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SPACE CONTROL AS A CRITICAL MISSION AREA: LEVERAGING SPACE-BASED ASSETS FOR THE JOINT COMMANDER

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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The existing organizational structure and doctrinal responsibilities at the operational level preclude the optimal methodology to fulfill Space Control mission requirements. Certain aspects of these critical mission areas, surveillance, protection, prevention, and negation, fall directly within the JFC's responsibility. Thus, the establishment of a Component Commander to perform this specific function will ensure continued space dominance by the United States' military.

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INTRODUCTION

The Report of the Commission to Assess United States National Security Space Management and Organization (otherwise known as the "Rumsfeld report"), issued on January 11, 2001, presents a rather scathing commentary on the overall status of the nation's and, specifically, the Department of Defense's performance and future in the realm of space. Since the former chairman of this esteemed commission, Hon. Donald Rumsfeld, is the Secretary of Defense designee for the new Presidential Administration, the subject of space will be thrust upon the top of the National Security agenda in the near future. The report highlights deficiencies of the current approach to space and even uses terms such as "Space Pearl Harbor" to warn of possible future consequences that could result from the current course of action.[1]

It is hard to believe that a mere ten years ago the U.S. so dominated the realm of space during Desert Storm that the conflict was commonly deemed a "space war" of unmitigated success. The initial use of the Global Positioning System (GPS) for navigation, the application of space-based missile warning system for the detection of Scud launches and the use of on-demand satellite communications throughout the region were highlights of the integration of space into military activities. While these particular successes in the Gulf War should not be overlooked, critical deficiencies regarding the use of space became readily apparent. The limitation of available communications capacity or "bandwidth" was the primary obstacle, which led to partitioning of this bandwidth intra and inter-theater.

[1] Commission to Assess United States National Security Space Management and Organization, The Report of the Commission to Assess United States National Security Space Management and Organization Executive Summary , (Washington: 2001), 13. This report is not to be confused with the other, earlier Rumsfeld Commission on missile defense that sent shockwaves around the U.S. about the lack of ability to thwart a ballistic missile threat. That report put National Missile Defense at the top of the National Security agenda much like this current report could do for space.

Furthermore, imagery products were too large to send electronically and, therefore, were shipped via conventional means that could take upwards of a week to reach the theater. This negatively impacted targeting and Battle Damage Assessment (BDA) timelines.[2]

In the years that followed, many of these shortfalls were addressed and mostly rectified. During Kosovo, imagery and other bandwidth intensive products were delivered via secure Internet. Additionally, commanders at several levels routinely held worldwide video teleconferences (VTC), for the coordination of planning and execution, something that had been impossible during Desert Storm. Yet even with these new capabilities, the Kosovo crisis identified further critical deficiencies with our current space-based resources. These include the lack of precise targeting, no true sensor-to-shooter capabilities and a disjointed space command structure. More importantly, as highlighted in the Rumsfeld Report, the U.S. dependence upon space to conduct military operations is at a level that make these space systems make potentially attractive targets.[3] This dependence on space-based assets for every aspect of military operations is already at the critical level and will only continue to increase.

In fact, the Chairman of the Joint Chiefs of Staff's newly published Joint Vision 2020 (JV-2020) identifies this and takes space from a behind the scenes "enabler" and plants it firmly at the forefront of our overall military vision for the future. It identifies that full spectrum dominance includes "access to and freedom to operate in all domains - space, sea, land, air and information."[4] Further, information superiority, inherent to this dominance, is

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[2] The information contained here was observed by the author during this timeframe.

[3] The Report of the Commission to Assess United States National Security Space Management, 8.

[4] Joint Chiefs of Staff, Joint Vision-2020 (Washington: 2000), 8.

dependent upon space as the primary medium in which this information will flow. JV-2020 also promotes "the evolution of new fundamental areas, such as space operations" to make this a possibility.[5]

Therefore, since joint military operations will become further dependent upon space, the Joint Force Commander (JFC) must determine the optimal approach for maintaining assured access to space systems while, at the same time, denying the enemy the use of space. This is the foundation of Space Control.

