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Appendix A

Commission Charter

THE WHITE HOUSE

WASHINGTON

Commission on the Future of the United States Aerospace Industry Charter

Purpose:

The Commission on the Future of the United States Aerospace Industry will study the issues associated with the future of the United States aerospace industry in the global economy, particularly in relationship to United States national security; and assess the future importance of the domestic aerospace industry for the economic and national security of the United States.

Authority:

Section 1092 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Public Law 106-398 establishes the Commission. Section 309 of Appendix D of Public Law 106-554 authorizes the General Services Administration (GSA) to utilize funds available to the National Science and Technology Council under section 635 of Appendix C of Public Law 106-554 for the Commission. This Commission is governed by the provisions of the Federal Advisory Committee Act (FACA), Public Law 92-463, as amended (5 U.S.C. Appendix 2), which sets forth standards for the formation of advisory committees, and implementing regulations (41 C. F. R. Subpart 101-6.10).

Scope:

The Commission shall study the following:

1. The budget process of the United States Government, particularly with a view to assessing the adequacy of projected budgets of the federal departments and agencies for aerospace research and development and procurement.

2. The acquisition process of the Government, particularly with a view to assessing:

   (a) the adequacy of the current acquisition process of Federal departments and agencies; and,

   (b) the procedures for developing and fielding aerospace systems incorporating new technology in a timely fashion.

3. The policies, procedures, and methods for the financing and payment of government contracts.

4. Statutes and regulations governing international trade and the export of technology, particularly with a view to assessing:

   (a) the extent to which the current system for controlling the export of aerospace goods, services, and technologies reflects an adequate

balance between the need to protect national security and the need to ensure unhindered access to the global marketplace; and

(b) the adequacy of United States and multilateral trade laws and policies for maintaining the international competitiveness of the United States aerospace industry.

5. Policies governing taxation, particularly with a view to assessing the impact of current tax laws and practices on the international competitiveness of the aerospace industry.

6. Programs for the maintenance of the national space launch infrastructure, particularly with a view to assessing the adequacy of current and projected programs for maintaining the national space launch infrastructure.

7. Programs for the support of science and engineering education, including current programs for supporting aerospace science and engineering efforts at institutions of higher learning, with a view to determining the adequacy of those programs.

Report:

Not later than March 1, 2002, the Commission shall submit a report on its activities to the President and Congress. The report shall include the following:

1. The Commission's findings and conclusions.

2. The Commission's recommendations for actions by federal departments and agencies to support the maintenance of a robust aerospace industry in the United States in the 21st century and any recommendations for statutory and regulatory changes to support the implementation of the Commission's findings.

3. A discussion of the appropriate means for implementing the Commission's recommendations.

The commission should also plan to submit an interim report outlining the areas the commission proposes to review and any preliminary findings.

Membership:

1. The Commission shall be composed of 12 members as follows:

(a) Up to six members shall be appointed by the President;

(b) Two members shall be appointed by the Speaker of the House of Representatives;

(c) Two members shall be appointed by the majority leader of the Senate;

(d) One member shall be appointed by the minority leader of the Senate;

(e) One member shall be appointed by the minority leader of the House of Representatives.

2. The members of the Commission shall be appointed from among persons with extensive experience and national reputations in aerospace manufacturing, economics, finance, national security, international trade, or foreign policy and persons who are representative of labor organizations associated with the aerospace industry.

3. Members shall be appointed for the life of the Commission. A vacancy in the Commission shall not affect its powers, but shall be filled in the same manner as the original appointment.

4. The President shall designate one member of the Commission to serve as the chairman of the Commission.

5. The Commission shall meet at the call of the chairman. A majority of the members shall constitute a quorum, but a lesser number may hold hearings.

Administrative Requirements and Authorities:

1. In accordance with section 309 of the Miscellaneous Appropriations Act, 2001, the Administrator of the General Services Administration may utilize funds available to the National Science and Technology Council (authorized by Executive Order No. 12881), or any successor entity to the council, under section 635 of the Treasury and General Government Appropriations Act, 2001 for payment of any expenses of, and shall ensure that administrative services, facilities, staff and other support are provided for the Commission.

2. The Commission may hold hearings, sit and act at times and places, take testimony, and receive evidence that the Commission considers advisable to carry out the purposes of this section.

3. The Commission may request directly from any department or agency of the United States any information that the Commission considers necessary to carry out the provisions of this section. To the extent consistent with applicable requirements of law and regulations, the head of such department or agency shall furnish such information to the Commission.

4. The Commission may use the United States mails in the same manner and under the same conditions as other departments and agencies of the United States.

Compensation and Funding:

1. Members of the Commission shall serve without additional compensation for their service on the Commission, except that members appointed from among private citizens may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons serving intermittently in government service under subchapter I of chapter 57 of title 5, United States Code, while away from their homes and places of business in the performance of services for the Commission.

2. The chairman of the Commission may appoint staff of the Commission, request the detail of Federal employees, and accept temporary and intermittent services in accordance with section 3161 of title 5, United States Code (as added by section 1101 of this Act).

3. Staffing: The Commission support staff will be full and part-time, determined by the Staff Director in accordance with the needs of the Commission Chairman. Staff will be provided

through details from NSTC organizations and direct hires as provided under Title 5, USC, Section 3161. Full time staffing is estimated to be 13 including administrative staff.

4. Funding: DOD will assist by providing the Commission with its space, phone, mail service, computer support, contracting, and other related administrative services consistent with their internal policies and practices. Funding of government-provided support personnel will be the responsibility of the respective parent organizations. The Commission costs, including Commissioner and staff travel, but excluding independent studies are estimated to be $1.13 million through March 31, 2002. Funding for independent studies is budgeted for $440 thousand. Actual amounts will be based on the availability of funds and the scope and specific needs determined by the Commission.

Termination:

The Commission shall terminate 30 days after the date of the submission of its final report.

General Provisions:

The functions of the President under the Federal Advisory Committee Act that are applicable to the Commission shall be performed by the National Science and Technology Council, in accordance with the guidelines and procedures established by the Administrator of General Services. The NSTC will appoint an Executive Director for the Commission who will represent the NSTC on the Commission and serve as the Designated Federal Officer according to the Act.

Approved: Date:

Lawrence B. Lindsey 7-19-01

Lawrence B. Lindsey
Assistant to the President for Economic Affairs

Appendix B

Commission Interim Reports

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B1 – Interim Report #1

Commission on the Future of the United States Aerospace Industry
1235 Jefferson Davis Highway, Suite 940
Arlington, Virginia 22202

December 18, 2001

The Honorable George W. Bush
President
The White House
1600 Pennsylvania Avenue, NW
Washington, DC 20500

Dear Mr. President:

As you know, your *Commission on the Future of the United States Aerospace Industry* is chartered to study federal department and agency actions to maintain a robust aerospace industry in the 21st Century and report its findings and recommendations to you and the Congress. Within that charter, the Commission was specifically asked to assess the adequacy of projected aerospace research and development and procurement budgets.

The Commission held its first public meeting at the U.S. Department of Commerce on November 27th, 2001, at which time we received testimony from Dr. John Marburger, Congressman Dave Weldon, our Commissioners, and senior representatives from a number of government departments and agencies. An initial determination from our deliberations was that federal government aerospace sector spending is currently spread across multiple government agency budgets, with oversight by numerous and different Congressional committees. As a result, none of these government groups has an integrated view of our national aerospace efforts. We further determined that the current process and structure lack the necessary overall insight and accountability for development and implementation of a coherent national strategy and program – making it difficult to provide overall national aerospace leadership and oversight.

From these findings, the Commission unanimously voted to issue this interim report recommending that the following sectoral budget analyses be conducted of federal government and industry aerospace spending and submitted to the Commission on or before March 15, 2002:

(1) The Office of Management and Budget (OMB) prepare a spending breakout, by category, as an addendum to the FY03 President's Budget Request;

(2) The Department of Commerce compile and present baseline statistics on the economic performance and investment expenditures of each aerospace industry sector for the purposes of comparison to the federal outlays; and

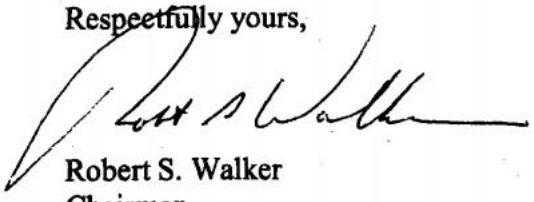
(3) The Congressional Budget Office provide an FY02 sectoral budget breakdown that parallels the OMB FY03 submission.

The Commission staff will work with OMB to develop an acceptable categorical definition of the aerospace sector for this analysis.

As the Commission continues moving forward with its assessment of our national aerospace enterprise in the upcoming year, it is my intent to provide you and the Congress with timely interim products to help strengthen and improve the U.S. aerospace enterprise. Your support for this critical work is greatly appreciated.

An identical interim report has been submitted to the Congress.

Respectfully yours,



Robert S. Walker
Chairman

cc: The Honorable Donald L. Evans, Secretary of Commerce
The Honorable Mitchell E. Daniels, Jr., Director, Office of Management and Budget
Dan L. Crippen, Director, Congressional Budget Office

B2 – Interim Report #2

Commission on the Future of the United States Aerospace Industry
1235 Jefferson Davis Highway, Suite 940
Arlington, Virginia 22202
Tel: (703) 602-1515
Fax: (703) 602-1532

March 20, 2002

The Honorable George W. Bush
President
The White House
1600 Pennsylvania Avenue, NW
Washington, DC 20500

Dear Mr. President:

The Commission has been meeting since November 2001 to study and recommend public policy reforms that will help sustain a robust U.S. aerospace industry in the 21st Century. While the Commission will not publish its final report until November 2002, we are pleased to provide the enclosed interim report that we approved at our February 12 public meeting. The report focuses on three issues that the Commission believes require immediate Administration and Congressional attention – improving the business climate for the aerospace industry, reforming the U.S. export control system, and creating the infrastructure needed to meet the nation's future air transportation needs.

The aerospace industry is critical to the nation's economy, national security and the quality of life for all Americans. As an important high technology engine of the American economy, the U.S. aerospace industry generates 15 percent of the U.S. gross domestic product and over 11 million jobs. Aerospace products account for the largest positive balance of payments contribution of any sector of the nation's economy. Over 40 percent of the industry's products are exported. We depend on the aerospace industry to arm our military with the superior weapons needed to defend our nation from those who seek to harm our citizens and threaten our democracy. We depend on air travel to move passengers and products rapidly across the nation and around the world. Each year, U.S. airlines move over 600 million passengers and many times that number of pieces of cargo. We depend on satellites for inexpensive and instantaneous global communications and navigation. A strong aerospace industry also enables scientific discovery and inspires our dreams to reach for the stars.

Our dependency on aerospace will continue to grow in the 21st Century, as we seek to move our citizens, goods and information anyplace, anytime. Aerospace systems will connect the world, providing fast, direct and accessible transportation for everyone. Aerospace will be a guarantor of public safety and national security. Aerospace leadership will enable us to explore, discover and settle new worlds while providing benefits for humanity and the Earth.

For these reasons, the United States must maintain its world leadership in aerospace. However, this can only happen with the direct interest and involvement of the White House, the Congress, the states, aerospace businesses, labor, academia and the American people.

We applaud the President for his foresight in proposing a federal budget for fiscal year 2003 that starts to reverse the downward trend in federal investments in aeronautics and space. We strongly urge the Congress to support these priorities and include a statement by the Commission to this effect in the enclosed report.

In addition to funding, we believe that the following issues discussed in the enclosed report could have a significant near-term impact on the aerospace industry and, hence, require immediate action:

- Business Environment. We must create a business environment in the United States that encourages the aerospace industry to grow and prosper and to be competitive in the global economy.

- Defense/Dual-Use Exports. Current export controls introduce so much uncertainty and delay that foreign customers are often reluctant to attempt to purchase U.S. products. In short, we need to reengineer the current export control system for the post-Cold War era. We must bring new thinking into the control of aerospace technology. It is counterproductive that the government, for example, prevents the sale of U.S. aerospace technology that is readily available from other sources worldwide. This is particularly true when the customer is a valued ally.

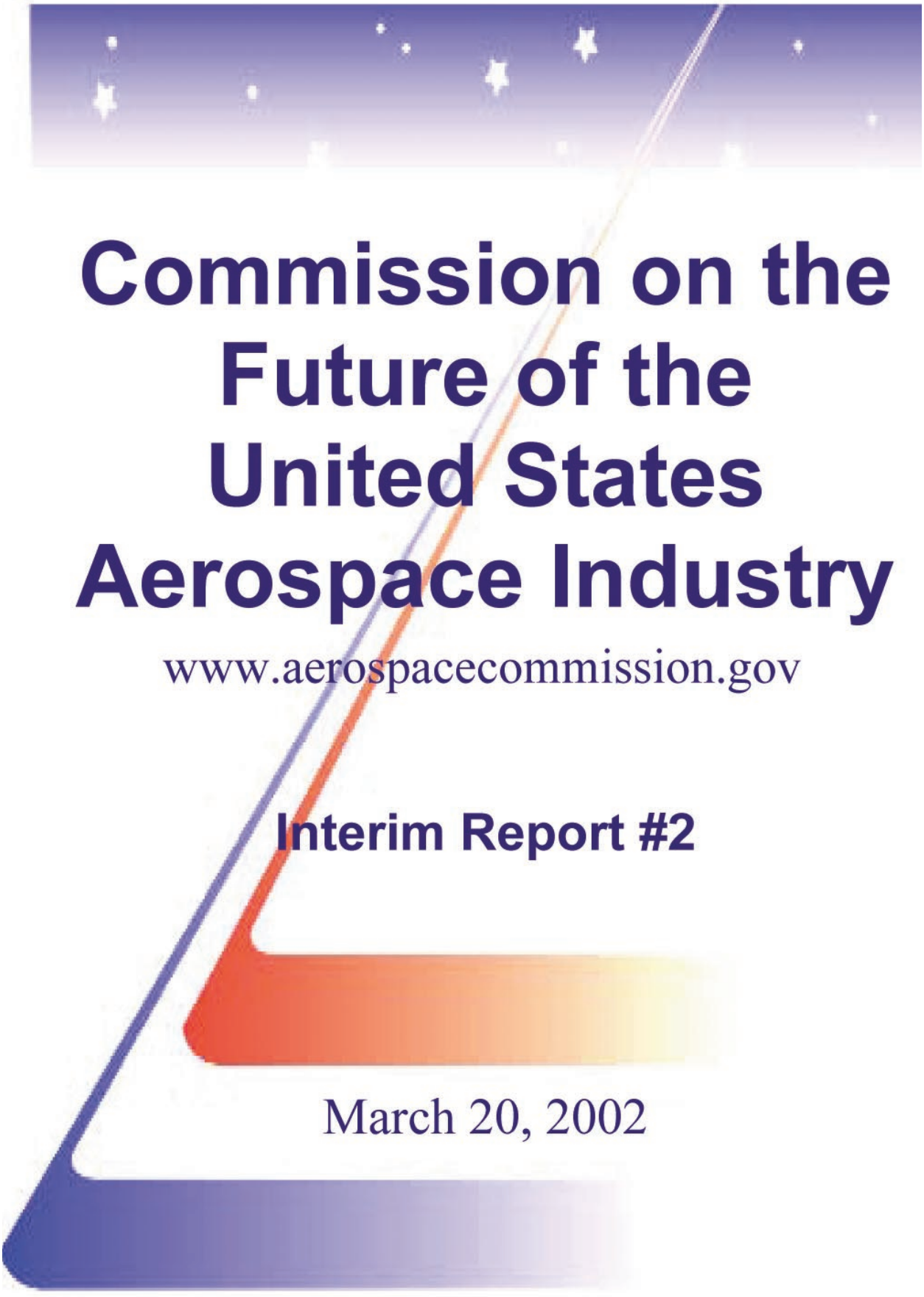
- Air Transportation. Our current air traffic control infrastructure is not scalable to meet future air transportation demand and is vulnerable to attack. We must begin to develop an infrastructure that meets the nation's future air traffic capacity and security needs. If we do not act now, we can expect the delays of the past few years to return and worsen, with resultant increases in cost and inconvenience for the American people and business. The temporary slowdown in air traffic resulting from the events of September 11, 2001, provide an opportunity to start developing a new air transportation system that can readily handle future air system capacity needs while improving public safety and homeland security.

The Commission's preliminary findings and recommendations in these three areas are provided in the enclosed report. We intend to make more sweeping recommendations in these areas in the final report. An identical letter has been sent to the Congress.

Respectfully yours,

Robert S. Walker
Chairman

Enclosure



Commission on the Future of the United States Aerospace Industry

www.aerospacecommission.gov

Interim Report #2

March 20, 2002

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I. Introduction

The Commission on the Future of the United States Aerospace Industry was established by Section 1092 of the Floyd D. Spence National Defense Authorization Act for fiscal year 2001, Public Law 106-398. It was formed to study the future of the U.S. aerospace industry in the global economy, particularly in relationship to U.S. national security; and to assess the future importance of the domestic aerospace industry for the economic and national security of the United States. The Commission will issue a final report to the President and Congress on November 19, 2002. Periodic interim reports will also be issued.

A. Mission Statement

The Commission shall develop and recommend a series of public policy reforms that will permit the U.S. aerospace industry to create superior technology, excel in the global marketplace, profit from investments in human and financial capital, benefit from coordinated and integrated government decision-making, assure our national security, access modern infrastructure, and give the United States a capacity throughout the 21st Century to reach for the stars.

B. Congressional Mandate

The Commission was given a broad mandate to study:

- The adequacy of projected budgets of the federal departments and agencies for aerospace research and development and procurement;
- The adequacy of the current acquisition process of federal departments and agencies;
- The procedures for developing and fielding aerospace systems incorporating new technology in a timely fashion;
- The policies, procedures, and methods for the financing and payment of government contracts;
- Statutes and regulations governing international trade and the export of technology;
- Policies governing taxation, particularly with a view to assessing the impact of current tax laws and practices on the international competitiveness of the aerospace industry;
- Programs for the maintenance of the national space launch infrastructure; and
- Programs for the support of science and engineering education.

C. Commissioners

The Commission is composed of 12 members: six appointed by the President, two each by the House and Senate Majority Leaders, and one each by the House and Senate Minority Leaders. The Chairman is the Honorable Robert S. Walker, former Chairman, U.S. House of Representatives Committee on Science, and the Vice Chairman is the Honorable F. Whitten Peters, former Secretary of the Air Force.

The commissioners appointed by the White House are:

Dr. Buzz Aldrin
President, Starcraft Enterprises, Sharespace, Starbooster & Starcycler

Mr. Edward M. Bolen
President, General Aviation Manufacturers Association

The Honorable John W. Douglass
President, CEO and General Manager, Aerospace Industries Association

Dr. Neil de Grasse Tyson
Director, Hayden Planetarium

The Honorable Robert S. Walker
Chairman, Wexler & Walker Public Policy Associates

Ms. Heidi R. Wood
Executive Director, Morgan Stanley

The commissioners appointed by the Congress are:

Mr. R. Thomas Buffenbarger
President, International Association of Machinists & Aerospace Workers

The Honorable Tillie K. Fowler
Partner, Holland & Knight

The Honorable John J. Hamre
President & Chief Executive Officer, Center for Strategic & International Studies

The Honorable F. Whitten Peters
Partner, Williams & Connolly

The Honorable William Schneider
President, International Planning Services, Inc.

Mr. Robert J. Stevens
President and Chief Operating Officer, Lockheed Martin Corporation

II. Present Trends in Federal Aerospace Research and Development Budgets

Technological advances have driven aerospace progress since the first flight of the Wright brothers and Dr. Robert Goddard's first rocket launch. It is clear to the Commission that investments in the research and development (R&D) of aerospace technology are absolutely crucial to continued U.S. aerospace progress and leadership.

A. Department of Defense

The Commission applauds the President's proposed fiscal year (FY) 03 augmentations to Department of Defense (DoD) R&D investments. The increases proposed both this year and last year are especially important because they follow a period of significant decline. The Commission supports the DoD goal to increase science and technology investment to three percent of the overall budget, and encourages continued progress toward this goal in the FY03 budget. The encouraging trends in defense R&D are a base to be built upon, but challenges will face us in future budget years. In future reports, the Commission will assess potential industrial base issues.

B. Civil Aviation

Federal Aviation Administration (FAA) and National Aeronautics and Space Administration (NASA) R&D investments represent the fundamental long-term, high-risk, precompetitive technology development that individual suppliers of aviation and space systems need but cannot support under near-term pressures from financial markets. Technologies and systems in use today are the result of R&D investments made 20 or more years ago. The United States is just now beginning to see the effects of the R&D budget declines of the 1990s in our air traffic control system capabilities, the technological parity of foreign-built aircraft, and the aging facilities of our federal research laboratories.

In contrast, the research programs of the European Union (EU) are driven by a policy seeking world leadership for its civil aeronautics industry. The EU member states are also placing increased emphasis on integrating and coordinating national research programs.

As the President and Congress move ahead to address the nation's future aerospace needs, new investments will be required. The Commission encourages the Congress to assess these needs in its deliberations on the FY03 budget, and encourages the Administration to consider them in preparing the FY04 budget.

III. Business Environment

A. Negotiate Resolution of Foreign Sales Credit and Extra-Territorial Income Exclusion Act of 2000 Dispute

1. Issue

On January 14, 2002, a World Trade Organization (WTO) appellate body issued a final ruling that a U.S. law, called the "FSC Repeal and Extra-territorial Income Exclusion Act of 2000" (ETI), is an illegal export subsidy and, thus, inconsistent with WTO rules. This legislation replaced the Foreign Sales Corporation (FSC) tax regime with the ETI regime in an effort to be WTO-compliant. If the United States does not act to come into compliance with the WTO rules, U.S. exporters could face sanctions totaling as much as $4-6 billion per year in the form of tariffs on the sale of U.S. goods.

2. Background/Findings

European Union (EU) countries rely heavily on a value-added tax for revenue. The tax is imposed on imports and rebated at the border for exports. EU countries also tend to tax their companies more leniently on overseas earnings than on domestic profits. In order to partly offset the differences in tax treatments between Europe and America, United States tax law allowed domestic companies to establish FSCs that provided a means to reduce taxes on a share of profits derived from exports. When the WTO determined that the FSC regime was inconsistent with WTO rules, because it was deemed an illegal export subsidy, the United States repealed FSC and enacted the ETI regime in November 2000.

