USAWC STRATEGY RESEARCH PROJECT

WILL CURRENT POLICIES AND CAPABILITIES ALLOW THE UNITED STATES TO CONTROL SPACE?

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ABSTRACT

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The United States and the world as we knew it changed dramatically on September 11, 2001 when we were brutally attacked by operatives of Osama Bin Laden. The events of that day set into motion military action by United States and coalition forces into Afghanistan in 2001 and Iraq in 2003. Both actions involved the extensive use of space assets to successfully prosecute the war against the Taliban, Al-Qaeda, and Iraqi forces. The purpose of this strategy research project is to investigate the historical basis for current policies and capabilities in order to control the ultimate high ground of space. This paper examines what space is, why it is important to us in the commercial, civil, and military arenas, what is space control, and how the Unites States could control space. In doing so it determines if current policies and capabilities will enable space control.

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WILL CURRENT POLICIES AND CAPABILITIES ALLOW THE UNITED STATES TO CONTROL SPACE?

> Let every nation know, whether it wishes us well or ill, that we shall pay any price, bear any burden, meet any hardship, support any friend, oppose any foe, in order to assure the survival and the success of liberty.
>
> - President John F. Kennedy[1]

The United States and the world as we knew it changed dramatically on September 11, 2001 when we were brutally attacked by operatives of Osama Bin Laden. The events of that day set into motion military action by United States and coalition forces into Afghanistan in 2001 and Iraq in 2003. Both actions involved the extensive use of space assets to successfully prosecute the war against the Taliban, Al-Qaeda, and Iraqi forces. The purpose of this strategy research project is to investigate the historical basis for current policies and capabilities in order to control the ultimate high ground of space. This paper examines what space is, why it is important to us in the commercial, civil, and military arenas, what is space control, and how the Unites States could control space. In doing so it determines if current policies and capabilities will enable space control.

BACKGROUND

WHAT IS SPACE?

Space is often thought of as an empty vacuum extending throughout the universe. In reality it is a place filled with energy particles, radiation, and an infinite number of objects large and small. It is an environment of extremes where distances are enormous and speed ranges from zero to the speed of light. It is an environment that is ever changing and one that is hostile for satellites.

There is no universally accepted definition of where space actually begins but space is where the atmosphere ends. It is generally accepted that this is where objects will remain in orbit, even for a brief period of time. This happens at altitudes above 81 miles from the earth's surface.[2]

WHY IS SPACE IMPORTANT TO US?

The United States is more reliant on space capabilities than any other country in the world.[3] Our commercial, civil, and military sectors use space or space-based assets for their day-to-day activities such as television, automatic teller banking, and various intelligence

activities. One of the key operational considerations for space as defined in Joint Publication 3-14 is that space has no geographic boundaries. The physical borders of sovereign nations do not extend into space according to international treaties and conventions. Unrestricted overflights in space permit access to other nations including remote and restricted areas.[4] If we are unable to control space we open ourselves to attack. Congress chartered "The Report of the Commission to Assess United States National Security, Space Management and Organization," (better known as the Space Commission Report). This report found that:

> The security and economic well-being of the United States and its allies and friends depend on the nation's ability to operate successfully in space. To be able to contribute to peace and stability in a distinctly different but still dangerous and complex global environment, the U.S. needs to remain at the forefront in space, technology and operationally, as we have in the air, on land and at sea. Specifically, the U.S. must have the capability to use space as an integral part of its ability to manage crises, deter conflicts and if deterrence fails , to prevail in conflict.[5]

The unique character of space power has been an American strength for decades. When the former Soviet Union launched Sputnik 1 on 4 October 1957 the "space race" between the United States and the USSR began a heated competition not only for the political propaganda coup of landing a man on the moon but in the defense of the country as well. President Eisenhower approved the Corona Program (a highly classified photo-reconnaissance satellite) in 1958, but the downing of U-2 pilot Frances Gary Powers 1 May 1960 saw the United States shift our reconnaissance needs from manned overflights to surveillance satellites to avoid further incidents. Space quickly became a means for the United States to monitor the Soviet Union in addition to other potential threats around the world. This is true even today as we have seen the bi-polar world of the Cold War transition into a multi-polar world where we continue to command the global commons of space, sea, and air which is a vital facet of our global power.[6]

