STRATEGY RESEARCH PROJECT

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CURRENT NATIONAL SPACE SECURITY TRENDS AND IMPLICATIONS FOR THE FUTURE

BY

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ABSTRACT

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Reliance and use by the military on various space-based forces have been on the increase during the past ten years, because of the increase of information required by and available to commanders. Although space has emerged as a vital political, economical, and military national interest, the development and deployment of replacement assets has been on the decrease. The only strategy being presented that addresses the needs of the military is for the outsourcing of space-based capabilities to the commercial sector. This action would require a move from solely government control and use of military satellite assets, to a system where private corporations, and possibly foreign governments, control assets and services the military requires. This paper addresses the question of whether the DOD's strategy to meet the military Services' space-based force enhancement needs are sound by describing why space and the resources in space are of such vital interest to the United States, presenting the extent to which the military relies on space systems for command and control of its forces, analyzing whether the outsourcing space capability strategy is a viable alternative, and looking at space system replacement trends and reorganization efforts currently underway within the Department of Defense.

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CURRENT NATIONAL SPACE SECURITY TRENDS AND IMPLICATIONS FOR THE FUTURE

Not so long ago the perception prevailed that the United States military consistently was out on the leading edge in the development and use of the newest technologies. One only had to look at who was involved in the early programs for computers and communications technology. This also holds true for space technology. Although the first rockets to be developed were for the use of nuclear warhead delivery, the U.S. Army Signal Corps entered the scene soon after to make use of space as a means to provide long range communications paths. However, since the dawn of the Information Revolution, there has been a steady decline in the Defense Department's lead in technological innovation. Corporate America is now the driving force for change and the DOD is adapting their solutions to its needs. Again, this also holds true for technologies used in space.

Under most circumstances this would not be considered a problem. However, over the last decade, space forces have emerged as a major element of U.S. military power and space has become a vital national interest. Reliance and use by the military on a variety of space-based forces have been on the increase during this same time because of the increase of information required by and available to commanders at all levels of strategic, operational, and tactical command. Although space has emerged as a vital political, economical, and military national interest and military commanders are increasingly relying on space assets for receiving information to command and control their forces, the development and deployment of replacement assets has been on the decrease.

This paper will outline the United States' dependence on space-based platforms and question the Department of Defense's (DOD) strategy to meet the needs of the armed Services by showing that the current DOD strategy is not comprehensive and endangers vital national security interests. The paper will described why space and the platforms in space are of vital interest to the United States' national security, demonstrate the extent the military relies on space-based systems, analyze whether a satellite system outsourcing strategy is a viable alternative, and review the current satellite replacement trends and DOD reorganization efforts.

US VITAL NATIONAL INTERESTS IN SPACE

Let's first look into the question of the vital national interests the United States has in space. In a world where surveillance satellites can discern extremely small objects from Earth orbit, the vital strategic potential of space must be equitably reflected in the government's policy positions and resource expenditures. Not only does space provide a lofty perch from which we

can monitor virtually anyone, it is also used as a relay by communications satellites for military and commercial purposes that are essential to U.S. security interests.

The Department of Defense space policy states that, "Space is a medium like the land, sea, and air within which military activities will be conducted to achieve U.S. national security objectives. The ability to access and utilize space is a vital national interest because many of the activities conducted in the medium are critical to U.S. national security and economic well-being. The globally interdependent information and knowledge-based economy as well as information-based military operations make the information lines of communications to, in, through, and from space essential to the exercise of the U.S. power."[1] This policy makes abundantly clear that the United States not only views space as a critical area to protect and defend, but also plays a significant role in both national defense, and corporate America. The evolution toward a global economy will depend as much upon the information lines of communications through space, as it currently does on the transportation lines of communications across the seas. Space systems are providing an ever-increasing role of importance and support for U.S. military, civil, and commercial activities. The flow of information has become a major engine of prosperity for the world and satellites are the primary means for its distribution. Because of this, security strategy and policies toward space must ensure the open and unencumbered use of space by the United States and its allies in order to support our other vital national interests. Inherent in this security interest is the corresponding ability to control or deny such access and use by adversaries.

