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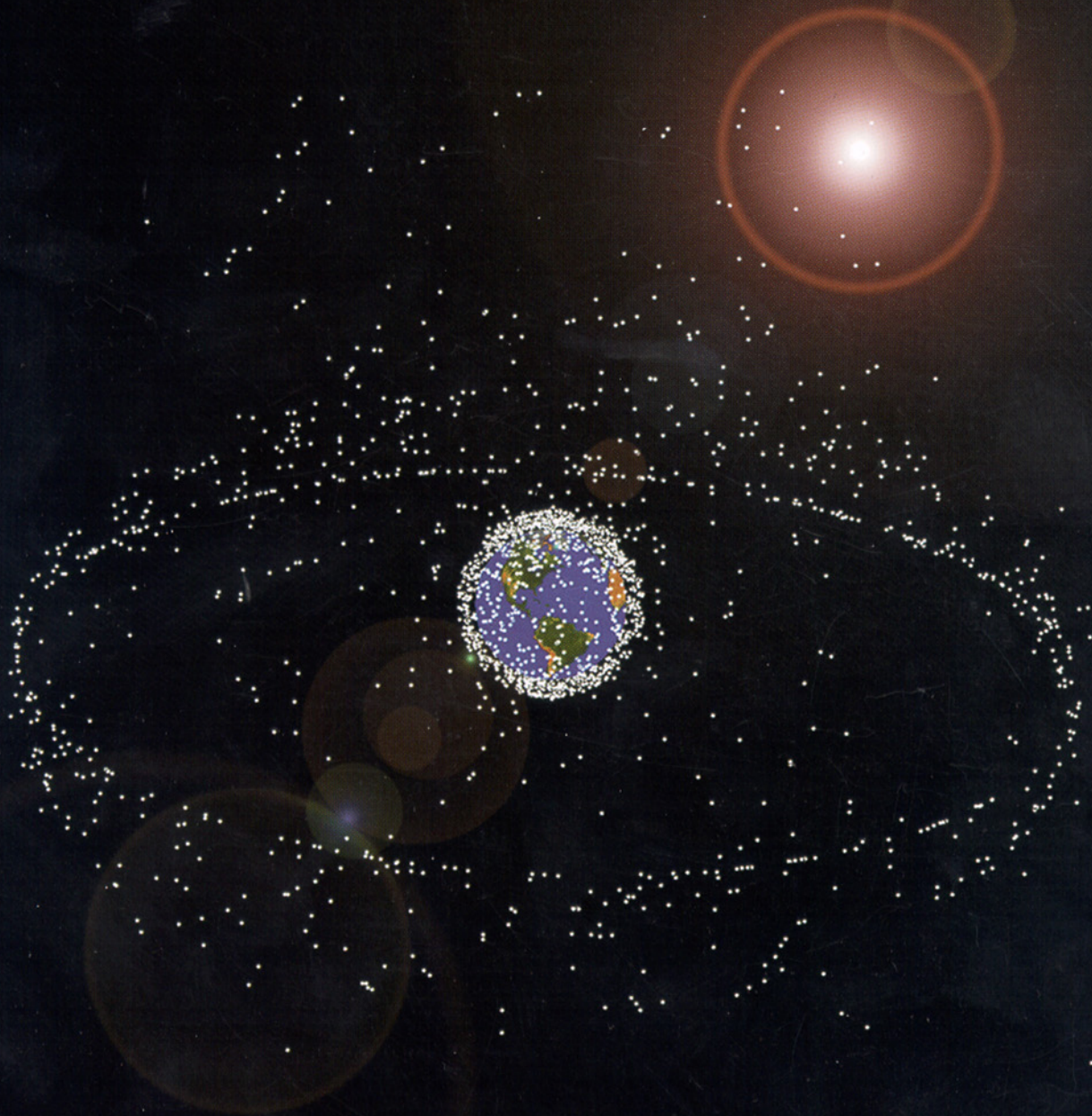
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Report of the

**COMMISSION TO ASSESS
UNITED STATES NATIONAL SECURITY SPACE
MANAGEMENT AND ORGANIZATION**



EXECUTIVE SUMMARY

Pursuant to Public Law 106-65
January 11, 2001

Report of the

**COMMISSION TO ASSESS
UNITED STATES NATIONAL SECURITY SPACE
MANAGEMENT AND ORGANIZATION**

EXECUTIVE SUMMARY

Pursuant to Public Law 106-65
January 11, 2001

Commission to Assess United States National Security Space Management and Organization

PO BOX 33633
WASHINGTON DC 20033-0633

Hon. Donald H. Rumsfeld *
Chairman

Hon. Duane P. Andrews
Mr. Robert V. Davis
Gen. Howell M. Estes, III, USAF (Ret.)
Gen. Ronald R. Fogleman, USAF (Ret.)
LTG Jay M. Garner, USA (Ret.)
Hon. William R. Graham

Gen. Charles A. Horner, USAF (Ret.)
ADM David E. Jeremiah, USN (Ret.)
Gen. Thomas S. Moorman, Jr., USAF (Ret.)
Mr. Douglas H. Necessary
GEN Glenn K. Otis, USA (Ret.)
Sen. Malcolm Wallop (ret.)

January 11, 2001

Chairman
Committee on Armed Services of the U.S. House of Representatives
Washington, DC 20515-6035

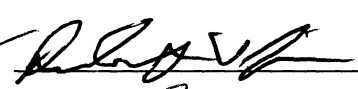
Dear Mr. Chairman:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

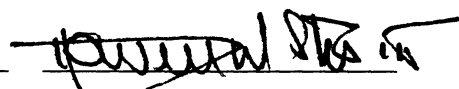
Respectfully submitted,



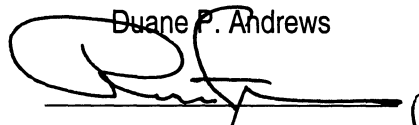
Duane P. Andrews



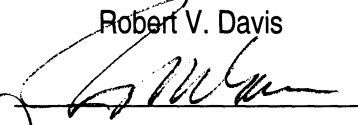
Robert V. Davis



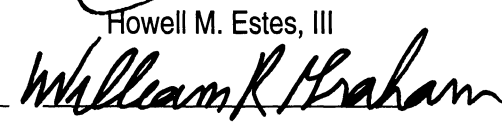
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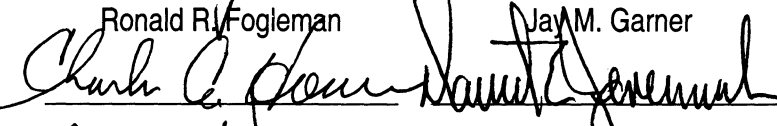
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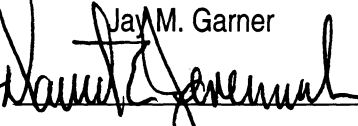
Jay M. Garner



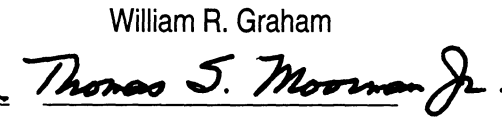
William R. Graham



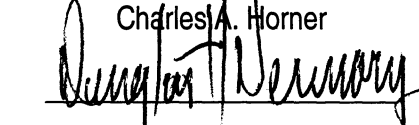
Charles A. Horner



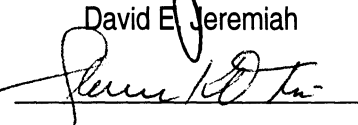
David E. Jeremiah



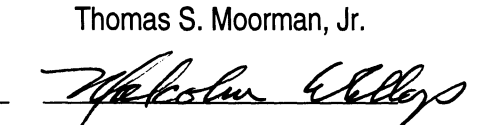
Thomas S. Moorman, Jr.



Douglas H. Necessary



Glenn K. Otis



Malcolm Wallop

* The Honorable Donald H. Rumsfeld served as a member and chairman of the Commission from its inception until December 28, 2000, when he was nominated for the position of Secretary of Defense by President-elect George W. Bush.

Commission to Assess United States National Security Space Management and Organization

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WASHINGTON DC 20033-0633

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Chairman

Hon. Duane P. Andrews
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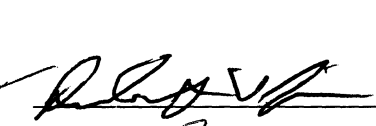
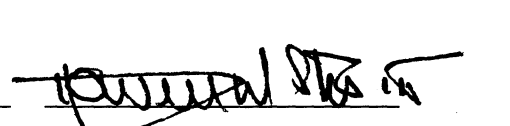
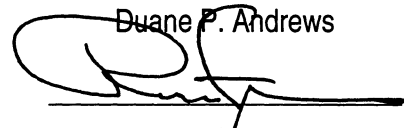
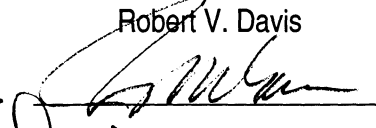
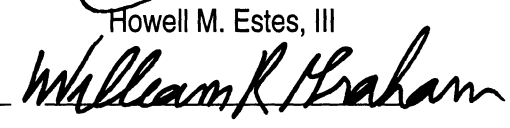
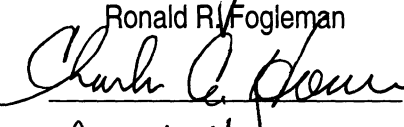
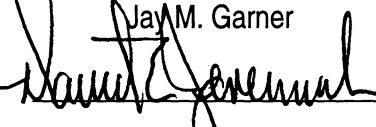
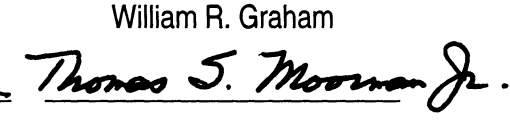
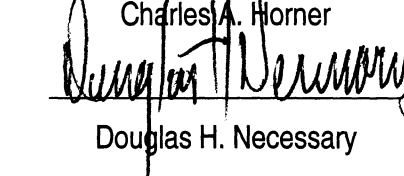
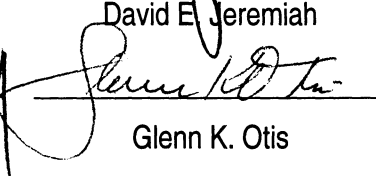
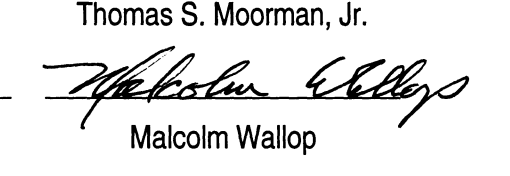
January 11, 2001

The Honorable Ike Skelton
Ranking Minority Member
Committee on Armed Services of the U.S. House of Representatives
Washington, DC 20515-6035

Dear Mr. Skelton:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

Respectfully submitted,

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 Ronald R. Fogleman	 Jay M. Garner	 William R. Graham
 Charles A. Horner	 David E. Jeremiah	 Thomas S. Moorman, Jr.
 Douglas H. Necessary	 Glenn K. Otis	 Malcolm Wallop

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Commission to Assess United States National Security Space Management and Organization

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WASHINGTON DC 20033-0633

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Chairman

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Gen. Ronald R. Fogleman, USAF (Ret.)
LTG Jay M. Garner, USA (Ret.)
Hon. William R. Graham

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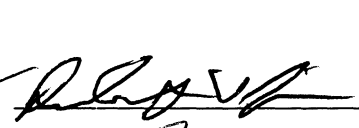
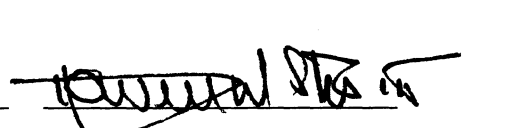
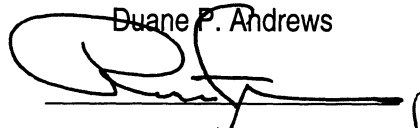
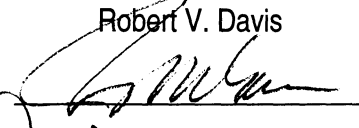
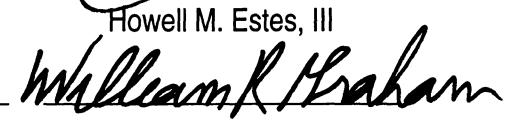
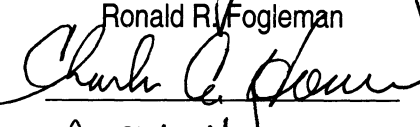
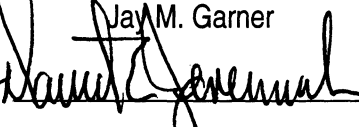
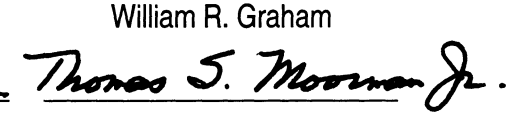
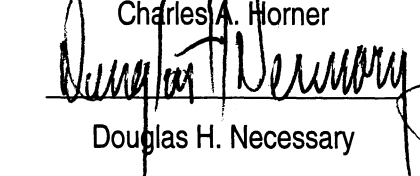
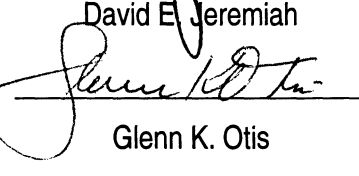
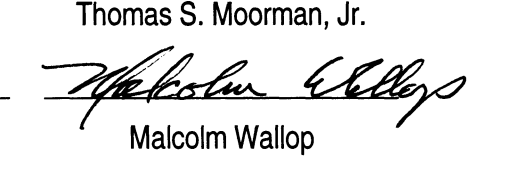
January 11, 2001