The WTO has now ruled that the ETI regime is also an illegal export subsidy. The loss of the ETI regime would negatively impact the competitiveness of U.S. exporters doing business in Europe by creating another competitive discriminator. This would add to several other factors already benefiting our European competitors, including outdated U.S. export control laws, increasing demand for offsets, and European government subsidies of national companies. Loss of the ETI tax incentive could result in the loss of U.S. employment if companies moved jobs to offshore facilities that enjoy favorable treatment by foreign governments.

Interim Report #2, Recommendation 1

The U.S. Trade Representative should seek additional time for the United States and EU to develop a long-term resolution of this issue that maintains the level of tax relief for all industries.

B. Strengthen Research and Experimentation Tax Credits

1. Issue

For the aerospace industry, heavily dependent on advanced technology, the federal research and experimentation (R&E) tax credit has become ineffective. Lack of permanence and the small number of firms qualifying for the full 20 percent R&E tax credit have virtually eliminated the desired incentive for companies to invest in R&D.

2. Background/Findings

U.S. tax law currently provides an incentive for R&D spending with a credit equal to 20 percent of incremental R&D expenditures measured by reference to the taxpayer's average R&D expenditures during the period 1984 through 1988. Very few aerospace companies qualify for the 20 percent R&E tax credit since the 1984-1988 base period was a high-water mark of military procurement and R&D spending. Since the base period, defense procurement (on a constant 2001 dollar basis) has declined by 57 percent. An Alternative Incremental Research Credit (AIRC) is available for companies that do not benefit from the regular R&E tax credit. The alternative rate is 2.65 percent to 3.75 percent of R&D expenditures exceeding one percent of gross receipts. These rates provide a small incentive but do not provide the full savings of the 20 percent regular credit.

The R&E tax credit is scheduled to expire in 2004. With the lengthy time frames of most R&D projects, the uncertainty of the credit's availability dampens the incentive for private investment in new technology. Legislative proposals currently pending in Congress (H.R. 41 and S. 41) would make the R&E credit permanent and increase the alternative credit rates to between 3 percent and 5 percent. The U.S. R&E credit is the third lowest of nine countries surveyed by the Organization for Economic Cooperation and Development (OECD). Increasing the alternative tax credit rates and making the credit permanent would improve the industry's financial capability and strengthen the country's technological base.

Interim Report #2, Recommendation 2

2.a. In the near term, revise the U.S. tax code to:

- Make the R&E tax credit permanent, and
- Increase the alternative credit rates to achieve parity with the savings provided by the regular credit.

2.b. In the longer term, enact structural changes to the R&E credit, including changes in the baseline period, increases in the rates for the AIRC and other improvements that enhance its effectiveness in stimulating private sector investment in new technologies.

C. Establish Shared Savings for Cost Efficiencies and Rationalization

1. Issue

The DoD and NASA ultimately pay for process inefficiencies and for underutilized and excess capacity in the defense industry by paying higher costs for products and services. Until sufficient incentives are provided for contractors to undertake cost-saving initiatives, DoD and NASA will not realize the potential for reducing program costs and improving the quality and timeliness of products and services delivered.

2. Background/Findings

There is little incentive for contractors to undertake initiatives that will have long-term positive benefits on program performance and cost because the government is the predominant beneficiary of the savings. On cost-based contracts, DoD receives the majority of any savings resulting from cost efficiencies and rationalization. During contract negotiations, government contract officers remove all contractor savings benefit through renegotiation of the overhead rate. On fixed price contracts, DoD contractors may realize some of the savings on the instant contract, but those savings then reduce the negotiation base for future contracts – often meaning that the benefit does not outweigh the cost.

The costs of rationalization without reward are a disincentive to contractors to pursue rationalization. One means of motivating the contractor to take on the cost of productivity and rationalization improvements is to share a portion of the savings over some number of years. Current Acquisition Excellence initiatives sponsored by the Under Secretary of Defense for Acquisition, Technology and Logistics to move most contracts from a cost to a performance basis would provide more contractor incentive to fund cost savings and rationalization.

Interim Report #2, Recommendation 3

Implement a strategy that provides incentives for contractors to pursue cost efficiencies and further rationalization of inefficient operations. The exact mechanism for achieving shared savings is not as important as the need to ensure that there is such a mechanism. One such strategy under consideration by the DoD is summarized below:

- Rules for Shared Savings Strategy
  - Ensure net savings result in each year of a not-to-exceed five-year period by amortizing associated costs. Recognize the cost of capital associated with amortized costs.
  - Contractor receives up to 50 percent of the net savings as long as the government receives at least $2 in savings for every $1 it expends (after deducting the negotiated shared savings amount and the cost of capital), and the contractor implements planned efforts to generate the savings.
  - Duplicate rewards are precluded for the same effort.

- Implementation. Contractor submits to the government-contracting officer a plan for efforts to achieve cost efficiencies and further rationalization. The government contracting officer ensures proposed savings are the direct result of the proposed efforts, contractor adequately supports the proposal, audits the proposal, negotiates an advance agreement for shared savings, and obtains the agreement of the appropriate departments, agencies and offices.

- Method for Sharing Savings
  - Additional "plus up" to profit on cost-based contracts is negotiated at the business segment level.
  - Government agrees to share up to 50 percent of savings from new cost savings initiatives for up to five years.

IV. Defense/Dual-Use Exports

Export controls have been and should be an important component of America's national security. The Commission believes, however, that export controls are increasingly counterproductive to our national security interests in their current form and method of implementation. Our export control system needs a thorough overhaul. In our judgment, export control reform is crucial to provide better security in the future and to insure the health and vitality of our aerospace industry. The Commission intends to make more sweeping recommendations in its final report. In the interim, we recommend the following steps be taken immediately.

A. Accelerate Implementation of the Defense Trade Security Initiative

1. Issue

The Defense Trade Security Initiative (DTSI) contains several important elements that can significantly improve the access of U.S. aerospace firms to the international market and strengthen defense-industrial collaboration within the alliance. The pace of implementation of several of these initiatives has slowed, including electronic licensing, the U.S. Munitions List (USML) review, bilateral negotiations with major allied nations to create exclusions from export licensing requirements, and a reduction in the barriers to Global Program/Project licenses.

2. Background/Findings

The Secretary of State promulgated the DTSI in May 2000. The DTSI contains 17 initiatives that can make a constructive contribution to defense trade process reform and liberalization and, hence, materially improve market opportunities for U.S. defense exporters. The implementation of the DTSI has slowed, thus limiting the pace of reform needed in defense trade policy and regulation. The implementation of electronic licensing can increase the speed of license processing, reduce costs, and improve compliance with export control regulations. The review of the USML can hasten the removal of items from the list that are needlessly burdening the compliance monitoring process and increasing cost to U.S. exporters by requiring the licensing of items that should not require export licenses.

The United States has begun negotiations with Australia and the United Kingdom (U.K.) to create a regulatory and compliance "template" to facilitate a wide range of exclusions from a requirement for export licensing. Although these negotiations began in earnest, they have stalled and need an impetus to reach an agreement. An effort to exploit residual authority under the Arms Export Control Act to facilitate issuing comprehensive licenses covering an entire defense industrial program or project has been burdened by needless regulatory barriers. These regulatory barriers have prevented the issuance of global program/project licenses, even though current efforts with the Joint Strike Fighter (F-35) may be productive.

Interim Report #2, Recommendation 4

Accelerate implementation of the DTSI as an important first step in a comprehensive reform of the nation's arms transfer policy and regulatory process. Specifically, the following items should proceed as quickly as possible to:

- Implement electronic licensing with system interface compatibility;
- Review the USML;
- Remove regulatory barriers to use global program/project licenses; and
- Reinvigorate U.S. bilateral negotiations with Australia and the U.K. to establish International Traffic in Arms Regulations (ITAR) country exemptions.

B. Update Country Risk Surveys to Modernize Export Licensing Compliance Practices

1. Issue

Effective compliance with U.S. Munitions List export regulations depends on up-to-date knowledge of the willingness and ability of nations abroad to implement their obligations to prevent unauthorized use or retransfer of U.S. defense hardware and technology exports. In many cases, U.S. government surveys of individual country risk are years out of date.

2. Background/Findings

The U.S. government conducts country risk surveys to support the export licensing function. U.S. export licensing practices, license provisos, and similar restrictions imposed on U.S. exporters are dependent on an up-to-date and detailed understanding of the willingness and ability of recipient nations to comply with restrictions on the unauthorized use or retransfer of U.S.-origin defense exports. Unfortunately many of these surveys are several years out of date. The absence of up-to-date data causes export-licensing authorities to depend on data that may no longer reflect current conditions in many United States defense export markets. Moreover, up-to-date country risk surveys will provide a basis for government-to-government consultations to strengthen compliance among the community of nations with whom the U.S. shares modern defense hardware and technology.

Interim Report #2, Recommendation 5

Country risk surveys should be updated immediately to align compliance practices with contemporary conditions in U.S. defense export markets.

C. Modernize the Defense Export Loan Guarantee Program

1. Issue

In 1996, the Congress established the Defense Export Loan Guarantee (DELG) program in the DoD. The purpose of the statute was to create an export credit mechanism for U.S. defense exporters. This program shares most of the characteristics of the U.S. Export-Import Bank loan guarantee program for civil sector exports with an important exception – the defense loan guarantees are not subsidized with funds appropriated to the DoD. Because of statutory constraints and regulatory and administrative practices, this program has proven to be unattractive to potential foreign customers – only one small transaction has been executed in more than five years of operation. As a result, the United States is the only significant exporter of defense-related equipment without an official exports credit mechanism. The DELG program needs to be modernized to facilitate the financing of U.S. defense exports.

2. Background/Findings

The Congress has been concerned with the inability of the Department of Defense to use the DELG to serve U.S. national security objectives. The FY02 DoD Authorization Act requires DoD to prepare a report describing its limitations in using the provision for the purpose intended in the statute. This report is now in preparation, and is likely to be delivered to the Congress in April 2002. The report could constitute an evidentiary basis for an Administration legislative initiative to modernize the DELG.

Interim Report #2, Recommendation 6

The DELG should be modernized to permit the DoD to create an effective unsubsidized export credit organization to facilitate the financing of defense exports to U.S. allies and friendly nations abroad. Modernization of the DELG should remove dysfunctional statutory and regulatory constraints that frustrate implementation of the DELG statute. Among the pertinent changes that should be implemented through both a legislative initiative and policy changes are:

- Eliminate restrictions on the capitalization of exposure fees by users of the DELG;
- Permit users of the DELG with allocations of Foreign Military Financing (FMF) to use their FMF to finance the payment of DELG exposure fees and other costs associated with the DELG;
- Broaden the eligibility for the DELG financing based on a waiver by the Secretary of Defense. This should include the financing of allied participation in collaborative defense-industrial projects with the United States to minimize the disruption to crucial multi-year programs from out-of-phase national budgeting;

- Implement administrative practices (including use of the U.S. Export-Import Bank as an administrative agent in exchange for a user fee) to reduce the DELG's administrative costs to the DoD and its users; and

- Modify administrative practices to facilitate the adding of nations to the list of eligible parties to the DELG program.

V. Air Transportation

A. Transform the U.S. Air Transportation System

1. Issue

Safe, secure and efficient air transportation is central to our nation's growth and economic development. Our current air traffic system, however, will not be able to meet the Nation's long-term needs. The suppressed capacity demand resulting from the September 11, 2001, terrorist attack and economic slowdown should not be misinterpreted as a reason to delay needed short-term and long-term improvements. We have an opportunity now to modernize the air transportation system and to increase its capacity, security and flexibility.

2. Background/Findings

Over the last century, aviation has become an integral part of the U.S. economy, a key catalyst for economic growth, and a profound influence on American quality of life. American citizens and businesses use air travel more than any country in the world. Aviation is responsible for more than $1 trillion in U.S. economic activity, employs nearly 11 million workers, and aviation products lead the development and use of advanced technologies. According to U.S. Government statistics, 31 percent of the value of international trade through the top 50 U.S. gateways was transported by air. Civil aviation integrates the United States into the world economy and promotes international exchange of people and ideas.

Our nation's security also depends on aviation. Federal, state, and local law enforcement agencies depend on aviation assets to ensure public safety. The contributions of the DoD and North American Air Defense Command to the nation's protection are inextricably linked to the operations and data shared with the air traffic control system.

Prior to September 11, 2001, the nation's air traffic control system was straining under progressively increasing demand and growing delays. The costs of those delays – both business and personal – were rapidly becoming unacceptable to the public, the true owners of America's airspace. Recent studies documented the annual loss associated with flight delays at over $8 billion. The aftermath of the September 11 terrorist attack highlights the vital importance of a safe, secure, and freely moving air transportation system as well as the fragile financial condition of the nation's air carriers.

There is no shortage of airspace – the skies are far larger than any highway and our current "capacity" of 6500 or so aircraft aloft use only a tiny fraction of existing airspace. The air carriers use only 12 percent of the more than 5000 public use airports in the United States. In fact, just 64 airports carry 85 percent of all air carrier traffic.

Today, we are not capable of fully exploiting the potential of this public asset. Our current air traffic system relies on, and is limited by, procedures and systems that have not substantially changed since the 1960s – imprecise radar tracking, voice radio communications, limited weather knowledge, severe visibility handicaps, lack of dynamic data sharing, and human monitoring throughout every flight with constant hand-offs between controllers.

a. Finding #1: Current Federal Aviation Administration (FAA) capacity enhancement plans are important and must be funded and remain on schedule.

The FAA's Operational Evolution Plan (OEP) is an organized collection of over 100 programs addressing capacity problems. The goal of the OEP is to increase the capacity of the National Airspace System by approximately 30 percent by the year 2010. This is equivalent to about 700-800 more flights in the air at a given time during normal operating hours.

Air traffic demand, however, is expected to grow by at least 30 percent by 2010. Expanded operations, innovative services, and efficient travel would benefit the entire nation and should be encouraged – not limited by a lack of sufficient infrastructure. So while we must continue aggressively with the OEP, greater capability and flexibility is clearly needed.

b. Finding #2: The FAA's OEP plan does not include funding for operator equipage or emerging technologies.

The OEP concept calls for incorporating additional technologies and capabilities as they emerge. Since these critical improvements are as yet unknown, no budget provision has been made for them. According to the FAA, "we are short now and we will be for the next eight years."

Moreover, OEP capacity improvements rely heavily on the voluntary purchase and installation of an estimated $11 billion in new equipment by the airlines. Given the economic realities airlines are facing today, this is a highly problematic assumption.

Since the events of September 11, the FAA has understandably focused on immediate actions required to meet security challenges. Some of the OEP activities have therefore been adjusted. Meanwhile, demand for air traffic services and airspace has already begun to recover.

c. Finding #3: Today's processes, laws, and plans for expanding airport and air traffic control infrastructure require many years' lead time and are fraught with technical, political, environmental, and management challenges.

Building, or even expanding, a single runway at a major airport can take one to two decades to complete, even if the local community favors its construction. Coordinating the upgrade of ground, airborne and space systems for improved operations is a hugely

complex job that relies upon consensus and voluntary agreements between government and private operators and also requires planning lead times of many years.

d. Finding #4: All present and future air transportation system concepts place a heavy reliance on a robust, secure, and flexible communication, navigation and surveillance capability.

The deployment of such a capability will rely on ground-, air-, and space-based components and avionics in the aircraft. The system and the users will not achieve the benefits of the new technologies and capabilities unless they are deployed together. This will require the synchronization of both public and private investments.

e. Finding #5: The nation needs a clear air transportation policy with an objective to move air traffic capacity substantially ahead of anticipated demands while enhancing public safety and homeland security.

The aviation transportation system must not be allowed to constrain the nation's economic productivity and growth and should continue to improve the quality of life for every citizen. The Commission believes that the nation needs strong leadership, guided by a new national aviation policy, to provide what America demands of, and deserves from, aviation. The effective operation, innovative use, and strategic development of air transportation must become a clear national priority.

Interim Report #2, Recommendation 7

7.a. The Administration should immediately create a multi-agency task force with the leadership to develop and implement an integrated plan to transform our air transportation system.

An integrated plan is needed to define a new system architecture for the nation's air transportation system with procedures based on precision knowledge, automated systems, and instantaneous communications throughout the network. Capacity, safety, and security will all be improved with increasing precision and information sharing. The technologies needed to provide this capability are either available today or feasible to develop in the near future. However, we need a national focus and the will to move ahead.

The many government organizations with aviation interests should immediately be brought together under strong administration leadership to collaborate on the design strategy for a revolution in air transportation capacity, safety, and security.

7.b. The Administration and Congress should fully fund air traffic control modernization efforts in fiscal year 2003 and beyond, and prioritize FAA and NASA research and development efforts that are the critical building blocks for the future.

Air transportation is so important to the nation that the Administration and the Congress need to make air traffic infrastructure modernization a top priority. The FAA OEP needs to be fully funded, and FAA and NASA need significant increases in R&D to start developing a new air transportation system for the nation. R&D investments should include a focus on security, high bandwidth communications, precision navigation and surveillance, ground and airborne control automation, advanced weather sensing, small aircraft transportation technologies, and noise and emissions reduction. In addition, new mechanisms and incentives need to be developed to accelerate the application of existing and new technologies and concepts into the marketplace.

For the fiscal year 2004 budget, the Administration and Congress should work together to fund a new R&D initiative to develop a new 21st Century air transportation system for the nation.

VI. Summary

This report is the second in a series of interim reports aimed at identifying issues the Commission believes are critical to the future of the U.S. aerospace industry and require immediate attention by the Administration and/or the Congress. The first report was issued on December 18, 2001, and focused on the need for the federal government to budget and fund aerospace activities as a sector. It is anticipated that the Commission will release other interim reports leading up to the release of its final report on November 19, 2002.

To support development of its findings and recommendations, the Commission has conducted two public meetings – on November 27, 2001, and February 12, 2002 – and has four more public meetings scheduled for this year: May 14th, August 22nd, September 17th, and October 23rd. The public is encouraged to attend these meetings, as well as to provide inputs directly to the Commission via its website at: www.aerospacecommission.gov or Mr. Paul F. Piscopo, Staff Director, Commission on the Future of the U.S. Aerospace Industry, Crystal Gateway 1, Suite 940, 1235 Jefferson Davis Highway, Arlington, Virginia 22202, via phone (703-602-1515), fax (703-602-1532), or e-mail (aerospace.commission@osd.pentagon.mil).

B3 – Interim Report #3

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June 26, 2002

President George W. Bush
The White House
1600 Pennsylvania Avenue
Washington, DC 20500

Dear Mr. President:

The Commission is pleased to provide the enclosed third interim report, which was approved at its May 14, 2002, public meeting. This report provides preliminary findings and recommendations on three issues the Commission believes require immediate Administration and Congressional attention:

- Space Infrastructure. The U.S. government continues to maintain a large and aging infrastructure in spite of dramatically reduced demand for space launch. As a result, the government continues to spend scarce resources to maintain a large number of aging facilities instead of designing the infrastructure the nation will need in the future. The government needs to prioritize its infrastructure requirements and seek new ways to manage and operate them.

- Aerospace Industrial Base. Today's challenging business environment has jeopardized the nation's ability to sustain critical design and manufacturing capabilities and expertise, especially in high-performance aircraft, solid rocket booster systems and rotorcraft. The U.S. government, particularly its national security organizations, needs a process to identify and address industrial base issues.

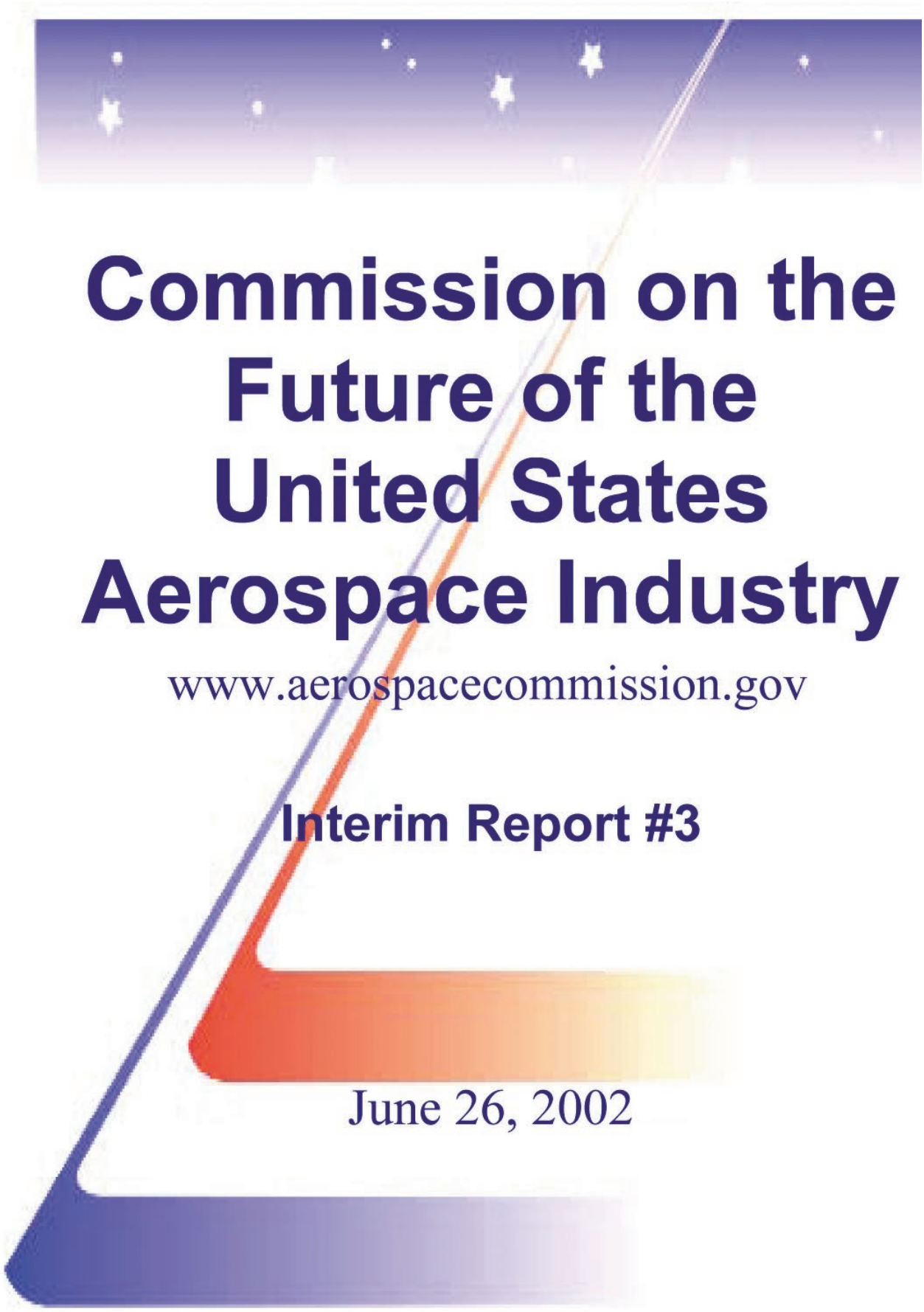
- 21st Century Aerospace Workforce. As with many high-tech U.S. industries, the aerospace industry is having increasing difficulty attracting and retaining well-educated and skilled workers. This problem is complicated by the fact that the workforce is aging, technology innovation is accelerating and global competition is increasing. The aerospace sector is the victim of an education system that needs to be dramatically improved, especially in the science, math and engineering disciplines.