ECONOMIC APPLICATIONS:

So why is space of such vital interest to the United States? Let's look at two sides of the economic picture.

Over the past two decades, space related companies have had dramatic growth. The space industry currently accounts for more than one million jobs worldwide and is expanding at a rate of 40,000 jobs a year. During the past five years, financial institutions have arranged private sector deals involving space worth more than $20 billion, with an estimated $65 billion more required to fund new commercial systems during the next five years.[2] Although there has been quite a bit of turmoil and uncertainty in space related industries, as exemplified by the dissolution of Motorola's Iridium system and the decline in INTELSAT market share of telephone traffic,[3] the growth will continue, although perhaps not at the pace originally anticipated. What is clear, however, is that telecommunications, global information systems, and financial services will require space platforms to relay data and link the nations of this world. As more Third World

countries step into the new age of technology, communications satellites will be the only economically viable solution for them to achieve global connectivity. Most cash-starved emerging nations do not have the resources to engineer and construct a communications infrastructure using terrestrial based equipment. Instead, the leasing of segments of third party satellite equipment is the most affordable solution for these countries.

This trend is clearly demonstrated when analyzing what has occurred in Africa over the past five to seven years. Instead of utilizing large and expensive communications satellites of the past, much smaller and far less expensive "micro-satellites" are today's preferred choice.[4] These satellites have not only made possible the dramatic increase in both telephone and Internet services to the majority of African nations, but also an equally dramatic decline in cost for these services. Five years ago telephone rates were as high as $8 per minute, today they cost on average about three cents per minute, depending on the country of origin.[5] Although this will be a decades long process, the growth of the industry is secure. This is because "...there are only about 14 million lines installed (in all of Africa) – fewer than the number of phones in Manhattan or Tokyo, and most of the lines are concentrated in the urban areas, while over 70% of the population is rural."[6] The trend towards information based economies will ensure the continued development and research into simpler and cheaper communications satellite systems, thereby increasing demand and availability throughout the continent.

Besides the importance of the space industry itself and its role in the economy of the nation, another important consideration is the role the industry plays in keeping the intellectual and technological development alive. Creating and maintaining cutting edge scientific exploration, research, and development is a vital part of any industrialized nation's security and an element of economic and military power.[7] A viable and strong space industry ensures that the United States maintains its technological lead over other nations. During the past decade, the U.S. military has demonstrated how advanced technological weapons can overpower an enemy force. These weapons are the primary reason for the extremely low U.S. casualties that the U.S. has suffered, especially when compared to those suffered by its opponents. This same technologically superior equipment is also important from an economic perspective. Although the U.S. "...currently has a lead in the systems integration skills required to produce communications satellite cost-effectively, it is losing its lead in major subsystems and components to Europe and Japan."[8] If not watchful, other nations will enter the market and chip away at the U.S.'s current predominance, possibly endangering the space industry's survival. If this were to occur, not only would there be economic ramifications, but security problems as well. Maintaining a strong and healthy space industry contributes a significant amount to the

nation's security. Its health and prosperity must be maintained as a high priority within any national strategic policy development.

The last, and most important, aspect of space to vital national economic interests is how it affects the United State's economic well-being. For a decade or more, the primary component of the U.S. economy has been the commerce of information. The fundamental underpinning of an information based economy is a nation's telecommunications infrastructure, comprised of terrestrial and space based communications platforms. In order to move information throughout commercial and governmental layers that use, manipulate, or disseminate information, space plays a significant role in providing the paths and relays in order to make such a system viable. Whether it is the transmission of financial data from one institution to another or providing breaking news of events half way around the world, satellite platforms are a primary, and often times the only means for information distribution. These activities are only two examples, but they are part of what makes up a major portion of the U.S. information economy's multi-trillion dollar annual gross domestic product. Yes, there are other mechanisms available that can provide the same services, but space is more flexible and responsive than any other means, especially for military applications.

MILITARY APPLICATIONS:

Although military activities in space began some fifty years ago, most observers agree that the dawn of the space age for the military did not come into its own until the Gulf War a decade ago. A number of both military and civilian communications satellite systems were developed in the 1950's. During this time the military played a key role in the research and development of the early satellite systems, but in later years commercial companies saw applications and commenced with programs of their own. Today, the military is much less involved in research and development than in its heyday. It has turned that function over to the space industry that is dominated by corporate giants such as Lockheed Martin, Boeing, Hughes, and many others, to whom it goes to develop and acquire the systems it needs.