The Honorable Carl Levin
Chairman
Committee on Armed Services of the U.S. Senate
Washington, DC 20510-6050

Dear Mr. Chairman:

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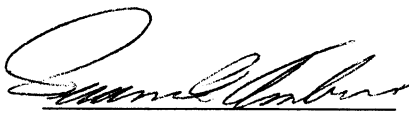
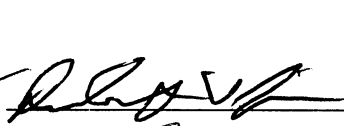
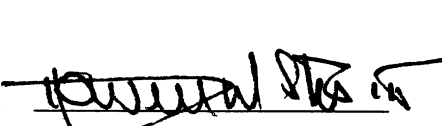
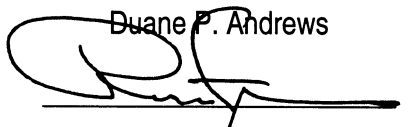
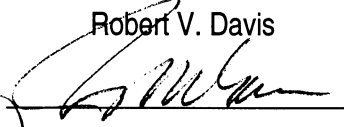
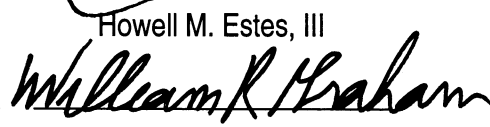
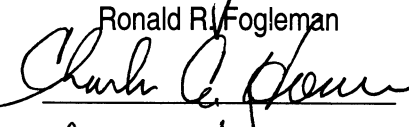
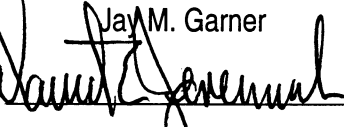
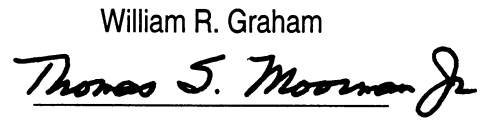
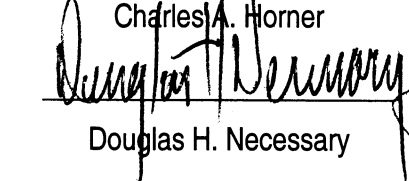
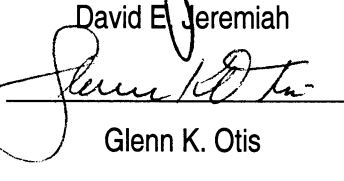
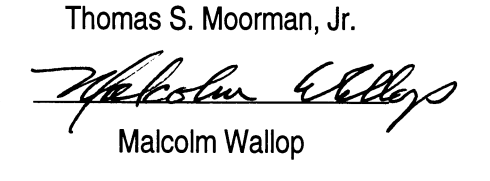
January 11, 2001

The Honorable John Warner
Ranking Minority Member
Committee on Armed Services of the U.S. Senate
Washington, DC 20510-6050

Dear Senator Warner:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

Respectfully submitted,

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 Ronald R. Fogleman	 Jay M. Garner	 William R. Graham
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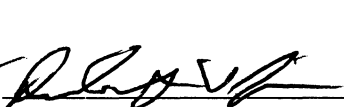
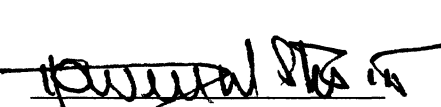
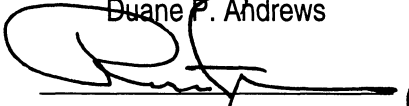
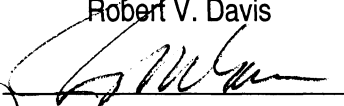

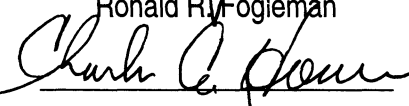
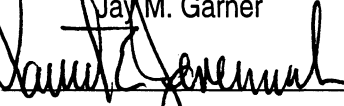
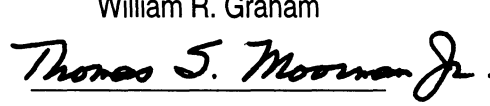
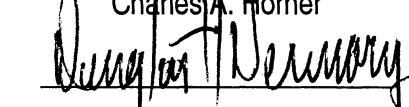
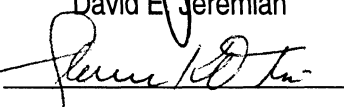
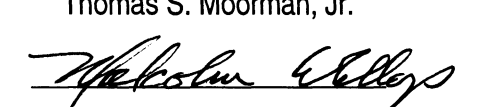
January 11, 2001

The Honorable J. Dennis Hastert
Speaker of the United States House of Representatives
Washington, DC 20515

Dear Mr. Speaker:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

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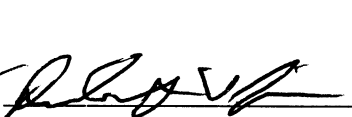
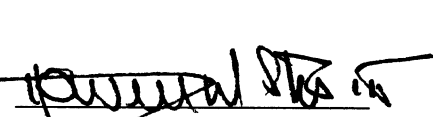
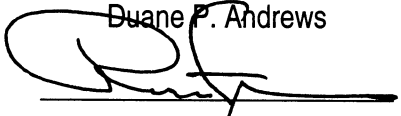
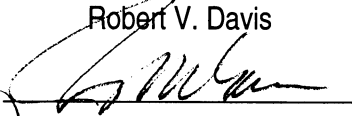
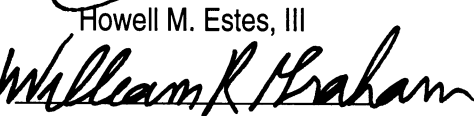
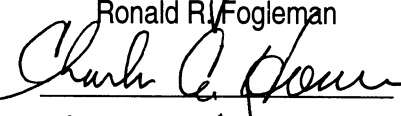
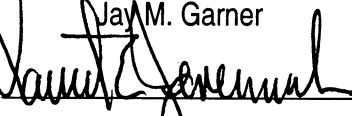
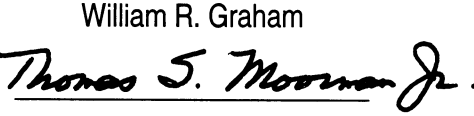
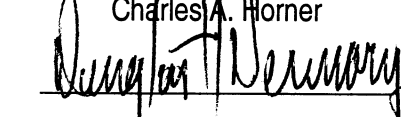
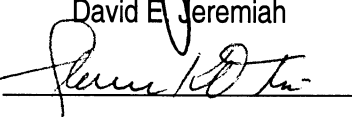
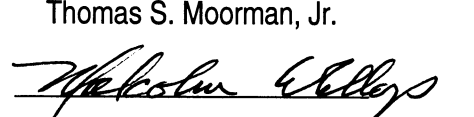
January 11, 2001

The Honorable Richard A. Gephardt
Minority Leader
United States House of Representatives
Washington, DC 20515

Dear Mr. Gephardt:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

Respectfully submitted,

 Duane P. Andrews	 Robert V. Davis	 Howell M. Estes, III
 Ronald R. Fogleman	 Jay M. Garner	 William R. Graham
 Charles A. Horner	 David E. Jeremiah	 Thomas S. Moorman, Jr.
 Douglas H. Necessary	 Glenn K. Otis	 Malcolm Wallop

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Commission to Assess United States National Security Space Management and Organization

PO BOX 33633
WASHINGTON DC 20033-0633

Hon. Donald H. Rumsfeld *
Chairman

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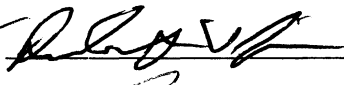
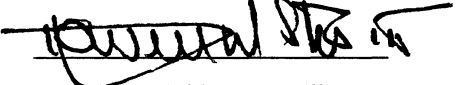

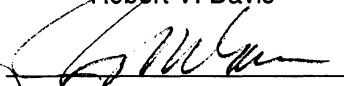
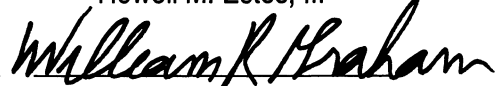
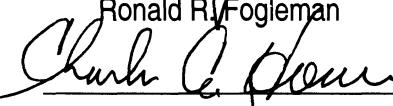
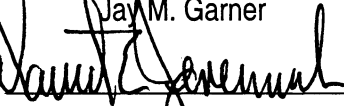
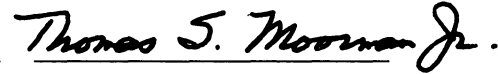
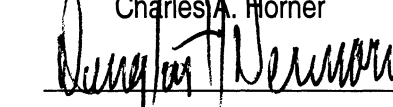
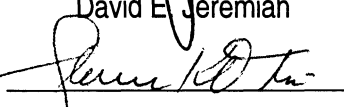
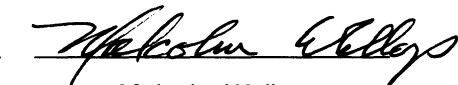
January 11, 2001

The Honorable Tom Daschle
Majority Leader
United States Senate
Washington, DC 20515

Dear Senator Daschle:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

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Commission to Assess United States National Security Space Management and Organization

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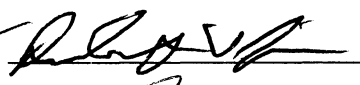
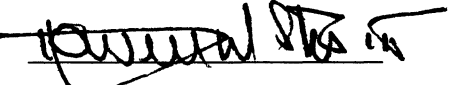
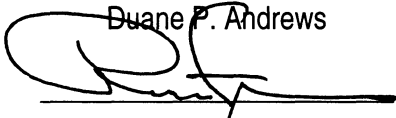
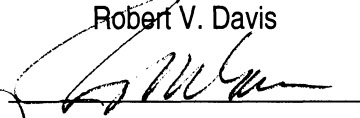
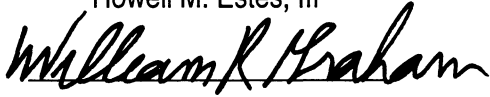
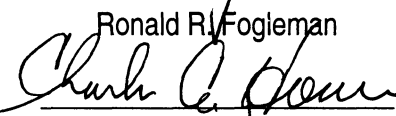
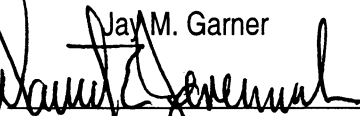
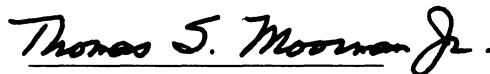
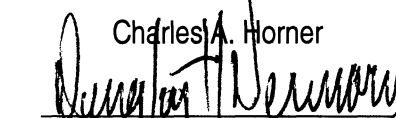
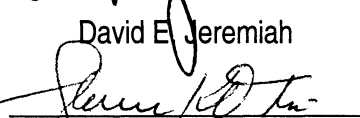
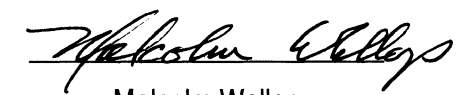
January 11, 2001

The Honorable Trent Lott
Minority Leader
United States Senate
Washington, DC 20515

Dear Senator Lott:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

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Commission to Assess United States National Security Space Management and Organization

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WASHINGTON DC 20033-0633

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Chairman

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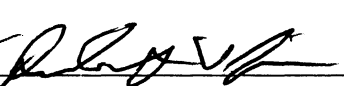
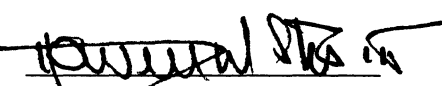
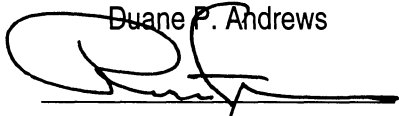
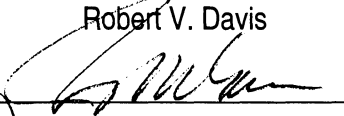
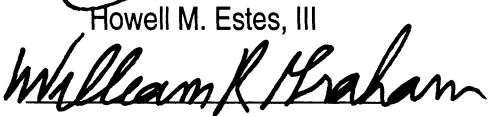
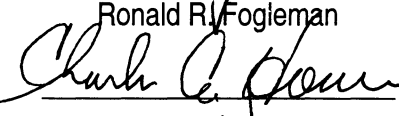
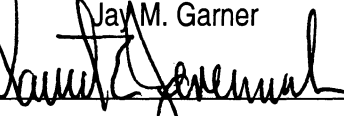
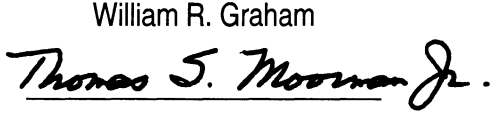
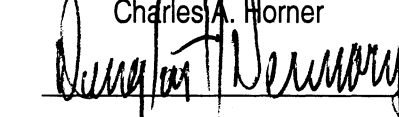
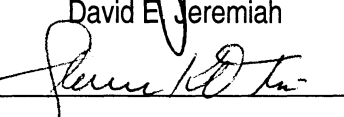
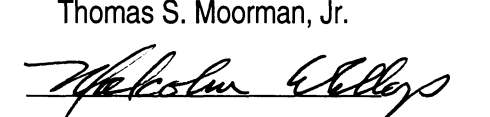
January 11, 2001

The Honorable William S. Cohen
Secretary of Defense
1000 Defense Pentagon
Washington, DC 20301-1000

Dear Mr. Secretary:

In accordance with section 1623 of the National Defense Authorization Act for Fiscal Year 2000 (P.L. 106-65), we hereby submit the report of the Commission to Assess United States National Security Space Management and Organization. The Commission's report is unanimous. It has been an honor to serve.