Commercial

Commercially, space allows us the use of satellite television and cell phones. It is the means to receive on-the-scene instant news reports from reporters on the ground in the world's hotspots. The malfunction of Galaxy IV in May 1998 silenced 90% of the pagers in the United States along with television and data links to millions of people.[7] The loss of Intelsat IS-804 15 January 2005 left many remote South Pacific areas completely cut off from outside communications and several other countries switched to backup systems for their voice and data needs.[8] While rare, such events illustrate the extensive reliance of space systems in everyday life and the challenges to restore service to those customers when lost. Without

space the search for natural resources like oil, minerals, and natural gas would return to the days of drilling hundreds of dry holes to find a producing well or mine. Most importantly, the loss of the Global Positioning System (GPS) would have serious impacts not only for hikers and boaters, but the airlines, cargo delivery companies, railroads and commuter lines that depend on the precision timing and location capabilities the system offers.

Civil

In the civil government arena, space-enabled services that are taken for granted include services such as: Emergency communications over radio and cellular phones for fire, police and other first-responders. Long-range weather forecasting is directly tied to meteorological satellites. GPS is the basis for many search and rescue organizations, the tracking of emergency vehicles, school busses, public transportation, and airliners to name a few. Malfunctions and losses of satellites such as the Galaxy and Intelsat systems pose significant challenges for civil governments' health and safety of its populace. In today's modern world vast numbers of services are tied to space based systems.

Military

The United States military is significantly tied to space. Without it we would not have effective long haul communications or direct command and control capabilities with joint or coalition partners. Communications satellites are the main means of reach-back for forces in theater to their home bases as well as supporting commands.

GPS is key our ability to conduct precision strikes against an adversary. Without it there would be more iron (commonly referred to as "dumb") and laser-guided bombs and collateral damage would increase. A secondary effect would be the vast increase in logistics requirements for munitions required to meet the same destruction level requirements of precision guided ordnance.

Special Operations Forces have utilized Blue Force tracking devices since the early operations into Afghanistan. Losing this advantage would significantly hamper their missions into hostile areas.

Meteorological satellites monitor the weather conditions, cloud cover, oceanographic and solar-geophysical environment of the Earth in support of military operations. Without them there would be limited weather forecasting including the tracking of weapons of mass destruction hazard areas.

Military Intelligence, Surveillance, and Reconnaissance (C4ISR) requirements are heavily reliant on space assets. This was emphasized by Secretary of the Air Force Dr. James G.

Roche who said, “Space capabilities in today’s world are no longer nice-to-have, they’ve become indispensable at the strategic, operational and tactical levels of war.”[9] Space capabilities are critical in how the United States derives intelligence. Without those capabilities there would be limited Signals Intelligence (SIGINT), Communications Intelligence, Imagery Intelligence and, Measurement and Signature Intelligence (MASINT) resulting in minimal targeting and battle damage assessment, a delay of imagery products, and reduced civil support capability.

Finally, space-bases assets defend the United States and its forces abroad with missile warning capabilities. Otherwise we would have primitive missile attack warning limited to perimeter radars with virtually no capability for impact point prediction. Our attack operations would be nearly impossible with any form of precision currently conducted by our forces.

WHAT IS SPACE CONTROL?

Space control is the actions which provide friendly forces freedom of action in space while denying freedom of action to an adversary. The four mission areas included under space control are space surveillance, protection, prevention, and negation. Surveillance includes the ability to detect and track objects. The protection mission focuses on passive measures to enhance the survivability of space assets. Prevention is prohibiting adversaries from “exploiting U.S. or allied space services” through measures such as encryption or shutter control (shutting down access to imagery).[10] The negation mission includes the measures to deceive, disrupt, deny, degrade or even destroy an adversary’s capability to use space from the ground, the linkage or the space segment itself.[11]

WHY IS SPACE CONTROL IMPORTANT?