However, as the military's role in the research and development of satellites has declined, its use has progressively increased. This is clearly evident when one reviews all of the critical functions the military performs in which space is a critical component.

- Navigation for individuals, vehicles, aircraft, and oceangoing vessels.
- Targeting for land, air, and sea-based platforms.
- Early warning for tactical and strategic missiles.
- Dissemination of imagery to ground commanders, fighter aircraft, and naval forces.

- Intelligence collection, processing and dissemination.
- Tactical enemy and friendly force disposition.

These are just a few of the applications where space is either the predominant or is an integral part of how the military employs its forces. Besides these offensive capabilities, space-based capabilities are also a critical factor in the deterrence of hostilities. "They helped to ensure that preparations for and the initiation of hostile actions will be discovered in a timely manner and they introduce an element of uncertainty into the minds of potential adversaries about whether they can achieve their aims."[9]

However, the most significant contribution that space resources are able to provide a nation's military is situational awareness, which has been described as the most revolutionary technology in the history of warfare.[10] Knowing where "I" am, where the friendly forces are, where the enemy forces are, increases velocity of action at every level. This increased velocity and availability of information combine to produce a new way of fighting and provides the United States with a significant advantage over any potential adversary in the world today.

THE ROLE OF SPACE WITHIN THE U.S. MILITARY

Since space is clearly of great importance to national security, we must maximize the effectiveness of functions carried out in that area. Unimpeded access to and use of space is, and will, remain a vital national interest and is central to DOD's ability to operate. Today U.S. forces successfully exploit space capabilities across the spectrum of military operations. A variety of activities are conducted from space and include detection of missiles inbound against the U.S. or its allies, enhanced command and control of U.S. forces, weapons targeting, global positioning capabilities, and a multitude of intelligence collection capabilities. Space forces contribute significantly to the military's ability to deploy around the world and to organize into a single, global force, able to deter and defend against major regional contingencies, engage in small operations, and lead peacekeeping operations.[11] Moreover, its value and range of uses will almost certainly increase over the next two decades. If the past decade is any indicator of just how much the military relies on capabilities accessed from space one only has to look at the Persian Gulf War, Somalia, the Bosnia and Kosovo Operations, and especially the current War against Terrorism. Everything from collecting and disseminating information and imagery, to targeting and bombing, uses some sort of space-based platform. Without these capabilities in space, the current levels of technological warfare could not occur. Space makes all of them possible.

Currently the United States is at the leading edge in exploiting space for military purposes. The U.S. military is also the world's only military with the mission and the capability to project power over great distances and extended time periods. However, the downsizing of the military services and reduction or loss of robust oversees basing infrastructure will present itself with unique problems for conducting operations away from sustaining bases and commanding and controlling forces. Space forces are in a unique position to be an enabler in the area of logistics and command and control (C2), by allowing a great deal of these functions to remain at their CONUS bases and execute their functions via capabilities provided from space.

There has also been change in the American style of war. The United States has come to place unprecedented emphasis on minimizing friendly casualties, infrastructure damage, civilian casualties, and even enemy casualties. Also, the kind of weaponry and command and control systems the US military is currently acquiring manifests a growing, if not unprecedented, dependence on computers and information. The point is not just the obvious one that modern weapon systems contain more computers and software than ever before. Instead, the important insights are that precision weapons require precision information to function as intended.[12] That precise information is collected and disseminated from space.

The magnitude of just how vast information requirements have grown over the past decade can be found in many sources. For example, RAND Corporation research on Desert Storm indicated that US forces used about 100 Mbps of data-rate capacity, of which about 75 percent was supplied by military satellites.[13] RAND also concluded that in 1991 a "great deal of intelligence information was not electronically transmitted to the theater because of insufficient bandwidth."[14] Estimates of the data rates US forces might need for two major theater wars vary almost an order-of-magnitude from 2.5 to 20 gigabits per second, depending on whether integrated-, functional-, or emerging-requirements databases are used.[15] No matter where one looks, it appears that American dependence on satellite communications is growing due to such trends as the increasing use of computers on the battlefield at all echelons, bringing real-time battle space awareness information to the "cockpit" (whether it's an airplane, track, or wheeled vehicle), growing use of reach-back, and the probability that American forces will have to fight in remote regions of the world lacking a modern communications infrastructure.