The Commission intends to make more sweeping recommendations in these areas in its final report. An identical letter has been sent to the Congress.

Respectfully yours,

Robert S. Walker
Chairman

Enclosure



Commission on the Future of the United States Aerospace Industry

www.aerospacecommission.gov

Interim Report #3

June 26, 2002

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I. Introduction

The Commission on the Future of the United States Aerospace Industry was established by Section 1092 of the Floyd D. Spence National Defense Authorization Act for fiscal year (FY) 2001, Public Law 106-398. It was formed to study the future of the U.S. aerospace industry in the global economy, particularly in relationship to U.S. national security; and to assess the future importance of the domestic aerospace industry for the economic and national security of the U.S.

This report is the third in a series of interim reports aimed at identifying issues the Commission believes are critical to the future of the U.S. aerospace industry and require immediate attention by the Administration and/or the Congress. The first report was issued on December 18, 2001, and focused on the need for the federal government to budget and fund aerospace activities as a sector. The second report was issued on March 20, 2002, and focused on the aerospace business environment, defense/dual-use exports and air transportation. The focus of this report is on space infrastructure, industrial base, and workforce issues. The Commission will issue a final report to the President and Congress in November 2002 (which will contain more sweeping recommendations in these and other areas).

A. Mission Statement

The Commission shall develop and recommend a series of public policy reforms that will permit the U.S. aerospace industry to create superior technology, excel in the global marketplace, profit from investments in human and financial capital, benefit from coordinated and integrated government decision-making, assure our national security, access modern infrastructure, and give the United States a capacity throughout the 21st Century to reach for the stars.

B. Congressional Mandate

The Commission was given a broad mandate to study:

- The adequacy of projected budgets of the federal departments and agencies for aerospace research and development and procurement;
- The adequacy of the current acquisition process of federal departments and agencies;
- The procedures for developing and fielding aerospace systems incorporating new technology in a timely fashion;
- The policies, procedures, and methods for the financing and payment of government contracts;
- Statutes and regulations governing international trade and the export of technology;
- Policies governing taxation, particularly with a view to assessing the impact of current tax laws and practices on the international competitiveness of the aerospace industry;
- Programs for the maintenance of the national space launch infrastructure; and
- Programs for the support of science and engineering education.

C. Commissioners

The Commission is composed of 12 members: six appointed by the President, two each by the House and Senate Majority Leaders, and one each by the House and Senate Minority Leaders. The Chairman is the Honorable Robert S. Walker, former Chairman, U.S. House of Representatives Committee on Science, and the Vice Chairman is the Honorable F. Whitten Peters, former Secretary of the Air Force.

The commissioners appointed by the White House are:

Dr. Buzz Aldrin
President, Starcraft Enterprises, Sharespace, Starbooster & Starcycler

Mr. Edward M. Bolen
President, General Aviation Manufacturers Association

The Honorable John W. Douglass
President, CEO and General Manager, Aerospace Industries Association

Dr. Neil de Grasse Tyson
Director, Hayden Planetarium

The Honorable Robert S. Walker
Chairman, Wexler & Walker Public Policy Associates

Ms. Heidi R. Wood
Executive Director, Morgan Stanley

The commissioners appointed by the Congress are:

Mr. R. Thomas Buffenbarger
President, International Association of Machinists & Aerospace Workers

The Honorable Tillie K. Fowler
Partner, Holland & Knight

The Honorable John J. Hamre
President & Chief Executive Officer, Center for Strategic & International Studies

The Honorable F. Whitten Peters
Partner, Williams & Connolly

The Honorable William Schneider
President, International Planning Services, Inc.

Mr. Robert J. Stevens
President and Chief Operating Officer, Lockheed Martin Corporation

II. Space Infrastructure

A. Establish Federal Spaceports

1. Issue

The National Aeronautics and Space Administration (NASA) and the United States Air Force (USAF) currently manage the space launch infrastructure at Kennedy Space Center (KSC) and Cape Canaveral Air Force Station (CCAFS) each according to its own distinct agency processes and procedures, even though both share the same infrastructure. A new paradigm to manage infrastructure is necessary to further increase efficiency and reduce cost.

2. Background/Findings

Significant strides have been made in unifying KSC and CCAFS through the Joint Base Support Contract and a joint planning and customer service office to coordinate customer space launch needs. Merging KSC and CCAFS into one facility, then creating a quasi-federal entity (QFE) to manage it, might well further improve efficiencies, reduce costs, and provide a simplified "single face" to the users of and suppliers supporting these two facilities. This would support both Government and commercial customers.

While the government could retain ownership of all land, the QFE could operate, maintain and upgrade the facility under the leadership of an executive director and Board of Directors comprised of the government owners of the facilities. The QFE should be allowed to operate more freely than traditional federal agencies through streamlined rules and regulations with respect to appropriations, real property and procurement. An appropriate model might be that of the Metropolitan Washington Airports Authority. The unified spaceport facility (KSC and CCAFS) would operate under a unified set of procedures rather than the two different sets of procedures (NASA and USAF) used today, incorporating the best practices of each. As tenants on a unified spaceport facility, NASA and the USAF could shed the direct responsibility for base operations in the expectation that this could result in more efficient operations and cost savings. Traditional government roles, such as range and airspace safety, could be left in the hands of NASA and the USAF, or transferred to other agencies, such as the Federal Aviation Administration (FAA).

Interim Report #3, Recommendation 1

NASA and the USAF should immediately begin a short-term study, to be completed prior to May 2003 to support the FY 2004 legislative process. The study should build on the recommendations from the February 2000 Interagency Working Group report "The Future Management and Use of the U.S. Space Launch Bases and Ranges." It should investigate the feasibility of establishing a national spaceport structure at KSC and CCAFS under a single management system. The study should identify the

advantages of a common management for the national spaceport system, potential cost savings, and process improvements above and beyond the current level of cooperation. Recognizing that the USAF today provides a significant subsidy to other users of CCAFS and KSC, the study should also consider the economic feasibility of a quasi-federal corporation in light of the current economic climate for space launch in the event that the USAF subsidy was unavailable to support range operations. The study should include representatives from Edwards Air Force Base (AFB), the Dryden Flight Research Facility and other government agencies, as appropriate. The results of the study should be delivered to the Administration and the U.S. Congress.

B. Enhance Leasing Authority

1. Issue

Currently, NASA and the Department of Defense (DoD) have only a limited ability to lease real property and, in the few instances in which they can, the proceeds generally return to the U.S. Treasury. Thus, there are few incentives for NASA and DoD to lease their property. At the same time, NASA and DoD are having difficulty adequately maintaining their space operations infrastructure due to budget constraints and/or competing priority operations. NASA and DoD should have expanded leasing authority and retain the proceeds from these arrangements to reimburse the impacted organization for operations and maintenance costs.

2. Background/Findings

Real property is liberally defined as land (including undeveloped land), facilities, capabilities and other resources provided to NASA and DoD customers under an official lease agreement. Currently, lease proceeds/rents are deposited in the U.S. Treasury as miscellaneous receipts rather than returned to the agencies for costs attributable to the lease. This inhibits NASA and DoD from entering into long-term agreements with state and commercial entities that would result in substantial state and private investment.

In early calendar year 1999, NASA proposed enhanced leasing authority legislation for consideration in Congress. Subsequently, Senator Bob Graham (D-FL) introduced the "Commercial Space Partnership Act of 1999" in the U.S. Senate in March 2000. The Senate postponed action on the bill at the Office of Management and Budget's request to allow the General Services Administration (GSA) one year to investigate similar legislation for all agencies. However, GSA's umbrella legislation for all agencies was not approved that year.

Since KSC and CCAFS still saw great potential for this legislation, they redrafted legislation that was included in NASA's proposed FY 2003 Authorization Act. KSC's proposed legislation is supported by Senator Graham and Congressman Dave Weldon (R-FL) and is consistent with the original bill, with the following significant

exceptions. It deletes the reference to the lease of personal property, increases the term for which a lease could be executed from five to 75 years, and adds new language on the flexibility of lease proceeds usage.

Interim Report #3, Recommendation 2

Congress should approve an Enhanced Leasing Authority bill that allows NASA and DoD to lease real property at fair market value and retain lease proceeds to cover the total costs incurred in supporting the development and operation of the KSC and CCASF facilities. This legislation should grant the individual organizations the widest and most flexible interpretation and authority.

C. Provide NASA Utility Privatization Authority

1. Issue

The electrical distribution infrastructure at KSC and CCAFS is 40 to 50 years old and frequently fails. There were 22 unscheduled outages last year alone. The current infrastructure is obsolete and many parts are no longer manufactured or available. The infrastructure should have been replaced 20 to 30 years ago but has not been upgraded due to lack of funding. Absent a new source of funding for upgrading the system, it is only a matter of time before a power failure delays a launch.

2. Background/Findings

Replacement of the electrical distribution infrastructure at KSC and CCAFS is long overdue but is now quite an expensive undertaking. There are 360 miles of primary and secondary electrical distribution lines. Some 170 miles of these lines are overhead/aerial and exposed to lightning strikes, which can propagate through the system causing extensive damage. It would cost $500,000 per mile or $85 million to relocate these lines underground in concrete-encased duct banks. An additional $17.7 million would be required to repair power cables on KSC. Replacing the power distribution on CCAFS and KSC would cost approximately $400 million. DoD and NASA budget priorities have precluded adequate maintenance and upgrade of the system. There is an urgent need for a new source of funding. In the commercial world, these upgrades would have been accomplished long ago (perhaps twice) through loans amortized over 30 years.

Congress enacted utility privatization legislation for DoD in 1994. The legislation authorized DoD to sell its utility systems, including electrical distribution and water and sewer to private companies. The USAF planned to sell its power and water utilities and had several bidders. If implemented, the companies would have owned, operated, and improved the systems, recovering the costs of operations and improvements from the CCAFS and KSC through monthly utility service charges. However, since CCAFS and KSC share the same electrical distribution system and NASA did not have the same legislative authorization, the USAF could not move forward with this plan until NASA received similar legislative authority, except at prohibitive expense to NASA.

Interim Report #3, Recommendation 3

Congress should grant NASA utility privatization authority. Privatization (whether to private, state or municipal utilities) holds great potential for NASA and DoD facilities (specifically KSC and CCAFS) to overcome the budget burdens associated with capital improvements to outdated infrastructure. This legislation should grant the individual organizations the widest and most flexible interpretation and authority. The legislation could also be a model for other government agencies.

III. Aerospace Industrial Base

A. Sustain Critical U.S. Industrial Base Capabilities

1. Issue

The aerospace industry has raised concerns regarding the lack of sustaining design and engineering for manned fighter aircraft (following completion of the Joint Strike Fighter in 2008) and for solid rocket boosters used in strategic missile systems and space launch systems.

The Commission recognizes the validity of industry's concerns and includes a more detailed description and assessment of these issues as appendices to this Interim Report. The Commission also recognizes that the past decade's dramatic shrinking and thinning of the overall aerospace industrial base and today's continuing challenging business environment leave a high probability that additional similar sub-sector problems exist or may arise in the future.

A broad assessment of the overall aerospace industrial base reveals the following:

Negative Conditions/Trends	Positive Conditions/Trends
- General reduction in the number and robustness of aerospace companies - U.S. civil transport aircraft market share declining - Overcapacity in launch industry - Space Shuttle future replacement clouded - Commercial/Military integration weak - Overcapacity in satellite industry - NASA, FAA research funding in decline - No U.S. regional jet production - U.S. export controls confining global access - World Trade Organization (WTO) position on tax issues unfavorable to U.S. manufacturers - Serious air traffic control challenges, airport saturation - Financially weak airlines struggling with post 9/11 challenges - Foreign government sponsored competitors - NASA elimination of rotorcraft research funding	- Defense research, development, testing and evaluation increase helping - Unmanned aerial vehicle developments emerging - Overall general aviation aircraft sale are growing

The U.S. Government, particularly its national security organizations, must be alert to risks that arise from such an environment and be prepared to take action to avert serious damage to the aerospace industrial base. The establishment of this Commission shows that a degree of overall concern has been noted. The DoD does conduct ad hoc analyses of individual programs when particular concerns are raised, but performs no future-looking systematic assessment to identify potentially critical industrial base issues. In fact, DoD has recently asked the Congress to drop a requirement for annual reporting on the status of the U.S. defense industrial base.

2. Background/Findings

Highlighted findings from an overall view of the U.S. aerospace industrial base include the following:

- Several economic and international trade issues are hampering the U.S. aerospace industry. The challenge of reforming U.S. export control policy has been raised by this Commission. The effect of recent WTO rulings on tax issues is to hurt U.S. companies while helping international competition. Furthermore, the impending expiration of research and development (R&D) tax credits will inhibit needed investment and innovation.

- Given the failure of a robust commercial space business to emerge, there is a worldwide overcapacity in space launch. The U.S. space launch industry is also facing severe pressures from international competitors, many of whom are sponsored by their governments and therefore do not face the full consequences of the marketplace.

- Even with DoD budgetary increases, the overall trend for consolidation and thinning of the aerospace industry will likely continue in the absence of government intervention. The government currently has not clearly stated its policy as to whether it favors or discourages further consolidation as the appropriate means to address overcapacity. As a result, the business community is less able to proceed efficiently in coordination with the national interest in strategic planning and development.

- The government's current mechanisms for addressing broad industrial base issues are weak and uncoordinated. Such mechanisms fail to match medium- and long-term future requirements with current policies affecting the size and structure of the aerospace industrial base. The current mechanisms do not address the significant barriers to entry for defense-related industries. These barriers make a free market model highly unreliable for industries seeking to reenter the defense market.
    - For example, the anticipated gap in engineering design and development for manned fighter aircraft and solid rocket boosters is not clearly being addressed by the DoD. If these gaps do occur, reconstituting the engineering expertise needed for successful system

development will be extremely problematic, time consuming, and at high risk of losing lessons from past experience.

- The budget increases proposed for the DoD by the Administration will clearly help support the defense sector. However, stability of these budgets will be required for improvements to be maintained over the long term.

- The long-term cooperative efforts between NASA and the DoD in rotorcraft research are in serious turmoil. As NASA faces internal budget pressures, it has sought to eliminate all of its rotorcraft R&D activity unilaterally. In the face of a growing European rotorcraft industry, the future competitive U.S. capabilities in both military and commercial rotorcraft technology development is in serious jeopardy.

- The past year's recession and the effects of the September 11, 2001 terrorist attacks have severely impacted the U.S. aerospace industry. Airline traffic is down, aircraft orders have dropped, and 2001 saw fewer space launches than any year since 1963. The supplier base has been especially hard hit with the repercussions of slowing orders from prime contractors. A significant portion of government spending in the air transportation sector is being refocused to massive security responses, reducing the funding available for innovation and system efficiency improvements.

- As stated in the Commission's Second Interim Report, the limitations to air traffic capacity growth is a major challenge facing the nation. The effects will be felt in the near term. Traffic recovery from September 2001 is already underway and will continue with an economic recovery and success in preventing future terrorist incidents. Already, however, on time performance is dropping as traffic increases, highlighting the fact that the air traffic control (ATC) system is very near its effective capacity. New runway construction is a process that typically takes well over a decade to complete. NASA and FAA budgets aimed at air transportation's growth have been decreasing for a number of years. The long lead-time for increasing aviation capacity calls for immediate Administration and Congressional attention to address this major national need.

- At this time of severe air transportation challenges, the senior leadership of the FAA is in transition. The FAA Administrator's term expires in August of this year, the Deputy Administrator has indicated his intent to retire in the same time period, and the leader of the proposed Performance Based Organization for managing air traffic operations remains unnamed.

In previous interim reports, the Commission has recommended a number of actions for the Administration and Congress that would directly improve the condition of the U.S. aerospace industrial base. It is important to consider industrial base issues in its full context, and worth reiterating several previous Commission recommendations:

- Congress should fully fund the President's DoD budget request.
- Congress and the President should ensure full funding of the FAA's operations budget and its Operational Evolution Plan.
- Congress should adopt the National Foreign Trade Council (NFTC) unitary proposal to replace the Foreign Sales Corporation (FSC)/Ethical Trading Initiative (ETI) with changes to U.S. tax laws that would ensure the future competitiveness of current users of the FSC/ETI regime in the global marketplace.
- The Administration should negotiate changes in the WTO rules that would remove the inequity in treatment of direct and indirect taxes that led to the European Union's challenge of the FSC/ETI tax regime, and put in place an equitable resolution that would ensure that U.S. business interests receive the same level of tax relief as European businesses enjoy from their government systems.
- In the near term, Congress should revise the U.S. tax code to make the research and experimentation (R&E) tax credit permanent, and increase the alternative credit rates to achieve parity with the savings provided by the regular credit. In the longer term, Congress should enact structural changes to the R&E credit, including changes in the baseline period, increases in the rates for the Alternative Incremental Research Credit and other improvements that enhance its effectiveness in stimulating private sector investment in new technologies.

Recommendations

This Interim Report recommends the following additional actions be taken to address areas of concern during Congressional deliberations in the current budget cycle and Administration preparation for the FY 2004 budget.

Interim Report #3, Recommendation 4

The Secretary of Defense should task the Defense Science Board (DSB) to review and recommend overall DoD policy toward future industrial base consolidation including its policies toward mergers and acquisitions. In particular, as part of this review, the DSB should:

- Address the aerospace industry consolidation and workforce challenges resulting from today's diminishing number of system design programs.
- Assess approaches for aligning consolidation policies with procurement and budgeting policies.
- Consider specific measures of the health of defense contractors such as the magnitude and longevity of a contractor's production base and product development work.
- Assess the long-term sustainability of the nation's high performance aircraft and solid rocket booster design and development capabilities, including the potential of increasing/initiating high payoff technology development programs and/or continuing low rate production of strategic systems to bridge industry capabilities to a succeeding generation.

Interim Report #3, Recommendation 5

The Administration and Congress should direct NASA and the DoD to coordinate R&D efforts in areas of common need and provide the appropriate funding for joint programs. For example, funding for joint Army/NASA rotorcraft R&D efforts should be restored.

Interim Report #3, Recommendation 6

Congress should hold hearings to address:

- National challenges for future air traffic capacity needs cited in the Commission's Second Interim Report.
- Increases to NASA and FAA research and development funding needed to retain national leadership in aeronautics.

Interim Report #3, Recommendation 7

The Administration should ensure that a new FAA Administrator, Deputy Administrator and Chief Operating Officer of the new Performance Based Organization are recruited to fill important leadership vacancies without delay and assign each a mandate for substantial long-term ATC capacity growth.

B. Ensure DoD Program and Budget Stability

1. Issue

Because of overall DoD budget constraints in the past decade, DoD investments have been inadequate to fund planned programs. This funding shortfall has been exacerbated by the practice of decrementing the investment accounts to provide supplemental funding for increasing operations and support (O&S) costs, the costs of unforeseen contingency operations and unanticipated internal program changes. The resulting program funding instability contributed to increased weapon system costs and delays in military modernization. The current Administration seeks to resolve this issue by providing a significantly increased DoD budget top line that can accommodate fully the O&S accounts, including unplanned contingencies, and by budgeting more realistically for individual programs.

2. Background/Findings

Protecting Investment Funding

Stable and predictable funding levels for DoD procurement and R&D accounts are essential for effective management of programs and costs, as well as meeting requirements for military modernization. This must be balanced with achievable and realistic requirements and mature technologies, the lack of which also contribute to a program's failure to meet established baselines.

Ensuring adequate funding for both O&S and investment requirements would ameliorate some of the funding stability concerns for individual programs, and would help ensure adequate funding to complete and maintain the desired modernization and transformation of U.S. Armed Forces.

Realistic Cost Estimates

The competition for scarce resources, coupled with a desire to satisfy more requirements by having more programs ongoing than may be affordable, creates incentives and pressures on the Services and industry to be overly optimistic when estimating future system costs. As programs mature, actual costs are difficult to accommodate within the planned top line, leading to cost increases, delays, restructuring, or cancellation. Overly aggressive schedules and requirements also have a significant impact on program execution and delivery.

Requiring more realistic cost and schedule estimates will help reduce the tendency to include too many ultimately unaffordable programs within the FYDP and preclude both contractor and DoD investment in programs that realistically will not be completed.

Financing Flexibility

The current financial system requires detailed estimates of program costs years in advance of execution, and then allows only very limited flexibility, once the budget is finalized, to address changes and emerging needs as the program progresses through execution.

Greater flexibility to adjust funding requirements among programs, and within programs, would allow DoD to meet higher priority requirements as they arise, and solve problems discovered in testing during production or to provide support following production.

Multiyear Budgeting

While a weapon system's design and development program typically requires many years, often from five to ten, resources are requested and appropriated on an annual basis. Thus, while contracts span multiple years, program managers and contractors face uncertainty every year about the timely availability of adequate funding to do the next increment of work. As long as high priority programs are performing, Congress and DoD should recognize that funding reductions impact performance and should avoid funding perturbations resulting from undistributed cuts, disbursement lags, and other adjustments not related to program performance or funding requirements. Multiyear contracts for production offer a means of providing defense companies with stable revenue and cash flow, lowering unit costs due to economies of scale and supporting a more stable workforce.