For decades the President and his key decision makers have relied on our space systems to provide them with critical worldwide (C4ISR) capabilities and support. Controlling space ensures the United States the ability to receive vital information and act decisively with it.

Defending the Information Operations (computer and communications) networks is a key Department of Defense mission assigned to U.S. Strategic Command as we are “the nation most heavily reliant on technology for its economy, defense and way of life.”[12] The importance of space and our computer capabilities is reflected by three key facts from the United States Strategic Command (USSTRATCOM) fact file:

- Near real-time satellite imagery and weather, combined with instant satellite communications and the accuracy and timing provided by GPS, gives U.S. and allied commanders’ unparalleled awareness of operations occurring within their designated areas of responsibility.

- Space support to current operations is a perfect example of how the United States fights. Satellite-aided munitions, communications, navigation, and weather systems, combine to achieve military objectives in a relatively short amount of time.

- Global communications are growing. The use of cellular phones and pagers, ATMs, and satellite-delivered TV are a way of life for most Americans.[13]

HOW COULD THE UNITED STATES CONTROL SPACE?

There are two options for the United States to effectively control space. The first is by military means using any or all of the space control mission areas (surveillance of space, protection, prevention, and negation) found in Joint Publication 3-14. This could involve any or all of the service components within U.S. Strategic Command or other combatant commands. The second method to control space would be through diplomatic means. While a military option is fairly easy to conduct it is the later of the two options that has the greatest difficulties associated with it for the United States.

MILITARY

There are three ways in which the military could control space. The first is at the satellite itself. This could be accomplished with kinetic munitions, microwave energy, or high-powered lasers resulting in permanent or temporary damage. The second area is with the satellites data link. The links are separated by frequency into down-link and up-link data streams whose function is dependent upon the nature of the payload. For example, the data streams could carry such information as a television broadcast, telephone calls, and the command and control information for the satellite.[14] The links could be jammed, intercepted or have false data inserted into them. Finally there is the ground segment which is susceptible to physical attack.

Operations affecting the ground segment would be conducted by the regional combatant command while the effects needed for space assets are the responsibility of U.S Strategic Command. As the combatant command for space, U.S. Strategic Command is the command and control center responsible for U.S. strategic forces and controls the military space operations (including the forces needed to conduct the missions) should action be required to protect our space systems.[15] The operational components of U.S. Strategic Command represent the Army, Navy, and Air Force. Of the three it is the Air Force with the greatest number of space operators and organizations. A distant second is the Army and the Navy. Any military operation would dictate coordination and cooperation among the services.

Understandably the specifics of space control are highly classified due to National Security but the basics are readily available.

The military service capability to control space openly resides with the Air Force and the Army. Peter B. Teets, the Undersecretary of the Air Force, Director of the National Reconnaissance Office, and the senior space official in the Department of Defense explained how the United States will assure space control,

> Our Offensive Counter Space program is intended to develop systems to deny adversary use of space and assure U.S. space superiority. Earlier this fiscal year, we successfully tested and delivered the first Counter Communications Systems to the 76th Space Control Squadron at Peterson Air Force Base, Colorado. We plan to deliver two more of the first generation units in FY05 to achieve a Full Operational capability, and will then begin work on the next generation capability. We also intend to award a contract for the multi-service Army/Air Force Counter Surveillance and Reconnaissance System (CSRS) for final system design and development. CSRS is a mobile, transportable system that will use reversible effects to counter space-based surveillance and reconnaissance satellites. Our goal is to achieve Initial Operational Capability in FY09.[16]

The Army's capability for space control is similar to that described above for the Air Force and resides with U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command. Space Control and Electronic Warfare companies are subordinate to the two Space Battalions (one active duty at Peterson Air Force Base, Colorado and one Colorado Army National Guard).