USE OF COMMERCIAL SPACE–BASED ASSETS

The use of space as a potential base for commanding and controlling our military forces has been an evolutionary process for more than four decades. With the explosive growth in technology over the past 10 years, its potential has become more definitive. The military is

relying more on space-based C3 assets. One only has to compare the diverse resources being used during each of the conflicts during the 1990's. The United States has the technological capability to make space-based command and control for the Department of Defense a reality today. The only barrier that stands in the way is the funds. The lack of funding to place hugely expensive platforms in space is keeping commanders from being able to make full use of all available C2 systems. To resolve this, Congress has dictated a policy strategy that mandates DOD makes use of commercial satellite resources. DOD followed Congress' lead and has pursued the policy of outsourcing space products to commercial entities with fervor. Some have wholly supported this effort citing the tremendous cost savings to government, while others have taken a more cautious approach by citing pitfalls in a policy that advocates commercial contractors provide all the services required by DOD.

This commercialization is being pursued not only in the area of communications, but also for imagery, weather, and geo-location. Let's now look at the commercial communications satellite issue that this policy supports and the possible strategic implications to the nation and the military.

SPACE POLICY IN REvIEW:

Since the 1950s with the launch of Sputnik, space has been viewed as key terrain for national security policy makers. From its earliest exploitation space was declared the ultimate high ground from which the nation could dominate both its enemies and friends.[16] Because of this, policies were implemented to ensure that this strategic terrain was developed and safeguarded. For many years, DOD was the predominant player in the exploitation of space and the technological innovator for developing the tools by which the nation could protect its national interests. It became an accepted norm that the military had to have control over the tools that play such a crucial role in defense of the homeland, the nation's economic well being, and pursuit of a favorable world order.[17] The Secretary of Defense made this clear in his recent space policy memorandum by stating that "...space-related activities shall focus on improving the conduct of national security space operations, assuring mission support and enhancing support to military operations and other national security objectives."[18] But this is nothing new. The Gulf War made it abundantly clear ten years ago by demonstrating the strategic importance of space-based assets not only for its missile warning, imagery, and global positioning capabilities, but more importantly, for the need to employ space as the area from which to receive and disseminate Command Control Communications Computers and Intelligence (C4I) information to all levels of strategic, operational, and tactical control.

THE CRUX OF THE ISSUE:

Every one of these capabilities clearly plays a vital role in how the nation uses its military as a tool of national power. The DOD has come to the conclusion that in order to provide dramatic increases in C2 coverage anywhere in the world at a moment's notice, space-based communication assets are the only way this can be accomplished. For the past seven years the military space community has studied and analyzed what resources DOD will need in order to meet the information needs of all the warfighters around the world. However, during these same years not enough funding resources have been dedicated to make the warfighter requirement become a reality. This has led to a band-aid approach for sustaining the aging satellites already deployed. Additionally, alternate methods to provide critical C2 information to commanders have been reviewed, which has led to the conclusion that it is imperative that we "...exploit the potential of information technologies and leverage other advancing technological opportunities..."[19] One option that has been suggested as a solution for accomplishing this is through the use of commercial communications satellites in times of emergency. This government effort is similar to the Commercial Reserve Aircraft Fleet program. Called the Commercial Satellite Communications Initiative (CSCI), the program was implemented in 1992 in accordance with directions instigated by Congress, instructing DOD to study its future communications needs.[20] This was the reason why DOD developed a policy directive that required the military to augment its communications satellite requirements using both domestic and international satellite services.[21] For the past five years, this commercial solution has picked up increased momentum by being heralded as ***the*** strategy for replacing the need for Military Satellite Communications Systems (MILSATCOM). This is only one example of the current policy the DOD is pursuing and is not limited to communications assets. The same policy is being applied to other government-owned space-based capabilities.

