatives that have been proposed which may substitute for, or compliment, ASAT employment. Some are quite contentious too, but their specific pro and con arguments are beyond the scope of this paper. They are introduced here principally to provide a more thorough perspective of the overall ASAT issue, and are presented in four categories.

1. General. Vulnerability through dependency on individual satellites might be reduced by the development of redundant land and air-based surveillance and warning systems. Additionally, reconstitution capabilities could be improved through increased launch sites, available booster vehicles and enhanced booster power. Finally, combat or support forces might be augmented to counter Soviet military effectiveness gained from their use of space assets.

2. Passive Countermeasures. These measures might enhance satellite survivability and include: Deception - using decoys to "fool" the enemy; Hiding - camouflaging and developing low observable, "stealth," techniques; Evasion - maneuver capability when threatened; Hardening - providing protection by applying ablative protective coatings; Positioning - arranging satellites in many, widely separated orbital planes, with irregular phasing; Proliferation - adding more satellites for redundancy and to compound an enemy's task; Enhanced Capabilities- improving technical capabilities to move satellites to higher orbits; Improved Tracking - additional radars and technical advances to improve monitoring and management of space systems.

3. Active Countermeasures. These are more aggressive measures intended to improve satellite survivability and include: Spoofing - directly controlling or fooling the enemy into making unnecessary adjustments to his space assets; Self-

Defense - providing a "shoot-back" capability for satellites; Jamming - electronic or electro-optical emissions that overwhelm and degrade enemy systems; Sabotage - surprise attacks against ASAT ground or air-based C^3 links.

4. Diplomatic Measures. Two areas of pursuit fall within this category: Arms Control Agreements and Rules of the Road. The first could include any negotiated agreement from a complete ban on ASAT activities to more specific qualitative or quantitative limitations. Rules of the Road, on the other hand, are mutual agreements that would define acceptable and unacceptable space behavior to reduce suspicious and provocative acts that might initiate an ASAT response. Examples might include agreed minimum separation distances between satellites; restrictions on very low altitude overflights; negotiated "keep-out zones" for foreign satellites; fly-by limitations; agreements on the rights of inspections; and procedures for consultation in the event of ambiguous or threatening acts.[43]

ENDNOTES

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3. Robert Bowman, "Arms Control in Space: Preserving Critical Strategic Space Systems Without Weapons in Space," in American Plans for Space, p. 117.

4. Herbert York, "Nuclear Deterrence and the Military Uses of Space," Daedalus, Spring 1985, p. 23.

5. Paul Stares, The Militarization of Space, p. 243.

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11. Ibid., p. 85.

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23. Aspen Strategy Group, Anti-Satellite Weapons and US Military Space Policy, p. 34.

24. Ibid.

25. Stares, p. 218.

26. Department of Defense Space Policy, March 10, 1987, reprinted in USAWC Selected Readings, AY 1988, Course 3, Vol 1, p. 107.

27. Bowman, p. 117.

28. Daniel Deudney, "Unlocking Space," Foreign Policy, Winter 83/84, p. 100.

29. John Tirman, ed., The Fallacy of Star Wars, p. 181.

30. Richard Garwin, Kurt Gottfried, Donald Hafner, "Anti-Satellite Weapons," Scientific American, June 1984, p. 49.

31. Lew Allen, GEN, USAF, quoted in Garwin et al, p. 49.

32. Deudney, p. 98.

33. Durch, p. 241.

34. Garwin et al, p. 50.

35. Stephen Meyer, "Anti-Satellite Weapons and Arms Control: Incentives and Disincentives from the Soviet and American Perspectives," International Journal, Summer 1981, p. 473.

36. Tirman, p. 229.

37. Durch, p. 54.

38. Meyer, p. 477.

39. Durch, p. 83.

40. Kurt Gottfried and Richard Lebow, "Anti-Satellite Weapons: Weighing the Risks," Daedalus, Spring 1985, pp. 154-161.

41. Tirman, p. 181.

42. Stephen Meyer, "Soviet Military Programs and the New High Ground," Survival, Sep/Oct 1983, p. 213.

43. Office of Technology Assessment, p. 27.

CHAPTER V

ASAT AND BMD/ASAT AND ARMS CONTROL

The final two ASAT issues that will be addressed are the relationship of ASAT to Ballistic Missile Defense and the arguments for and against ASAT Arms Control Agreements.