Recommendations

Based on the need to adequately fund and manage investment in modernization and transformation, the Commission recommends that the Administration/DoD and Congress:

Interim Report #3, Recommendation 8

Establish and maintain a stable top line for DoD investment in the FYDP.

a. Establish and maintain an adequate long-term investment (procurement and R&D) budget in the FY 2004-2009 FYDP.
b. Establish and maintain an adequate O&S budget in the FY 2004-2009 FYDP.
c. Protect continuity of long-term investment funding by seeking to limit downward adjustments across the FYDP for other than economic reasons (i.e., inflation) and/or by limiting reprogramming into O&S or other accounts in year of execution.

Interim Report #3, Recommendation 9

Fully fund programs within the FYDP.

a. Industry should submit realistic cost and schedule information in all bid proposals.
b. DoD should provide sufficient funds in the FYDP based on realistic schedule and performance goals, using independent cost estimates as decided by the Milestone Decision Authority.
c. DoD and industry should jointly manage programs to ensure visibility and review of all requirements changes during program execution. If approved, funding will be adjusted for any such requirements.

Interim Report #3, Recommendation 10

Increase DoD's financial flexibility.

a. Support the Administration's proposal to provide authority for program managers to move funds from procurement to R&D in a program.
b. Double reprogramming thresholds to $20 million for procurement and operations and maintenance and $8 million for R&D.

Interim Report #3, Recommendation 11

Support multiyear, full-phase funding for both development and production programs.

a. Procurement Programs: Expand the use of multiyear procurement contracting and funding using existing criteria and by working to achieve the Secretary of Defense's (SECDEF) desired goals for multiyear contracts. SECDEF selected pilot programs with spiral development acquisition and multiyear funding will include mechanisms to allow insertion of technology

enhancements without invalidating the advantages (cost savings and program stability) of multiyear contracting.

b. Development Programs: Develop baselines for selected development programs based on realistic cost, schedule and performance goals; establish and protect "milestone-to-milestone" budgets in the FYDP to provide full-phase funding from initiation to production, as long as acquisition program baseline goals are met. Enact legislation to provide "milestone" Congressional authorizations for the duration of each selected development program, and appropriate funds annually as required for each program so long as each program meets its baseline goals.

IV. 21st Century Aerospace Workforce

A. Develop and Maintain a 21st Century Workforce

1. Issue

The future of the U.S. aerospace industry depends on the ability of the industry to attract, develop and retain a properly skilled professional, scientific, engineering and production workforce. Contractions in the industry due to mergers and consolidations and a downturn in the economy have produced large layoffs and few opportunities for new jobs. This will result in a shortage of young and experienced talent as the aging workforce retires over the next decade.

2. Background/Findings

With the end of the cold war, the rise of global competition, industry consolidation, and growth in other sectors of the economy – particularly in the computer sciences – the U.S. aerospace industry has lost its premier status as the employer of choice for many types of professional, scientific, engineering, production and maintenance workers. At the same time, the average age in the workforce on the defense side of aerospace is over 50 years old. In the next six years, nearly half of the workforce is eligible to retire, leaving a gaping hole in skills and experience. According to retired USAF General Thomas Moorman, "The work force is the biggest issue facing the industry today. We are not attracting and retaining the best and the brightest."

The aerospace industry plays a major role in the health of the U.S. economy and in maintaining the strength of our nation's security. It provides jobs for hundreds of thousands of workers in aerospace and related industries. The industry is constantly developing sophisticated technologies that have widespread application in increasing the nation's productivity and in protecting our country from its enemies. The development of new technologies has also spurred the creation of other industries that have greatly contributed to our economy.

None of the great benefits that have been derived from the aerospace industry would have been possible without the availability of a highly skilled and dedicated workforce. Despite its importance, the aerospace workforce is dramatically declining. From a peak employment in December 1989 to March 2002, over 600,000 aerospace workers have lost their jobs. The impact of the recent use of commercial aircraft in attacks on the U.S. by terrorists and the current downturn in the business have led to further unplanned loss of aerospace jobs. Aerospace industry representatives have noted that the total announced layoffs since the September 11, 2001 terrorist attacks exceed 60,000 workers across the industry.

Recommendations

Given the necessity of the U.S. aerospace industry for economic and national security, the Commission makes these recommendations for stemming these losses with an overall objective of stabilizing and growing the U.S. aerospace workforce.

Interim Report #3, Recommendation 12

Interagency Workforce Task Force: The aerospace industry's workforce provides the skills, knowledge, and technical capabilities necessary to keep the U.S. in the leadership of production, sales, and marketing for the 21st century aerospace industry. To ensure leadership throughout the 21st century the Commission recommends that the Administration:

a. Through Executive Order, create an interagency Workforce Task Force to coordinate programs and initiatives composed of the Departments of Labor, Commerce, Education, and other agencies as appropriate to respond to industry workforce and training needs.
b. As part of the Workforce Task Force, establish an Industry-Based Aerospace Capability Network to develop public/private partnerships in which all key stakeholders – business, labor, government, and community groups – coordinate agency resources, the development of skill standards and certification programs, and provide information on occupations and job availability in order to foster the growth of the American aerospace economy and workforce.

Interim Report #3, Recommendation 13

Aerospace Industry Promotion (AIP): The Commission recommends that the Administration develop a national program to attract public attention to the importance and opportunities within the aerospace industry targeted to high schools, community colleges and universities with engineering schools. The AIP should be coordinated through the Aerospace Capability Network. Programs such as the National Aerospace Initiative or the Automotive Youth Educational Systems could be models for promotion in the aerospace industry.

Interim Report #3, Recommendation 14

Tax credits for apprenticeship and training*:* The Commission recommends the Administration and Congress consider targeted tax credits for employers who invest in the skills and training of the workforce for employees enrolled in registered apprenticeship programs and other short-term occupational training programs that meet the needs identified by industry.

Interim Report #3, Recommendation 15

Make long-term investments in education and training to keep America's highly skilled workforce "pipeline" filled. The Administration and Congress should:

a. Support recommendations of the National Commission on Mathematics and Science Teaching for the 21st Century on improving K-12 mathematics and science education.
b. Create programs to encourage more young people to study and work in the mathematics, science, and engineering fields, including scholarships and internships.
c. Make investments in vocational education to develop a workforce with the skills needed by industry.
d. Expand the use of registered apprenticeships for skilled and technical occupations.

Interim Report #3, Recommendation 16

U.S. Aerospace Workforce Stabilization: Since the tragedy of September 11, 2001, the current erosion of U.S. aerospace employment has accelerated. U.S. policy towards domestic aerospace employment must reaffirm the goal of stabilizing and increasing the number of good and decent jobs in the industry. The Administration and the Congress should consider the impact on U.S. aerospace employment of domestic and international policies.

V. Summary

To support development of its findings and recommendations, the Commission has conducted three public meetings – on November 27, 2001, February 12, 2002, and May 14, 2002 – and has three more public meetings scheduled for this year – August 22, September 17, and October 23. The public is encouraged to attend these meetings, as well as to provide inputs directly to the Commission via its website at: www.aerospacecommission.gov or to Mr. Paul F. Piscopo, Staff Director, Commission on the Future of the U.S. Aerospace Industry, Crystal Gateway 1, Suite 940, 1235 Jefferson Davis Highway, Arlington, Virginia 22202, via phone (703-602-1515), fax (703-602-1532), or e-mail (aerospace.commission@osd.pentagon.mil).

Appendix A: U.S. Solid Rocket Motor Technology and Production Capability

1. Issue

The United States solid propellant production programs for strategic missiles will end in 2008 with no follow-on development or production anticipated before 2015. Current trends indicate that civil and commercial markets beyond 2008 will not sustain the production base for solid rocket motors. The loss of the solid rocket motor industrial base would impede, if not prevent, the development and production of the next generation of U.S. strategic missiles.

2. Background

Our strategic, tactical and missile defense weapons depend on solid rocket motors for propulsion systems. Currently, the U.S. Navy is procuring Trident II D-5 Fleet Ballistic Missiles (FBM) and the U.S. Air Force is beginning a life extension program for 500 Minuteman III Intercontinental Ballistic Missiles (ICBM). Rocket motor production for these programs will end in 2008, and missile deployment is planned through 2020. For the first time in 50 years, no new strategic missile solid propulsion development or production program is on the horizon.

The defense industry is no longer the dominant solid rocket motor customer. In 1984 the $2.5 billion solid rocket motor market was two-thirds defense related and one-third commercial space related. By 1999, the market dropped to $1.2 billion: commercial space became the dominant customer with two-thirds of the market while defense made up only one-third of the market. Space launch customers using solid rocket motors include the NASA Space Shuttle, Air Force Titan IV and commercial Delta and Atlas vehicles. However, these customers plan to transition to liquid propulsion systems for their next generation vehicles. Potential reductions in strategic missiles will further dampen demand for solid rocket propulsion.

Future U.S. strategic missile development and production capability is now threatened. Inadequate solid propulsion markets could erode the U.S. ability to develop solid rocket boosters to meet future demands. Critical engineering design skills could be lost. Already the workforce is in decline: experienced engineers are retiring, and young talent is not entering the labor force. If there is ever a requirement for more advanced capabilities in strategic missiles, then we must continue to pursue related research and development. If we ever need to increase production of solid rocket motors in the future, then we must retain our production capability.

Appendix B: Design Capability for Advanced, High-Performance Aircraft

1. Issue

Based on current plans, by the end of the current decade, the United States will not be designing and developing a new advanced, high-performance aircraft. There will be no new fighter on the drawing boards to follow the Joint Strike Fighter. As a result, the U.S is at risk of losing its broad combat fighter aircraft design capability.

2. Background

There is concern over the declining design capability for advanced, high-performance aircraft in the U.S. aerospace industry. Over the past 50 years, the number of military manned aircraft design programs per decade has dropped 96% (1950s – 46 programs; 1960s – 16; 1970s – 12; 1980s – 7; 1990s – 6; 2000s – 2 [the Joint Strike Fighter (JSF), a manned aircraft, and the Uninhabited Combat Air Vehicle (UCAV), an as yet unproven concept]. This translates into a huge drop in the number of programs a technician, engineer, or manager will work on during a 40-year career. According to the RAND Corporation, declining experience levels have contributed to the problems observed in many recent military aircraft development programs. While experienced employees are retiring (54% are over 45 years of age, and 33% are eligible for retirement in 5 years), there are few, if any, high-tech aircraft programs on the horizon that would allow companies to attract and develop young talent, as well as maintain expertise throughout the workforce.

The JSF System Design and Development SDD will end in 2012. The UCAV program will complete its major design work by 2010. From that point forward, DoD plans leave a combat fighter aircraft design gap of 10 to 20 years, seriously impacting the capability of the U.S. to retain critical skills. Except for the possibility of a Long Range Strike Aircraft (B-2 replacement) or a possible National Aerospace Initiative hypersonic aircraft, there are no new military aircraft programs of any kind under consideration until 2024.

Appendix C

Aerospace Sector Breakout

Prepared by: Office of Management and Budget

Aerospace Sector Breakout

($ in millions)

	2001 DoD	2001 NASA	2001 NOAA	2001 FAA[6]	2001 DOE	2002 DoD	2002 NASA	2002 NOAA	2002 FAA[6]	2002 DOE	2003 DoD	2003 NASA	2003 NOAA	2003 FAA[6]	2003 DOE
Space*	13,955	9,078.3	576.0	0.0	121.0	15,377.0	9,348.3	640.0	0.0	130.0	18,013.0	9,151.0	680.0	0.0	136.0
Spacecraft & User Equipment		4,603.4	576.0		121.0		4,586.3	640.0		130.0		4,330.7	680.0		136.0
R&D[1]		*2,070.4*	*117.0*		*55.0*		*1,983.3*	*210.0*		*63.0*		*1,785.7*	*233.0*		*55*
Flight Systems[2]		*1,134*	*356.0*		*66.0*		*630.5*	*315.0*		*67.0*		*500.6*	*290.0*		*81*
Operations[3]		*1,129.4*	*53.0*				*1,656.9*	*55.0*				*1,728.9*	*66.0*		
Ground Infrastructure[4]		*269.6*	*50.0*				*315.6*	*60.0*				*315.5*	*91.0*		
Space Transportation		4,474.9					4,762					4,820.3			
R&D[1]		*1,127.3*					*1,331.5*					*1,531.3*			
Flight Systems[2]		*50.9*					*117.5*					*16.5*			
Operations[3]		*2,914.1*					*2,978.6*					*2,928.6*			
Ground Infrastructure[4]		*382.6*					*334.4*					*343.9*			
Aircraft & Air Systems	25,786.0	585.1		2,837.5	68.0	26,495.0	611.4		3,203.0	75.0	29,628.0	541.4		3,107	63
R&D[1]	*6,587.0*	*572.6*		*186.5*	*68.0*	*6,149.0*	*599.4*		*195.0*	*75.0*	*6,808.0*	*531*		*126*	*63*
Flight Systems[2]	*19,199*					*20,346*					*22,820*				
Operations[3]															
Ground Infrastructure[4]		*12.5*		*2,651.0*			*12*		*3,008.0*			*10.4*		*2,981*	
Missiles	4,304.0					4,316.0					5,514.0				
R&D[1]	*1,137.0*					*1,128.0*					*1,232.0*				
Flight Systems[2]	*3,167.0*					*3,188.0*					*4,282.0*				
Missile Defense	5,362					7,772					7,763				
Non-Space	4,958					7,388					7,295				
R&D[1]	*4,518*					*6,623*					*6,608*				
Flight Systems[2]	*440*					*765*					*687*				
Space[5]	404					384					468				
R&D[1]	*404*					*384*					*468*				
Flight Systems[2]															
Basic Research[5]		2,011.8					2,101					2,376.7			
Total	49,407	11,675	576	2,838	189	53,960	12,061	640	3,203	205	60,918	12,069	680	3,107	199

* Additional details of DoD space spending are classified. Space funding excludes space-related missile defense (shown under missile defense).

[1] BA for Applied Research (e.g., 6.2 for DoD) and Development (e.g., 6.3 through 6.7 for DoD) specifically for new or improved systems.

[2] BA for the 'production' of systems.

[3] BA to operate, maintain and decommission systems after they have been purchased.

[4] BA for facilities/equipment/capabilities necessary to develop/test/operate systems.

[5] BA for Basic Research in aerospace that is not specifically related to any of the sector categories listed above (e.g. 6.1 for DoD).

[6] These numbers only represent the Research, Engineering and Development (i.e. R&D in table) and Facilities, Engineering and Development (i.e. Ground Infrastructure in table) portions of FAA's total budget, which were $12.9 for FY2001, $13.7 for FY2002 and $14.0 billion (requested) for FY2003.

Appendix D

Scoping Aerospace

Prepared by: RAND

Full report available at www.ita.doc.gov/aerospace/aerospacecommission

RAND

Scoping "Aerospace"

Donna Fossum, Dana Johnson, Lawrence Painter, Emile Ettedgui

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Prepared for the Aerospace Commission

National Defense Research Institute

Unpublished RAND research and analysis of federal aerospace procurements and personnel expenditures for the past ten years were conducted in support of Aerospace Commission deliberations by Dr. Donna Fossum and Mr. Lawrence Painter in 2001."

Notes:

The following table shows federal aerospace procurement and personnel expenditures for FY 1993 through FY 2001. All amounts are "Obligations" in actual dollars. The table presents the data in the aerospace sectoral categories agreed to by the Commission staff and the White House Office of Management and Budget (OMB), which are as follows:

- Air Systems
  - Aircraft
  - Infrastructure
- Missile Systems
  - Missiles
  - Infrastructure
- Space Systems
  - Space Systems
  - Infrastructure
- Research and Development (Conduct only)
- Personnel

Data on aerospace procurements is from the Federal Procurement Data System (FPDS), maintained by the General Services Administration. The FPDS tracks all contracts awarded by all federal agencies that exceed the "small purchase" threshold by the type of "Product and/or Service" procured. To determine which procurements were categorized as "Aerospace," the "Product and Service Code" (PSC) numbers from the FPDS were used for each contract awarded by the federal government. The description of each "Product and Service Code" is provided in the left-hand columns of the table, along with the PSC number(s). The personnel information was taken directly from the "Budget of the United States Government" for the relevant fiscal years. All caveats regarding the data in the table are provided in the "Comments" column of the chart.

The second table shows federal department and agency aerospace procurement spending only and does not include personnel costs.

Federal Aerospace Procurement and Personnel Expenditures(8/19/02)

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	COMMENTS
	Obligations ('000's)	Obligations ('000's)	Obligations ('000's)	Obligations ('000's)	Obligations ('000's)	Obligations ('000's)	Obligations ('000's)	Obligations ('000's)	
AIR SYSTEMS	28,568,746	30,398,592	23,838,569	30,307,043	20,308,985	22,562,710	20,996,822	19,148,971	18,533,676
Aircraft	23,717,669	25,214,611	19,170,302	25,297,023	15,693,029	18,464,131	17,493,276	15,501,968	15,165,566
Aircraft and airframe structural components	15,831,848	17,000,762	11,210,247	17,918,694	9,534,548	11,841,679	10,520,958	7,364,503	8,019,087
Fixed wing (1510)	12,402,534	14,963,824	9,280,293	15,985,957	8,450,863	10,040,118	8,721,091	5,248,959	5,726,696
Rotary wing (1520)	2,221,620	835,846	880,700	1,134,482	569,754	952,511	798,406	961,692	1,056,200
Gliders (1540)	0	29	381	0	0	0	1,251	0	569
Drones (1550)	208,732	159,377	126,685	36,746	9,794	28,818	61,552	94,621	86,210
Airframe structural components (1560)	998,962	1,041,686	922,188	761,509	504,137	820,232	938,656	1,059,231	1,149,412
Aircraft components and accessories (non-structural)	1,684,168	1,364,527	1,659,575	1,635,502	1,217,621	1,509,372	1,516,327	2,190,003	2,026,339
Aircraft propellers and components (1610)	55,651	50,467	51,406	46,215	28,062	114,375	12,520	16,101	22,031
Helicopter rotor blades, drive mechanisms, and components (1615)	303,615	315,551	298,156	421,371	212,384	382,109	392,934	445,409	388,044
Aircraft landing gear components (1620)	45,145	46,275	67,064	55,898	52,774	80,655	80,076	110,458	92,949
Aircraft wheels and brake systems (1630)	30,903	55,941	49,265	72,107	52,970	58,729	78,292	168,468	214,500
Aircraft hydraulic, vacuum, and de-icing system components (1650)	80,830	90,608	101,035	125,909	112,182	126,817	171,639	121,937	143,344
Aircraft air conditioning, heating, and pressurizing equipment (1660)	63,060	60,578	53,253	74,932	52,059	68,780	47,341	38,287	57,203
Parachutes/Aerial pickup, delivery, & recovery systems/Cargo tie down equip. (1670)	41,535	78,749	71,184	49,282	31,876	36,223	78,095	56,666	55,547
Miscellaneous aircraft accessories and components (1680)	1,063,429	666,358	968,212	789,788	675,314	641,684	655,430	1,232,677	1,052,721
Aircraft launching, landing, and ground handling equipment	101,455	55,263	72,245	62,927	78,804	122,945	62,057	95,628	78,461
Aircraft landing equipment (1710)	40,111	7,280	12,076	18,349	20,942	49,799	20,448	23,966	27,612
Aircraft launching equipment (1720)	22,023	32,696	36,981	33,137	38,784	55,595	23,678	56,184	39,691
Airfield specialized trucks and trailers (1740)	39,321	15,287	23,188	11,441	19,078	17,551	17,931	15,508	11,158
Aircraft tires and tubes/pneumatic (2620)	26,178	24,488	35,245	40,342	37,438	39,801	56,634	45,886	40,901
Communication, detection and coherent radiation equipment	864,386	1,327,175	1,286,895	794,260	1,047,567	884,955	574,669	583,214	406,772
Radio and television communication equipment/airborne (5821)	142,891	287,284	371,752	173,170	261,038	274,570	148,736	247,925	134,107
Radio navigation equipment/airborne (5826)	145,784	118,348	76,985	66,260	65,538	67,103	32,074	31,373	34,437
Intercommunication and public address systems/airborne (5831)	983	2,821	4,408	4,828	7,778	1,446	1,324	1,966	2,587
Radar equipment/airborne (5841)	574,728	918,722	833,710	550,002	713,213	541,836	392,535	301,950	235,641
Engines, turbines, and components	3,657,030	3,835,185	3,050,905	3,101,605	2,308,854	2,488,913	2,954,048	3,042,212	2,750,932
Gasoline reciprocating engines and components/aircraft prime movers (2810)	922	2,748	806	1,080	45	428	784	637	340
Gas turbines and jet engines and components/aircraft prime movers (2840)	2,881,815	3,264,710	2,566,795	2,689,250	2,233,628	2,429,997	2,894,116	3,001,821	2,727,020
Rocket engines and components (2845)	774,293	567,727	483,304	411,275	75,181	58,488	59,148	39,754	23,572
Engine accessories	122,424	115,885	118,960	106,311	95,997	177,014	232,045	238,608	138,691
Engine fuel system components/aircraft and missile prime movers (2915)	55,568	62,035	73,069	46,020	48,004	101,366	113,582	89,355	71,788
Engine electrical system components/aircraft prime movers (2925)	14,001	15,215	9,735	16,563	14,541	24,269	12,909	18,356	12,138
Engine cooling system components/aircraft prime movers (2935)	3,888	1,640	3,135	2,257	3,317	7,189	2,639	1,409	3,220
Engine air and oil filters/cleaners/aircraft prime movers (2945)	1,403	1,217	1,428	2,321	2,232	2,384	3,165	2,244	2,299
Miscellaneous engine accessories/aircraaft (2995)	47,564	35,778	31,593	39,150	27,903	41,806	99,750	127,244	49,246
Fire control equipment	243,667	171,909	388,190	113,096	140,585	132,793	83,196	174,127	76,674
Aircraft gunnery fire control components (1270)	165,421	146,990	340,446	95,947	95,383	125,384	65,456	137,033	53,720
Aircraft bombing fire control components (1280)	78,246	24,919	47,744	17,149	45,202	7,409	17,740	37,094	22,954
Fuels, lubricants, and oils	na	na	na	na	na	na	na	na	Unable to separate "aircraft" use from all other uses.
Instruments (6340, 66__)	89,548	116,919	152,229	130,992	99,102	70,029	107,153	118,433	90,545
Rockets, rocket ammunition, and rocket components (1340)	106,369	5,734	156,875	80,387	125,152	172,281	248,467	333,093	220,361
Weapons	35,801	22,463	8,440	70,285	95,369	22,688	57,697	124,399	176,893
Launchers/Torpedo and depth charge (1045)	3,101	881	1,029	957	1,182	9,579	18,720	4,733	695
Launchers/rocket and pyrotechnic (1055)	32,647	21,582	7,411	69,328	94,187	13,109	38,977	119,666	176,198
Nuclear bombs (1105)	53	0	0	0	0	0	0	0	0
Other (including federal personnel)	954,795	1,174,301	1,030,496	1,242,622	911,992	1,001,661	1,080,025	1,191,832	1,139,910
Aerial fertilization/spraying (F001)	5,402	5,844	12,331	9,331	4,029	3,817	2,584	1,706	4,448
Aerial photography (T009)	9,376	16,100	12,588	8,570	9,773	18,746	14,918	6,707	20,695
Aerial seeding (F002)	694	193	1,541	379	495	119	23	281	693
Aeronautic/Space studies (B539)	4,010	15,665	22,104	24,206	20,252	18,906	19,025	23,409	43,842
Air freight (V111)	16,114	9,725	2,872	4,392	24,060	25,063	9,983	5,611	5,113
Air passenger (V211)	43,199	59,925	11,663	10,877	16,290	23,884	6,919	43,847	8,374
Aircraft salvage (P200)	0	0	0	0	29	7,174	208	5,194	899
Construction of airfield, communication, & missile facilities - A&E services (C111)	173,624	174,577	240,564	350,951	90,959	110,638	148,725	224,948	363,086
Freight transport -- Air charter (V121)	185,404	206,224	73,990	342,417	299,594	41,948	94,318	96,469	39,308
Navigational aid and pilotage services (V227)	0	0	0	80	73	305	346	2,525	3,695
Passenger air charter (V221)	516,972	686,048	652,843	491,419	446,438	751,051	782,976	781,135	649,757