What has occurred during the past ten years is that fewer and fewer assets are owned or controlled by the military. Besides a lack of funding, a degradation of DOD's past leadership in technological innovations has forced it to rely more each year on commercial providers of space capabilities. This move and the fact that the civilian sector has more capacity and more modern platforms in space, has shifted the old paradigm of maintaining full military control of all space assets. That is why, at the direction of Congress, the DOD directed the Services and military agencies to utilize commercial satellites.[22] When viewed from a purely economic or resource perspective, commercialization makes sense. Since the U.S. military is not funding, designing, building, or developing advanced, state of the art space systems, the momentum is behind leveraging the more advanced commercial systems.

THE DILEMMA:

The only alternative to commercial reliance is for the DOD to allocate billions of dollars for a next generation space system. Although technology has made great strides in reducing costs, a brief study of the development and fielding cost of the newest MILSATCOM currently being deployed will provide a glimpse into the daunting challenges ahead. For example, the Milstar satellite system (originally designed to provide strategic C2 to the National Command Authority during a nuclear scenario) was developed in the 1980s at a cost of $1 billion for each satellite. However, to launch each one into space costs an additional billion dollars followed by millions of dollars to field tactical terrestrial equipment so that military forces can make use of its capabilities. In an era of reduced defense dollars, no wonder scarce resources have not been allocated to space C2 systems.

IMPLICATIONS TO NATIONAL STRATEGY AND SECURITY:

The deliberate shift in how the U.S. views strategic space resources and the implementation of policies on the question of ownership and control of strategic space-based capabilities seem simple when viewed only through the budgetary lens. But when analyzed in detail it becomes clear that there are hidden costs and risks:

- The risks of having a foreign company or government control U.S. strategic information dissemination means.
- The risk of an electro-magnetic pulse attack in space that could destroy all commercial satellites. (Many DOD systems have Electronic Magnetic Pulse protection.)
- The risk and cost if the commercial company goes out of business.
- Loss of sunk-costs when lease options are not used.
- The requirement to purchase or lease proprietary terminal equipment.
- Incurring increased cost for the fielding of multi-use terminal equipment owned by the military.
- The risk to military operations in areas where there is little or no commercial satellite capacity.
- The risk of obtaining landing rights of the satellite signal.
- The ever-increasing fees for satellite landing rights in a variety of countries.
- The risk of having landing rights denied during an operational mission, even with initial agreements secured.
- The increased risk of jamming threats to defenseless commercial satellites.
- Unavailability of bandwidth due to changing economic conditions of the commercial satellite industry

All of the above have serious implications to both the U.S.'s military and its national security strategy. In a scenario where vital national interests are at stake, the military C2 capabilities would be seriously degraded if access, interference, or destruction attempts were made at the highly vulnerable commercial systems. In an austere environment, the only means

of receiving and transmitting information to the deployed commander is through space. There are decisive risks involved in the current position. The commercialization policy was conceived in times of intense budgetary pressures. In their zealous attempts to make more efficient use of resources, the progenitors of the policy overlooked and did not consider the potentially devastating repercussions of this shortsighted course of action. The military can take steps and initiate cost savings that will make important changes in how it conducts business today. However, the reliance on only one source of a strategic military tool is fraught with too much risk. A balance of capabilities must be utilized, with the predominance being military. If it is true that "The ability to access and utilize space is a vital national interest... (and) ...military operations make the information lines of communications to, in, through, and from space essential to the exercise of U.S. power,"[23] then a policy that limits the options and flexibility for the military and strategic use of space, is critically flawed.

EQUIPMENT REPLACEMENT TRENDS AND REORGANIZATION EFFORTS

Even if the basic argument that DOD should not rely on commercial companies as the provider of space systems is not persuasive enough, then common sense would dictate that the government ought to at least keep existing force structure at current levels. However, all current indicators derived from published policy statements point to an increase in commercialization and a decrease in military controlled systems.