SPACE CONTROL

The most recent National Space Policy, published in 1996, delineates the Civil, National Security, and Commercial space guidelines and specifically identifies the overarching goals of this policy as national security strengthening, economic enhancement, space exploration, and private and international involvement. Further, it states that "access to and use of space is central for preserving peace and protecting national security as well as civil and commercial interests."[6] These goals form the whole concept behind strategic Space Control. The Department of Defense (DoD), as the lead agency for space national security interests, has published a specific space policy that further outlines responsibilities across the defense organization spectrum. This document further expands the definition of Space Control as:

> Combat and combat support operations to ensure freedom of action in space for the United States and its allies and, when directed, deny an adversary freedom of action in space. The space control mission area includes: surveillance of space; protection of U.S. and friendly space systems; prevention of an adversary's ability to use space systems and

[5] Ibid, 19.

[6] The White House National Science and Technology Council, National Space Policy (Washington: 1996), 1.

> services for purposes hostile to U.S. national security interests; negation of space systems and services used for purposes hostile to U.S national security interests; and directly supporting battle management, command, control, communications, and intelligence.[7]

Embedded within this definition is the fact that Space Control covers the entire spectrum of space operations. This includes not only the on-orbit space assets, but also the associated ground elements and the communications linking these two mediums.

Based upon this definition, and the fact that it deals with issues and assets commonly managed and organized by national level entities, Space Control is thought of as an essentially strategic concept. Further, there is no real definition concerning Space Control on the operational level. However, Space Control has real implications for and potential impacts upon operational level commanders.

In determining the importance of Space Control, it is possible to apply the basic principles of Operational Art to frame this mission area for the operational commander. The use of space-based assets transcends all levels of war. Satellites may be utilized at the strategic, operational and tactical level at the same time and access to these assets may be limited. Thus, the JFC must understand Space Control mission areas to ensure optimal use of the resources.

JV-2020 visualizes the principle of "mass" as totally redefined and beyond the traditional superior numbers of personnel or weapons platforms intrinsic in the annals of warfare. This new concept of "massing of effects" from dispersed elements makes the importance of space control all that more important. Thus, the operational factors of space, time and forces are all re-defined in this new warfare methodology. The operational commander can establish immediate connectivity in an immature theater of war with these

[7] Department of Defense, Space Policy, Directive 3100.10 (Washington: 1999), Enclosure 2, p 23.

space-based assets. In remote areas without the communications backbone that could support a large operation, there is no time to establish this connectivity from the ground up, therefore, this type of "plug and play" methodology of communications connectivity not only saves valuable time, but also increases the economy of force and simplicity of the operation.

The dispersed nature of forces needed to produce these massed effects brings about the problem of synchronization. By controlling space, GPS allows for these dispersed units to self-synchronize using precise timing.

These same principles for full spectrum dominance also apply to an adversary. By denying the enemy's use of space, the JFC can significantly degrade the enemy's ability to optimally employ forces and weapons. These are but a few examples of the importance of Space Control to the JFC. An even more pressing issue centers on how our military, strategically and operationally, is organized for space.

WHO'S IN CHARGE?

This question is valid since it applies to all levels of Space Control. At the strategic level, the Rumsfeld Report again identifies that the U.S., especially the DoD and the Intelligence Community, is not organized to meet future national security space needs due to the sheer number of disparate space organizations.[8] The United Stated Space Command (USSPACECOM) is designated as the single point of contact for military space operational matters and the primary supporting CINC in terms of the overall space effort including that of Space Control. Yet, other governmental organizations, some of which are not in the DoD, also control certain aspects of space assets.[9] To complicate matters, for many satellite

[8] The Report of the Commission to Assess United States National Security Space Management, 9.

[9] Department of Defense, Space Policy, Enclosure 2, p 19.

constellations, USSPACECOM performs command and control of the physical satellite hardware, but does not have operational control of the mission payload or the data derived from that satellite. The Intelligence, Surveillance, and Reconnaissance (ISR) satellite infrastructure provides a telling example of the convoluted bureaucracies involved in the control of satellites. USSPACECOM, the National Reconnaissance Office (NRO), the National Security Agency (NSA) and the Central Intelligence Agency (CIA) all control some aspect of these ISR assets. Another example is that the DoD weather satellites have migrated with those under the control of National Aeronautical and Space Administration (NASA).[10] Therefore, with no centralized control there is no overall unity of command of space assets, which makes it difficult for the JFC to determine to whom to go for support to execute Space Control within a certain Joint Operating Area (JOA).