DIPLOMATIC

While the military is capable of controlling space by physical or electronic means it is the diplomatic means of the United States that presents the great challenges for controlling space. Diplomacy is the traditional means to convince a potential adversary into doing what you want or need and that seems to have worked to date.

America controls U.S. licensed commercial satellite imagery via "shutter control", the authority to control sensitive satellite images taken by a U.S. owned satellite. The debate for the most part had been between the State Department and the media and was not tied to military operations. "In August 1998 the State Department quietly informed several U.S. satellite companies that they would be limited in imaging certain portions of the Middle East."[17] While this certainly sparked First Amendment debates, foreign imagery was and still is just as available for the asking. The Russian military system SPIN-2 provides black and white two-meter high-resolution imagery along with France's SPOT and India's Space Research Organization to the media.[18] It is the ability to readily obtain imagery of previously denied areas

that concerns U.S. military and governmental leaders. Shortly after September 11th the National Imagery and Mapping Agency (now the National Geospatial-Intelligence Agency) side-stepped the issue of imposing "shutter control" and simply bought the rights to all of the IKONOS images taken over Afghanistan and the areas surrounding the country.[19] This monetary version of shutter control, while costly, does work to keep images of sensitive areas controlled and unavailable to potential adversaries.

Diplomatically, attacking a satellite would deny its use but it would violate the publicly stated polices of several Administrations that consider the satellite as a nation's property. A competing political point is our stated access to space as an inherent means of defense. This is a delicate position dependent upon the needs of the nation and not one to be solved with a simple answer.

WHAT ARE THE CURRENT POLICIES AND CAPABILITIES TO CONTROL SPACE?

United States space policy dates to the early days of the space race against the Soviets with every American president having his own approach to space policy. It is important to understand the development of space polices by each Presidential administration. Shortly after Werner Von Braun led American scientists and engineers with the successful Redstone rocket launch of Explorer I, President Dwight Eisenhower's science advisory committee issued a statement that the development of space technology was potentially vital to the national security.[20] The National Aeronautics and Space Act of 1958 was the first official national space policy. It stated that the United States would devote itself to peaceful purposes for mankind's benefit. Furthermore it directed separate space programs for the civilian and military sectors. The act created the National Aeronautics and Space Administration (NASA) to seek and encourage the fullest commercial use of space.[21] The exception to this applied to the "activities peculiar to or primarily associated with the development of weapon systems, military operations, or the defense of the United States (including the research and development necessary to make effective provision for the defense of the United States) shall be the responsibility of, and shall be directed by, the Department of Defense."[22]

The Eisenhower administration concentrated on unmanned scientific programs and disapproved requests from the Department of Defense and NASA for manned space flight. The Soviet accomplishment of successfully orbiting Major Yuri A. Gagarin in 1961 thrust the United States into a race against the Soviets for scientific and engineering firsts during the Kennedy and Johnson administrations. This included many programs such as CORONA that saw a rapid

building of our space capabilities beyond manned exploration into areas such as scientific endeavors, commercial applications, and military support systems.[23]

The civil unrest and economic needs of the country forced a change in the American space program. President Richard Nixon enjoyed the lunar landing due in part to the decisions of his predecessors. He faced a Congress reluctant to fund large programs for space exploration. The focus for space shifted to practical uses such as communications and weather systems. Military surveillance and navigation systems did receive increased emphasis.[24]

Studies conducted early in the Carter administration recommended that two Presidential Directives (PD) be issued focusing on national and civil space polices. PD 37 addressed the entire American space program shifting from just a force enhancement to the entire warfighting medium. President Carter's Directive viewed space not just where the systems are deployed to increase the effectiveness of the military forces but as a key strategic requirement that reflected the Soviet threat and the importance of space systems to our national survival. Additionally, it indicated a willingness to pursue an anti-satellite capability. Carter's PD 42 was intended to map the efforts of the United States for the next decade in space. Unfortunately, the Directive lacked long-term goals.[25]