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**Members of the Commission to Assess United States National Security Space
Management and Organization**

**were appointed
by the**

**Chairman of the Committee on Armed Services of the
United States House of Representatives**

**Chairman of the Committee on Armed Services of the
United States Senate**

**Ranking Minority Members of the
Committee on Armed Services of the United States House of Representatives
and the Committee on Armed Services of the United States Senate**

**Secretary of Defense, in consultation with the
Director of Central Intelligence**

The Honorable Duane P. Andrews
Mr. Robert V. Davis
General Howell M. Estes, III, USAF (Ret.)
General Ronald R. Fogleman, USAF (Ret.)
Lieutenant General Jay M. Garner, U.S. Army (Ret.)
The Honorable William R. Graham
General Charles A. Horner, USAF (Ret.)
Admiral David E. Jeremiah, USN (Ret.)
General Thomas S. Moorman, Jr., USAF (Ret.)
Mr. Douglas H. Necessary
General Glenn K. Otis, U.S. Army (Ret.)
The Honorable Donald H. Rumsfeld*
Senator Malcolm Wallop (ret.)

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Executive Summary

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I. The Commission's Charter

A. Statutory Charter of the Commission

The Commission to Assess United States National Security Space Management and Organization was established pursuant to Public Law 106-65, the National Defense Authorization Act for Fiscal Year 2000, Section 1622.

The mandate is as follows:

“The Commission shall, concerning changes to be implemented over the near-term, medium-term and long-term that would strengthen United States national security, assess the following:

- (1) The manner in which military space assets may be exploited to provide support for United States military operations.
- (2) The current interagency coordination process regarding the operation of national security space assets, including identification of interoperability and communications issues.
- (3) The relationship between the intelligence and nonintelligence aspects of national security space...and the potential costs and benefits of a partial or complete merger of the programs, projects, or activities that are differentiated by those two aspects.
- (4) The manner in which military space issues are addressed by professional military education institutions.
- (5) The potential costs and benefits of establishing:
 - (A) An independent military department and service dedicated to the national security space mission.
 - (B) A corps within the Air Force dedicated to the national security space mission.
 - (C) A position of Assistant Secretary of Defense for Space within the Office of the Secretary of Defense.

- (D) A new major force program, or other budget mechanism, for managing national security space funding within the Department of Defense.
- (E) Any other change in the existing organizational structure of the Department of Defense for national security space management and organization.”

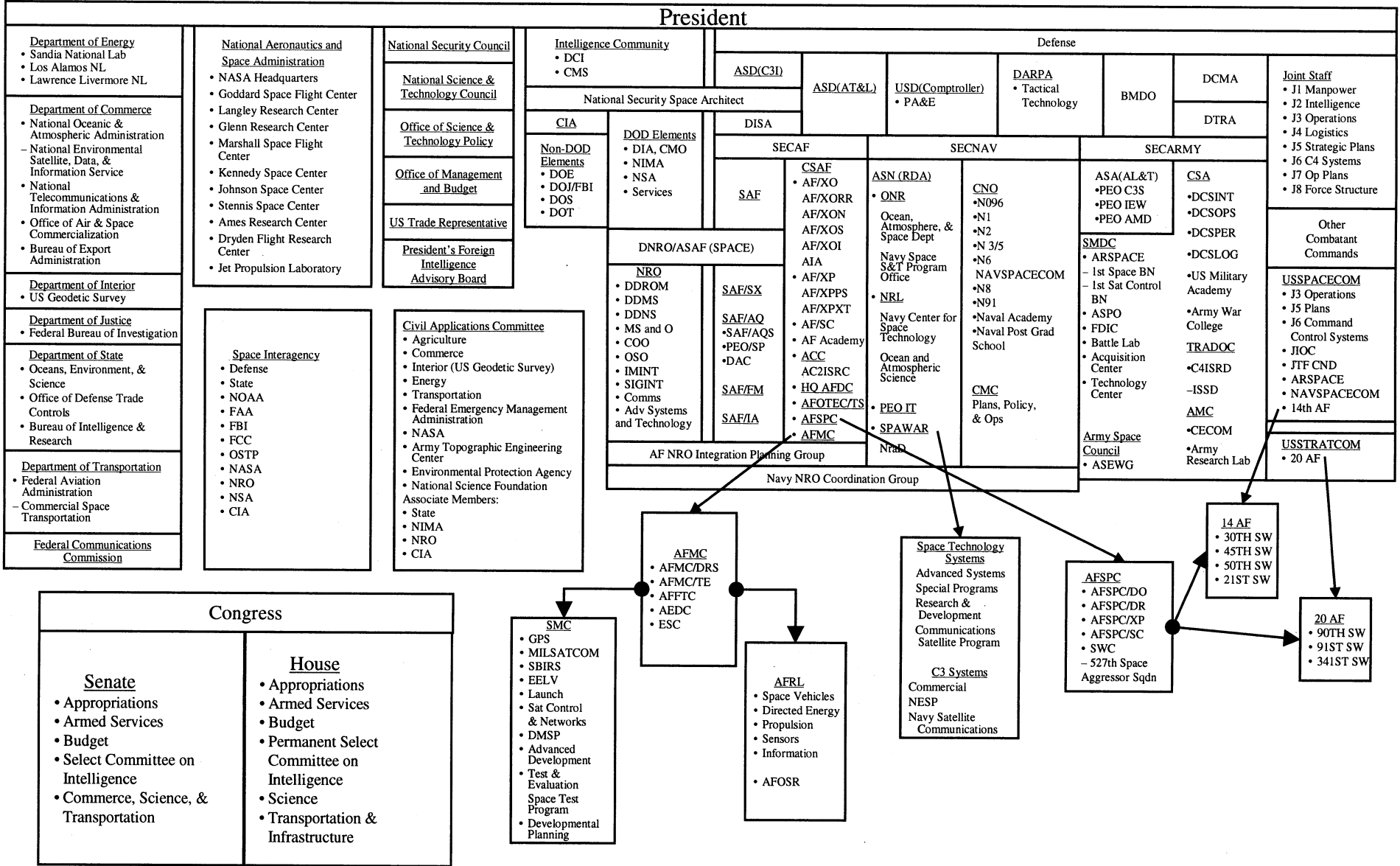
The National Defense Authorization Act for Fiscal Year 2001 amended the Commission mandate, adding the following task:

- (6) “The advisability of
 - (A) various actions to eliminate the requirement for specified officers in the United States Space Command to be flight rated that results from the dual assignment of such officers to that command and to one or more other commands for which the officers are expressly required to be flight rated;
 - (B) the establishment of a requirement that all new general or flag officers of the United States Space Command have experience in space, missile, or information operations that is either acquisition experience or operational experience; and
 - (C) rotating the command of the United States Space Command among the Armed Forces.”

B. Scope of the Commission’s Assessment

The Commission’s charter was to assess the organization and management of space activities that support U.S. national security interests. (Figure 1 represents the U.S. Government organizations currently involved in space activities.) The Commission took into account the range of space missions and functions identified in the 1996 National Space Policy, but focused its assessment on national security space activity. As a result, attention was given primarily to the Department of Defense (DoD) and Intelligence Community space activities. However, the assessment included consideration of civil and commercial activities to assess their relationship to and effect on national security space.

The U.S. has an urgent interest in promoting and protecting the peaceful use of space...



The Commission examined the role of organization and management in developing and implementing national-level guidance and in establishing requirements, acquiring and operating systems, and planning, programming and budgeting for national security space capabilities. The review concentrated on intelligence and military space operations as they relate to the needs of the national leadership as well as the needs of the military in conducting air, land and sea operations and independent space operations.

The Commission's unanimous findings and conclusions reflect its conviction that the U.S. has an urgent interest in promoting and protecting the peaceful use of space and in developing the technologies and operational capabilities that its objectives in space will require. This will require a focus on the long-term goals of national security space activities in the context of a dynamic and evolving security environment. Precisely because organizations need to adapt to changing events, the Commission focused its recommendations on near- and mid-term actions. The Commission believes these actions will better position U.S. space organizations and provide the direction and flexibility the U.S. needs to realize its longer-term interests in space. However, while organization and management are important, the critical need is national leadership to elevate space on the national security agenda.

While organization and management are important, the critical need is national leadership to elevate space on the national security agenda.

The Commission reviewed a large number of studies completed over the last decade on the state of the nation's launch capabilities and facilities. The Commission is in broad agreement with these studies on the nation's clear needs in this area, particularly modernization of the launch infrastructure and vehicles.

Although the Commission was not asked to evaluate specific space programs, it did consider the Future Imagery Architecture (FIA), Space-Based Infrared System-Low (SBIRS-Low) and Discoverer-II programs as examples of the ways in which organizational and management issues can affect decisions on national security space programs.

In evaluating alternative approaches to organizing and managing national security space activities, the Commission did not conduct a cost assessment of each approach. Instead, the advantages and disadvantages of

organizational changes were considered more broadly in terms of the opportunity costs of the status quo versus the advantages of making changes to better attain U.S. interests in space.

The Commission met with senior officials in the Department of Defense, the Intelligence Community and the National Aeronautics and Space Administration (NASA), as well as senior military and industry leaders. To gain perspective, the Commission also met with former senior government officials. The Department of Defense and National Reconnaissance Office provided the Commissioners access to a number of their classified space programs.

C. Organization of the Report

The report provides the Commission's views on:

- The role for space in future national security affairs and the challenges the U.S. is likely to confront to its commercial, civil, defense and intelligence interests in space.
- Objectives for advancing U.S. interests in space by enabling and encouraging development of policies, personnel, technologies and operations essential to maintaining U.S. leadership.
- U.S. agencies involved in national security space as a basis for understanding current practices and identifying alternative approaches to organization and management.
- Current management of space activity at the national level, within the Department of Defense and within the Intelligence Community.
- Recommendations for organization and management, including specific proposals to address discrete issues and problems identified in the course of the Commission's deliberations.

II. Executive Summary

A. Conclusions of the Commission

The Commission was directed to assess the organization and management of space activities in support of U.S. national security. Members of the Commission were appointed by the chairmen and ranking minority members of the House and Senate Armed Services Committees and by the Secretary of Defense in consultation with the Director of Central Intelligence.

The Commission unanimously concluded that the security and well being of the United States, its allies and friends depend on the nation's ability to operate in space.

Therefore, it is in the U.S. national interest to:

- Promote the peaceful use of space.
- Use the nation's potential in space to support its domestic, economic, diplomatic and national security objectives.
- Develop and deploy the means to deter and defend against hostile acts directed at U.S. space assets and against the uses of space hostile to U.S. interests.

The pursuit of U.S. national interests in space requires leadership by the President and senior officials. The Commission recommends an early review and, as appropriate, revision of the national space policy. The policy should provide direction and guidance for the departments and agencies of the U.S. Government to:

- Employ space systems to help speed the transformation of the U.S. military into a modern force able to deter and defend against evolving threats directed at the U.S. homeland, its forward deployed forces, allies and interests abroad and in space.
- Develop revolutionary methods of collecting intelligence from space to provide the President the information necessary for him to direct the nation's affairs, manage crises and resolve conflicts in a complex and changing international environment.

- Shape the domestic and international legal and regulatory environment for space in ways that ensure U.S. national security interests and enhance the competitiveness of the commercial sector and the effectiveness of the civil space sector.
- Promote government and commercial investment in leading edge technologies to assure that the U.S. has the means to master operations in space and compete in international markets.
- Create and sustain within the government a trained cadre of military and civilian space professionals.

The U.S. Government is increasingly dependent on the commercial space sector to provide essential services for national security operations. Those services include satellite communications as well as images of the earth useful to government officials, intelligence analysts and military commanders. To assure the United States remains the world's leading space-faring nation, the government has to become a more reliable consumer of U.S. space products and services and should:

- Invest in technologies to permit the U.S. Government to field systems one generation ahead of what is available commercially to meet unique national security requirements.
- Encourage the U.S. commercial space industry to field systems one generation ahead of international competitors.