Consequently, it should then be no surprise that this lack of unity at the strategic level translates into a similar lack of unity at the operational level. But, with the advent of space systems that are critical to military operations, it is clear that Space Control is evolving into a critical mission area for the JFC. However, space is still looked upon as a stovepipe and not considered an aggregate of capabilities encompassing the functions of the entire joint staff. A telling example of this is the lack of a coherent, synergistic approach is that the document intended to consolidate all of this information that a JFC needs, the Joint Doctrine for Space Operations (JP 3-14), has been in draft form for over ten years and has yet to be released.[11] The fact that the geographic CINCs have had the responsibility of combatant command of assigned forces since the Goldwater-Nichols DoD Reorganization Act of 1986 and that the

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[10] Howell M. Estes III, "Space and Joint Space Doctrine", Joint Force Quarterly (Winter 1996-97): 62.

[11] "Joint Doctrine Status", Joint Doctrine Web Site, <http://www.dtic.mil/doctrine/qstatrep.pdf>, 22 December 2000.

delineation of space operations and space forces in a formal doctrinal publication has yet to be published shed light into the Rumsfeld Report's concerns.

Therefore, with no common framework each CINC and associated JFC does not have a road map for the use of space-based systems in support of theater objectives. Moreover, this use of space goes well beyond the simple application of data received from satellites, but must address the pre-planning of the integration of space assets and forces within the JOA, coordination requirements for Protection, Prevention, and Negation of these assets and the training of these forces within the entire joint organizational structure.

This is not to suggest that the CINCs have not taken measures to try to enhance Space Control within their AOR. USSPACECOM has assigned a Liaison Officer (LNO) to geographic CINC staffs to facilitate integration of space capabilities into the planning, training, operations and execution cycle. Further, upon request from the CINC, JFC or LNO, USSPACECOM can deploy a Joint Space Support Team (JSST) to the theater in order to bolster the staff's ability to incorporate space into the joint campaign plans.[12] Finally, other DoD and national agencies deploy to form a National Intelligence Support Team (NIST) to act as a liaison and enhance the use of space assets within the theater.[13] Members of these teams are only in an advisory role and have no authority when it comes to Space Control.

These teams are extremely helpful during ongoing operations by optimizing the use of space-derived data and providing a conduit for information flow between the parent organization and the JFC. However, beyond the single LNO at the CINC level, these teams

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[12] Joint Chiefs of Staff, Joint Doctrine for Space Operations, Preliminary Coordination Draft, Joint Pub 3-14 (Washington: 14 August 2000), II-5.

[13] Joint Pub 3-14, II-6.

are not normally called upon during routine exercise and training evolutions. Thus, during a crisis, these teams form, deploy and operate on an ad-hoc basis. Therefore, during deliberate theater planning or the early portions of crisis planning (before these teams can form and get in theater) the JFC staff must determine the best methodology to conduct Space Control.

Another resource for the JFC is found in Annex N of the Joint Operations Planning and Execution System (JOPES), Volume II. It provides a template for delineating the required space operations support for joint operations plans and covers the entire range of space activities to help the JFC determine what general concepts of space activities support the operational plans. However, it does not help the JFC resolve how to accomplish this mission. For example, in the section of Space Control, Annex N dictates the identification of "space related activities...that ensure friendly forces and deny enemy forces the unrestricted use of space and space assets."[14] Therefore, the JFC needs to determine the correct method to perform Space Control for the respective operational plans. These plans may need to be written before augmentation by the national space teams designated above reach the theater.