ASAT AND BMD

> Because of the technology overlap between ASAT and BMD, the vital role of ASAT in countering BMD systems, the necessity of anti-satellite systems to protect the enormous investment represented by space-based BMD, and because of the powerful ASAT capabilities of even primitive Star Wars BMD systems, it is probably no longer possible to deal with either ASATs or BMD alone.[1]

The preceding quotation highlights the significant and complex relationship between ASAT and BMD. While certain types of ASAT systems possess BMD capability, many more types of BMD systems would have substantial ASAT capabilities.[2] Moreover, while ASATS may someday threaten BMD space systems, they also provide an avenue for the initial development of BMD. Therefore, prohibitions to BMD testing and development could be theoretically circumvented with ASAT testing and development. Additionally, proponents of SDI might vehemently oppose any restrictions to ASAT development, while critics of SDI could use ASAT arms control to suppress BMD.[3]

This symbiotic yet antithetical relationship between ASAT and BMD has been labeled a "lethal paradox" by John Tirman and

Peter Didisheim. To them, "the continuously evolving ASAT capability will loom as a greater and greater threat to the boost-phase and midcourse elements of SDI."[4] "Not only do anti-satellite weapons, those of today and those that will be created within the SDI, fatally threaten the Star Wars armada of the twenty-first century, but they will threaten the vital military satellites of the twentieth."[5]

According to Paul Stares, the US commitment to BMD--in the form of the Strategic Defense Initiative--"represents both an obstacle and a threat to ASAT limitations." "It is an obstacle in that the United States is clearly reluctant to agree to ASAT limits that might constrain its freedom of action to pursue antimissile research." And, it is a "threat to meaningful ASAT limitations because the techniques for intercepting satellites and ballistic missiles are so similar." But, he continues, it is ironic that "strategic defense may not be feasible unless constraints are placed on antisatellite weapons."[6]

However, although ASAT and BMD are interdependent in many ways, they are not inextricably linked. For example, while it appears that much of a BMD system would be located in space, there is a strong likelihood for ground and air-based ASAT systems in addition to space-based capabilities. Moreover, a regime that would prohibit BMD deployment need not preclude ASAT deployment. Hence, if the Strategic Defense Initiative were forestalled or outright terminated, a similar demise for ASAT need not follow.[7]

ASAT AND ARMS CONTROL

> ASAT arms control will serve this nation better than will an ASAT arms race.[8]
>
> ASATs will be so costly that we should find a way if at all possible to avoid building new systems.[9]
>
> ASAT arms control is a lost cause for a wide range of powerfully plausible reasons . . .[10]
>
> Arms control need not make us more secure, just as weapons need not make us stronger.[11]

Like the other ASAT issues, arms control is a complex and contentious subject. According to Ashton Carter, ASAT arms control faces two formidable problems. First, ASAT attacks on some space missions are both tempting and relatively easy. "Satellites in LEO will probably remain fairly cheap to attack in relation to their cost, and if they are engaged in threatening military activities they will present an irresistible temptation for ASATs . . ." Moreover, "limiting ASATs might mean swimming against the tide of technological advance and military opportunity." The second problem is "that not all uses of space are benign and deserving of protection . . ." "Paradoxically, any possibility of sanctuary from attack will probably encourage the superpowers to place more and more threatening satellites in space.[12]

Opponents of ASAT arms control argue that significant obstacles must be overcome in any quest for a viable ASAT arms control agreement. Among the leading problems presented are the difficulties in defining what constitutes an ASAT weapon, and negotiating adequate verification provisions; the potential for covert ASAT development that would have disproportionally large strategic consequences; the existence of a Soviet capability which the Soviets would not likely give up; and the fact that restrictions on ASAT may also restrict BMD development.