The relative dependence of the U.S. on space makes its space systems potentially attractive targets. Many foreign nations and non-state entities are pursuing space-related activities. Those hostile to the U.S. possess, or can acquire on the global market, the means to deny, disrupt or destroy U.S. space systems by attacking satellites in space, communications links to and from the ground or ground stations that command the satellites and process their data. Therefore, the U.S. must develop and maintain intelligence collection capabilities and an analysis approach that will enable it to better understand the intentions and motivations as well as the capabilities of potentially hostile states and entities.

An attack on elements of U.S. space systems during a crisis or conflict should not be considered an improbable act. If the U.S. is to avoid a "Space Pearl Harbor" it needs to take seriously the possibility of an attack on U.S.

space systems. The nation's leaders must assure that the vulnerability of the United States is reduced and that the consequences of a surprise attack on U.S. space assets are limited in their effects.

The members of this Commission have, together, identified five matters of key importance that we believe need attention quickly from the top levels of the U.S. Government. We have drawn these conclusions from six months of assessing U.S. national security space activities, including 32 days of meetings with 77 present and former senior officials and knowledgeable private sector representatives. These five matters—our unanimous conclusions—are:

First, the present extent of U.S. dependence on space, the rapid pace at which this dependence is increasing and the vulnerabilities it creates, all demand that U.S. national security space interests be recognized as a top national security priority. The only way they will receive this priority is through specific guidance and direction from the very highest government levels. Only the President has the authority, first, to set forth the national space policy, and then to provide the guidance and direction to senior officials, that together are needed to ensure that the United States remains the world's leading space-faring nation. Only Presidential leadership can ensure the cooperation needed from all space sectors—commercial, civil, defense and intelligence.

Second, the U.S. Government—in particular, the Department of Defense and the Intelligence Community—is not yet arranged or focused to meet the national security space needs of the 21st century. Our growing dependence on space, our vulnerabilities in space and the burgeoning opportunities from space are simply not reflected in the present institutional arrangements. After examining a variety of organizational approaches, the Commission concluded that a number of disparate space activities should promptly be merged, chains of command adjusted, lines of communication opened and policies modified to achieve greater responsibility and accountability. Only then can the necessary trade-offs be made, the appropriate priorities be established and the opportunities for improving U.S. military and intelligence capabilities be realized. Only with senior-level leadership, when properly managed and with the right priorities will U.S. space programs both deserve and attract the funding that is required.

Third, U.S. national security space programs are vital to peace and stability, and the two officials primarily responsible and accountable for those programs are the Secretary of Defense and the Director of Central Intelligence. Their relationship is critical to the development and deployment of the space capabilities needed to support the President in war, in crisis and also in peace. They must work closely and effectively together, in partnership, both to set and maintain the course for national security space programs and to resolve the differences that arise between their respective bureaucracies. Only if they do so will the armed forces, the Intelligence Community and the National Command Authorities have the information they need to pursue our deterrence and defense objectives successfully in this complex, changing and still dangerous world.

Fourth, we know from history that every medium—air, land and sea—has seen conflict. Reality indicates that space will be no different. Given this virtual certainty, the U.S. must develop the means both to deter and to defend against hostile acts in and from space. This will require superior space capabilities. Thus far, the broad outline of U.S. national space policy is sound, but the U.S. has not yet taken the steps necessary to develop the needed capabilities and to maintain and ensure continuing superiority.

Finally, investment in science and technology resources—not just facilities, but people—is essential if the U.S. is to remain the world’s leading space-faring nation. The U.S. Government needs to play an active, deliberate role in expanding and deepening the pool of military and civilian talent in science, engineering and systems operations that the nation will need. The government also needs to sustain its investment in enabling and breakthrough technologies in order to maintain its leadership in space.

B. Space: Today and the Future

With the dramatic and still accelerating advances in science and technology, the use of space is increasing rapidly. Yet, the uses and benefits of space often go unrecognized. We live in an information age, driven by needs for precision, accuracy and timeliness in all of our endeavors—personal, business and governmental. As society becomes increasingly mobile and global, reliance on the worldwide availability of

information will increase. Space-based systems, transmitting data, voice and video, will continue to play a critical part in collecting and distributing information. Space is also a medium in which highly valuable applications are being developed and around which highly lucrative economic endeavors are being built.

1. A New Era of Space

The first era of the space age was one of experimentation and discovery. Telstar, Mercury and Apollo, Voyager and Hubble, and the Space Shuttle taught Americans how to journey into space and allowed them to take the first tentative steps toward operating in space while enlarging their knowledge of the universe. We are now on the threshold of a new era of the space age, devoted to mastering operations in space.

The Role for Space

Space-based technology is revolutionizing major aspects of commercial and social activity and will continue to do so as the capacity and capabilities of satellites increase through emerging technologies. Space enters homes, businesses, schools, hospitals and government offices through its applications for transportation, health, the environment, telecommunications, education, commerce, agriculture and energy. Much like highways and airways, water lines and electric grids, services supplied from space are already an important part of the U.S. and global infrastructures.

Space-related capabilities help national leaders to implement American foreign policy and, when necessary, to use military power in ways never before possible. Because of space capabilities, the U.S. is better able to sustain and extend deterrence to its allies and friends in our highly complex international environment.

In the coming period, the U.S. will conduct operations to, from, in and through space in support of its national interests both on the earth and in space. As with national capabilities in the air, on land and at sea, the U.S. must have the capabilities to defend its space assets against hostile acts and to negate the hostile use of space against U.S. interests.

Intelligence collected from space remains essential to U.S. national security. It is essential to the formulation of foreign and defense policies, the capacity of the President to manage crises and conflicts, the conduct of

military operations and the development of military capabilities to assure the attainment of U.S. objectives. The Department of Defense and the Intelligence Community are undertaking substantial and expensive programs to replace virtually their entire inventory of satellites over the next decade or so. These programs are estimated to cost more than \$60 billion during this period.

Opportunities in space are not limited to the United States. Many countries either conduct or participate in space programs dedicated to a variety of

The Department of Defense and the Intelligence Community are undertaking...expensive programs to replace virtually their entire inventory of satellites...

tasks, including communications and remote sensing. The U.S. will be tested over time by competing programs or attempts to restrict U.S. space activities through international regulations.

Toward the Future

Mastering near-earth space operations is still in its early stages. As mastery over operating in space is achieved, the value of activity in space will grow. Commercial space activity will become increasingly important to the global economy. Civil activity will involve more nations, international consortia and non-state actors. U.S. defense and intelligence activities in space will become increasingly important to the pursuit of U.S. national security interests.

The Commissioners appreciate the sensitivity that surrounds the notion of weapons in space for offensive or defensive purposes. They also believe, however, that to ignore the issue would be a disservice to the nation. The Commissioners believe the U.S. Government should vigorously pursue the capabilities called for in the National Space Policy to ensure that the President will have the option to deploy weapons in space to deter threats to and, if necessary, defend against attacks on U.S. interests.

2. Vulnerabilities and Threats

Space systems are vulnerable to a range of attacks that could disrupt or destroy the ground stations, launch systems or satellites on orbit. The political, economic and military value of space systems makes them attractive targets for state and non-state actors hostile to the United States and its interests. In order to extend its deterrence concepts and defense

capabilities to space, the U.S. will require development of new military capabilities for operation to, from, in and through space. It will require, as well, engaging U.S. allies and friends, and the international community, in a sustained effort to fashion appropriate “rules of the road” for space.

Assessing the Threat Environment

The U.S. is more dependent on space than any other nation. Yet, the threat to the U.S. and its allies in and from space does not command the attention it merits from the departments and agencies of the U.S. Government charged with national security responsibilities. Consequently, evaluation of the threat to U.S. space capabilities currently lacks priority in the competition for collection and analytic resources. Failure to develop credible threat analyses could have serious consequences for the United States. It could leave the U.S. vulnerable to surprises in space and could result in deferred decisions on developing space-based capabilities due to the lack of a validated, well-understood threat.

The ability to restrict or deny freedom of access to and operations in space is no longer limited to global military powers. Knowledge of space systems and the means to counter them is increasingly available on the international market. The reality is that there are many extant capabilities to deny, disrupt or physically destroy space systems and the ground facilities that use and control them. Examples include denial and deception, interference with satellite systems, jamming satellites on orbit, use of microsattellites for hostile action and detonation of a nuclear weapon in space.

The U.S. is more dependent on space than any other nation.

Reducing Vulnerability

As harmful as the loss of commercial satellites or damage to civil assets would be, an attack on intelligence and military satellites would be even more serious for the nation in time of crisis or conflict. As history has shown—whether at Pearl Harbor, the killing of 241 U.S. Marines in their barracks in Lebanon or the attack on the USS Cole in Yemen—if the U.S. offers an inviting target, it may well pay the price of attack. With the growing commercial and national security use of space, U.S. assets in space and on the ground offer just such targets. The U.S. is an attractive candidate for a “Space Pearl Harbor.” The warning signs of U.S. vulnerability include:

- In 1998, the Galaxy IV satellite malfunctioned, shutting down 80 percent of U.S. pagers, as well as video feeds for cable and broadcast transmissions. It took weeks in some cases to fully restore satellite service.
- In early 2000, the U.S. lost all information from a number of its satellites for three hours when computers in ground stations malfunctioned.
- In July 2000, the Xinhua news agency reported that China's military is developing methods and strategies for defeating the U.S. military in a high-tech and space-based future war.

The signs of vulnerability are not always so clear as those described above and therefore are not always recognized. Hostile actions against space systems can reasonably be confused with natural phenomena. Space debris

The U.S. is an attractive candidate for a "Space Pearl Harbor."

or solar activity can "explain" the loss of a space system and mask unfriendly actions or the potential thereof. Such ambiguity and uncertainty could be fatal to the successful management of a crisis or resolution of a conflict. They could lead to forbearance when action is needed or to hasty action when more or better information would have given rise to a broader and more effective set of response options.

There are a number of possible crises or conflicts in which the potential vulnerability of national security space systems would be worrisome. For example:

- Efforts to identify and strike terrorist strongholds and facilities in advance of or in retaliation for terrorist attacks on U.S. forces or citizens abroad, or on the U.S. homeland or that of its allies.
- Conflict in the Taiwan Straits, in which the U.S. attempts to deter escalation through the conduct of military operations while seeking to bring it to a favorable end through diplomatic measures.
- War in the Middle East, posing a threat to U.S. friends and allies in the region and calling for a rapid political and military response to threats by an aggressor to launch ballistic missiles armed with weapons of mass destruction.

That U.S. space systems might be threatened or attacked in such contingencies may seem improbable, even reckless. However, as political economist Thomas Schelling has pointed out, “There is a tendency in our planning to confuse the unfamiliar with the improbable. The contingency we have not considered looks strange; what looks strange is thought improbable; what is improbable need not be considered seriously.” Surprise is most often not a lack of warning, but the result of a tendency to dismiss as reckless what we consider improbable.

We are on notice, but we have not noticed.

History is replete with instances in which warning signs were ignored and change resisted until an external, “improbable” event forced resistant bureaucracies to take action. The question is whether the U.S. will be wise enough to act responsibly and soon enough to reduce U.S. space vulnerability. Or whether, as in the past, a disabling attack against the country and its people—a “Space Pearl Harbor”—will be the only event able to galvanize the nation and cause the U.S. Government to act.

We are on notice, but we have not noticed.

C. U.S. Objectives for Space

How the U.S. develops the potential of space for civil, commercial, defense and intelligence purposes will affect the nation’s security for decades to come.

How the U.S. develops the potential of space for civil, commercial, defense and intelligence purposes will affect the nation’s security for decades to come.

America’s interests in space are to:

- Promote the peaceful use of space.
- Use the nation’s potential in space to support U.S. domestic, economic, diplomatic and national security objectives.
- Develop and deploy the means to deter and defend against hostile acts directed at U.S. space assets and against the uses of space hostile to U.S. interests.

The U.S. Government must work actively to make sure that the nation has the means necessary to advance its interests in space. This requires action in the following areas.

1. Transform U.S. Military Capabilities

A deterrence strategy for space... must be supported by a greater range of space capabilities.

The United States must develop, deploy and maintain the means to deter attack on and to defend vulnerable space capabilities. Explicit national security guidance and defense policy is needed to

direct development of doctrine, concepts of operations and capabilities for space, including weapons systems that operate in space and that can defend assets in orbit and augment air, land and sea forces. This requires a deterrence strategy for space, which in turn must be supported by a broader range of space capabilities. Improvements are needed in the areas of:

- Assured access to space and on-orbit operations.
- Space situational awareness.
- Earth surveillance from space.
- Global command, control and communications in space.
- Defense in space.
- Homeland defense.
- Power projection in, from and through space.

The senior political and military leadership needs to test these capabilities in exercises on a regular basis. Exercises, including “live fire” events, are needed both to keep the armed forces proficient in the use of these capabilities and to bolster their deterrent effect on potential adversaries. While exercises may give adversaries information they can use to challenge American space capabilities, that risk must be balanced against the fact that capabilities that are untested, unknown or unproven cannot be expected to deter.