REPLACEMENT TRENDS:

One of the important lessons learned that came out of the Gulf War demonstrated the critical importance of enough communications capacity to conduct operations on the modern battlefield. This lesson has been relearned several times as demonstrated by Somalia, Bosnia, and Kosovo. These operations were conducted in an environment where the communications infrastructure ranged from limited to nonexistent. From the outset the communications planners of these operations had to scramble to relocate enough military communications satellites to support the vast amount of command, control, communications, and intelligence (C3I) requirements. In each of these instances, the military owned communications assets ran out very quickly. Commercial communications assets had to be acquired in order to meet the needs of the military forces.

Since this has been a recurring issue for over a decade, one would think that fixes would have been implemented by now. However, when one scrutinizes the efforts made by the Department of Defense during the same time, it becomes evident that only a minimum amount of attention has been focused on solving the lack of forces issue. The edict from DOD to

transition to commercial sources for space products can only be described as a band-aid approach. The problem of not enough space forces is being resolved counter-intuitively: Eliminate reliable military systems and replace with commercial vendor uncertainties.

The pace of new space force fieldings during the past decade has barely begun to address the actual demand from tactical commanders. The expansion of Milstar from purely a strategic nuclear scenario platform[24] to a capability to provide services to tactical ground and ship-borne forces, was a step in the right direction. However, this expansion was not initiated in order to provide increased capabilities to tactical units, but was forced on DOD by Congress for budgetary reasons. Milstar was costing billions more than anticipated and provided such a limited capability, Congress forced the military to expand its services.[25] Arguably the best of any of the efforts up to this point has been the Defense Satellite Communications System Service Life Enhancement Program (DSCS SLEP). It provides a several-fold increase to all users of the system, but tactical forces will see the most benefit. Commanders are now less likely to have to compete with strategic users for limited bandwidth. The only other noteworthy expansion of satellite capabilities is the Global Broadcast Service (GBS).[26] Its function is to offload data currently residing on DSCS, to a system that is dedicated to "pushing" large bandwidth data such as imagery, VTC, air tasking orders, etc., to units stationed worldwide and forces deployed to a specific theater of operations.

Although the above programs are relieving pressure off the existing communications infrastructure, they are not nearly enough to satisfy both user requirements and service provider capabilities. Demand from operational commanders and the potential products that could be provided them, far outstrip the current capability that military satellite systems can provide. In order to get a better understanding just how much bandwidth is required, analysis have been conducted based on requirements from the various unified commands. It is estimated that it would take up to twenty gigabits[27] of bandwidth to provide the various imagery, video teleconferencing, administrative/logistical, and various other data transfers from service providers to users. That is compared to the several megabit bandwidth that is currently available. A gap of this magnitude has major implications for the Defense Department.

There have been many discussions about future programs that address this problem. Two of these include the SHF Gapfiller program and the Advanced EHF satellite system, both of which are intended to narrow the gap between requirements and current capacity. However, looking at current trends of the ever-increasing bandwidth needs when compared to the DOD's capability to meet them, it is clear using current strategies, the gap can't be filled.[28] The question must be asked just how much technology will be made available to forwardly deployed

units. Neither the budget nor the willingness exists within the DOD to provide everything required by the warfighter. To make matters worse, the current Service transformations, especially within the Army, will only exacerbate the problem. The Army's vision of the transformed, lethal Army is heavily based and reliant on digitization; that is to say, making the most technologically advanced capabilities available to the lowest levels of the Army structure. This capability is extremely reliant on services provided via space-based platforms. The digitization bandwidth requirements will increase the gap even greater than the current forecasted levels.

The most significant barrier to closing the bandwidth gap is the budget. During the past decade tremendous pressures have been levied by Congress on the Defense Department to reduce its force structure; both manpower and equipment. Inevitably these pressures have manifested themselves in space programs. Programs such as SHF Gapfiller and Advanced EHF have been pushed back year after year due to lack of funding. Also, as often is the case, a developmental program is plagued by yearly budget cuts. An example of this is the recent U.S. House Appropriations Committee cut of $90 million from the Advance EHF program.[29] This 20 percent cut in the program will push back the program's availability to fill the gap.