SPACE CONTROL MISSION AREAS

The fact remains that the JFC must consider Space Control as a critical mission area in order to fully optimize military activities within a theater. Although some portions of Space Control fall under the purview of strategic entities, the theater commander must understand these aspects and ensure support and execution of Space Control requirements at that level. Other portions of Space Control fall firmly in the JFC's realm of responsibility. What follows are the specific tenets of Space Control and the methodology in which the JFC can accomplish them or leverage outside agencies to do the same.

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[14] Joint Chiefs of Staff, Joint Operation Planning and Execution Systems, Volume II, 3122.03A (Washington: 31 December 1999), Annex N, N-3.

SURVEILLANCE

Surveillance of space is one of the prime responsibilities of SPACECOM and is defined as the ability to detect, track, characterize, classify, catalogue and monitor all orbiting objects in space utilizing terrestrial assets.[15] These objects could be space debris, commercial satellites or foreign intelligence assets. While the JFC has no inherent ability to accomplish this mission, the results are very important. Specifically, the staff J2 can liaison with SPACECOM, via the CINC's SPACECOM LNO if appropriate, or directly, to determine the precise time that these foreign surveillance assets are orbiting overhead the JOA. Thus, the JFC can maintain electronic emission control or utilize Cover, Concealment, and Deception (CC&D) techniques to diminish an adversary's operational intelligence.

An even more important aspect of surveillance, which is not expressly contained in the SPACECOM definition, is that of Theater Missile Defense (TMD). SPACECOM operates the Defense Support Program (DSP) constellation that detects ballistic missile launches and disseminates warning information directly into theater. Specifics about this system are beyond the scope and classification of this paper, but this process is very effective for alerting operational assets in mature theaters such as those operating near Iraq.[16] However, in an immature theater the JFC must create the TMD warning communications, protocol and associated infrastructure from the ground up. The JFC must formally request this support from SPACECOM and include "specific threat assessment, location, and type of threat, duration of support requested, primary and secondary communications medias

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[15] U. S. Space Command, Long Range Plan: Implementing USSPACECOM Vision for 2020 (Peterson Air Force Base, CO: 1998), 29.

[16] This information comes from personal experience by the author during his tenure working with related systems.

preferred for reporting, (and) false reporting tolerance."[17] Therefore, the JFC staff must have the requisite expertise to determine the data for this request and to implement the results.

PROTECTION

The protection of U.S. and friendly space assets is simply the application of active and passive defensive measures to ensure space systems operate as planned.[18] This concept includes protection of space-based assets, which is a strategic function, and protection of terrestrial sites and communications links within the JOA, which is the JFC's responsibility. This task is accomplished in the same manner as force protection for the entire joint force with a few extra considerations.

The JFC may need to consider protection of commercial assets within the JOA due to the proliferation of commercial space ventures. With revenues from these activities projected to reach over $100 billion this year, the commercial implications of this discipline are very lucrative.[19] Communications satellites have historically been the concentration of commercial space application, with the advent of remote sensing (such as imagery) as a moneymaking opportunity, many private companies are entering this field. For example, The French SPOT and American SpaceImaging companies are well-established systems that provide very good imagery to anyone with a credit card.[20] While the U.S. has its own military imaging system, our allies and friends utilize these other systems. Thus, it is

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[17] Joint Pub 3-14, A-1.

[18] U. S. Space Command, 34.

[19] A.T. Kearney, State of the Space Industry: 1998 Outlook (Bethesda, MD: Space Publishing, 1998), 9.

[20] "Frequently Asked Questions", Space Imaging Web Site <http://www.spaceimaging.com> 15 January 2001. There are many other sources to obtain imagery products such as: U.S. Landsat, Canada's Radarsat, European Space Agencies ERS satellite, Japan's JERS Imaging Satellite, and the Indian Remote Sensing system. SpaceImaging can deliver an image within a day dependent upon the satellite's orbit or what images they hold in their database.

incumbent upon the JFC to help protect these assets if any portions of the ground systems or communications nodes reside within the JOA. Further, the JFC, if unable to obtain the imagery support desired from U.S. governmental sources, could purchase these products from these companies. This may be especially valuable for a low-level conflict in an immature theater when higher priorities in other theaters may preclude support to the JFC or if the imagery format is incompatible or too bandwidth intensive for the JFC's communications capabilities. Therefore, the staff J2 must realize that these possibilities exist.