2. Strengthen Intelligence Capabilities

The U.S. needs to strengthen its ability to collect information about the activities, capabilities and intentions of potential adversaries and to overcome their efforts to deny the U.S. this information. Since the end of the Cold War, the number, complexity and scope of high-priority tasks assigned to the Intelligence Community have increased even as its human resources and technical advantage have eroded. This has reduced the Intelligence Community's ability to provide timely and accurate estimates of threats and has correspondingly increased the possibility of surprise.

To meet the challenges posed to space-based intelligence collection, the U.S. needs to review its approach to intelligence collection from space. Planned and programmed collection platforms may not be adaptable enough to meet the many and varied tasks assigned. To the extent that commercial products, particularly imagery from U.S. commercial remote sensing companies, can meet intelligence collection needs, these should be incorporated into an overall collection architecture. The U.S. must also invest in space-based collection technologies that will provide revolutionary methods for collecting intelligence.

3. Shape the International Legal and Regulatory Environment

U.S. activity in space, both governmental and commercial, is governed by treaties and by international and domestic law and regulations, which have contributed to the orderly use of space by all nations. As interest in and use of space increases, both within the United States and around the world, the U.S. must participate actively in shaping the space legal and regulatory environment. To protect the country's interests, the U.S. must promote the peaceful use of space, monitor activities of regulatory bodies, and protect the rights of nations to defend their interests in and from space. The U.S. and most other nations interpret "peaceful" to mean "non-aggressive"; this comports with customary international law allowing for routine military activities in outer space, as it does on the high seas and in international airspace. There is no blanket prohibition in international law on placing or using weapons in space, applying force from space to earth or conducting military operations in and through space. The U.S. must be cautious of agreements intended

The U.S. must participate actively in shaping the space legal and regulatory environment.

for one purpose that, when added to a larger web of treaties or regulations, may have the unintended consequences of restricting future activities in space.

4. Advance U.S. Technological Leadership

To achieve national security objectives and compete successfully internationally, the U.S. must maintain technological leadership in space. This requires a healthy industrial base, improved science and technology resources, an attitude of risk-taking and innovation, and government policies that support international competitiveness. In particular, the government needs to significantly increase its investment in breakthrough technologies to fuel innovative, revolutionary capabilities. Mastery of

The U.S. will not remain the world's leading space-faring nation by relying on yesterday's technology to meet today's requirements at tomorrow's prices.

space also requires new approaches that reduce significantly the cost of building and launching space systems. The U.S. will not remain the world's leading space-faring nation by relying on yesterday's technology to meet today's requirements at tomorrow's prices.

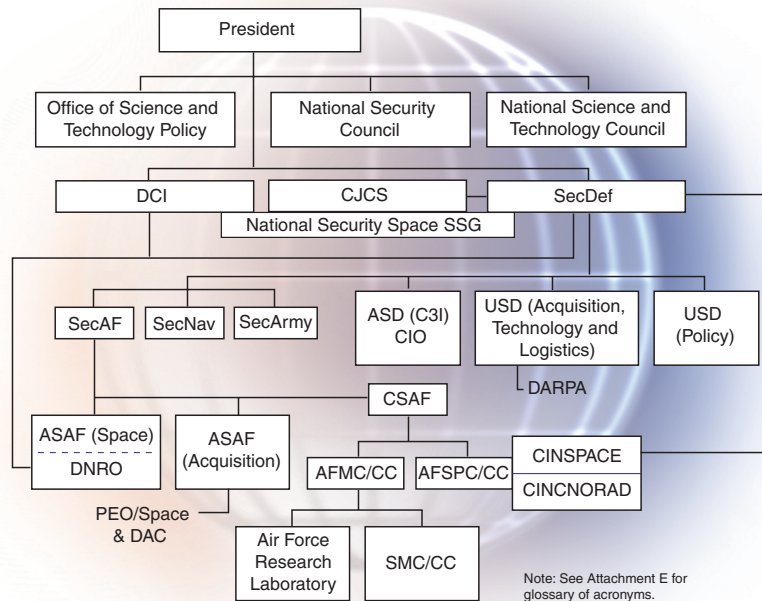
5. Create and Sustain a Cadre of Space Professionals

Since its inception, a hallmark of the U.S. space program has been world-class scientists, engineers and operators from academic institutions, industry, government agencies and the military Services. Sustained excellence in the scientific and engineering disciplines is essential to the future of the nation's national security space program. It cannot be taken for granted.

Military space professionals will have to master highly complex technology; develop new doctrine and concepts of operations for space launch, offensive and defensive space operations, power projection in, from and through space and other military uses of space; and operate some of the most complex systems ever built and deployed. To ensure the needed talent and experience, the Department of Defense, the Intelligence Community and the nation as a whole must place a high priority on intensifying investments in career development, education and training to develop and sustain a cadre of highly competent and motivated military and civilian space professionals.

D. Organizations that Affect National Security Space

The principal organizations involved in national security space include the Executive Office of the President, the Department of Defense, the Intelligence Community and the Congress (Figure 2).



Source: Commission Staff

Figure2: Current Organization for Managing US National Security Space Activity

1. Executive Office of the President

There is no single individual other than the President who can provide the sustained and deliberate leadership, direction and oversight of national security space policy that is needed. Currently, responsibility and accountability for space are broadly diffused throughout the government.

The 1996 National Space Policy designates the National Science and Technology Council (NSTC), a Cabinet-level organization chaired by the President, as “the principal forum for resolving issues related to national space policy.” The policy directs that, “as appropriate, the NSTC and NSC [National Security Council] will co-chair policy processes.” In the National Security Council, national security space issues are currently assigned to the Senior Director for Defense Policy and Arms Control.

This arrangement has not, does not and cannot provide the focused attention to space matters that is needed. The interdependence of the space sectors requires a more concentrated focus on space at the Cabinet level. The distribution of responsibility for space activity among many departments and agencies is less than ideal. Moreover, the portfolio of the Senior Director with responsibility for space affairs on the NSC is broad. That combined with a lack of staff support means that space issues are selectively addressed, most frequently only when they have become crises.

2. Department of Defense

Secretary of Defense

Title 10 of the U.S. Code, which provides the statutory basis for the Armed Services, assigns the Secretary of Defense as the principal assistant to the President in all matters relating to the Department of Defense. The Secretary has “authority, direction, and control” over the Department. With respect to those elements of the Intelligence Community within the Department, Title 50 U.S.C. provides the statutory basis for the Intelligence Community and directs that the Secretary, in consultation with the Director of Central Intelligence (DCI), “shall...ensure that [their] budgets are adequate...[and] ensure appropriate implementation of the policies and resource decisions of the Director of Central Intelligence by [those] elements...” This dual tasking establishes the obligation for the Secretary of Defense to ensure that the missions of the Department of Defense and of the Intelligence Community are successfully completed.

The relationship between the Secretary of Defense and the Director of Central Intelligence has evolved over time in such a manner that national security space issues do not receive the sustained focus appropriate to their importance to national security.

Office of the Secretary of Defense

Except for responding to urgent programmatic decisions, defense secretaries have generally delegated management of national security space activities. Today, this responsibility is delegated to the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD (C3I)), who serves as the “principal staff assistant and advisor to the Secretary and Deputy Secretary of Defense and the focal point within the Department for space and space-related activities.” The ASD (C3I) in turn relies on deputy assistant secretaries to guide policy and acquisition and provide oversight of the Department’s intelligence, surveillance, reconnaissance, information, command, control, communications and space programs.

The current ASD (C3I) organization suffers from three difficulties:

- The span of control is so broad that only the most pressing issues are attended to and space matters are left, on a day-to-day basis, in the hands of middle-level officials without sufficient influence within the Department and the interagency arena.
- Its influence on the planning, programming and budgeting process for space is too far removed or too late to have substantial effect on either the Services’ or the Intelligence Community’s processes.
- Within this structure it is not possible for senior officials outside DoD to identify a single, high-level individual who has the authority to represent the Department on space-related matters.

Commander in Chief of U.S. Space Command and North American Aerospace Defense Command and Commander, Air Force Space Command

The Commander in Chief, U.S. Space Command (CINCSPACE) serves as the Commander in Chief, North American Aerospace Defense Command (CINCNORAD) and as the Commander, Air Force Space Command. As CINCSPACE, he serves as the advocate for the space requirements for all the CINCs and, on an annual basis, submits to the Chairman of the Joint Chiefs of Staff an Integrated Priority List that reflects these requirements. CINCSPACE has a broad set of responsibilities that are quite different in character. He is responsible for protecting and defending the space environment. His responsibilities also include support of strategic ballistic missile defense and the Department’s computer network attack and computer network defense missions.

With the growing dependence on space and the vulnerability of space-related assets, more attention needs to be given to deploying and employing space-based capabilities for deterrence and defense. As space missions continue to expand, space will continue to mature as an “area of responsibility.” All of this will require CINCSPACE to pay more attention to the space tasks assigned by the National Command Authorities, leaving less time for other assigned duties as CINCNORAD and Commander, Air Force Space Command.

Military Services

Each military Service is directed by the Secretary of Defense to execute specific space programs, comply with DoD space policy and integrate space capabilities into its strategy, doctrine, education, training, exercises and operations. Each Service is free to develop those space capabilities needed to perform its mission. However, no single service has been assigned statutory responsibility to “organize, train and equip” for space operations. Eighty-five percent of space-related budget activity within the Department of Defense, approximately \$7 billion per year, resides in the Air Force.

Within the Air Force, space-related activity is centered primarily in four elements. Space systems operations and requirements are organized under Air Force Space Command (AFSPC). Design, development and acquisition of space launch, command and control, and satellite systems are conducted

As with air operations, the Air Force must take steps to create a culture within the Service dedicated to developing new space system concepts, doctrine and operational capabilities.

by personnel assigned to the Space and Missile Systems Center (SMC) under the Air Force Materiel Command. The Program Executive Officer (PEO) and the SMC Commander, who also serves as the Designated Acquisition Commander (DAC), report to the Assistant Secretary of the Air Force for Acquisition on the cost,

schedule and performance for the programs in their portfolios. The Air Force Research Laboratory, also part of Air Force Materiel Command, conducts advanced technology research.

The Commission heard testimony that there is a lack of confidence that the Air Force will fully address the requirement to provide space capabilities for the other Services. Many believe the Air Force treats space solely as a supporting capability that enhances the primary mission of the Air Force to conduct offensive and defensive air operations. Despite official doctrine that calls for the integration of space and air capabilities, the Air Force does

not treat the two equally. As with air operations, the Air Force must take steps to create a culture within the Service dedicated to developing new space system concepts, doctrine and operational capabilities.

National Reconnaissance Office

The National Reconnaissance Office (NRO) is the single national organization tasked to meet the U.S. Government's intelligence needs for space-borne reconnaissance. The NRO is responsible for unique and innovative technology; large-scale systems engineering; development, acquisition and operation of space reconnaissance systems; and related intelligence activities needed to support national security missions. While the NRO is an agency of the Department of Defense, its budget, the National Reconnaissance Program (NRP), is one part of the National Foreign Intelligence Program (NFIP). The Director of Central Intelligence provides guidance for and approves the NRP and all other elements of the NFIP. The Secretary of Defense ensures implementation of the DCI's resource decisions by DoD elements within the NFIP. As a result, the NRO is a joint venture between these organizations.

The NRO today is a different organization, simultaneously struggling to manage a large number of legacy programs while working to renew a focus on leading edge research.

The NRO had a reputation as one of the U.S. Government's best system acquisition agencies and worked to maintain exceptional systems engineering capabilities. In its early years, the NRO was a small, agile organization, a leader in developing advanced technologies, often first-of-a-kind systems, for solving some of the nation's most difficult intelligence collection challenges. The NRO today is a different organization, simultaneously struggling to manage a large number of legacy programs while working to renew a focus on leading edge research. The NRO's capacity to convert leading edge research and technology into innovative operational systems is inhibited by the requirement to maintain its legacy programs.

3. Intelligence Community

The Director of Central Intelligence is the principal advisor to the President for intelligence matters related to national security and serves as the head of the Intelligence Community. The DCI is responsible for providing national intelligence to the President, to the heads of departments and

agencies of the executive branch, to the Chairman of the Joint Chiefs of Staff and senior military commanders and, when appropriate, to the Congress. “National intelligence” refers to “intelligence which pertains to the interests of more than one department or agency of the government.”

The DCI develops and presents to the President an annual budget for the National Foreign Intelligence Program, which is distributed throughout the budgets of the various departments and agencies that comprise the Intelligence Community.

The Community Management Staff, managed by the Deputy Director of Central Intelligence for Community Management, assists the DCI in coordinating and managing the Intelligence Community, including responsibility for managing resources and collection requirements and assessing space programs and policies. It is also responsible for coordinating policy and budgets with the Office of the Secretary of Defense. The Community Management Staff has made substantial progress in coordinating the planning and budgeting of the components of the Intelligence Community. However, it does not have authority to reprogram in-year money within components, an authority that would enhance its direction of Intelligence Community affairs. Nor is it well structured to coordinate with OSD on broad intelligence policy, long-term space strategy and other issues requiring intelligence support.