Colin Gray is especially skeptical of the potential for any effective arms control agreement in space. Besides addressing the "trivial" and "harmful" long term historical record of arms control agreements, he characterizes the Soviet attitude towards arms agreements as "caveat emptor," and sees the arms control process in a democracy as serving too easily as an "alibi for laxness in defense preparation."[13] He also contends that any treaty "beyond the innocuous" would work to the US disadvantage, and the US "has a major interest in denying Soviet spacecraft a free ride for their force multiplier missions."[14] To Gray, the important task at hand is not to develop space arms control agreements, but to either "remove the incentives for (defensive) space weaponization," or "to facilitate the effectiveness of defensive space weapons."[15]

In contrast, proponents of an ASAT agreement contend an unconstrained ASAT regime would only be favored if one side or the other expects to attain a persistent advantage in weapons that can destroy satellites--and there is no such expectation.[16] Furthermore, they argue that "a viable ASAT arms control regime that serves US security interests can be identified."[17] They view as a "realistic" treaty one conferred to "ASAT activities that are readily verified: ASAT tests and the development of new ASAT techniques."[18] While there may be some areas of uncertainty, supporters contend "they are not so great as to permit the Soviets to pose a significant unanticipated threat to US security if we take prudent steps toward improving intelligence capabilities and diversifying and protecting vital satellite functions."[19] Moreover, proponents argue that with such treaty constraints, "the United States would possess much more secure space-based intelligence, early-warning, and command and control facilities at considerably lower cost than it would in an environment in which both superpowers were continually refining their ability to destroy satellites."[20]

This concludes the brief look on the relationship between ASAT and BMD, and ASAT arms control. The next, and last, chapter, will provide a summary and some concluding observations.

ENDNOTES

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2. Ibid.

3. Ashton Carter, "The Relationship of ASAT and BMD Systems," Daedalus, Spring 1985, p. 172.

4. John Tirman and Peter Didisheim, "Lethal Paradox: The ASAT-SDI Link," in Empty Promise: The Growing Case Against Star Wars, John Tirman, ed., p. 109.

5. Ibid., p. 128.

6. Paul Stares, *Space and National Security*, p. 181.

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8. Michael Lemonick, "Surging Ahead," *Time*, October 5, 1987.

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10. Colin Gray, "Space and Arms Control: A Skeptical View," *America Plans for Space*, p. 134.

11. *Ibid.*, p. 137.

12. Ashton Carter, "Satellites and Anti-Satellites: The Limits of the Possible," *International Security*, Spring 1986, p. 88.

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15. *Ibid.*, p. 134.

16. Richard Garwin, Kurt Gottfried and Donald Hafner, "Antisatellite Weapons," *Scientific American*, June 1985, p. 55.

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18. *Ibid.*, p. 165.

19. John Tirman, ed., *The Fallacy of Star Wars*, p. 248.

20. Gottfried and Lebow, p. 168.

CHAPTER VI

CONCLUSION

> Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after changes occur.
>
> Guileo Douhet[1]

This study has presented several major controversial issues regarding ASAT development. First, the general subject of the weaponization of space was reviewed; next, the military utility and justification for ASAT were explored; and finally, the ASAT-BMD relationship and the ASAT arms control controversies concluded the study.

The objective of this paper has been to act as a sounding board on ASAT, highlighting the significance and complexity of the issues, and conveying the need for further and immediate study and resolution. While specific recommendations regarding the issues are beyond the charter and scope of the study, two observations are offered in conclusion.

First, digging deeper into the literature has confirmed initial impressions that ASAT issues are indeed polemic and urgent, and there are no simple or quick answers. Moreover, their potential consequences are clearly too critical to dismiss or ignore, and allow an enemy or technology to dictate a course of action that may not be to our advantage. Comprehensive analysis and national debate are required now to forge a consensus on ASAT direction if we are to heed the advice--and challenge--of Douhet.

Finally, while stark differences exist among viewpoints and recommendations, our choice need not be to select one and exclude the others. Rather, the more prudent course of action may be where we proceed cautiously while avoiding either/or thinking and aim to balance interests and not foreclose future options. Hence, it may be preferable and appropriate to pursue some level of ASAT development in conjunction with BMD and still actively investigate arms control initiatives. As the Aspen Strategy Group has said:

> Our task is not the demilitarization of space--that is now impossible. Our task is to balance our space programs--ASAT, protective and negotiated measures and SDI--in such a way that military activities in space do not increase the threat of deliberate or inadvertent war on earth.[2]

ENDNOTES

1. Guileo Douhet quoted by Thomas Brandt, MG, USAF, in "The Military Uses for Space" in American Plans for Space, p. 91.

2. Aspen Strategy Group, Anti-Satellite Weapons and U.S. Military Space Planning, p. 38.

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