Another consideration for the JFC is cyber-attacks against these friendly space systems. Defending against cyber-attacks and determining the culprit are very difficult accomplishments since the attack could be accomplished by anyone anywhere. These facts are exacerbated by the fact that since space systems operate in an environment subject to immense radiation, which can induce an electrical malfunction similar to that of a cyber-attack, it may be impossible to determine if the satellite was even truly attacked. Therefore, assuming that this cyber activity did occur within the JOA, theater assets could play a significant role in thwarting such attacks by monitoring the enemy's information operations (IO) capabilities.[21] Also, the JFC must liaison with SPACECOM, FBI, CIA and NSA since they all have responsibility for some aspects of Computer Network Attack (CNA) and Computer Network Defend (CND).[22] The JFC must consult with these entities before any

[21] While it is a big assumption that computer attacks will come from within a JOA, during the Kosovo crisis many of the cyber activity was traced back to Serbia.

[22] SPACECOM is the executive agent for CAN and CND for the DoD. IO, much like Space Control, has many hands in the pot both strategically and operationally.

military action because once hostilities commence any successful cyber-attack would lead to devastating consequences to military activities dependent upon satellites.

PREVENTION

Whereas surveillance and protection provide freedom of action for U.S. forces, prevention is defined as "employing measures to prevent an enemy's use of data or services from U.S. and friendly space systems for proposed hostilities to the U.S."[23] Prevention is mainly a diplomatic issue and is conducted at the national level, however a geographic CINC may become involved at the request of national agencies or a JFC if the assets exist within the CINC's AOR.

The controversy regarding prevention occurs when the U.S. attempts to impose "shutter control" commercial satellite systems. As with the imagery systems described above, it is possible for an enemy, such as China or even Usama bin Laden's terrorist organization, to purchase products from a U.S. company that can provide the disposition of forces within a JOA. While this topic is beyond the scope of this paper, it is imperative that the JFC understands that this capability exists.

NEGATION

The JFC pays a significant role in the negation aspect of Space Control since military action is intrinsic to its ability to deny, disrupt, deceive, degrade, or destroy the enemy's space capabilities.[24] While at this time a JFC may not have the capability to attack an enemy's space-based assets, military action against the ground sites and communications links is achievable. If the enemy does have an indigenous space program, then most of the

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[23] Joint Pub 3-14, IV-4.

[24] United States Space Command, 42.

negation targets would lie within the JOA. The JFC can direct aircraft, Tomahawk cruise missiles or Special Operations Forces to attack and destroy these ground sites. Potential targets include the physical ground control node, launch sites, computer centers, analysis nodes, communications link facilities, and supporting power grids. Further, in-theater jamming of the communications links is a means to temporarily deny and disrupt the enemy's use of the satellite systems. However, the JFC staff must initiate a complex nodal analysis to determine the correct targets that would have the most lasting impacts.[25]

A major complication of negation falls back to the prevalence of commercial satellite systems. As discussed, an adversary may not have an indigenous space program, but data from commercial imagery, communication and even weather is easily obtained. Further, even though GPS is owned and operated by the DoD, its services are free to the entire world. Thus, an enemy can use this navigation data to coordinate troop movements or deliver weapons against the forces within the JOA.[26] Negation of these assets must be incorporated into the Crisis Action Plans in order to optimize force protection, but the ultimate decision to pull the trigger would fall to the National Command Authority. Therefore, the entire Chain-of-Command must expressly clarify the Rules of Engagement (ROE) for this type of act before the start of any hostilities.

To further muddy the waters, commercial satellite assets that an enemy employs may potentially be used by the theater forces for communications augmentation. Without a precise understanding of the entire space picture, one misplaced Tomahawk missile could

[25] The Joint Warfare Analysis Center (JWAC) is tasked with this mission and can be a tremendous asset.

[26] The decision to allow free and unencumbered access to GPS data is highly debatable and could be the subject of an entire paper.

destroy a power station that supported a communications relay node that the JFC relies on for additional communications bandwidth.