4. Congress

Congressional oversight of the authorization and appropriation of national security space funding routinely involves no fewer than six committees. Generally, each committee mirrors the priorities of the executive branch interests it oversees. Executive branch officials must expend considerable time and energy interacting with a large number of committees and subcommittees that, on some matters, have overlapping jurisdiction. To the extent that this process can be streamlined, it would likely benefit the nation, Congress and the executive branch. It would also help if there were an environment in which national security space matters could be addressed as an integrated program—one that includes consideration for commercial and civil capabilities that are often overlooked today.

This report offers suggestions for organizational changes in the executive branch that are intended to bring a more focused, well-directed approach to the conduct of national security space activities, based on a clear national

space policy directed by the President. These organizational changes in the executive branch suggest changes in the Congressional committee and subcommittee structure to align the jurisdictions of these committees as much as possible with the executive branch, leading to a more streamlined process. Congress might usefully consider encouraging greater “crossover” membership among all of the space-related committees to increase legislative coordination between defense and intelligence space programs.

E. Management of National Security Space Activities

A number of issues transcend organizational approaches and are important to the ability of the U.S. to achieve its objectives in space. These are issues that the national leadership, the Department of Defense and the Intelligence Community should address in the near term irrespective of particular organizational arrangements that may be pursued.

1. Interagency Coordination

The present interagency process is inadequate for the volume and complexity of today’s space issues. For the most part, the existing interagency process addresses space issues on an as needed basis. As issues in the space arena inevitably become more complex, this approach will become increasingly unsatisfactory. What may be needed is a standing interagency group to identify key national security space issues, to guide, as necessary, the revision of existing national space policy and to oversee implementation of that policy throughout the departments and agencies of the U.S. Government. The need for a standing interagency coordination process is made more urgent by the fact that there are a number of pending issues on space affairs in Congress, in domestic regulatory bodies and in international trade and arms control negotiating fora. To avoid unintended and deleterious effects on the space sectors, these issues must be addressed in a comprehensive fashion.

2. SecDef/DCI Relationship

No relationship within the executive branch touching on national security space is as important as the one between the Secretary of Defense and the Director of Central Intelligence. Together, the Secretary and the DCI control national security space capabilities. Neither can accomplish the

tasks assigned without the support of the other. The Secretary and the DCI have not given the national security space program their sustained, joint attention for nearly a decade. Nor have the urgent issues related to space control, information operations and the assessment of the threats the nation faces from space received the attention they deserve. The Secretary and the DCI need to align their respective staff offices so that coordination on intelligence issues broadly, and space matters specifically, is easier and more direct between the two.

No relationship...touching on national security space is as important as the one between the Secretary of Defense and the Director of Central Intelligence.

3. Acquiring and Operating Space Systems

The Department of Defense and the Intelligence Community acquire and operate most of the satellites used to support defense and intelligence missions. Within DoD, the Air Force is the Service that acquires most of the Department's satellites; the NRO is the acquisition agent for the Intelligence Community's space systems. The acquisition processes used by DoD and the NRO have become similar in recent years. The NRO relies on authorities delegated by both the Secretary of Defense and the Director of the Central Intelligence Agency. By virtue of these authorities, the NRO is able, for some purposes unique to its mission, to award and administer contracts without a number of the encumbrances that affect DoD. Because the use of NRO and Air Force satellites is sufficiently different, the approach to operations in the two organizations is also different in character.

The NRO's approach to acquisition and operations, referred to as "cradle-to-grave," creates a different relationship between the acquirers and operators than that of the Air Force, in which the acquisition and operations elements are in separate commands. With the NRO model, the same individuals are involved in the acquisition and operations processes. Therefore, the experiences and understanding derived from operations can more directly influence satellite design. This is not the case in the Air Force, where the operators have less direct influence. When the operators are on the technical design team, their capacity to resolve on-orbit anomalies is also greater. These differences amount, in essence, to different organizational cultures within NRO and Air Force space activities, an understanding of which is essential to determining whether and how the activities might be integrated over time.

4. Pursuing “Leap Ahead” Technologies

Technological superiority has aided the U.S. military in maintaining its worldwide commitments even as the size of its force has been reduced. As the spread of high technology weaponry on the world market continues, it will become increasingly difficult to stay ahead, particularly in space-related technologies. The Department of Defense needs to provide both resources and direction to ensure that advances in space technology continue. In addition to establishing possible areas for investment, the Department, in cooperation with the space community, needs to ensure that an environment exists within which experimentation and innovation will flourish. The Department also needs to actively coordinate science and technology investments across the space technology community so as to better integrate and prioritize these efforts, many of which have application across all space sectors. And, finally, it needs to encourage demonstration projects, such as Discoverer II was planned to be, if the U.S. is to develop and deploy effective, affordable systems dedicated to military missions in space.

5. Leveraging the Commercial and Civil Sectors

Despite the importance of the U.S. commercial and civil space sectors to the successful completion of the national security mission, the U.S. Government has no comprehensive approach to incorporating these capabilities and services into its national security space architecture. The U.S. Government, as a consumer, a regulator or an investor, is currently not a good partner to the national security space industry. To ensure support for the commercial and civil sectors, the U.S. Government must:

The U.S. Government, as a consumer, a regulator or an investor, is currently not a good partner to the national security space industry.

- Use more expeditious licensing processes while safeguarding U.S. national security interests.
- Develop a strategy for integrating and funding commercial services to meet, as practical, part of current and future national security space requirements.

- Develop a strategy for relying more on commercial launch facilities, toward the goal of largely privatizing the national launch infrastructure.
- Foster multinational alliances to help maintain the U.S. position as a leader in the global space market.

6. Budgeting for Space

Currently, there is no DoD appropriation that identifies and aggregates funding for space programs. Space funding is a part of many appropriations spread across the DoD and Intelligence Community budgets. Most of the funding for national security space is in the Air Force and National Reconnaissance Office budgets. The Army and Navy each fund space programs that are primarily in support of Service-unique requirements. In the Navy's case, funding supports satellite communication and satellite surveillance systems.

These multiple appropriations lead to several problems. When satellite programs are funded in one budget and terminals in another, the decentralized arrangement can result in program disconnects and duplication. It can result in lack of synchronization in the acquisition of satellites and their associated terminals. It can also be difficult for user requirements to be incorporated into the satellite system if the organization funding the system does not agree with and support those user requirements. The current methods of budgeting for national security space programs lack the visibility and accountability essential to developing a coherent program.

Looking to the future, the Department of Defense will undertake new responsibilities in space, including deterrence and defense of space-based assets as well as other defense and power projection missions in and from space. These new missions will require development of new systems and capabilities. Space capabilities are not funded at a level commensurate with their relative importance. Nor is there a plan in place to build up to the investments needed to modernize existing systems and procure new capabilities. Appropriate investments in space-based capabilities would enable the Department to pursue:

- Improved space situational awareness and attack warning capabilities.
- Enhanced protection/defensive measures, prevention and negation systems and rapid long-range power projection capabilities.
- Modernized launch capabilities.
- A more robust science and technology program for developing and deploying space-based radar, space-based laser, hyper-spectral sensors and reusable launch vehicle technology.

Providing the Department of Defense and the Intelligence Community with additional resources to accomplish these new missions should be considered as part of U.S. national space policy.

7. Exercises, Experiments and Wargames

The military uses a variety of tools to simulate warfighting environments in support of exercises, experiments and wargames. However, these tools have not been modernized to take into account the missions and tasks that space systems can perform. As a result, simulation tools cannot be used effectively to understand the utility of space-based capabilities on warfare. Further, the lack of modeling and simulation tools has prevented military commanders from learning how to cope with the loss or temporary interruption of key space capabilities, such as the Global Positioning System (GPS), satellite communications, remote sensing or missile warning information. To support exercises, experiments and wargames, the Department must develop and employ modeling and simulation tools based on measures of merit and effectiveness that will quantify the effects of space-based capabilities.

F. Recommendations: Organizing and Managing for the Future

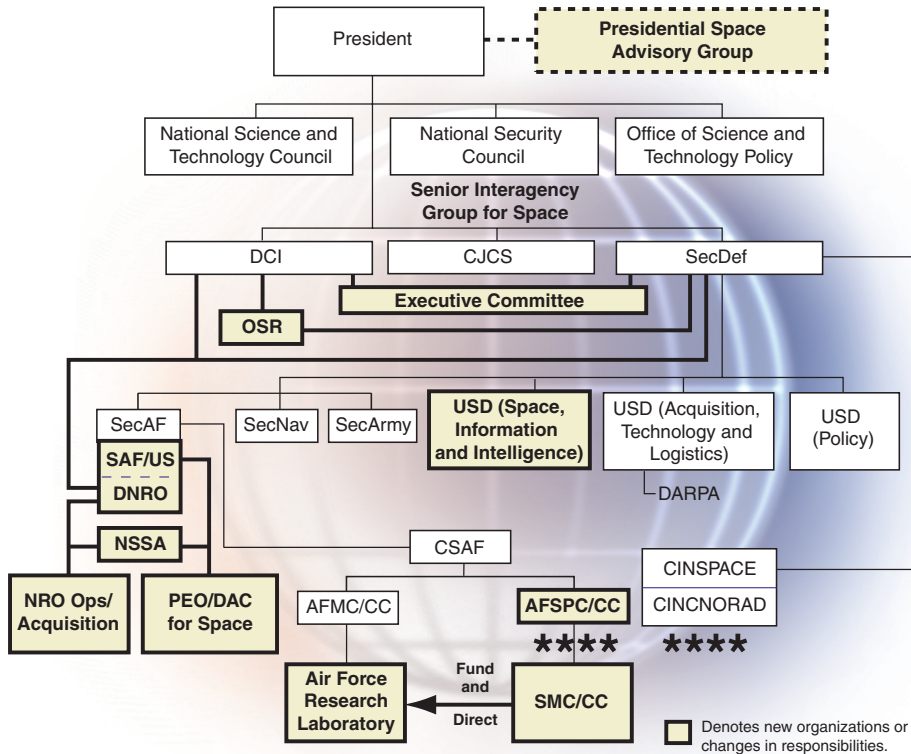
National security space organization and management today fail to reflect the growing importance of space to U.S. interests. There is a need for greater emphasis on space-related matters, starting at the highest levels of government.

National security space organization and management today fail to reflect the growing importance of space to U.S. interests.

In light of the vital place space has in the spectrum of national security interests, a successful approach to organization and management for the future must:

- Provide for national-level guidance that establishes space activity as a fundamental national interest of the United States.
- Create a process to ensure that the national-level policy guidance is carried out among and within the relevant agencies and departments.
- Ensure the government's ability to participate effectively in shaping the domestic and international rules and policies that will govern space.
- Create conditions that encourage the Department of Defense to develop and deploy systems in space to deter attack on and, if deterrence should fail, to defend U.S. interests on earth and in space.
- Create conditions that encourage the Intelligence Community to develop revolutionary methods for collecting intelligence from space.
- Provide methods for resolving the inevitable issues between the defense and intelligence sectors on the priority, funding and control of space programs.
- Account for the increasingly important role played by the commercial and civil space sectors in the nation's domestic and global economic and national security affairs.
- Develop a military and civilian cadre of space professionals within DoD, the Intelligence Community and throughout government more generally.
- Provide an organizational and management structure that permits officials to be agile in addressing the opportunities, risks and threats that inevitably will arise.
- Ensure that DoD and the Intelligence Community are full participants in preparing government positions for international negotiations that may affect U.S. space activities.

The Commission believes that a new and more comprehensive approach is needed to further the nation's security interests in space (Figure 3).



Source: Commission Staff

Figure 3: A New Organizational Approach for Space

Following are the Commission's unanimous recommendations.

1. Presidential Leadership

The United States has a vital national interest in space. National security space should be high among the nation's priorities. It deserves the attention of the national leadership, from the President down.

The President should consider establishing space as a national security priority.

2. Presidential Space Advisory Group

The President might find it useful to have access to high-level advice in developing a long-term strategy for sustaining the nation's role as the leading space-faring nation.

The President should consider the appointment of a Presidential Space Advisory Group to provide independent advice on developing and employing new space capabilities.

3. Senior Interagency Group for Space

The current interagency process is inadequate to address the number, range and complexity of today's space issues, which are expected to increase over time. A standing interagency coordination process is needed to focus on policy formulation and coordination of space activities pertinent to national security and to assure that representation in domestic and international fora effectively reflects U.S. national security and other space interests.

The President should direct that a Senior Interagency Group for Space be established and staffed within the National Security Council structure.

4. SecDef/DCI Relationship

The issues relating to space between the Department of Defense and the Intelligence Community are sufficiently numerous and complex that their successful resolution and implementation require a close, continuing and effective relationship between the Secretary of Defense and the Director of Central Intelligence.

The Secretary of Defense and the Director of Central Intelligence should meet regularly to address national security space policy, objectives and issues.