REORGANIZATION EFFORTS:

But what about the willingness of the Defense Department to address this issue in the first place? As in most bureaucracies, turf battles and rice bowl issues are a fact of everyday life. The DOD Service rivalries are no exception. Several reorganization efforts have been undertaken over the past two decades to create more effective and efficient agencies, commands, and staffs in order to get a handle and focus on activities in space.[30] These have met with varying degrees of success, but when reviewed in their entirety, little evidence of progress can be observed and old bureaucracies still prevail. The current efforts by Secretary of Defense Rumsfeld indicate a willingness to address the issue at the highest levels. Guidelines and directives coming out of the Secretary of Defense indicate sweeping organizational changes of the Pentagon's space management structure.[31] These include the Air Force gaining milestone acquisition authority for the Defense Department's space programs. This shift is significant because it will give authority to approve programs for various phases, including system design, development, and production to the Secretary of the Air Force. Further, the Air Force will also be named executive agent for space to handle the bulk of national security space programs and have the authority to approve its own programs for progression through the acquisition pipeline.[32] These are significant policy and organizational

changes, whose impact remains to be seen. It is clear that change was inevitable and had to be made. Focusing and providing specific visions towards a comprehensive space architecture and designating what must be funded, are steps that can only lead to a more comprehensive and effective structure and focus. However, many are concerned with the significant role that the Air Force will be playing. Critics have already come to the forefront and expressed their issues. Some of these include:[33]

- weighing tradeoffs between space programs and similar or related air-, sea-, and ground-based programs
- other Services having little or no voice in space programs due to the Air Force's "strangle hold" on all areas of space development, acquisition, and management
- unless closely monitored, space could become focused on support to a single service, its style of warfighting, and its priorities
- decisions and policies are made that do not protect the joint nature of space forces

Besides policy and organizational changes, doctrinal changes need also be made. The Army has been far behind in its efforts to be a player and influence space policy. Although one of the largest consumers of data derived from space resources, the Army has published little doctrine in the use and application of space. But, more importantly, having a "seat" at the table where space policy is made, has been the most significant shortcoming, as described in the Army's own 1999 Science Board report.[34] Without a voice to fight for the C2 related applications, the Army will continue to have difficulties in providing its commanders with the information they so desperately want. The Air Force's doctrine has also not been fully updated to reflect the realities of space operations. For example, the Air Force holds that a single commander should control both air and space forces for the theater command; but on the otherhand, it acknowledges that United States Space Command, and not an air commander in theater, has operational control of space forces.

Obviously these issues must be resolved by each of the services in order to effectively and efficiently manage a scarce resource that is so vital to all levels of command. As the Services recognize the criticality of space operations, there is no doubt that inconsistencies in doctrine will be rectified.

CONCLUSION

This paper has attempted to demonstrate that the current DOD space strategy has not been well designed to address the nation's space needs by first explaining why space is a vital

national interest, describing the extent to which the U.S. military relies on space, providing an example of the flawed strategy, and reviewing satellite replacement trends and DOD reorganization efforts.

There can be no argument that space is a vital U.S. interest and key to national security. During the past decade the world has truly entered the space age and the United States is far ahead of any other competitor at this time. Products of all types originating from space have permeated throughout every facet of both economic and governmental structure and require proper management. Space needs to be looked at as an area that must be protected, through which the commercial lifeblood of the nation is conducted, from where military operations can be controlled and prosecuted, and must be protected. Taking all of this into consideration, one must agree that significant resources have to be expended in the exploitation and security of this vital interest. The United States cannot afford to fall behind in the technological development of space and allow other nations to obtain the lead. The U.S. military must retain its technological lead that currently allows it to prosecute any operation with such overwhelming advantage. The lead must be maintained at any cost, because falling behind will have serious implications to the nation's security.

Without space forces to provide Command Control and Communications (C3), the U.S. military could not fight the one-sided, low casualty wars it fights today. Every facet of military activity to include planning, fighting, protecting, sustaining, and reorganizing operational forces, relies in some substantive way on information either provided by or passing through space. Without communications satellites, the U.S. would command and control its military significantly different. Space based C2 products have evolved and inculcated themselves to such a degree that one could make the argument that reliance on space is the key component that has transformed the military to become the lethal force that it is today.