National Space Policy under President Ronald Reagan committed the country to space exploration and national well being when National Security Decision Directive 42 (NSDD 42) was announced. It superseded all previous presidential directives regarding space. NSDD 42 stated several broad principles that would be the basis of future space programs. Of particular note is the principle that, "The United States considers the space systems of any nation to be national property with the right of passage through the operations in space without interference. Purposeful interference with space systems shall be viewed as infringement upon sovereign rights."[26]

An interesting contribution to U.S. space policy was stated in President George H.W. Bush's National Space Policy Directives and Executive Charter (NSPD-1) in 1989. His policy was intended to assure that hostile forces could not prevent the U.S. from using space. His policy also called for the negation of hostile space forces if needed and the development and deployment of an anti-satellite capability.[27]

The basics of what the United States has in orbit was discussed in President Bill Clinton's National Space Policy of 1996 in which it was stated that photoreconnaissance, overhead SIGINT and MASINT was conducted by the United States. Furthermore, the policy stated that the existence of the National Reconnaissance Office is unclassified.[28]

Current U.S. policy in the George W. Bush administration regarding space control was last issued by former Secretary of Defense William Cohen in 1999. In his memorandum, Secretary Cohen stated that "the capability to control space, if directed, will contribute to achieving the full dimensional protection, battlespace dominance, and information superiority necessary for success in military operations. Similarly, the ability to perform space force application in the future could add a new dimension to U.S. military power. Space forces thus will enable the United States to compel an adversary to cease and desist from the pursuit of its aims through the use of necessary and proportional force."[29]

The policy has been in effect since July 1999 during the Clinton administration. It updated the previous Department of Defense Space Policy of 1987 from the end of the Reagan presidency. Regardless, a clear-cut policy is needed in light of the current Global War on Terrorism, not a patchwork of policies spanning administrations and pre/post September 11th.

The policy we have now is articulated in a minor extent in the 2001 Quadrennial Defense Review but the 2004 National Military Strategy refers to joint force capability needs that the President and the Secretary of Defense could have available for employment. These options could be kinetic or non-kinetic.[30] Historically a direct attack on an orbiting satellite could be accomplished only by the United States and the former Soviet Union with anti-satellite weapons. China may have the capability to deploy anti-satellite weapons but it is the U.S. and the former USSR who had known programs. There are two categories of anti-satellite weapons, interceptors and directed-energy weapons. The former would make physical contact with a satellite while the later would be an Earth-based system. A serious drawback in using an anti-satellite weapon would be from the debris damaging other government and commercial satellites.[31]

In addition to the military systems discussed above for the control of space, another potential method of attack would be by a High Altitude Nuclear Device. Very few countries have the capability to launch such a weapon that would have long-term severe consequences if used. The radiation exposure would damage those satellites in the line of sight and drastically reduce the usability of the other satellites passing into the radiation.

Guidelines for the policy of space control would need to fully address the circumstances leading to the United States disrupting, denying, degrading, deceiving or even destroying an adversary's space capability. As the National Military Strategy mentions, these options would be for the President and Secretary of Defense to approve for action after all diplomatic means have been exhausted.

GIVEN THE ABOVE WILL THE CURRENT AND PROJECTED MILITARY CAPABILITIES ENABLE US TO CONTROL SPACE?