5. Under Secretary of Defense for Space, Intelligence and Information

Until space organizations have more fully evolved, the Office of the Secretary of Defense would benefit from having a senior-level official with sufficient standing to serve as the advocate for space within the Department. The Secretary of Defense would assign this official responsibility to oversee the Department's research and development,

acquisition, launch and operation of its space, intelligence and information assets; coordinate the military intelligence activities within the Department; and work with the Intelligence Community on long-range intelligence requirements for national security.

An Under Secretary of Defense for Space, Intelligence and Information should be established.

6. Commander in Chief of U.S. Space Command and NORAD and Commander, Air Force Space Command

The Commander in Chief, U.S. Space Command should continue to concentrate on space as it relates to warfare in the mediums of air, land and sea, as well as space. His primary role is to conduct space operations and provide space-related services, to include computer network defense/attack missions in support of the operations of the other CINCs, and national missile defense. This broad and varied set of responsibilities as CINCSPACE will leave less time for his other assigned duties.

The Secretary of the Air Force should assign responsibility for the command of Air Force Space Command to a four-star officer other than CINCSPACE/CINC NORAD.

The Secretary of Defense should end the practice of assigning only Air Force flight-rated officers to the position of CINCSPACE and CINC NORAD to ensure that an officer from any Service with an understanding of combat and space could be assigned to this position.

7. Military Services

The Department of Defense requires space systems that can be employed in independent operations or in support of air, land and sea forces to deter and defend against hostile actions directed at the interests of the United States. In the mid term a Space Corps within the Air Force may be appropriate to meet this requirement; in the longer term it may be met by a military department for space. In the nearer term, a realigned, rechartered Air Force is best suited to organize, train and equip space forces.

The Air Force should realign headquarters and field commands to more effectively organize, train and equip for prompt and sustained space operations. Assign Air Force Space Command (AFSPC) responsibility for providing the resources to execute space research, development, acquisition and operations, under the command of a four-star general. The Army and Navy would still establish requirements and develop and deploy space systems unique to each Service.

Amend Title 10 U.S.C. to assign the Air Force responsibility to organize, train and equip for prompt and sustained offensive and defensive air and space operations. In addition, the Secretary of Defense should designate the Air Force as Executive Agent for Space within the Department of Defense.

8. Aligning Air Force and NRO Space Programs

The Department of Defense and the Intelligence Community would benefit from the appointment of a single official within the Air Force with authority for the acquisition of space systems for the Air Force and the NRO based on the “best practices” of each organization.

Assign the Under Secretary of the Air Force as the Director of the National Reconnaissance Office. Designate the Under Secretary as the Air Force Acquisition Executive for Space.

9. Innovative Research and Development

The Intelligence Community has a need for revolutionary methods, including but not limited to space systems, for collecting intelligence.

The Secretary of Defense and the Director of Central Intelligence should direct the creation of a research, development and demonstration organization to focus on this requirement.

Competitive centers of innovation that actively pursue space-related research, development and demonstration programs are desirable.

The Secretary of Defense should direct the Defense Advanced Research Projects Agency and the Services' laboratories to undertake development and demonstration of innovative space technologies and systems for dedicated military missions.

10. Budgeting for Space

Better visibility into the level and distribution of fiscal and personnel resources would improve management and oversight of space programs.

The Secretary of Defense should establish a Major Force Program for Space.

The Commission believes that its recommendations, taken as a whole, will enable the U.S. to sustain its position as the world's leading space-faring nation. Presidential leadership and guidance, coupled with a more effective interagency process and especially with improved coordination between the Department of Defense and the Intelligence Community, are essential if the nation is to promote and protect its interests in space.

Attachment A

Résumés of Commission Members

The Honorable Duane P. Andrews

Mr. Andrews is Corporate Executive Vice President and Director, Science Applications International Corporation (SAIC) (1993 to present). He previously was an officer in the United States Air Force (1967-77), a professional staff member with the House Permanent Select Committee on Intelligence (1977-89), and the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (1989-93). Mr. Andrews was awarded the Department of Defense Medal for Distinguished Public Service and the National Intelligence Distinguished Service Medal.

Mr. Robert V. Davis

Mr. Davis is President of R.V. Davis & Associates (1997 to present). He previously was a professional staff member of the House Appropriations Committee (1977-95) and Deputy Under Secretary of Defense for Space (1995-97). Mr. Davis was awarded the Secretary of Defense Medal for Outstanding Public Service (1997).

General Howell M. Estes, III, United States Air Force (Retired)

General Estes is President of Howell Estes & Associates, Inc. (1998 to present) and serves as Vice Chairman of the Board of Trustees, The Aerospace Corporation. He entered the United States Air Force in 1965 and served for 33 years. At the time of his retirement in 1998, General Estes was Commander in Chief, North American Aerospace Defense Command, Commander in Chief, United States Space Command, and Commander, Air Force Space Command. He previously served as a consultant to the Defense Science Board Task Force on Space Superiority (1999).

General Ronald R. Fogleman, United States Air Force (Retired)

General Fogleman is president and chief operating officer of the B Bar J Cattle and Consulting Company, Durango Aerospace Incorporated, and a partner in Laird and Company, LLC (1998 to present). He entered the United States Air Force in 1963 and served for 34 years. At the time of his retirement in 1997, General Fogleman was Chief of Staff of the U.S. Air Force. He previously served as the Commander in Chief of the U.S. Transportation Command (1992-94). He serves on the Boards of Directors for International Airline Service Group, DERCO Aerospace, EAST Inc., Mesa Air Group, MITRE Corporation, North American Airlines, Rolls-Royce North America, and World Airways. General Fogleman is a member of the Council on Foreign Relations.

Lieutenant General Jay M. Garner, United States Army (Retired)

General Garner is President of SY Technology (1997 to present). He entered the United States Army in 1962 and served for 35 years. Prior to leaving military service in 1997, he served as Assistant Vice Chief of Staff of the Army (1996-97). Previously he was the Commander of the U.S. Army Space and Strategic Defense Command (1994-96).

The Honorable William R. Graham

Dr. Graham is the Chairman of the Board and President of National Security Research, Inc. (1997 to present). He previously served as the Deputy Administrator of the National Aeronautics and Space Administration (1985-86), Science Advisor to President Reagan and Director of the White House Office of Science & Technology Policy (1986-89), and Member of the Commission to Assess the Ballistic Missile Threat to the United States (1998). He has a Ph.D. in electrical engineering.

General Charles A. Horner, United States Air Force (Retired)

General Horner is a business consultant, author and national defense advisor (1994 to present). He entered the United States Air Force in 1958 and served for 36 years. He served as Commander in Chief, North American Aerospace Defense Command, Commander in Chief, United States Space Command, Commander, Air Force Space Command, and he commanded Allied Air Forces during the 1991 Gulf War.

Admiral David E. Jeremiah, United States Navy (Retired)

Admiral Jeremiah is President of Technology Strategies & Alliances Corporation (1994 to present). Prior to leaving military service in 1994, he served as Vice Chairman, Joint Chiefs of Staff (1990-94) for Generals Powell and Shalikashvili. He serves on the Boards of Directors for several firms, including Litton Industries, Alliant Techsystems Inc., Getronics Government Systems, LLC and Geobiotics, Inc. Admiral Jeremiah serves on various national security and intelligence panels, boards and commissions, including the Defense Policy Board, and a National Reconnaissance Office Advisory Panel.

General Thomas S. Moorman, Jr., United States Air Force (Retired)

General Moorman is a Partner in Booz-Allen Hamilton (1998 to present). He also serves as a member of the Board of Trustees for The Aerospace Corporation, is an Outside Director on the Board of Smiths Industries and is a member of the Defense Policy Board Advisory Committee. He entered the United States Air Force in 1962 and served for 35 years. General Moorman served as Commander of Air Force Space Command (1990-92). At the time of his retirement in 1997, General Moorman was Vice Chief of Staff, United States Air Force. He is a member of the Council on Foreign Relations.

Mr. Douglas H. Necessary

Mr. Necessary is an independent management consultant. He has recently served on several government boards. He served on active duty in the U.S. Army from 1964-1984 and as a professional staff member of the Committee on Armed Services, U.S. House of Representatives (1984-2000).

General Glenn K. Otis, United States Army (Retired)

General Otis serves as a consultant for many defense firms and serves on the Defense Science Board and Ballistic Missile Defense Advisory Committee. Previously he was Senior Vice President of Coleman Research Corporation (1988-96) and Chairman of the Board on Army Science and Technology at the National Academy of Sciences. He entered the United States Army in 1946 and served for 42 years. Prior to leaving military

service in 1988, he served as Commander in Chief, U.S. Army Europe and 7th Army, and Commander, NATO's Central Army Group (1983-88). Previously he commanded the U.S. Army's Training and Doctrine Command (1981-83).

The Honorable Donald H. Rumsfeld*

Mr. Rumsfeld is currently in private business. He serves as Chairman of the Board of Directors of Gilead Sciences, Inc., and on the Boards of Directors of a number of corporations and non-profit organizations. Previously he served as CEO of G.D. Searle & Co. and of General Instruments Corporation, and in a variety of U.S. government posts, including: Naval Aviator, Member of U.S. Congress, U.S. Ambassador to NATO, White House Chief of Staff, Secretary of Defense, Presidential Envoy to the Middle East and Chairman of the Commission to Assess the Ballistic Missile Threat to the United States. He received the Presidential Medal of Freedom, the nation's highest civilian award, in 1977.

Senator Malcolm Wallop (Retired)

Senator Wallop is currently a Senior Fellow with the Heritage Foundation and chairs Frontiers of Freedom, a non-profit public policy organization he established in January 1995. Previously he served as a U.S. Senator from Wyoming (1977-95). In 1977 he was the first elected official to propose a space-based missile defense system. Prior to serving in the U.S. Senate, he was a rancher, a businessman, and a member of the Wyoming Legislature (1969-76).

* The Honorable Donald H. Rumsfeld served as a member and chairman of the Commission from its inception until December 28, 2000, when he was nominated for the position of Secretary of Defense by President-elect George W. Bush.

Attachment B

Résumés of Core Staff of the Commission

Dr. Stephen A. Cambone, Staff Director. Research Director, Institute for National Strategic Studies, National Defense University (1998 to present). Staff Director, Commission to Assess the Ballistic Missile Threat to the United States (1998); Senior Fellow, Center for Strategic and International Studies (1993-98); Director, Strategic Defense Policy, Office of the Secretary of Defense (1990-93); Deputy Director of Strategic Analysis, SRS Technologies (1986-90); Staff Analyst, Los Alamos National Laboratory (1982-86). Ph.D. in political science.

D. Craig Baker, Staff Member. Special Assistant to the Chief Scientist, U.S. Army Space and Missile Defense Command (1999-2000); Concepts and Initiatives Division Chief, Army Space and Missile Defense Battle Lab (1997-98); Plans Director, Army Space Command (1996-97); Space Integration Division Chief, Army Space Command (1990-96); Army Research Fellow, RAND Arroyo Center (1986-88). M.S. in national security strategy. M.S. in systems management.

Barbara Bicksler, Staff Member. Senior Policy Analyst, Strategic Analysis, Inc. (1996 to present). Research Staff Member, Institute for Defense Analyses (1986-95); Analyst, Office of the Assistant Secretary of Defense for Program Analysis and Evaluation (1981-84). Master in Public Policy.

Linda L. Haller, Staff Member. Assistant Bureau Chief (1999 to present) and Senior Legal Advisor (1997-99), International Bureau, Federal Communications Commission (FCC); Senior Counsel, Office of General Counsel, FCC (1994-97); Attorney Advisor, FCC (1991-92); Associate, Morgan Lewis & Bockius (1988-90); Associate, Pierson, Ball & Dowd (1986-88). Juris Doctor.

Delonnie Henry, Staff Member. Committee Clerk, U.S. House Select Committee on U.S. Technology Transfers to the People's Republic of China (1998-99); Commission to Assess the Ballistic Missile Threat to the United States (Rumsfeld Commission) (1998); National Defense University (1993-98). M.Ed.

John Luddy, Staff Member. Senior Policy Advisor, U.S. Senator Jon Kyl (1999-2000); Senior Legislative Assistant, U. S. Senator Bob Smith (1997-99); Military Legislative Assistant, U.S. Senator James Inhofe (1995-97); Defense Policy Analyst, The Heritage Foundation (1992-95); U.S. Marine Corps (1986-89). M.S. in international relations.

Lieutenant Colonel J. Kevin McLaughlin, United States Air Force, Staff Member. Commander, 2d Space Operations Squadron (1998-2000); Chief, Space/Missile Branch, Legislative Liaison (1996-98); Chief, Space Policy, Assistant Secretary of the Air Force (Space) (1995-96); Titan Launch Controller/Deputy for Standards/Evaluation, 45th Space Wing (1991-94). M.A. in space systems management.

William E. Savage, Staff Member. Director of Strategic Development for Space Programs, Litton TASC (1994 to present). National Reconnaissance Office (1986-94); U.S. Air Force Space Program (1967-86). M.S. in astrophysics.