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	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	COMMENTS
	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	
Infrastructure	4,851,077	5,183,961	4,668,267	5,010,020	4,615,956	4,098,579	3,503,546	3,647,003	3,368,110
Aircraft carriers (subset of Combat ships and landing vessels) (subset of 1905)	0	111	0	0	0	0	0	0	0
Aircraft ground servicing equipment (1730)	93,788	94,865	54,772	79,795	81,730	52,629	101,467	88,544	79,138
Aircraft maintenance and repair shop specialized equipment (4920)	222,478	246,472	186,565	160,960	176,371	299,064	240,984	249,594	183,095
Construction of air system facilities --	465,382	715,807	516,297	339,912	523,712	302,707	271,744	399,942	294,000
Air traffic control towers (Y121)	57,547	96,493	141,288	31,745	59,677	54,850	25,485	28,908	16,091
Air traffic control training facilities (Y122)	2,349	8,383	40,498	4,631	10,876	2,466	12,987	959	2,550
Radar and navigational facilities (Y123)	77,155	74,666	65,133	13,416	33,810	96,105	30,251	5,773	13,448
Airport runways (Y124)	15,225	86,247	28,415	34,530	18,356	10,476	32,365	37,600	37,871
Airport terminals (Y125)	10,676	4,030	9,212	1,385	2,851	14,062	150	36	461
Electronic and communications facilities (Y127)	73,427	93,148	61,639	53,591	37,849	15,375	17,247	5,350	13,260
Other aerospace structures (Y129)	229,003	352,840	170,112	200,614	360,293	109,373	153,269	321,316	210,319
Equipment and materials testing	161,214	42,855	36,057	17,855	19,665	21,824	7,095	4,803	3,729
Aircraft and airframe structural components (H215)	148,624	29,976	3,586	7,268	364	-201	0	0	0
Aircraft components and accessories (H216)	12,590	12,879	32,471	10,587	19,301	21,997	7,095	4,803	3,729
Aircraft launching, landing, and ground handling equipment (H217)	0	0	0	0	0	28	0	0	0
Engines, turbines, and components (H228 Aircraft Only)	0	0	0	0	0	0	0	0	0
Inspection services	1,374	224	0	495	1,438	1,987	2,954	1,009	1,679
Aircraft and airframe structural components (H315)	1,091	0	0	495	1,314	1,987	2,954	1,009	1,246
Aircraft components and accessories (H316)	283	224	0	0	124	0	0	0	0
Aircraft launching, landing, and ground handling equipment (H317)	0	0	0	0	0	0	0	0	433
Engines, turbines, and components (H328 Aircraft Only)	0	0	0	0	0	0	0	0	0
Installation of equipment	24,734	63,796	111,430	340,643	203,626	21,506	35,569	12,371	2,575
Aircraft and airframe structural components (N015)	67	0	0	45	62	924	30	3,626	2,506
Aircraft components and accessories (N016)	24,621	9,739	15,507	25,012	1,206	0	6,620	5,591	0
Aircraft launching, landing, and ground handling equipment (N017)	46	57	39	541	664	35	0	99	69
Engines, turbines, and components (N028 Aircraft Only)	0	54,000	95,884	315,045	201,694	20,547	28,919	3,055	0
Lease or rental of air system facilities--	1,694	3,537	2,474	1,110	1,870	3,011	2,795	2,842	1,516
Air traffic control towers (X121)	0	214	0	0	0	0	0	27	39
Air traffic control training facilities (X122)	0	0	0	0	32	0	0	0	0
Radar and navigational facilities (X123)	0	0	0	0	0	0	0	0	0
Airport runways (X124)	52	101	3	1	0	0	0	6	0
Airport terminals (X125)	3	59	118	15	30	47	0	16	0
Electronic and communications facilities (X127)	544	1,204	570	35	43	731	282	591	352
Other aerospace structures (X129)	1,095	1,959	1,783	1,059	1,765	2,233	2,513	2,202	1,125
Lease or rental of facilities	9,949	21,910	29,328	43,950	32,230	16,877	8,553	20,317	32,984
Aircraft and airframe structural components (W015)	9,949	21,864	29,203	43,871	31,818	16,039	7,816	20,317	32,958
Aircraft components and accessories (W016)	0	46	125	0	0	0	0	0	0
Aircraft launching, landing, and ground handling equipment (W017)	0	0	0	79	412	838	737	0	26
Engines, turbines, and components (W028 Aircraft Only)	0	0	0	0	0	0	0	0	0
Maintenance, repair, and rebuilding of equipment	1,970,194	2,194,004	2,046,200	2,179,800	1,906,009	1,772,043	1,483,073	1,670,716	1,352,120
Aircraft and airframe structural components (J015)	1,558,041	1,672,352	1,452,719	1,424,929	1,278,347	1,175,769	843,939	1,175,013	890,120
Aircraft components and accessories (J016)	282,430	426,076	435,132	328,767	356,218	352,513	352,532	191,840	144,924
Aircraft launching, landing, and ground handling equipment (J017)	19,091	17,001	18,199	8,581	2,518	4,768	4,653	6,096	17,160
Engines, turbines, and components (J028 Aircraft Only)	110,632	78,575	140,150	417,523	268,926	238,993	281,949	297,767	299,916
Maintenance, repair, or alteration of air system facilities --	306,859	297,312	294,594	322,173	299,408	235,828	249,260	228,706	282,823
Air traffic control towers (Z121)	10,106	20,643	14,306	10,460	11,503	9,179	5,311	9,753	11,979
Air traffic control training facilities (Z122)	10,105	7,631	7,374	7,764	6,904	11,145	3,508	7,096	7,673
Radar and navigational facilities (Z123)	22,295	27,364	18,738	20,439	46,966	16,188	10,390	10,626	7,012
Airport runways (Z124)	91,779	80,277	96,986	81,474	55,878	67,388	84,119	67,250	150,484
Airport terminals (Z125)	2,195	3,657	5,498	12,286	9,236	5,856	6,844	5,514	1,724
Electronic and communications facilities (Z127)	47,006	42,415	38,722	56,548	28,539	19,661	14,514	23,929	16,832
Other aerospace structures (Z129)	123,373	115,325	112,970	133,202	140,382	106,411	124,574	104,538	87,119
Modification of equipment	843,615	705,077	595,753	778,038	613,229	623,804	558,546	415,615	513,144
Aircraft and airframe structural components (K015)	694,644	562,088	403,366	567,074	406,863	368,632	354,536	211,311	254,539
Aircraft components and accessories (K016)	118,469	130,618	187,464	200,504	205,180	255,209	204,847	204,350	258,605
Aircraft launching, landing, and ground handling equipment (K017)	629	111	77	0	0	0	0	0	0
Engines, turbines, and components (K028 Aircraft Only)	29,873	12,260	4,846	10,460	1,186	-37	163	-46	0
Operation of government-owned air system facilities --	612,776	673,247	679,158	621,935	629,198	620,404	457,900	463,903	493,401
Air traffic control towers (M121)	2,696	5,845	5,517	2,422	3,331	3,560	4,864	1,579	363
Air traffic control training facilities (M122)	0	0	0	0	0	0	0	0	0

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	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	COMMENTS
	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	
Radar and navigational facilities (M123)	154,442	125,375	167,709	137,915	126,022	129,184	133,323	163,309	173,625
Airport runways (M124)	822	358	1,127	2,006	261	0	764	1,527	138
Airport terminals (M125)	30,706	64,457	31,791	32,859	34,666	43,998	28,042	35,481	12,826
Electronic and communications facilities (M127)	392,605	457,415	443,773	429,032	428,967	422,787	271,866	245,380	289,774
Other aerospace structures (M129)	31,501	19,797	29,241	17,702	35,931	20,875	19,041	16,627	16,675
Other quality control,testing, and inspection services	4,005	1,101	0	0	1,102	2,481	1,870	2,586	315
Aircraft and airframe structural components (H915)	3,757	1,101	0	0	490	1,871	461	0	315
Aircraft components and accessories (H916)	248	0	0	0	612	526	1,409	2,586	0
Aircraft launching, landing, and ground handling equipment (H917)	0	0	0	0	0	84	0	0	0
Engines, turbines, and components (H928 Aircraft Only)	0	0	0	0	0	0	0	0	0
Purchase of air system facilities --	223	100	83	0	0	0	0	0	109
Air traffic control towers (E121)	0	0	0	0	0	0	0	0	0
Air traffic control training facilities (E122)	0	100	0	0	0	0	0	0	0
Radar and navigational facilities (E123)	0	0	0	0	0	0	0	0	0
Airport runways (E124)	0	0	0	0	0	0	0	0	0
Airport terminals (E125)	0	0	0	0	0	0	0	0	0
Electronic and communications facilities (E127)	30	0	83	0	0	0	0	0	69
Other aerospace structures (E129)	193	0	0	0	0	0	0	0	40
Quality control services	0	0	191	52	0	0	1,837	1,620	1,876
Aircraft and airframe structural components (H115)	0	0	0	0	0	0	209	0	0
Aircraft components and accessories (H116)	0	0	191	52	0	0	0	0	94
Aircraft launching, landing, and ground handling equipment (H117)	0	0	0	0	0	0	1,628	1,620	1,782
Engines, turbines, and components (H128 Aircraft Only)	0	0	0	0	0	0	0	0	0
Rocket maintenance, repair, and checkout specialized equipment (4927)	107	176	81	726	606	0	92	37	0
Technical representation services	132,685	123,387	115,284	122,556	125,762	124,414	78,807	84,398	125,606
Aircraft and airframe structural components (L015)	80,626	78,400	68,827	65,271	33,884	64,767	21,574	19,550	7,827
Aircraft components and accessories (L016)	48,511	40,800	43,797	53,779	78,547	46,690	43,870	53,233	107,946
Aircraft launching, landing, and ground handling equipment (L017)	3,548	4,187	2,660	3,506	13,331	12,957	13,363	11,615	9,833
Engines, turbines, and components (L028 Aircraft Only)	0	0	0	0	0	0	0	0	0
MISSILE SYSTEMS (including Ballistic Missiles)	7,426,739	5,767,743	5,071,118	4,514,413	4,062,356	4,930,011	4,684,612	4,959,099	3,713,593
Missiles	5,790,291	4,660,048	4,472,581	3,854,942	3,473,401	4,180,078	3,527,112	3,634,406	2,826,889
Guided missiles (excluding warheads and explosive components)	5,673,815	4,619,653	4,374,142	3,684,584	3,446,973	4,159,788	3,513,710	3,623,758	2,821,088
Guided missiles (1410)	2,261,199	2,409,996	2,069,289	2,108,199	1,891,141	1,154,552	976,956	1,759,467	909,855
Components (excluding propulsion units and components) (1420)	765,011	965,609	955,555	758,115	756,030	1,086,386	384,665	540,136	920,309
Systems/complete (1425)	1,498,802	501,419	250,002	104,661	113,180	237,474	965,598	489,534	220,087
Subsystems (1427)	422,417	142,440	309,328	243,115	311,778	723,053	791,614	584,260	608,988
Remote control systems (1430)	304,401	166,743	106,064	89,058	88,699	43,109	96,002	70,075	66,962
Launchers (1440)	421,985	433,446	683,924	381,436	286,145	915,214	298,875	180,286	94,907
Guided missile warheads and explosive components (1336)	105,698	28,610	97,971	58,993	1,324	18,554	13,402	11,012	5,768
Nuclear warheads and warhead sections (1115)	1,637	462	0	0	188	0	0	82	33
Guided missile explosive propulsion units and components/solid fuel (1337)	0	0	0	30	0	0	0	0	0
Guided missile inert propulsion units and components/solid fuel (1338)	9,141	11,323	468	111,335	24,891	1,736	0	-446	0
Nuclear rockets (including ballistic missiles) (1127)	0	0	0	0	25	0	0	0	0
Infrastructure	1,636,448	1,107,695	598,537	659,471	588,955	749,933	1,157,500	1,324,693	886,704
Construction of missile system facilities (Y126)	16,874	6,329	11,662	5,262	32,197	11,919	4,952	577	28,920
Equipment and materials testing (H214)	9,518	43,351	8,448	2,739	162	53	-267	50	74
Guided missile maintenance, repair, and checkout specialized equipment (4935)	40,141	75,658	40,677	28,844	10,764	11,648	7,377	4,994	6,814
Inspection services (H314)	0	0	0	0	0	0	0	0	0
Installation of equipment (N014)	0	0	0	0	0	86	0	0	0
Lease or rental of missile system facilities (X126)	0	0	0	0	0	0	0	0	0
Lease or rental of equipment (W014)	0	0	0	0	0	0	0	0	0
Maintenance, repair, and rebuilding of equipment (J014)	221,513	193,858	178,854	180,533	158,583	95,905	42,838	29,777	125,977
Maintenance, repair, or alteration of missile system facilities (Z126)	18,616	20,353	21,690	21,028	18,795	19,047	21,713	14,752	20,888
Missile handling and servicing equipment (1450)	806,979	394,973	79,078	117,953	166,581	189,792	132,173	96,544	11,440
Modification of equipment (K014)	61,564	57,125	6,570	72,473	8,224	1,783	408,937	38,943	1,537
Operation of government-owned missile system facilities (M126)	329	10,858	6,457	9,790	11,063	83,135	54,222	24,057	23,462
Other quality control,testing, and inspection services (H914)	0	0	377	447	0	26	0	1,996	7,082
Purchase of missile system facilities (E126)	0	0	0	29	0	0	0	0	0
Quality control services (H114)	197,360	17,428	14,385	7,434	6,276	6,252	70	44	823
Technical representation services (L014)	283,564	287,762	230,339	212,939	176,310	330,287	485,485	1,112,958	659,687

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		FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	COMMENTS
	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	Obligations (000's)	
SPACE SYSTEMS	3,207,982	3,184,764	3,024,625	3,823,579	2,123,776	2,264,885	1,888,153	1,776,434	1,741,634	
Space systems	2,024,033	1,926,562	1,869,228	2,014,130	1,931,212	2,003,750	1,643,396	1,550,019	1,324,471	
Space vehicles (including satellites)	1,745,993	1,640,600	1,503,705	1,519,560	1,385,635	1,423,476	1,237,197	1,063,898	1,289,233	
Space vehicles (1810)	834,066	894,203	570,226	753,075	829,227	798,373	694,180	486,141	505,376	
Space vehicle components (1820)	317,065	235,480	382,927	222,571	63,728	154,397	85,979	152,388	367,544	
Space vehicle remote control systems (1830)	46,513	8,027	2,513	57,593	32,601	55,265	11,222	24,996	6,734	
Space vehicle launchers (1840)	548,070	502,778	547,885	486,296	459,679	409,249	439,877	395,568	404,262	
Space survival equipment (1860)	279	112	154	25	400	6,192	5,939	4,805	5,317	
Space vehicle explosive propulsion units and components/solid fuel (1337)	7,595	18,405	7,709	34,476	35,645	31,892	10,270	9,703	7,495	
Space vehicle inert propulsion units and components/solid fuel (1338)	270,445	267,557	357,814	460,094	509,932	548,382	395,929	476,418	27,743	
Infrastructure	1,183,949	1,258,202	1,155,397	1,809,449	192,564	261,135	244,757	226,415	417,163	
Construction of space system facilities (Y___ Space Systems Only)	0	0	0	0	0	0	0	0	0	
Engines, turbines, and components (J028 Space Systems Only)	0	0	0	0	40	0	0	0	0	
Equipment and materials testing (H218) (H228 Space Systems Only)	13,003	13,636	59,836	26,511	22,012	25,091	16,611	24,279	20,175	
Freight transport -- Space transportation and launch services (V126)	30,551	40,937	65,472	71,051	67,536	70,649	53,358	32,512	143,321	
Inspection services (H318) (H328 Space Systems Only)	0	0	0	0	0	0	0	49	6,979	
Installation of equipment (N018) (N028 Space Systems Only)	0	0	0	0	0	0	0	0	0	
Lease or rental of space system facilities (X___ Space Systems Only)	0	0	0	0	0	0	0	0	0	
Lease or rental of facilities (W018) (W028 Space Systems Only)	0	0	0	0	0	0	0	0	0	
Maintenance, repair, and rebuilding of equipment (J018)	970,840	1,040,792	864,531	1,579,927	-6,961	43,387	24,446	18,937	20,041	
Maintenance, repair, or alteration of space system facilities (Z___ Space Systems Only)	0	0	0	0	0	0	0	0	0	
Modification of equipment (K018) (K028 Space Systems Only)	1,715	8,293	2,153	3,082	4,022	0	0	11,000	91,860	
Other quality control,testing, and inspection services (H918) (H928 Space Systems Only)	38,270	30,406	31,077	45,299	47,655	48,090	54,371	55,260	44,966	
Purchase of space system facilities (E___ Space Systems Only)	0	0	0	0	0	0	0	0	0	
Quality control services (H118) (H128 Space Systems Only)	82,535	73,721	71,400	39,126	29,673	24,865	36,969	7,403	41,824	
Space vehicle handling and servicing equipment (1850)	418	0	4,821	1,885	1,717	787	679	1,364	3,562	
Space vehicle maintenance, repair, and checkout specialized equipment (4960)	256	290	823	290	479	21,023	31,948	47,194	44,027	
Technical representation services (L018) (L028 Space Systems Only)	46,361	50,127	55,284	42,278	26,391	27,243	26,375	28,417	408	
RESEARCH AND DEVELOPMENT (Conduct of Basic Research, Applied Research &Development)	15,305,714	18,189,050	16,673,776	15,163,755	11,674,723	13,188,662	10,813,683	8,282,561	8,267,695	Does NOT include R&D grants and In-House R&D activities.
Aeronautic and space technology (AR1_)	1,105,288	696,466	615,324	540,934	500,501	529,637	452,244	352,752	387,095	
Aerospace navigation and navigational aids (AT3_)	9,196	4,454	2,042	3,761	3,137	1,499	1,482	1,499	933	
Air transportation (AS1_)	3,121	4,267	12,549	16,248	33,646	14,683	3,813	1,219	427	
Aircraft (Defense) (AC1_)	5,251,154	6,081,766	6,873,178	5,227,075	3,773,776	4,824,900	4,077,450	3,060,837	3,209,946	
General science and technology R&D	169,369	189,467	175,041	164,690	146,646	162,947	156,415	126,075	126,091	
Physical sciences (AJ1_)	153,184	168,553	152,741	143,472	118,534	107,386	87,841	86,560	90,514	DOD/AF, NASA, and DOT/FAA ONLY
Mathematical and computer sciences (AJ2_)	3,148	4,639	6,558	3,882	4,848	32,569	39,430	5,729	7,297	DOD/AF, NASA, and DOT/FAA ONLY
Environmental sciences (AJ3_)	473	799	2,450	5,877	6,134	3,989	9,445	21,340	20,731	DOD/AF, NASA, and DOT/FAA ONLY
Engineering (AJ4_)	12,069	11,277	9,563	7,225	10,015	12,341	14,304	8,375	5,450	DOD/AF, NASA, and DOT/FAA ONLY
Life sciences (AJ5_)	148	500	1,246	731	836	1,496	821	312	480	DOD/AF, NASA, and DOT/FAA ONLY
Psychological sciences (AJ6_)	0	0	0	0	0	0	0	27	46	DOD/AF, NASA, and DOT/FAA ONLY
Social sciences (AJ7_)	0	0	0	0	0	0	0	0	0	DOD/AF, NASA, and DOT/FAA ONLY
Other (AJ9_)	347	3,699	2,483	3,503	6,279	5,166	4,574	3,732	1,573	DOD/AF, NASA, and DOT/FAA ONLY
Missiles and space systems (Defense) (AC2_)	4,213,621	6,299,412	4,806,057	4,876,084	3,504,109	3,561,989	2,942,326	1,875,554	1,808,743	
Space flight (AR2_)	2,068,028	2,083,195	784,114	671,549	607,802	1,191,568	793,863	504,116	606,072	
Space operations (tracking and data acquisition) (AR4_)	316,855	249,383	226,771	157,195	91,340	87,974	98,495	101,964	87,154	
Space science and applications (AR3_)	920,180	750,728	1,021,436	1,020,189	544,084	584,372	377,052	292,051	607,516	
Space and terrestrial (AR5)	0	0	0	0	0	0	416	0	9,832	
Space Station (AR6)	555,297	1,123,634	1,406,847	1,563,411	1,606,816	1,420,378	1,162,789	1,236,741	759,422	
Commercial space programs (AR7)	19,309	15,205	33,853	15,390	12,524	7,439	16,587	15,802	8,742	
Other space R&D (AR9)	674,296	691,073	714,564	907,229	850,342	801,279	730,751	713,951	655,722	
PERSONNEL	23,725,985	22,801,947	25,964,000	25,576,000	25,761,000	25,970,000	26,591,000	27,564,000	29,724,000	Includes costs of In-House R&D personnel.
DOD/Air Force (All Non-Reserve)	18,559,634	17,538,972	20,746,000	20,302,000	20,318,000	20,313,000	20,551,000	21,116,000	22,409,000	Includes benefits.
DOD/Air Force (Military/Non-reserve) (11.7, 12.2)	14,828,766	13,588,200	16,713,000	16,420,000	16,293,000	16,104,000	16,277,000	16,786,000	17,415,000	Includes benefits.
DOD/Air Force (Civilian O&M) (11.9, 12.1)	3,306,864	3,531,772	3,578,000	3,534,000	3,622,000	3,708,000	3,879,000	4,003,000	4,601,000	Includes benefits.
DOD/Air Force (Civilian RDTE) (11.9, 12.1)	424,004	419,000	455,000	348,000	403,000	501,000	395,000	327,000	393,000	Includes benefits.
DOT/FAA	3,625,810	3,683,407	3,677,000	3,763,000	3,923,000	4,138,000	4,502,000	4,824,000	5,488,000	Includes benefits.
DOT/FAA Operations (11.9, 12.1)	3,430,107	3,479,188	3,465,000	3,538,000	3,695,000	3,911,000	4,239,000	4,541,000	5,174,000	Includes benefits.
DOT/FAA Facilities and Equipment (11.9, 12.1)	149,920	157,209	168,000	176,000	177,000	174,000	232,000	244,000	274,000	Includes benefits.
DOT/FAA Research, Engineering, and Development (11.9, 12.1)	45,783	47,010	44,000	49,000	51,000	53,000	31,000	39,000	40,000	Includes benefits.
NASA (11.9, 12.1)	1,540,541	1,579,568	1,541,000	1,511,000	1,520,000	1,519,000	1,538,000	1,614,000	1,827,000	Includes benefits.