The military capabilities of the United States will allow us to control space now and in the future. Air Force Undersecretary Teet's vision of space control was detailed by researchers and analysts in 2002 at the RAND Corporation whose report: *Space Weapons – Earth Wars*, discusses the fact and fiction of space weapons.[32] In a review of the RAND report for space.com several distinct classes of space weapons were reviewed. While the weapons listed below reflect a missile threat to the United States, their potential to affect orbiting or terrestrial space capabilities can not be overlooked as a means to control space:

- Directed-energy weapons, such as space lasers. They use millions of watts of power and large optics to deliver a speed-of-light knockout punch as a missile arcs over Earth. Depending on the wavelength of the energy beamed out and atmospheric conditions, an energy beam can destroy a target on Earth's surface;

- Kinetic-energy weapons against missile targets. This hardware can ram headlong into a target in space or an object still within the upper reaches of Earth's atmosphere;

- Space-based kinetic energy weapons that slam into targets on the ground, such as large ships, tall buildings, and fuel tanks. Sleek and meteoroid-like in speed, these weapons attack targets at steep, nearly vertical trajectories; and

- Space-based conventional weapons capable of maneuvering to hit terrestrial targets. These can carry and dispense rather exotic packages of destruction, such as radio-frequency or high-power microwave munitions.[33]

While the report may sound science-fiction to many, the Air Force released the *Transformation Flight Plan*[34] less than two years later. This extensive work describes the near, mid, and far-term requirements of Air Force strategy. The projects tie in with the potential control abilities of the RAND report. The plan reflects a lot of the RAND Corporations work as evidenced by the space projects listed in a technology review by space.com to include:

- Air-Launched Anti-Satellite Missile capable of intercepting satellites in low Earth orbit and seen as a past 2015 development.

- Counter Satellite Communications System to deny and disrupt an adversary's communications and early warning systems by 2010.

- Counter Surveillance and Reconnaissance System for the near-term to deny, disrupt and degrade adversary space-based surveillance and reconnaissance systems.

- Evolutionary Air and Space Global Laser Engagement (EAGLE) Airship Relay Mirrors which are intended to significantly extend the range of both the

Airborne Laser and Ground-Based laser by using airborne, terrestrial or space-based lasers in conjunction with space-based relay mirrors to project different laser powers and frequencies to achieve a broad range of effects from illustration to destruction.

- Ground-Based Laser propagates laser beams through the atmosphere to Low-Earth Orbit satellites to provide robust, post-2015 defensive and offensive space control capability.

- Hypervelocity Rod Bundles provide the capability to strike ground targets anywhere in the world from space.

- Orbital Deep Space Imager is a mid-term predictive, near-real time common operating picture of space to enable space control operations.

- Orbital Transfer Vehicle significantly adds flexibility and protection of US space hardware in the post-2015 era while enabling on-orbit servicing of those assets.

- Rapid Attack Identification Detection and Reporting System is a family of systems that will provide near-term capability to automatically identify when a space system is under attack.

- Space-Based Radio Frequency Energy Weapon is a far-term constellation of satellites containing high-power radio-frequency transmitters that possess the capability to disrupt/destroy/disable a wide variety of electronics and national-level command and control systems. It would typically be used as a non-kinetic anti-satellite weapon.

- Space-Based Space Surveillance System is a near-term constellation of optical sensing satellites to track and identify space forces in deep space to enable offensive and defensive counterspace operations.[35]

The RAND report's list of weapons is in concert with Undersecretary Teets statement above regarding systems to deny space use to adversaries. A grave concern not addressed is the potential for space debris from a kinetic incident. The danger here is the creation of hundreds or even thousands of items in space that in turn could harm or destroy satellites, vessels, or personnel upon impact.

The *Transformation Flight Plan* lists impressive capabilities for the next two decades that should allow the United States to control space through military means. Space capable countries such as Russia, China, France, the United Kingdom, India, Japan, Israel and Brazil are pursuing new types of technology for space applications which could be used for space-based weapons.[36] It would appear that the *Plan* would seek to maintain an edge over other countries in the same manner that the U.S. is ahead of these countries now in our ability to

protect our space systems. Our ability to defend and even withstand a threat to our space systems does include active and passive measures such as maneuver and hardening in addition to offensive capabilities described above.

GIVEN THE ABOVE WILL THE CURRENT NATIONAL POLICIES ENABLE US TO CONTROL SPACE?