G. Randall Seftas, Staff Member. Project Manager/Lead Engineer, National Aeronautics and Space Administration (1994-Present); Senior Research Engineer, Lockheed Missiles and Space Company (1989-94); Spacecraft Systems Engineer, Booz-Allen & Hamilton (1988-89); Operational Space Systems Engineer, GE Space Systems Division (1984-88). B.S. in aerospace engineering.

Thomas L. Wilson, Jr., Staff Member. Deputy Head, Program Coordination and Liaison Office, Naval Center for Space Technology (1997 to present). Program Manager, Naval Research Laboratory (1992-2000). Professional Staff, Office of the Deputy Under Secretary of Defense for Space (1996-98). B.S. in aerospace engineering.

Department of Defense Liaison

Major General H. J. “Mitch” Mitchell, United States Air Force. Department of Defense Liaison to the Commission to Assess United States National Security Space Management and Organization and Special Assistant to the Assistant Secretary of Defense for Command, Control, Communications and Intelligence. Former National Security Space Architect.

Attachment C

Commission Meetings

July 11, 2000

The Honorable Arthur L. Money	Assistant Secretary of Defense for Command, Control, Communications and Intelligence and DoD Chief Information Officer
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July 26, 2000

The Honorable Porter J. Goss	Co-Chairman, National Commission for the Review of the National Reconnaissance Office and Chairman, Permanent Select Committee on Intelligence, U.S. House of Representatives
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The Honorable J. Robert Kerrey	Co-Chairman, National Commission for the Review of the National Reconnaissance Office and former Vice Chairman, Select Committee on Intelligence, U.S. Senate
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Mr. Ken Colucci	Chief of Staff, National Commission for the Review of the National Reconnaissance Office
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Mr. Art Grant	Executive Staff Director, National Commission for the Review of the National Reconnaissance Office
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July 27, 2000

The Honorable Edward C. "Pete" Aldridge	Chief Executive Officer, The Aerospace Corporation and former Secretary of the Air Force and Director of the National Reconnaissance Office
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August 7, 2000

Mr. Lawrence K. Gershwin	National Intelligence Officer for Science and Technology, National Intelligence Council
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Mr. Marc Berkowitz	Director of Space Policy, Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence
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August 8, 2000

LTG John Costello, U.S. Army	Commanding General, U.S. Army Space & Missile Defense Command
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VADM Richard Mayo, USN	Deputy Director, U.S. Navy Space Information Warfare Command & Control
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August 23, 2000

LtGen Emil R. Bedard, USMC	Deputy Chief of Staff for Plans, Policies and Operations, Headquarters, U.S. Marine Corps
Maj Gen H. Marshall Ward, USAF	Director, Special Programs, Office of the Under Secretary of Defense for Acquisition, Technology and Logistics
The Honorable Keith Hall	Assistant Secretary of the Air Force for Space and Director of the National Reconnaissance Office
Mr. David A. Kier	Deputy Director, National Reconnaissance Office

August 24, 2000

Mr. Richard L. Shiffrin	Deputy General Counsel (Intelligence), Department of Defense
Mr. W. Harvey Dalton	Associate Deputy General Counsel (International Affairs and Intelligence), Department of Defense
Mr. Richard K. Sylvester	Assistant Deputy Undersecretary of Defense (Systems Acquisition)
The Honorable John Hamre	President and Chief Executive Officer, Center for Strategic and International Studies and former Deputy Secretary of Defense
Mr. James M. Simon, Jr.	Assistant Director of Central Intelligence for Administration
Mr. Larry Kindsvater	Executive Director, Intelligence Community Affairs, Office of the Director of Central Intelligence
Mr. Charles Allen	Assistant Deputy Director of Central Intelligence for Collection, Office of the Director of Central Intelligence
Mr. John Gannon	Assistant Deputy Director of Central Intelligence for Production and Analysis, Office of the Director of Central Intelligence

September 19, 2000

Lt Gen Robert H. Foglesong, USAF	Deputy Chief of Staff for Air and Space Operations
Brig Gen Daniel P. Leaf, USAF	Director of Operational Requirements
Gen Michael E. Ryan, USAF	Chief of Staff, United States Air Force
Maj Gen Brian A. Arnold, USAF	Director of Space and Nuclear Deterrence, Office of the Secretary of the Air Force for Acquisition

The Honorable Arthur L. Money	Assistant Secretary of Defense for Command, Control, Communications and Intelligence and DoD Chief Information Officer
Mr. Kenneth F. Colucci	Chief of Staff, National Commission for the Review of the National Reconnaissance Office
Mr. Arthur V. Grant	Executive Staff Director, National Commission for the Review of the National Reconnaissance Office

September 20, 2000

Mr. Kevin M. O'Connell	Executive Secretary, National Imagery and Mapping Agency Commission
Lt Gen Michael V. Hayden, USAF	Director, National Security Agency
Mr. Robert R. Soule	Director, Program Analysis & Evaluation, Office of the Secretary of Defense
LTG Edward G. Anderson, III, U.S. Army	Director for Strategic Plans & Policy (J-5), the Joint Staff
LTG James C. King, U.S. Army	Director, National Imagery and Mapping Agency

September 27, 2000

Mr. Larry Kindsvater	Executive Director, Intelligence Community Affairs, Office of the Director of Central Intelligence
Mr. James M. Simon, Jr.	Assistant Director of Central Intelligence for Administration
Gen Larry D. Welch, USAF (Ret.)	President, Institute for Defense Analysis and former Chief of Staff of the Air Force
Mr. Lawrence K. Gershwin	National Intelligence Officer for Science and Technology, National Intelligence Council

September 28, 2000

Ms. Cheryl Roby	Deputy Assistant Secretary of Defense for Programs and Evaluation, Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence
The Honorable William S. Cohen	Secretary of Defense
The Honorable Rudy de Leon	Deputy Secretary of Defense
Gen Richard B. Myers, USAF	Vice Chairman, Joint Chiefs of Staff
The Honorable Joan A. Dempsey	Deputy Director of Central Intelligence for Community Management

October 11, 2000

Mr. Albert E. Smith	Executive Vice President, Lockheed Martin Space Systems Company
Mr. James W. Evatt	Executive Vice President, Boeing Space and Communications Group and President, Government Systems
Mr. Tig H. Krekel	President and Chief Executive Officer, Hughes Space and Communications Company
Mr. Timothy W. Hannemann	Executive Vice President and General Manager, TRW Space and Electronics Group

October 12, 2000

The Honorable R. James Woolsey	Partner, Shea & Gardner and former Director of Central Intelligence
RADM J. J. Quinn, USN	Commander, Naval Space Command
The Honorable James R. Schlesinger	Senior Advisor, Lehman Brothers and former Secretary of Defense, former Secretary of Energy, former Director of Central Intelligence

October 17, 2000 *Buckley Air Force Base, Denver, Colorado*

Lt Gen Roger G. DeKok, USAF	Vice Commander, Air Force Space Command
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October 18, 2000 *Peterson Air Force Base, Colorado Springs, Colorado*

Lt Gen Roger G. DeKok, USAF	Vice Commander, Air Force Space Command
Lt Gen Eugene L. Tattini, USAF	Commander, Space and Missile Systems Center
Maj Gen Richard W. Davis, USAF	Director, National Security Space Architect, Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence
Gen C. W. Fulford, Jr., USMC	Deputy Commander in Chief, U.S. European Command
COL (P) Richard V. Geraci, U.S. Army	Deputy Commanding General, Army Space, U.S. Army Space and Missile Defense Command
Maj Gen Thomas C. Waskow, USAF	Director of Air and Space Operations, Headquarters Pacific Air Forces
Lt Gen Maxwell C. Bailey, USAF	Commander, Air Force Special Operations Command
LTG Daniel G. Brown, U.S. Army	Deputy Commander in Chief, U.S. Transportation Command

RADM Martin J. Mayer, USN	Director for Strategy, Requirements and Integration (J-8), U.S. Joint Forces Command
RADM Paul Sullivan, USN	Director for Plans (J-5), U.S Strategic Command
MG Gary D. Speer, U.S. Army	Deputy Commander in Chief, U.S. Southern Command

October 19, 2000 *Peterson Air Force Base, Colorado Springs, Colorado*

Maj Gen William R. Looney, III, USAF	Component Commander, U.S. Air Force Space Operations, U.S. Space Command
COL (P) Richard V. Geraci, U.S. Army	Deputy Commanding General, Army Space, U.S. Army Space and Missile Defense Command
CAPT Victor Cerne, USN	Joint Information Operations Center, U.S. Space Command
Col John T. Hill, USMC	Deputy, Naval Space Command
LTG Edward G. Anderson, III, U.S. Army	Deputy Commander in Chief and Chief of Staff, U.S. Space Command
Lt Gen George E.C. Macdonald, Canadian Forces	Deputy Commander in Chief, North American Aerospace Defense Command
Gen Ralph E. Eberhart, USAF	Commander in Chief, U.S. Space Command, Commander in Chief, North American Aerospace Defense Command and Commander, Air Force Space Command

October 25, 2000

Dr. David Whelan	Director, Tactical Technology Office, Defense Advanced Research Projects Agency
Lt Gen George K. Muellner, USAF (Ret.)	Vice President and General Manager-Phantom Works, The Boeing Company and former Principal Assistant to the Secretary of the Air Force for Acquisition
Mr. David A. Kier	Deputy Director, National Reconnaissance Office
Mr. Peter A. Marino	Chairman, National Imagery and Mapping Agency Commission

October 26, 2000

The Honorable Robert M. Gates	Interim Dean, George Bush School of Government and Public Service, Texas A&M University and former Director of Central Intelligence
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October 31, 2000

Mr. Robert S. Zitz	Director, Initiatives Group, National Imagery and Mapping Agency
Mr. Fred Faithful	Director of Analysis and Plans, National Imagery and Mapping Agency
Mr. James M. Simon, Jr.	Assistant Director of Central Intelligence for Administration
Lt Gen Bruce Carlson, USAF	Director for Force Structure, Resources, and Assessment (J-8), the Joint Staff
Mr. David A. Kier	Deputy Director, National Reconnaissance Office
Dr. Lawrence J. Delaney	Assistant Secretary of the Air Force for Acquisition
Lt Gen Ronald T. Kadish, USAF	Director, Ballistic Missile Defense Organization

November 1, 2000

Mr. Andrew W. Marshall	Director, Net Assessment, Office of the Secretary of Defense
Dr. Taylor Lawrence	Vice President, Products and Technology, Northrop Grumman Corporation and former Staff Director, U.S. Senate Select Committee on Intelligence
Mr. David Thompson	President and Chief Executive Officer, Spectrum Astro
Gen Richard B. Myers, USAF	Vice Chairman, Joint Chiefs of Staff
Mr. John Cople	Chief Executive Officer, Space Imaging

November 14, 2000

VADM Lyle G. Bien, USN (Ret.)	Vice President, Government Programs, Teledesic LLC
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November 15, 2000

Brig Gen Douglas J. Richardson, USAF	Commander, Space Warfare Center, Air Force Space Command, Schriever Air Force Base, Colorado
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November 28, 2000

Commission Business

November 29, 2000

The Honorable Daniel S. Goldin	Administrator, National Aeronautics and Space Administration
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November 30, 2000

Commission Business

December 5, 2000

The Honorable George J. Tenet

Director of Central Intelligence

December 12, 2000

Commission Business

December 18, 2000

Commission Business

December 19, 2000

Commission Business

January 3, 2001

Commission Business

January 4, 2001

Commission Business

January 10, 2001

Commission Business

January 11, 2001

Deliver Report

Attachment D

Acknowledgements

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Attachment E

Glossary for Organization Charts

AF	Air Force
AFMC/CC	Commander, Air Force Materiel Command
AFRL	Air Force Research Laboratory
AFSPC/CC	Commander, Air Force Space Command
ASAF	Assistant Secretary of the Air Force
ASAF(A)	Assistant Secretary of the Air Force (Acquisition)
ASD (C3I)	Assistant Secretary of Defense (Command, Control, Communications, Intelligence)
C3	Command, Control, Communications
C3ISR	Command, Control, Communications, Intelligence Surveillance and Reconnaissance
CIA	Central Intelligence Agency
CINCNORAD	Commander in Chief, North American Aerospace Defense Command
CINCSPACE	Commander in Chief, United States Space Command
CIO	Chief Information Officer
CJCS	Chairman, Joint Chiefs of Staff
CMS	Community Management Staff
CSAF	Chief of Staff of the Air Force
DAC	Designated Acquisition Commander
DARPA	Defense Advanced Research Projects Agency
DCI	Director of Central Intelligence
DDCI/CM	Deputy Director of Central Intelligence/Community Management
DepSecDef	Deputy Secretary of Defense
DNRO	Director, National Reconnaissance Office
FBI	Federal Bureau of Investigation
J2	Directorate for Intelligence
NRO	National Reconnaissance Office
NSSA	National Security Space Architect
OSR	Office of Strategic Reconnaissance
PEO	Program Executive Officer
SAF/US	Under Secretary of the Air Force
SecAF	Secretary of the Army
SecArmy	Secretary of the Army
SecDef	Secretary of Defense
SecNav	Secretary of Navy
SMC/CC	Commander, Space and Missile Systems Center
USD	Under Secretary of Defense