The above example highlights the difficulties with Space Control in the 21st Century. With the increase in globalization and associated commercial satellite systems the virtual boundaries between friend and foe are at times non-existent. Therefore, the importance of these tenets of Space Control is only magnified since they directly support the JFC's ability for successful battlespace management and to fulfill mission requirements.

RECOMMENDATIONS

The operational use of space has matured significantly since Desert Storm as exemplified by the increased communication connectivity and integration of GPS into weapons systems. Just the fact that a Carrier Battle Group can now deploy with enough satellite bandwidth to remain tethered to the internet, to access and retrieve data from national intelligence databases, and to allow worldwide VTCs with virtually any command authority proves this. However, these examples are more a reflection of the state of the world's technological growth vice a success story for the military. Actually, the military has lagged behind in the application of space in military activities and updated doctrinal changes. The Rumsfeld report highlights these problems.[27]

It is easy to consider Space Control as a primarily strategic function, but with the dependence of satellites upon successful military operations the JFC cannot sit back and let national agencies (in this case SPACECOM is truly a national agency) determine the correct methodology and asset allocation for theater Space Control. The following recommendations

[27] The Report of the Commission to Assess United States National Security Space Management, 29.

would allow for a further integration of Space Control into joint activities of the operational commander.

As shown, Space Control functions cross the entire spectrum of the JFC staff. While the Draft JP 3-14 identifies the J3 as the coordinating activity for space on the staff, the Air Force Basic Doctrine states that the Joint Force Air Component Commander (JFACC) is "responsible for air and space, when the JFC desires that an Air Force Commander serve in that capacity."[28] The obvious problem with this doctrine is that if an Air Force Commander is not the JFACC, will this other person assume the duties of Space Control. Having no clear doctrinal responsibility for space within the Joint Staff could lead to the mishandling of space resources. In essence the JFC acts as the Component Commander since the decisions of deconfliction of space resources and Space Control mission requirements fall outside the realm of the J3 or JFACC and must be coordinated across the entire joint staff.

Therefore, it is clear that a designated Component Commander outside the J3 and mirrored on the principles of the JFACC would alleviate redundancy and confusion. If this were to occur, the NIST and JSST would have a single point of contact on the staff that has been a part of the joint force since the inception of activities. Further, the LNO at the CINC level does not deploy in theater with the JFC and may even be coordinating with multiple JFCs under a CINC's control. The LNO still retains an important function of liaison for the CINC with the JFC or back to SPACECOM.

The geographic CINC could retain these space cognizant personnel to fill Component Commander billets as operational necessity dictates. The argument that these billets should reside with SPACECOM is valid only if their purpose is to keep Space Control at the strategic level and outside the CINC's purview. To optimize space for direct military actions

[28] Air Force, Air Force Basic Doctrine, Air Force Doctrine 1 (Washington: September 1997), 68.

at the operational level this must not occur. The geographic CINCs would be better serviced with a cadre of personnel that could perform not only the Component Commander function, but also deliberate planning, exercise integration and assets deconfliction. This type of advanced, dedicated staff work would pay dividends at the onset of hostilities.

The drawback of this recommendation is that very few core-component personnel exist. JV-2020 cites this exact problem and declares that new disciplines "such as space operations...will require development of appropriate career progression and leadership opportunities for specialists..." in this field.[29] Further, the Rumsfeld Report details that one of the five matters of key importance that must be addressed now by the highest echelons is that the "U.S. Government needs to play an active, deliberate role in expanding and developing the pool of military and civilian talent" in space related fields.[30]

The military's use of space will continue to expand beyond the current unprecedented levels. The fact that the U.S. holds a decisive edge in military technology is also without question. However, with the advent of globalization and the burgeoning commercial satellite market, our adversaries are closing the gap without spending untold billions of dollars on an indigent space-based system. An even more important aspect of space is that the U.S. has the most to lose if a catastrophic event such as a nuclear detonation in space took place, which would debilitate satellite access for an indeterminate amount of time. Perhaps a "Space Pearl Harbor" truly is on the horizon.

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[29] Joint Vision-2020, 19.

[30] The Report of the Commission to Assess United States National Security Space Management, 10.

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