The outsourcing of space capabilities by DOD is a strategy that will be exposed in the near future as being shortsighted and having been considered only because of budgetary policies. Although it is true that fiscal realities play a key role in the decision making process, exposing a crucial vulnerability in the area of space is not where savings need to be made. Reliance on commercial providers for a variety of critical space-based functions for national security and C2 of our armed forces is decidedly not the most prudent course of action. The Department of Defense must support its base requirements with a core set of military owned and operated systems. Additionally, commercial vendors need to be available during surge requirements generated by contingency operations. The flawed strategy of outsourcing is being exacerbated by the lack of funding into replacing aging military space platforms caused by the

budget crunch. Without at least minimum military requirements provided by DOD owned and operated platforms, the nation is at too great a risk and at the mercy of the uncertainties imposed by private or foreign conglomerates. Based on the dangers described earlier, under no circumstance should the military rely solely on commercial vendors. In an era when information is considered the most valuable commercial and military commodity, the United States cannot afford to settle for a strategy that exposes the system to extreme vulnerabilities.

Lastly, the still emerging reorganization of the DOD space industry is giving indications that bureaucracies, service rivalries, and rice-bowl issues might be getting the upper hand. The Space Realignment Commission made ten recommendations in their 2001 report.[35] Two of these will not come close to solving management and operations of the space industry. The first is that the Air Force will be designated as the Executive Agent for Space to plan, program, and acquire space systems and the second is that the other Services will continue to establish requirements, research, develop, acquire, and deploy space systems unique to each. Both of these will only perpetuate the inequities generated by the current Title-10 structure such as evidenced in other programs such as the C-17.[36] The solution is to revamp Title-10 to allow organizations, other than the Services, to manage acquisition of products that are required by multiple Services. Single Service products should remain under management of a Service. However, for anything that is based on multiple Service requirements, other organizations need to become the acquisition manager. U.S. Special Operations Command exemplifies a working solution. They develop and acquire equipment to meet the specialized requirements for all Services under their jurisdiction. A similar construct could be established for U.S. Space Command as the Executive Agent for the acquisition of space forces. Unlike the Department of the Air Force, they have a vested interest in establishing the forces to meet all of the Services' requirements.

It is imperative that a sensible and workable solution be developed and agreed upon by all. Otherwise, progress to develop a cohesive space architecture will not be achieved and the United States' security, economic well-being, and military will suffer the consequences. By adopting all or some of the above recommendations, an efficient and effective space management program can be realized.

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ENDNOTES

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[14] Ibid., 19-20.

[15] Ibid., 18-19.

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[26] Department of the Navy, Naval Warfighter's Guide to Space (Dahlgren, VA: Fleet Support Team, 1 Nov 1997), 11.

[27] Johnson, Ibid.,18-19.

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[29] Brian Berger and Jeremy Singer, "Military Space Funds May be Off Priority List," Space News, (17 September 2001).

[30] This includes the establishment of U.S. Space Command as a CINC, organization of DUSD for Space and DOD Space Architect, activation of the three Services space commands, and a variety of other Directorates, Divisions, and Branches within the Joint Staff and Service staffs. Based on personal experience while working as Chief, MILSATCOM Operations, J3, United States Space Command.

[31] Amy Butler, "Rumsfeld Issues Long-Awaited Guidance on DOD Space Realignment," Inside the Air Force, (October 23, 2001): 1.

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[33] Ann Roosevelt, "Interservice Static in Space," Air Force Magazine (September 2001): 57-62.

[34] Department of the Army, Army Science Board Summer Study, "Prioritizing Army Space Needs, (Washington, D.C.: Department of Defense, July 1999), 58.

[35] Department of Defense, Commission to Assess United States National Security Space Management and Organization, (Washington, D.C.: Department of Defense, 11 Jan 2001), 30.

[36] All of the Services, but especially the Army, require strategic lift and submit their requirements in order for the Air Force to acquire resources to support the need. The problem is that the Air Force's focus is elsewhere; with their fighters and bombers. The result is that the Army's requirements are not being met. Since it looks like space operations will organize under the same Title-10 structure, the program will more than likely fall into the same trap and experience the same shortfalls as the C-17 program has for the Services.

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