Federal Aerospace Procurement Spending by Agency (6/10/02)
Table 2

Agency Name	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
DOD	45,572,025,000	48,263,958,000	40,408,716,000	44,865,174,000	32,339,107,000	37,174,234,000	32,930,021,000	28,863,318,000
NASA	8,306,292,000	8,572,857,000	7,342,178,000	8,199,925,000	5,246,091,000	5,149,294,000	4,950,582,000	4,594,896,000
DOT	258,350,000	349,563,000	387,663,000	193,860,000	226,865,000	310,065,000	152,792,000	125,649,000
GSA	90,896,000	86,101,000	120,311,000	104,445,000	33,047,000	37,648,000	45,404,000	157,550,000
STATE	31,025,000	22,187,000	33,775,000	152,715,000	23,938,000	22,456,000	47,447,000	93,297,000
TREA	99,006,000	69,416,000	84,563,000	76,627,000	69,107,000	56,233,000	60,584,000	76,516,000
DOJ	27,701,000	43,986,000	34,872,000	27,184,000	104,880,000	44,965,000	44,459,000	86,578,000
DOI	56,907,000	64,958,000	30,106,000	75,661,000	50,796,000	54,992,000	56,120,000	69,116,000
DOE	9,216,000	10,384,000	18,917,000	30,065,000	16,690,000	46,858,000	44,016,000	43,630,000
USDA	17,253,000	21,247,000	27,781,000	30,318,000	21,478,000	20,210,000	18,048,000	27,726,000
DOC	17,534,000	17,846,000	52,930,000	15,945,000	24,648,000	14,539,000	14,191,000	7,465,000
HHS	17,051,000	8,658,000	42,938,000	17,007,000	7,371,000	8,579,000	10,651,000	13,026,000
TVA	1,874,000	3,853,000	13,500,000	4,447,000	2,818,000	4,343,000	2,730,000	3,866,000
DVA	2,086,000	1,695,000	3,475,000	3,615,000	1,070,000	1,431,000	826,000	3,617,000

Appendix E

U.S. Aerospace and Aviation Industry: A State-by-State Analysis

Prepared by: Content First

Full report available at: www.ita.doc.gov/aerospace/aerospacecommission


U.S. Aerospace and Aviation Industry:
A State-by-State Analysis
Commission on the Future of the United States Aerospace Industry
October 2002

The Economic Impact of the U.S. Aerospace and Aviation Industry

The Commission on the Future of the United States Aerospace Industry commissioned a study to examine the economic impact of the aerospace and aviation industry at the national, state, and local level. This report provides comprehensive and objective statistics on the U.S. aerospace and aviation industry.

The U.S. Aerospace and Aviation Industry: A State-by-State Analysis, shows the economic importance of the aerospace and aviation industry on the U.S. economy using such key indicators as employment and wages. The first section of this report also includes an analysis of what the aerospace and aviation industry means for all 50 states, the District of Columbia, and Puerto Rico.

The second section of the report, gives objective, comparative economic data for the top ten aerospace and aviation metropolitan areas in the United States. These top aerospace and aviation metropolitan areas include Atlanta, Boston, Los Angeles, and Seattle.

Key U.S. Aerospace and Aviation Industry Findings

More than 2 million workers are directly employed by the nation's civilian and commercial aerospace and aviation industry, based on the U.S. government data analyzed in the report, *The U.S. Aerospace and Aviation Industry: A State-by-State Analysis*. These employees earned an average wage of $47,700 annually, or 35 percent more than the U.S. average.

Other key U.S. findings contained in the report include:

- U.S. aerospace and aviation industry employment jumped by 7 percent between 1996 and 2001, with the addition of 138,200 jobs.
- Most of the job gains since 1996 were concentrated in the air transportation industry.
- Overall employment declined in such key aerospace segments as guided missiles and space manufacturing and space research and technology between 1996 and 2001.
- Employment in the nation's aircraft and parts manufacturing industry was nearly unchanged from 1996.

Key State Aerospace and Aviation Industry Findings

The Commission also wanted to understand the economic impact of the aerospace and aviation industry on the nation's state economies. The report covers the aerospace and aviation industry in every state, the District of Columbia, and Puerto Rico.

The major state findings showed:

- California, with nearly 300,000 employees, was the nation's aerospace and aviation industry leader.
- Texas and Washington ranked near the top by most of the metrics examined.
- Texas ranked first nationwide in aerospace and aviation job creation between 1996 and 2001, adding 15,600 jobs to its economic base.
- When controlling for population size, Washington led the nation with 44 aerospace and aviation industry jobs per 1,000 workers in 2001, when controlling for population size.

Also, the state-by-state economic metrics demonstrated that states like Alabama, Arizona, and Kansas are home to strong aerospace and aviation industry clusters.

Key Metropolitan Aerospace and Aviation Industry Findings

The second section of the report examined the ten leading metropolitan areas by aerospace industry employment, wages, payroll, and establishments. The ten metropolitan areas examined in the study were Atlanta, Boston, Chicago, Dallas, Fort Worth, Los Angeles, New York, Phoenix, Seattle, and Wichita.

The major metropolitan area findings revealed:

- Los Angeles was the nation's leading metropolitan area with 137,100 workers employed by the aerospace and aviation industry.
- Other leading metropolitan areas by aerospace and aviation industry employment were Seattle, Chicago, Atlanta, and Fort Worth.
- The highest concentration of aerospace and aviation industry jobs was in the Wichita metro area, accounting for one out of every five jobs in 2001.
- Seattle ranked second with one out of every 10 jobs in the aerospace and aviation industry in 2001.

Appendix F

Federal Departments and Agencies with Aerospace Responsibilities

Agencies of the Executive Office of the President

- Central Intelligence Agency (e.g., communications, intelligence)
- Council of Economic Advisors
- Council on Environmental Quality
- Domestic Policy Council
- National Economic Council
- National Security Council
- Office of Management and Budget
- Office of Science and Technology Policy
  - National Science & Technology Council
  - President's Advisory Council on Science & Technology
- Office of the U.S. Trade Representative

Executive Departments

- Department of Agriculture (e.g., remote sensing for agricultural, rangeland and forestry resources; precision farming using GPS; positive train control for expedited shipment of crops to market)
- Department of Commerce (e.g., weather services, trade promotion, telecommunication and information administration)
  - National Oceanic and Atmospheric Administration
- Department of Defense (e.g., space support, force enhancement, space control, force applications)
  - Office of the Secretary
    - Defense Advanced Research Projects Agency
    - Missile Defense Agency
    - National Reconnaissance Office
    - National Security Agency
  - Joint Chiefs of Staff
    - U.S. Strategic Command
  - U.S. Air Force
  - U.S. Army
  - U.S. Marine Corps
  - U.S. Navy
- Department of Education (e.g., distance learning, individualized instruction)
- Department of Energy (e.g., non-proliferation, nuclear energy, energy and material sciences, space radiation effects on human and materials)
- Health and Human Services (e.g., distance medicine, research on new medicines and drugs)
- Housing and Urban Development (e.g., regional and urban planning)
- Department of Interior (e.g., geodetics, fish and wildlife preservation, mining reclamation and enforcement, national park surveys)
  - U.S. Geological Survey

- Department of Justice (e.g., law enforcement, immigration, border patrol)
- Department of Labor (e.g., aerospace apprenticeship programs)
- Department of State (e.g., international treaty and standards development, transportation of foreign service professionals and dignitaries)
- Department of Transportation (e.g., civil air navigation, commercial space transportation, ground and sea transportation applications, law enforcement)
  - Federal Aviation Administration
  - Federal Highway Administration (e.g., intelligent transportation system)
  - Federal Motor Carrier Safety Administration (e.g., truck safety)
  - Federal Railroad Administration (e.g., positive train control)
  - Federal Transit Administration (e.g., intelligent transportation system)
  - Maritime Administration (e.g., maritime commerce)
  - National Highway Traffic Safety Administration (e.g., automobile safety)
  - Research and Special Programs Administration (e.g. pipelines and hazardous material safety)
  - Transportation Security Administration (e.g., security, law enforcement)
  - U.S. Coast Guard (e.g., search and rescue, law enforcement)
- Department of Treasury (e.g., customs, secret service)
- Department of Veteran Affairs (e.g., telecommunication)

Independent Agencies

- Environmental Protection Agency (e.g., environmental monitoring for developing regulations and for enforcement)
- Federal Emergency Management Agency (e.g., emergency response)
- General Services Administration (e.g., government aircraft services)
- NASA (e.g., space science, space transportation, aeronautics research and development)
- National Science Foundation (e.g., aerospace-related research)
- Tennessee Valley Authority (e.g., flood control, river way management, environmental research, forestry and wildlife management)

Appendix G

Congressional Committees with Aerospace Responsibilities

Full Committees of the Senate

Appropriations

Armed Services

- Aeronautical and space activities peculiar to development of weapon systems or military operations
- Departments of the Army, Navy, Air Force
- Military Research and Development

Banking, Housing, and Urban Affairs

- Economic stabilization and defense production
- Export and Foreign Trade
- Export Controls
- Financial aid to commerce and industry
- Renegotiation of government contracts

Budget

Commerce, Science and Transportation

- Interstate commerce
- Non-military aeronautical and space sciences
- Oceans, weather and atmospheric activities
- Regulation of interstate common carriers, including civil aviation
- Science, Engineering, Technology research, development, and policy
- Transportation

Energy and Natural Resources

- Energy research and development
- Nuclear energy
- Solar energy

Environment and Public Works

- Air pollution
- Noise pollution
- Regional Economic Development

Finance

- Customs and ports of entry
- Reciprocal trade agreements
- Tariffs and import quotas
- Transportation of dutiable goods

Foreign Relations

- Measures to foster commercial intercourse with foreign nations and to safeguard American business interests abroad

Governmental Affairs

- Census and collection of statistics, including economic statistics
- Intergovernmental relations
- Organization of the Executive Branch
- Government efficiency, economy, effectiveness
- Relationships between the US, states, and municipalities

Health, Education and Labor

- Measures relating to education and labor
- Labor standards and statistics
- Labor disputes
- Pension plans
- Student loans

Judiciary

- Patents, trademarks and copyrights
- Protection of trade and commerce against unlawful restraint and monopolies

Small Business and Entrepreneurship

Select Committees of the Senate

Intelligence

Full Committees of the House of Representatives

Appropriations

Armed Services

- Army, Navy, Air Force generally
- Intelligence related activities of DoD
- Scientific research and development pertaining to the military

Budget

Energy and Commerce

- Interstate and foreign commerce
- Energy generally
- Travel and tourism

Education and the Workforce

- Labor
- Education
- Mediation of disputes

Financial Services

- Economic stabilization and defense production
- Financial aid to commerce and industry [other than transportation]

Government Reform

- Government management and accounting generally
- Economy and efficiency of government
- Transportation of mail
- Public information and records
- Organization of the Executive Branch

International Relations

- Export controls and trading with the enemy
- Commercial intercourse abroad and safeguarding American business interests abroad
- International economic policy

Judiciary

- Patents, trademarks and copyrights
- Protection of trade and commerce against unlawful restraints and monopolies

Science

- Energy research
- Astronautical research and development, including resources, personnel, equipment, and facilities; Outer space exploration and control
- Civil aviation research and development
- Environmental research and development
- NASA
- National Space Council
- National Science Foundation
- National Weather Service
- Science scholarships
- Scientific research and development, demonstrations and projects

Small Business

Transportation and Infrastructure

- Public works in support of navigation
- Transportation, including civil aviation, safety and infrastructure
- Transportation regulatory agencies

Ways and Means

- Customs and ports of entry
- Reciprocal trade agreements
- Transportation of dutiable goods

Appendix H

Acronyms

ATA	Air Transport Association
AIR-21	Aviation Investment and Reform Act for the 21st Century
ADS-B	Automatic Dependent Surveillance-Broadcast
AFB	Air Force Base
ASCM	Agreement on Subsidies and Countervailing Measures
ATC	Air Traffic Control
ATM	Air Traffic Management
ATOS	Air Transportation Oversight System
CBO	Congressional Budget Office
CCAFS	Cape Canaveral Air Force Station
CIS	Commonwealth of Independent States
CNS	Communications, Navigation and Surveillance
COCOM	Coordinating Committee of NATO
CPFF	Cost Plus Fixed Fee
CRV	Current Replacement Value
DARPA	Defense Advanced Research Projects Agency
dB	Decibel
DELG	Defense Export Loan Guarantee
DISC	Domestic International Sales Corporation
DNL	Day-Night Level
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DSB	Defense Science Board
DSR	Display System Replacement
DWCF	Defense Working Capital Fund
EADS	European Aeronautic Defense and Space Company
EC	European Commission
ECA	Export Credit Agency
EELV	Evolved Expendable Launch Vehicle
ELV	Expendable Launch Vehicle
EPA	Environmental Protection Agency
ETI	Extra Territorial Income
EU	European Union
Ex-Im Bank	Export-Import Bank
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
	Federal Accounting Regulations
	Federal Acquisition Regulations
FMS	Foreign Military Sales
FP	Framework Program
FSC	Foreign Sales Corporation
FTM	Freight and Express Ton Miles
FY	Fiscal Year
FYDP	Future Year Defense Program
GAO	Government Accounting Office
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GPRA	Government Performance and Results Act
GPS	Global Positioning System
GSA	General Services Administration
HPCC	High Performance Computing and Communications
IAM	International Association of Machinists
ICAO	International Civil Aviation Organization
ICGS	International Coast Guard System
INAS	International Airspace System
IR&D	Independent Research and Development
IRS	Internal Revenue Service
ISS	International Space Station
ISSA	Inter-Service Support Agreement
ITAR	International Traffic in Arms Regulations
JSF	Joint Strike Fighter

JTIDS	Joint Tactical Information Distribution System
K-12	Kindergarten through Twelfth Grade
KSC	Kennedy Space Center
LCA	Large Civil Aircraft
LEO	Low Earth Orbit
LOI	Letter of Intent
MEO	Medium Earth Orbit
NAI	National Aerospace Initiative
NATO	North Atlantic Treaty Organization
NASA	National Aeronautics and Space Administration
NEO	Near-Earth Object
NFTC	National Foreign Trade Council
NOAA	National Oceanic and Atmospheric Administration
NOx	Nitrogen Oxide
NSC	National Security Council
NSF	National Science Foundation
O&S	Operations and Support
OECD	Organization for Economic Cooperation and Development
OEP	Operational Evolution Plan
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
PCC	Policy Coordinating Counsel
PFC	Passenger Facility Charge
P.L.	Public Law
POC	Percent of Completion
PPBS	Planning, Programming and Budgeting System
QRE	Qualified Research Expenditure
R&D	Research and Development
R&D	Research and Experimentation
RDT&E	Research, Development, Test and Evaluation
RLV	Reusable Launch Vehicle
RNP	Required Navigation Performance
RPM	Revenue Passenger Miles
S&T	Science and Technology
SLI	Space Launch Initiative
SSAs	Special Security Agreements
S&P	Standard and Poors
STARS	Standard Terminal Automation Replacement System
UK	United Kingdom
UN	United Nations
U.S.	United States
USAF	U.S. Air Force
USC	U.S. Code
USML	U.S. Munitions List
VAATE	Versatile, Affordable, Advanced Turbine Engine Program
VAT	Value-Added Tax
WTO	World Trade Organization

Airport Acronyms

ATL	Hartsfield Atlanta International Airport
BWI	Baltimore-Washington International Airport
CLT	Charlotte/Douglas International Airport
DEN	Denver International Airport
DFW	Dallas-Ft. Worth International Airport
DTW	Detroit Metropolitan Wayne County Airport
EWR	Newark International Airport
IAD	Washington Dulles International Airport
JFK	New York John F. Kennedy International Airport
LAS	Las Vegas McCarran International Airport
LAX	Los Angeles International Airport

LGA	New York LaGuardia Airport
MEM	Memphis International Airport
MSP	Minneapolis-St. Paul International Airport
ORD	Chicago O'Hare International Airport
PHL	Philadelphia International Airport
PHX	Phoenix Sky Harbor International Airport
PIT	Greater Pittsburgh International Airport
SEA	Seattle-Tacoma International Airport
SFO	San Francisco International Airport
SLC	Salt lake City International Airport
STL	Lambert St. Louis International Airport

Appendix I

Summary of Commission Activities and Contacts

During the period from September 2001 through November 2002, the Commission: held six (6) public hearings and nine (9) administrative/preparatory meetings; conducted fact-finding trips to the Kennedy Space Center and Cape Canaveral Air Force Station, various U.S. aerospace companies, Europe, and Asia; received informational briefings and issue papers from over 100 companies, government organizations, and aerospace interest groups; heard testimony from over 60 witnesses; met with over 50 government and industry organizations from seven (7) foreign countries; briefed over 45 groups on Commission activities and progress; and had over 150,000 "hits" on the Commission's website. Based on the extensive inputs received from these activities and contacts, the Commission issued three (3) Interim Reports and its Final Report to the President and the Congress. A listing of these contacts is provided, by category, below:

I. INFORMATIONAL BRIEFINGS/DISCUSSIONS/MEETINGS IN THE U.S.

A. U.S. Aerospace Industry and Financial Organizations

Aerospace Corporation
The Boeing Company
Credit Suisse First Boston
General Electric Company
Kistler Aerospace Corporation
Microcosm
Northrop Grumman
Raytheon
Spectrum Astro
TRW
United Technologies Corporation
Analytical Graphics International
Cessna
Eclipse Aviation
Honeywell
Lockheed Martin Corporation
Morgan Stanley
Orbital Science Corporation
Rolls-Royce North America
The Teal Group
Vought

B. Federal and State Government Organizations

California Space Authority
Central Intelligence Agency (CIA)
Department of Commerce (DOC)
Department of Defense (DoD)
- Acquisition Reform
- Ballistic Missile Defense Organization (BMDO)
- Defense Advanced Research Projects Agency (DARPA)
- Defense Intelligence Agency (DIA)
- Defense Science Board (DSB)
- Defense Technology Security Agency (DTSA)
- Director, Defense Research and Engineering (DDR&E)
- Industrial Affairs
- Joint Aeronautical Commanders Group (JACG)
- Joint Strike Fighter (JSF) Program Office
- National Reconnaissance Office (NRO)

- National Security Space Architect (NSSA)
- Office of Net Assessment
- Operational Test and Evaluation (OT&E)
- U.S. Army
- U.S. Navy
- U.S. Air Force

Department of State (DOS)
Federal Aviation Administration (FAA)
National Aeronautics and Space Administration (NASA)
National Oceanic and Atmospheric Administration (NOAA)
National Research Council (NRC) Aerospace Roundtable
Office of Management and Budget (OMB) (the White House)
Spaceport Florida Authority
Texas Aerospace Commission
U.S. Congress

- House of Representatives Members/Staffs
- Senate Members/Staffs

C. Foreign Governments And Industry
Airbus Industries
Arianespace
CNES (French Space Agency)
European Aerospace Defense Systems (EADS)
European Commission
French Embassy
International Civil Aviation Organization (ICAO)
NAV Canada
UK Ministry of Defence

D. Labor And Industry Organizations
Aerospace Industries Association (AIA)
Advisory Group on Electronic Devices (AGED)
Aircraft Electronics Association
Aircraft Owners and Pilots Association (AOPA)
Air Transportation Association (ATA)
General Aviation Manufacturers Association (GAMA)
International Association of Machinists and Aerospace Workers (IAM&AW)
National Air Transportation Association (NATA)
National Business Aircraft Association (NBAA)

National Center for Advanced Technologies (NCAT)
National Defense Industry Association (NDIA)
National Science Teachers Association (NSTA)
Radio Technical Commission for Aeronautics, Inc. (RTCA)
Space Transportation Association (STA)
Space Foundation

E. Academia
George Mason University
Industrial College of the Armed Forces (IDAF)/National Defense University (NDU)
Massachusetts Institute of Technology (MIT)

F. The Media
Aviation Week
Defense News
Space News

G. Professional Societies
American Helicopter Society (AHS)
American Institute of Aeronautics and Astronautics (AIAA)
American Society of Mechanical Engineers (ASME)
Society of Automotive Engineers (SAE)