The current policies of the United States enable us to control space as the dominant superpower but in a post Cold War and post "September 11th" age updated and clarified policies to clearly reflect our capabilities and intent are missing. Having a space policy for the nation should be that of the current administration, not one from two Presidential elections ago and address four key issues. First, an integrated space control architecture involving the systems and capabilities of the United States. Second, the active and passive methods of Defensive Counterspace should be stressed. Third, permanent and temporary effects of Offensive Counterspace should clearly be articulated to preclude a potential adversary from attacking our space capabilities. Finally, the policy should clearly convey the diplomatic consequences should our systems be attacked regardless of the aggressors status.

The space policy should also address the way we look at and describe space control. Currently the Department of Defense addresses Space Control when it should use the term Space Supremacy in the same context as air and maritime supremacy if we intend the opposing force (regardless of who it may be) to be incapable of effective interference. This would align terminology across the Department and accurately reflect our intent.

The policies we have today could be used against third parties. While they may become the source of problems in the future, the technology to defeat them is the same as that for our adversaries. The problem lies in what we are facing today in the Global War on Terror. Third party use of technology stopped when it was made known that there was a means to track them. While this is an example of a determined adversary who adjusted to our actions, the safety and survivability of space systems is not an absolute. Dedicated Defensive Counterspace, as recommended above, should protect our systems.

The diplomatic leverage of the United States is often overlooked in discussions involving space control. In many respects this has been the most successful method to achieve superiority. The most recent success with diplomacy has been "shutter control" as discussed above. While that is always an option, the means of controlling space are much the same as with any other international issue the United States is involved in. Offers for third party discussions and economic incentives on one end to sanctions at the other end are at the disposal of the government to achieve its space control goals short of the military option.

Diplomacy, however, cannot guarantee that actions against our space systems will not be taken. The diplomatic approach may not be unilateral in that our allies could be leveraged against the potential adversary to resolve the matter in our favor. Diplomatic opposition by our adversaries could also serve as a rallying cry for those opposed to American ideas and polices.

The most realistic way to look at what might happen is for the United States to state that it will take action unless an adversary is proven to be without involvement in matters affecting our space assets.

While the United States has the diplomatic and technical ability to control space, it is a question of when and under what conditions each option would be used. Planners and approval authorities must weigh the actions and reactions against overall outcomes. Kinetic and non-kinetic methods against space systems may achieve the same near-term results but those methods may create different second and third order effects. At what point will actions of an adversary justify the United States exercising control and by what measures are we willing to accept those effects?

The most likely exercise of American will to protect homeland would be the use of our military capabilities against an attack. When the art and skill of diplomacy fail, the protection of the homeland may involve military actions with adverse second or third order consequences. The political will would require the defeat of an adversary as early and as far removed from the United States as well as our allies and friends.

CONCLUSION

The United States remains the world's only superpower and the leader in space capabilities. Yet within the space club there are fewer than a dozen nations which have the capability to independently launch their own or another's satellite into space from less than two dozen sites worldwide. Besides the U.S., Russia and now the People's Republic of China can independently place mankind in orbit without depending on another country for support. Technology is permitting the rest of the world to catch up to America's current capabilities.

To remain the premier power we must take any and all steps to ensure we have access to and from space-based assets in times of peace and war. How we ensure that access depends on the political and military situations but the one publicly stated constant is that we will exercise our capabilities to control space by surveillance of activities for situational awareness, protection of friendly assets, preventing the hostile use of others space systems, or negating an adversary's use of space systems. This could be done by using any one or a combination of

the above missions which is in concert with President Bush's National Security Strategy to "deter threats against U.S. interests, allies, and friends; and decisively defeat any adversary if deterrence fails."[37]

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ENDNOTES

[1] John F. Kennedy, "Inaugural Addresses of the Presidents of the United States," 20 January 1961; available from <http://www.bartleby.com/124/pres56.html>; Internet; accessed 11 November 2004.

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