H. Others
Booz-Allen & Hamilton
Centennial of Flight Commission
Content First
Center for Strategic & International Studies (CSIS)
Institute for Creative Technologies
Institute for Defense Analyses (IDA)
Jet Propulsion Laboratory (JPL)
JSA Associates
Lunar Exploration, Inc
NASA Aero Support Team
Eric Newsom
Jim Oberg
Rand Corporation
Science Applications International Corporation (SAIC)

Synthesis Partners
Team Vision Corporation
Will Trafton
CEF Mission Aerospace

II. INTERNATIONAL BRIEFINGS/DISCUSSIONS/MEETINGS ABROAD

A Belgium
European Commission
Euro-Control
Foreign NATO Representatives
U.S. Ambassador to NATO

B. China
American Chamber of Commerce Aerospace Forum
Aviation Industry Corporation I
Aviation Industry Corporation II
Civil Aviation Administration of China
China National Aero-Technology Import and Export Corporation
Commission on Science and Technology for National Defense
U.S. Embassy

C. France
Arianespace
Centre National d'Etudes Spatiales (CNES)
European Aerospace Defense Systems (EADS)
European Space Agency (ESA)
French Transport Minister
Groupement Des Industries Francaises Aeronautiques et Spatiales (GIFAS)
U.S. Embassy

D. Japan
American Chamber of Commerce in Japan
Council for Science and Technology Policy
Japanese Association of Defense Industries
Japanese Defense Agency
Ministry of Economy, Trade and Industry
Ministry of Education, Culture, Sports, Science and Technology
Ministry of Land, Infrastructure and Transport

Ministry of Public Management, Home Affairs, Posts and Telecommunications
Space Activities Commission
Society of Japanese Aerospace Companies
Technical Research & Development Institute
U.S. Embassy

E. Russia
American Chamber of Commerce in Russia
Aviation and Space Agency (Rosaviakosmos)
Boeing Engineering Design Center
Khrunichev Research and Production Center
National Investment Council (NIC)
Star City Astronaut Training Center
U.S. Embassy

F. United Kingdom
BAE Systems
Civil Aviation Authority
Defense Procurement Agency
Department of Transport
The Economist Technology/Defense Writers
European Association of Aerospace Industries
Foreign Office (Aviation Section)
National Air Traffic Services (NATS)
Treasury Office (Defense, Diplomacy and Intelligence)
U.S. Embassy

III. PUBLIC TESTIMONY

A. Public Hearing November 27, 2001

1. Administration Testimony
   Dr. John H. Marburger, III, Director, OSTP, Executive Office of the President
2. Congressional Testimony
   The Honorable Dave Weldon (R-FL)
3. Executive Branch Testimony
   Joseph Bogosian, Deputy Assistant Secretary (Transportation and Machinery), Commerce Department
   Ralph Braibanti, Director, Office of Space and Advanced Technology, State Department

The Honorable Edward C. "Pete" Aldridge, Jr., Under Secretary of Defense
(Acquisition Technology & Logistics), Department of Defense
Samuel L. Venneri, Associate Administrator, Office of Aerospace Technology, NASA
Steven Zaidman, Associate Administrator for Research and Acquisitions, FAA

B. Public Hearing February 12, 2002

1. Air Transportation Capacity/Infrastructure Discussions

Mr. Charles Keegan, Operational Evolution Plan Program Manager, FAA
Mr. Charles Barclay, Executive Director, American Association of Airport Executives
Dr. Linton Wells, Principal Deputy to the Assistant Secretary of Defense
(Command, Control, Communications and Intelligence)
Mr. Vern Raburn, President, Eclipse Aviation
Mr. John Hayhurst, President, Boeing ATM

2. Export Control Discussions

Government

Matthew Borman, Deputy Assistant Secretary (Export Administration), Commerce Department
Gregory Suchan, Principal Deputy Assistant Secretary (Political-Military Affairs),
State Department
Lisa Bronson, Deputy Under Secretary (Defense for Technology Security Policy and Counter Proliferation), DoD

Industry

LGEN (ret.) Larry Farrell, President & CEO, NDIA
Hon. David McCurdy, President, Electronic Industries Alliance
Robert Bauerlein, Chairman, International Council, AIA

C. Public Hearing May 14, 2002

1. Space Discussions

The Hon. Sean O'Keefe (NASA)
The Hon. Peter Teets (Under Secretary of the Air Force-NRO)
GEN Ed Eberhart, USAF, CINCSPACECOM
The Hon. Ron Sega (DoD/DDR&E)
GEN (ret.) Tom Moorman, Space Industrial Base
The Hon. Bill Nelson (D-FL)

2. Space Vision for 2050

Mr. W. David Thompson, President & CEO, Spectrum Astro
Dr. Wesley Huntress, Director, Geophysical Laboratory, Carnegie Institute of Washington
The Hon. Tidal McCoy, Chairman of the Board, Space Transportation Association
Mr. Martin P. Kress, Chair, Public Policy Committee, AIAA

Ms. Lori Garver, President, American Astronautical Society

Dr. John Lewis, Professor of Planetary Science, University of Arizona

3. Industrial Base Discussions

   The Hon. Norm Dicks (D-WA)

   Jeff Foote, President, ATK Aerospace

   Dain Hancock, President, Lockheed Martin Aerospace Co

   Jerry Daniels, President & CEO, Military Aircraft & Missile Systems, Boeing

4. 21st Century Aerospace Workforce Discussions

   Labor Panel

   Dr. Jeff Faux, Economic Policy Institute

   Dr. Tom Kochan, MIT/Sloan School of Management

   Government Panel

   Dr. John Bailey, Director of Education Technology, Department of Education

   Emily DeRocco, Assistant Secretary for Employment and Training Administration, Department of Labor

   GEN (ret.) Sam Armstrong, NASA

   Educators Panel

   Dr. Bernard Grossman, Exec. Dir., Aerospace Department Chairman's Association

   Dr. Albert Koller, Exec. Dir., Aerospace Programs at Brevard Community College

   Dr. Abe Nisanci, Program Director for Engineering, Division of Undergraduate Education, National Science Foundation

   Student Panel

   Ms. Sandra Goins, Apprentice, Seattle, WA

   Mr. Denny Reyes, Aviation High School, New York

   Ms. Annalisa Weigel (Ph.D. Candidate, Aerospace Engineering), MIT

D. Public Hearing August 22, 2002

1. Aviation (Airlines, Pilots, Controllers) Discussions

   Duane Woerth, President, Airline Pilots Association

   John Olcott, President, National Business Aircraft Association

   John Carr, President, National Air Traffic Controllers

   Mac Armstrong, Executive VP, Air Transportation Assoc. of America

2. Aeronautics and Space Engineering Board (National Academy of Science)

   GEN (ret.) Ronald R. Fogleman, Chairman, Committee on Aeronautics Research and Technology

3. Suppliers Discussions

   Ms. Judy Northup, Vice President, Vought Aircraft Industries

   Mr. Mike Grosso, CEO, DynaBil Industries

   Mr. Joe Murphy, Chairman of the Board, Ferco Tech Corporation

Mr. Peter Rettaliata, President, Air Industries Machining Corp.

4. Space/Planetary Discussions
   Thomas F. Rogers, Chairman, The Sophron Foundation
   BGEN Simon "Pete" Worden, Deputy Director of Operations, US Space Command
5. RDT&E Infrastructure Discussions
   David Swain, Senior VP of Engineering and Chief Technology Officer, Boeing
   Philip Coyle, former Director, Operational Test & Evaluation, DoD
   James Beggs, former NASA Administrator
   Thomas Christie, Director, Operational Test & Evaluation, DoD
   General Lester L. Lyles, Commander, Air Force Materiel Command

IV. BRIEFINGS BY COMMISSIONERS AND STAFF

A. Federal/State Government
   Air Force Aeronautical Systems Center Corporate Board
   AST Forecast Conference
   DOC Aerospace Industry Sector Advisory Committee
   FAA Commercial Space Transportation Conference
   National Academies Space Studies Board
   National Academies Air and Space Engineering Board
   National Security Council
   NAASC Air Surveillance Data Sharing Working Group
   NASA Administrator Sean O'Keefe
   NASA Project Management Shared Experience Program
   NRO/AIAA Forum
   Ohio Aerospace and Defense Advisory Council
   PEO/Systems Command Commanders' Conference
   Small Payload Rideshare Conference
   Transportation Research Board/FAA Forecasting Workshop
   Tri-Service Turbine Engine Technology Symposium
   U.S. Space Command
   U.S. Congress (Members and Staff)
   Vice President Richard Cheney
   White House Office of Science & Technology Policy (Dr. Marburger)
   White House Staff

B. Labor/Industry Organizations
   AIA Annual Fall Conference (Commission Panel)
   AIA Compensation Practices Committee

AIA Communications Council
AIA Space Council
AIA Annual Spring Conference (Commission Panel)
IAM&AW
Space Foundation (Commission Panel)

C. Professional Groups/Societies
AHS Chapter Meeting
AIAA Aerospace Sciences Meeting Fast-Track Tutorial
AIAA Congressional Visits Day
AIAA Global Air & Space 2002 Symposium
AIAA Speakers Day
Air Traffic Controllers Association Conference
ASME International Workshop
ASME Inter-Council Committee on Federal R&D
California Space Authority
International Space University 7th Annual Symposium
International Space Group
Maryland Space Business Roundtable
National Space Club – Florida Chapter
National Space Society Governors Meeting
Small Launch Vehicle Consortium
Society of Satellite Professionals International Meeting
Space Foundation Symposia
Space Transportation Association
U.S. Chamber Workshop (Market Opportunities in Space: The Near-Term Roadmap)
U.S. Chamber Space Enterprise Council
Washington Space Business Roundtable
Western Ohio Senior Executives Association
Women and Aerospace Symposium

D. U.S. Industry
Aerospace Corporation
SAIC Managers Meeting
Schafer Corporation Innovations in Space Symposium

E. The Media

Atlantic Monthly
Aviation News Today (TV Show)Business Week
Flight Daily International
IEEE USA Policy Perspectives
McGraw-Hill Editorial Board
Newsweek
Popular Science
St. Louis Post-Dispatch
USA Today
Washington Post

F. Academia

MIT

Appendix J

Aerospace-related Websites—Partial List

Academia

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Academia

U.S. Colleges & Universities

	Website Addresses
Arizona State University – College of Engineering & Applied Science	http://www.eas.asu.edu
Auburn University – Department of Aerospace Engineering	http://www.eng.auburn.edu/aero
Brown University – Center for Fluid Mechanics, Turbulence and Computation	http://www.cfm.brown.edu/
California Institute of Technology	http://www.caltech.edu
California Institute of Technology – Graduate Aeronautical Laboratories	http://www.galcit.caltech.edu
California State Polytechnic University, Pomona – Aerospace Engineering	http://www.aro.csupomona.edu
Case Western Reserve University – Department of Mechanical & Aerospace Engineering	http://mae1.cwru.edu/mae/
Columbia University – School of Engineering and Applied Sciences	http://www.columbia.edu/cu/mechanical
Cornell University – Sibley School of Mechanical & Aerospace Engineering	http://www.mae.cornell.edu
Embry-Riddle (Arizona)	http://www.pr.erau.edu/
Embry-Riddle (Florida)	http://www.db.erau.edu
Florida Institute of Technology – Division of Engineering Sciences	http://www.fit.edu/AcadRes/engsci/
George Mason University	http://www.gmu.edu
Georgia Institute of Technology – School of Aerospace Engineering	http://www.ae.gatech.edu
Harvard University – Division of Engineering & Applied Sciences	http://www.deas.harvard.edu
Iowa State University – Department of Aerospace Engineering and Engineering Mechanics	http://www.aeem.iastate.edu
John Hopkins University – School of Engineering	http://www.wse.jhu.edu
Lansing Community College – Aviation Center	http://alpha.lansing.cc.mi.us/~whitehead/avmaint.html
Louisiana Tech – Department of Professional Aviation	http://www.aviation.latech.edu/
Massachusetts Institute of Technology – Department of Aeronautics and Astronautics	http://web.mit.edu/aeroastro/www/
Massachusetts Institute of Technology – School of Engineering	http://web.mit.edu/engineering/
Mississippi State University – Engineering Research Center	http://www.erc.msstate.edu
North Carolina State University – Mechanical & Aerospace Engineering	http://www.mae.ncsu.edu

Ohio State University – Department of Aerospace Engineering & Aviation	**http://www.aerospace.ohio-state.edu/**
Old Dominion University – College of Engineering & Technology	**http://www.odu.edu**
Penn State University – Aerospace Engineering	**http://www.aero.psu.edu**
Polytechnic University – Department of Mechanical Engineering	**http://media.poly.edu/mechanical/page/template/HomeBody.cfm**
Princeton University – Mechanical & Aerospace Engineering	**http://www.princeton.edu**
Purdue University – School of Aeronautical and Astronautical Engineering	**http://roger.ecn.purdue.edu/AAE/**
San Diego State University – Department of Aerospace Engineering	**http://www.engineering.sdsu.edu/aerospace**
San Jose State University – College of Engineering	**http://www.engr.sjsu.edu/**
Stanford University- Department of Aeronautics and Astronautics	**http://aa.stanford.edu**
State University of New York – Farmingdale	**http://www.farmingdale.edu**
Texas A&M University – Department of Engineering	**http://aggieengineer.tamu.edu/**
United States Naval Academy	**http://www.usna.navy.mil**
United States Air Force Academy	**http://www.usafa.af.mil**
University of Akron – School of Engineering	**http://www.ecgf.uakron.edu**
University of Alabama – Aerospace Engineering & Mechanics	**http://aem.eng.ua.edu/**
University of Alaska, Anchorage – Aviation Technology Division	**http://www.uaa.alaska.edu/aviation/**
University of Arizona – Department of Aerospace & Mechanical Engineering	**http://www.ame.arizona.edu**
University of California, Berkeley – Mechanical Engineering	**http://www.me.berkeley.edu**
University of California, Irvine – Henry Samueli School of Engineering	**http://mae.eng.uci.edu**
University of California, San Diego – Department of Mechanical & Aerospace Engineering	**http://maeweb.ucsd.edu/index.html**
University of Cincinnati – Aerospace Engineering & Engineering Mechanics	**http://www.ase.uc.edu**
University of Colorado at Boulder – Aerospace Engineering Sciences	**http://aerospace.colorado.edu**

University of Illinois (Urbana-Champaign) – Dept. of Aeronautical & Astronautical Engineering	**http://www.aae.uiuc.edu**
University of Kansas – School of Engineering	**http://www.engr.ku.edu**
University of Maryland – Department of Aerospace Engineering	**http://www.enae.umd.edu**
University of Michigan – College of Engineering	**http://www.engin.umich.edu**
University of Minnesota – Department of Aerospace Engineering & Mechanics	**http://www.aem.umn.edu**
University of Missouri-Rolla – Mechanical & Aerospace Engineering and Engineering Mechanics	**http://web.umr.edu/~maeem/**
University of North Dakota – School of Aerospace Sciences	**http://www.aero.und.edu/**
University of Notre Dame – Aerospace and Mechanical Engineering	**http://www.nd.edu**
University of Southern California – Department of Aerospace & Mechanical Engineering	**http://ae-www.usc.edu/**
University of Texas – Aerospace Engineering & Engineering Mechanics	**http://www.ae.utexas.edu**
University of Texas, Arlington – Department of Mechanical & Aerospace Engineering	**http://www-mae.uta.edu**
University of Washington – Department of Aeronautics and Astronautics	**http://www.aa.washington.edu**
Virginia Tech – Department of Aerospace and Ocean Engineering	**http://www.aoe.vt.edu/**
Wichita State University – Department of Aerospace Engineering	**http://www.engr.twsu.edu/ae**

Foreign Colleges & Universities

Australia – Royal Melbourne Institute of Technology – Department of Aerospace Engineering	**http://www.aero.rmit.edu.au**
Australia – University of New South Wales – School of Mechanical & Manufacturing Engineering	**http://www.eng.unsw.edu.au/research/schools/mech.htm**
Australia – University of Queensland – Department of Mechanical Engineering	**htpp://www.uq.edu.au/mecheng/**
Australia – University of Sydney – Aerospace, Mechanical & Mechatronic Engineering	**http://www.ae.su.oz.au**
Belgium – Katholieke Universiteit Leuven	**http://www.mech.kuleuven.ac.be/default_en.phtml**
Belgium – Universite de Liege – Aerodynamics Group	**http://www.ulg.ac.be/aerodyn/**

Canada – Carleton University – Department of Mechanical & Aerospace Engineering	**http://www.mae.carleton.ca**
Canada – Ryerson University	**http://www.ryerson.ca**
Canada – University of Toronto – Institute for Aerospace Studies	**http://www.utias.utoronto.ca**
Finland – Helsinki University of Technology – Aeronautical Engineering	**http://www.aeronautics.hut.fi/**
France – ENSICA	**http://www.ensica.fr/index2fr.htm**
France – International Space University	**http://www.isunet.edu**
France – SUPAERO	**http://www.supaero.fr/**
Germany – Institut fur Luft- und Raumfahr	**http://keynes.fb12.tu-berlin.de**
Germany – University of Stuttgart – Institute for Statics & Dynamics	**http://www.isd.uni-stuttgart.de/**
Japan – Civil Aviation College	**http://www.kouku-dai.ac.jp/**
Japan – Tokyo Metropolitan College of Aeronautical Engineering	**http://www.kouku-k.ac.jp/index_e.html**
Netherlands – Delft University of Technology – Aerospace Engineering	**http://www.delftaerospace.com**
Sweden – Chalmers University – Department of Thermo & Fluid Dynamics	**http://www.tfd.chalmers.se/**
Sweden – Lulea University of Technology – Division of Fluid Mechanics	**http://www.luth.se/depts/mt/strl/**
Sweden – Royal Institute of Technology – Department of Aeronautics	**http://www.flyg.kth.se/**
Turkey – Middle East Technical University	**http://www.metu.edu.tr/**
UK – Bristol University – Department of Aerospace Engineering	**http://www.aer.bris.ac.uk/**
UK – Cambridge University – Department of Engineering	**http://www.eng.cam.ac.uk**
UK – Cranfield University – Computational Fluid Dynamics	**http://www.cranfield.ac.uk/sme/cfd/**
UK – Imperial College of Science, Technology, and Medicine – Department of Aeronautics	**http://www.ae.ic.ac.uk/**
UK – Loughborough University – Department of Aeronautical and Automotive Engineering	**http://info.lut.ac.uk/departments/tt/index.html**
UK – University of Glasgow – Department of Aerospace Engineering	**http://www.aero.gla.ac.uk/**

The National Academies

Aeronautics and Space Engineering Board	**http://www7.nationalacademies.org/aseb/**
National Academy of Engineering	**http://www.nae.edu/**

National Academy of Sciences	http://www4.nationalacademies.org/nas/nashome.nsf
National Research Council	http://www.nas.edu/nrc/
Space Studies Board	http://www.nas.edu/ssb/ssb.html
Transportation Research Board	http://www.nas.edu/trb/

Air Carriers and Airports	Website Address
Air Carriers & Airports – Aerolink Directory	http://www.aerolink.com/catairports.html

Associations & Societies	Website Addresses
Aeronautical Repair Station Association	http://www.arsa.org/
Aerospace Department Chairman's Association	http://www.princeton.edu/~asmits/ADCA/adca.html
Aerospace Industries Association of America	http://www.aia-aerospace.org/
Aerospace Industries Association of Canada	http://www.aiac.ca/
Air Force Association	http://www.afa.org/
Air Line Pilots Association	https://www.alpa.org/home/index.html
Air Traffic Control Association	http://www.atca.org/
Air Transport Association	http://www.air-transport.org
Aircraft Electronics Association	http://www.aea.net/
Aircraft Owners and Pilots Association	http://www.aopa.org/
Airline Dispatchers Federation	http://www.dispatcher.org/
Airports Council International	http://www.aci-na.org
American Association for the Advancement of Science	http://www.aaas.org/
American Association of Airport Executives	http://www.airportnet.org/Index.htm
American Astronautical Society	http://www.astronautical.org/
American Bar Association	http://www.abanet.org/scitech/home.html
American Helicopter Society, International	http://www.vtol.org/
American Institute of Aeronautics and Astronautics	http://www.aiaa.org/
American Museum of Natural History – Rose Center for Earth & Space	http://www.amnh.org/rose
American Society of Mechanical Engineers, International	http://www.asme.org/offices.shtml
American Society of Travel Agents	http://www.astanet.com/
Army Aviation Association of America	http://www.quad-a.org/
Association for Women in Aviation Maintenance	http://www.awam.org/
Aviation Distributors and Manufacturers Association	http://www.adma.org/
Business Executives for National Security	http://www.bens.org/

Canadian Aeronautics and Space Institute	**http://www.casi.ca/**
Electronic Industries Alliance	**http://www.eia.org**
European Association of Aerospace Industries (AECMA)	**http://www.aecma.org**
FAA Council of African American Employees	**http://www.faa.gov/acr/cae.htm**
FAA National Coalition of Federal Aviation Employees with Disabilities	**http://www.faa.gov/acr/ncfaed.htm**
FAA National Native American/Alaska Native Coalition of Federal Aviation Employees	**http://www.faa.gov/acr/naan.htm**
FAA Technical Women's Organization	**http://two.faa.gov**
Federal Managers Association	**http://www.fedmanagers.org/**
Federation of American Scientists	**http://www.fas.org/**
Flight Safety Foundation	**http://www.flightsafety.org/home.html**
General Aviation Manufacturers Association	**http://www.generalaviation.org/main.shtml**
Helicopter Association International	**http://www.rotor.com/**
Institute of Electrical and Electronics Engineers	**http://www.ieee.org/**
International Air Transport Association	**http://www.iata.org**
International Association of Machinists and Aerospace Workers	**http://www.iamaw.org**
International Civil Aviation Organization (ICAO)	**http://www.icao.org**
International Council of Aircraft Owner and Pilot Association	**http://www.iaopa.org/**
International Council of the Aeronautical Sciences	**http://www.icas.org**
International Society of Women Airline Pilots	**http://www.iswap.org/**
National Aeronautic Association	**http://www.naa-usa.org/website/**
National Agricultural Aviation Association	**http://www.agaviation.org/**
National Air Traffic Controllers Association	**http://www.natcadc.org/**
National Air Transportation Association	**http://www.nata-online.org/**
National Association of Air Traffic Specialists	**http://www.naats.org/**
National Association of Flight Instructors	**http://www.nafinet.org/who/contactus.html**
National Association of State Aviation Officials	**http://www.nasao.org**
National Business Aviation Association	**http://www.nbaa.org/**
National Center for Advanced Technologies	**http://www.ncat.com**
National Council for Science and the Environment	**http://www.cnie.org/NLE/**
National Defense Industrial Association	**http://www.adpa.org/**
National Education Association	**http://www.nea.org/**
National Hispanic Coalition of Federal Aviation Employees	**http://www.nhcfae.com/**
National Science Teachers Association	**http://www.nsta.org/**
Navy League of the United States	**http://www.navyleague.org/index_flash.php**

Professional Airways Systems Specialists	http://www.passnational.org
Professional Women Controllers, Inc.	http://www.pwcinc.org
Radio Technical Commission for Aeronautics	http://www.rtca.org/
Regional Airline Association	http://www.raa.org/
Royal Aeronautical Society	http://www.raes.org.uk/
Smithsonian Institution – National Air & Space Museum	http://www.nasm.si.edu/
Society of Airway Pioneers	http://www.airwaypioneers.com/
Society of Automotive Engineers, International	http://www.sae.org/servlets/index
Society of Women Engineers	http://www.swe.org/
Space Foundatioon	http://www.spaceconnection.org
Space Frontier Foundation	http://www.space-frontier.org
Space Transporation Association	http://www.spacetransportation.org
Women in Aviation	http://www.womeninaviation.com
World Air Sports Federation (Federation Aeronautique International)	http://www.fai.org

Directories

Website Addresses

AERADE Aerospace and Defense Resources	http://www.aerade.cranfield.ac.uk
Aero Images Military Library	http://www.aeroimages.com/imagmili.htm
Aerolink – the Internet's Commercial Aviation Directory	http://www.aerolink.com
Aeroseek – Aviation Search Engine	http://www.aeroseek.com
Astronomical Pictures & Animation	http://graffiti.u-bordeaux.fr/MAPBX/roussel/astro.html
Astronomy.com	http://www.astronomy.com
Aviation Image Archives	http://www.landings.com/_landings/pages/images.html
Dictionary of Technical Terms	http://roland.lerc.nasa.gov/~dglover/dictionary//content.html
Embry Riddle Virtual Libraries	http://www.erau.edu/libraries/virtual/Aerospace/
Federal Agencies Directory	http://www.lib.lsu.edu/gov/fedgov
Gateway to U.S. Government Science & Technology Websites	http://www.scitech.gov
Great Aviation Quotes	http://www.skygod.com/quotes/index.html
International Aviation Directory	http://www.infomart.net/av/
Internet Aerospace Links	http://www.alumni.caltech.edu/~padam/htmls/AeroLinks.html
Jane's Information Group	http://www.janes.com
Landings Pages database	http://www.landings.com
Library of Congress	http://lcweb.loc.gov
Russian Space Science Internet	http://www.rssi.ru/

Science, Technology & Engineering – Kennedy Space Center	http://ftp.ksc.nasa.gov
Space Jobs, Inc.	http://www.spacejobs.com
U.S. Space Walk of Fame	http://www.spacewalkoffame.com
WWW Virtual Library of Logistics	http://www.logisticsworld.com/logistics

Foreign Governments, Agencies, and Multinational Organizations	Website Addresses
Aeronautics for Europe	http://europa.eu.int/comm/research/growth/aeronautics/en
Australia – Defense Science & Technology Organization	http://www.dsto.defence.gov.au/
Belgium – Office of Scientific, Technical and Cultural Affairs	http://www.belspo.be
Brasil National Institute for Space Research	http://www.inpe.br/english
Canadian Herzberg Institute of Astrophysics	http://cadcwww.dao.nrc.ca
Canadian Space Agency	http://www.space.gc.ca/
China National Space Administration	http://www.cnsa.gov.cn
CNES – Centre National d'Etudes Spatiales	http://www.cnes.fr
CSIRO Australia – Scientific & Industrial Research Organization	http://www.csiro.au
Euroconsult	http://www.euroconsult-ec.com
European Aeronautic Defence and Space Company (EADS)	http://www.eads.com/eads/index_nof.htm
European Commission	http://europa.eu.int
European Space Agency	http://www.esa.int
GIFAS – Groupement Des Industries Francaises Aeronautiques et Spatiales	http://www.gifas.asso.fr
Indian Space Research Organization	http://www.isro.org
International Astronautical Federation	http://www.iafastro.com
International Civil Aviation Organization	http://www.icao.int
National Space Development Agency of Japan	http://www.nasda.go.jp/index_e.html
North Atlantic Treaty Organization (NATO)	http://www.nato.int/
NATO Research & Technology Organization	http://www.rta.nato.int/
Netherlands – National Aerospace Laboratory	http://www.nlr.nl
Russian Aviation Page	http://aeroweb.lucia.it/~agretch/RAP.html
Russian Space Agency	http://www.rosaviakosmos.ru/english/eindex.htm
Russian Space Research Institute	http://www.iki.rssi.ru
UK Ministry of Defence	http://www.mod.uk

United Nations	http://www.un.int/
International Telecommunications Union	http://www.itu.int/home/index.html
World Meteorological Organization	http://www.wmo.ch/index-en.html
von Karmen Institute for Fluid Dynamics	http://www.vki.ac.be

News and Print Media — Website Addresses

Aerospace Online – Marketplace for Industry Professionals	http://www.aerospaceonline.com/
AeroSpaceNews	http://www.aerospacenews.com/
Aerotech News and Review	http://www.aerotechnews.com/
AeroWorldNet – Daily Aerospace Magazine on the Internet	http://www.aeroworldnet.com/
Air & Space Smithsonian Magazine	http://www.airspacemag.com/
Aviation Today	http://www.aviationtoday.com/index.html
Aviation Week and Space Technology	http://www.awgnet.com/aviation
Aviation Week's AviationNow	http://www.aviationnow.com/
Avweb	http://www.avweb.com/
Defence Systems Daily	http://www.defence-data.com/index2/index2.shtml
Defense News	http://www.defensenews.com
DoD DefenseLINK News	http://www.defenselink.mil/news/
Financial Times News and Analysis	http://news.ft.com/home/us/
Global Defence Review	http://www.global-defence.com
GlobalAir.com – Connecting the Aviation Industry	http://www.globalair.com/
Key Publishing, Ltd.	http://www.keypublishing.com/flash.html
Space News	http://www.space.com/spacenews/
Space.com	http://www.space.com/
World Spaceflight News	http://members.aol.com/wsnspace/index.htm

U.S. Industry — Website Addresses

AAI Corporation	http://www.aaicorp.com
Aerojet	http://www.aerojet.com
Aerospace Corporation	http://www.aero.org
AeroVironment, Inc.	http://www.aerovironment.com
Aircraft Technical Publishers	http://www.atp.com
Airtechnics, Inc.	http://www.airtechnics.com
Alaska Aerospace Development Corporation	http://www.akaerospace.com
Alliant Techsystems Incorporated	http://www.atk.com
American Pacific Corporation	http://american-pacific-corp.com
Analytical Graphics International	http://www.analyticalgraphics.com

Andrews Space and Technology	**http://www.spaceandtech.com**
Arete Associates	**http://www.arete.com**
Argo-Rech Corporation	**http://www.aero-tech.com**
AstroVision International, Incorporated	**http://www.astrovision.com**
ATK-Thiokol	**http://www.thiokol.com**
Atlantic Research Corporation	**http://www.atlantic-research.com**
Aviall Incorporated	**http://www.aviall.com**
Avidyne Corporation	**http://www.avidyne.com**
AXA Space	**http://www.axa.com**
B.H. Aircraft Company, Incorporated	**http://www.bhaircraft.com**
B/E Aerospace	**http://www.beaerospace.com**
BAE Systems, North America Incorporated	**http://www.na.baesystems.com**
Ball Aerospace & Technologies Corporation	**http://www.ball.com/aerospace**
Barnes Aerospace	**http://www.barnesaero.com**
Battelle	**http://www.battelle.org/**
BF Goodrich Aerospace	**http://www.goodrich.com**
Boeing	**http://www.boeing.com**
Boeing Business Jets	**http://www.boeing.com/commercial/bbj**
Bombardier Learjet, Inc.	**http://www.aerospace.bombardier.com**
CAE SunyFlite Training International, Inc.	**http://www.simuflite.com**
Century Flight Systems	**http://www.centuryflight.com**
Cessna	**http://www.cessna.com**
Commander Aircraft Company	**http://www.commanderair.com**
Computer Sciences Corporation	**http://www.csc.com**
Cordiem, LLC	**http://www.cordiem.com**
Crane Aerospace	**http://www.craneaerospace.com**
Cubic Corporation	**http://www.cts-nordic.dk**
Curtiss-Wright Corporation	**http://www.curtisswright.com**
Dassault Falcon Jet Corporation	**http://www.dassaultfalcon.com**
DeCrane Aircraft Holdings, Inc.	**http://www.decraneaircraft.com**
DRS Technologies, Incorporated	**http://www.drs.com**
Ducommun Incorporated	**http://www.ducommun.com**
Dukes Aerospace	**http://www.dukesaerospace.com**
Dupont Company	**http://www.dupont.com**
Eclipse Aviation	**http://www.eclipseaviation.com**
EDO Corporation	**http://www.edocorp.com**
EFW Incorporated	**http://www.efw.com**
Embraer Aircraft Holding, Incorporated	**http://www.embraer.com**

ESIS Incorporated	http://www.esis.com
Esterline Technologies	http://www.esterline.com
Exostar LLC	http://www.exostar.com
Fairchild Corporation	http://www.fairchildcorp.com
FlightSafety International	http://www.flightsafety.com
GARMIN International	http://www.garmin.com/
General Atomics Aeronautical Systems Incorporated	http://www.ga.com/asi/aero.html
General Dynamics Corporation	http://www.generaldynamics.com
General Electric – Aircraft Engines	http://www.geae.com
GKN Aerospace Services	http://www.aero.gknpic.com
Goodrich Corporation	http://www.aerospace.goodrich.com
Groen Brothers Aviation, Incorporated	http://www.gbagyro.com
Gulfstream Aerospace Corporation	http://www.gulfstream.com
Hamilton-Sundstrand Corporation	http://www.hamiltonsundstrand.com
Harris Corporation	http://www.harris.com
Hartzell Propeller, Inc.	http://www.hartzellprop.com
HEICO Corporation	http://www.heicocorp.com
Hexcel Corporation	http://www.hexcel.com
Honeywell	http://www.honeywell.com
Hughes	http://www.hughes.com
i2 Technologies	http://www.i2.com
ITT Industries Defense Electronics & Services	http://www.ittind.com/business
Jeppesen	http://www.jeppesen.com
KAMAN Aerospace Corporation	http://www.kamanaero.com
Kelly Aerospace	http://www.kellyaerospace.com
Kistler Aerospace Corporation	http://www.kistleraerospace.com
L-3 Communications	http://www.l-3com.com
Lockheed Martin	http://www.lockheedmartin.com
Lockheed Martin Space Systems	http://lmms.external.lmco.com
Martin-Baker America Incorporated	http://www.martin-baker.com
MatrixOne Incorporated	http://www.matrix-one.com
MD Helicopters, Incorporated	http://www.mdhelicopters.com
Meggitt Avionics/S-TEC	http://www.s-tec.com
Microcosm, Inc.	http://www.smad.com
MOOG Incorporated	http://www.moog.com
Northrop Grumman Corporation	http://www.northgrum.com/
Omega Air, Incorporated	http://www.omegaair.ie
Omega Airline Software	http://www.omegaair.ca

Orbital Sciences Corporation	**http://www.orbital.com**
Parker Aerospace	**http://www.parker.com/ag**
Parker Hannifin Corporation	**http://www.parker.com**
PerkinElmer Fluid Sciences	**http://wwwl.perkinelmer.com**
PPG Industries Aerospace	**http://www.ppg.com**
Pratt & Whitney	**http://www.pratt-whitney.com/**
Precision Aerospace Corporation	**http://www.prec-aero.com**
Raytheon	**http://www.raytheon.com**
Raytheon Aircraft Company	**http://www.raytheon.com/rac**
Remmele Engineeering, Incorporated	**http://www.remmele.com**
Rockwell Collins, Inc.	**http://www.collins.rockwell.com**
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Rolls-Royce North America	**http://www.rolls-royce.com**
Sabreliner Corporation	**http://www.sabreliner.com**
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Silicon Graphics, Incorporated	**http://www.sgi.com**
Smiths Aerospace	**http://www.smiths-aerospace.com**
Smiths Aerospace Actuation Systems – Yakima	**http://www.dowty.com**
Smiths Group Actuation Systems	**http://www.si-act-sys.com**
Space Systems/Loral	**http://www.ssloral.com**
Spectrum Astro	**http://www.specastro.com**
Spirent Systems Wichita, Inc.	**http://www.spirent-systems.com**
Stellex Aerostructures, Incorporated	**http://www.stellex.com**
Teledyne Continental Motors	**http://www.tcmlink.com**
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Teleflex Incorporated	**http://www.telflex.com**
Textron Lycoming	**http://www.lycoming.textron.com**
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TRW Incorporated	**http://www.trw.com**
Unison Industries	**http://www.unisonindustries.com**
United Defense	**http://www.uniteddefense.com**
United Technologies Corporation	**http://www.utc.com/index1.htm**

Universal Avionics Systems	http://www.uasc.com
UPS Aviation Technologies, Inc.	http://www.upsat.com
Vertical Aeronautics International	http://www.heliports.com
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Vought Aircraft Industries	http://www.vought.com/
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Central Intelligence Agency	http://www.odci.gov/
Council of Economic Advisors	http://www.whitehouse.gov/cea
Council on Environmental Quality	http://www.whitehouse.gov/ceq
National Economic Council	http://www.whitehouse.gov/nec/
National Security Council	http://www.whitehouse.gov/nsc/
Office of Management and Budget	http://www.whitehouse.gov/omb/budget
Office of Science and Technology Policy	http://www.ostp.gov/
National Science & Technology Council	http://www.ostp.gov/NSTC/html/NSTC_Home.html
President's Advisory Council on Science & Technology	http://www.ostp.gov/pcast/pcast.html
Office of the U.S. Trade Representative	http://www.ustr.gov

Executive Branch Departments

Department of Agriculture	http://www.usda.gov
Department of Commerce	http://www.commerce.gov
International Trade Administration	http://www.ita.doc.gov
National Oceanic & Atmospheric Administration – Satellites	http://www.noaa.gov/satellites.html
Critical Infrastructure Assurance Office	http://www.ciao.gov/
Department of Defense	http://www.dod.mil/
Secretary & Deputy Secretary of Defense	http://www.defenselink.mil/osd/topleaders.html
Under Secretary of Defense (Acquisition, Technology & Logistics)	http://www.acq.osd.mil/
Deputy Undersecretary of Defense, Acquisition Reform	http://www.acq.osd.mil/ar/
Deputy Undersecretary of Defense, Industrial Affairs	http://www.acq.osd.mil/ia/
Director, Defense Research and Engineering	http://www.dod.mil/ddre/

Director, Operational Test and Evaluation	http://www.dote.osd.mil/
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Under Secretary of Defense (Comptroller)	http://www.dtic.mil/comptroller/
Assistant Secretary of Defense (Command, Control, Communications & Intelligence)	http://www.c3i.osd.mil/
Assistant Secretary of Defense (C3I) Space Policy Director	http://www.c3i.osd.mil/org/c3is/spacepol/
Under Secretary of Defense (Policy)	http://www.defenselink.mil/policy
Assistant Secretary of Defense (International Security Affairs)	http://www.defenselink.mil/policy/isa/
Defense Technology Security Administration	http://www.dtra.mil/
Advisory Committees	
Advisory Committee to Assess Domestic Response to Terrorism Involving WMD – Charter	http://www.odam.osd.mil/omp/pdf/5277.pdf
Ballistic Missile Defense Advisory Committee – Charter	http://www.odam.osd.mil/omp/pdf/2.pdf
Defense Policy Board Advisory Committee – Charter	http://www.odam.osd.mil/omp/pdf/412.pdf
Defense Science Board	http://www.acq.osd.mil/dsb
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National Imagery & Mapping Agency	http://www.nima.mil/
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Defense Advanced Research Projects Agency	http://www.arpa.mil/
DARPA Tactical Technology Office	http://www.darpa.mil/tto/
National Security Agency	http://www.nsa.gov/
National Reconnaissance Office	http://www.nro.gov/
Joint Service Schools	
National Defense University	http://www.ndu.edu
Joint Chiefs of Staff	http://www.dtic.mil/jcs/
Joint Vision 2020	http://www.dtic.mil/jv2020/
Program Executive Offices	
Joint Strike Fighter Program Office	http://www.jast.mil/IEFrames.htm
Unified Commands	
United States Strategic Command	http://www.stratcom.mil/
United States Transportation Command	http://www.transcom.mil/

United States Air Force	http://www.af.mil/
US Air Force Vision 2020	http://www.af.mil/vision/
Office of the Secretary of the Air Force – Acquisition (SAF/AQ)	http://www.safaq.hq.af.mil/
Assistant Secretary of the Air Force – Space Operations (SAF/USI)	http://www.asaf.space.hq.af.mil/
Air Force Scientific Advisory Board – Charter	http://www.odam.osd.mil/omp/pdf/439.pdf
Office of Scientific Research	http://www.afosr.af.mil
Air Combat Command	http://www.af.mil/sites/acc.shtml
Air Education and Training Command	http://www.aetc.randolph.af.mil/
Air Force Space Command Headquarters	http://www.spacecom.af.mil/hqafspc/Default2.asp
Air Force Link – Library	http://www.af.mil/lib_af/index.shtml
Air Force Research Laboratory	http://www.afrl.af.mil
Arnold Engineering Development Center	http://www.arnold.af.mil/
Air National Guard	http://www.ang.af.mil/
Air War College	http://www.au.af.mil/au/awc/awchome.htm
Air Force Institute of Technology	http://www.afit.edu
US Air Force – Thunderbirds	http://www.airforce.com/thunderbirds/
United States Army	http://www.army.mil/
US Army Vision	http://www.army.mil/vision/default.htm
US Army Science Board – Charter	http://www.odam.osd.mil/omp/pdf/389.pdf
US Army Materiel Command	http://www.amc.army.mil/
US Army Parachute Team	http://www.usarec.army.mil/hq/goldenknights/
United States Navy	http://www.navy.mil/
US Navy Vision – From the Sea	http://www.chinfo.navy.mil/navpalib/policy/fromsea/forward.txt
CNO Executive Panel – Charter	http://www.odam.osd.mil/omp/pdf/401.pdf
CNO Space, Information Warfare, Command & Control Directorate (N6)	http://cno-n6.hq.navy.mil
Office of Naval Research	http://www.onr.navy.mil/
Naval Research Laboratory	http://www.nrl.navy.mil/
Naval Research Advisory Council – Charter	http://www.odam.osd.mil/omp/pdf/425.pdf
Naval Air Systems Command	http://www.navair.navy.mil/
Naval Air Warfare Center – Aircraft Division	http://www.nawcad.navy.mil/
Naval Air Warfare Center – Weapons Division	http://www.nawcwpns.navy.mil/

US Navy – Flight Test	http://flighttest.navair.navy.mil/
Naval Center for Space Technology	http://www.ncst.nrl.navy.mil/
Naval Facilities Engineering Command	http://www.navfac.navy.mil/
Naval Network & Space Operations Command	http://www.nnsoc.navy.mil
Naval Sea Systems Command	http://www.navsea.navy.mil/
Space & Naval Warfare Systems Command	http://enterprise.spawar.navy.mil/spawarpublicsite/
Naval Test Pilot School	http://www.usntps.navy.mil/
Naval Postgraduate School	http://www.nps.navy.mil
US Navy – Blue Angels	http://www.navy.com/blueangels/index.jsp?hasFlash=true
US Navy – Leap Frogs	http://www.sealchallenge.navy.mil/leapfrogs.htm
United States Marine Corps	http://www.usmc.mil/
USMC Vision	http://www.usmc.mil/templateml.nsf/25241abbb036b230852569c4004eff0e/$FILE/strategy.pdf
Department of Education	http://www.ed.gov/index.jsp
Department of Energy	http://www.energy.gov/
National Nuclear Security Administration	http://www.nnsa.doe.gov/
National Security	http://www.energy.gov/security/index.html
Office of Defense Nuclear Non-Proliferation	http://www.nnsa.doe.gov/na-20/
National Laboratories	http://www.energy.gov/aboutus/org/natlabs.html
Ames Laboratory	http://www.ameslab.gov/
Argonne National Laboratory	http://www.anl.gov/
Brookhaven National Laboratory	http://www.bnl.gov/world/
Ernest Orlando Lawrence Berkeley National Laboratory	http://www.lbl.gov/
Fermi National Accelerator Laboratory	http://www.fnal.gov/
Idaho National Engineering & Environmental Laboratory	http://www.inel.gov/
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Princeton Plasma Physics Laboratory	http://www.pppl.gov/
Sandia National Laboratory	http://www.sandia.gov
Stanford Linear Accelerator Center	http://www.slac.stanford.edu/
Department of Health and Human Services	http://www.hhs.gov
Centers for Disease Control & Prevention	http://www.cdc.gov/

National Institute for Occupational Safety & Health	http://www.cdc.gov/niosh/homepage.html
Department of Housing and Urban Development	http://www.hud.gov
Department of Interior	http://www.doi.gov
U.S. Geological Survey	http://www.usgs.gov
Department of Justice	http://www.usdoj.gov/ag/index.html
Department of Labor	http://www.dol.gov/
Department of State	http://www.state.gov/
Bureau of Political-Military Affairs	http://www.state.gov/t/pm/
Department of Transportation	http://www.dot.gov
Assistant Secretary for Aviation & International Affairs	http://ostpxweb.dot.gov/aviation/
Office of Intermodalism	http://www.dot.gov/intermodal/
Transportation Science & Technology	http://scitech.dot.gov/
Federal Aviation Administration	http://www.faa.gov/
FAA Associate Administrator for Research and Acquisitions (ARA)	http://www.faa.gov/ARA/INDEX.htm
FAA Office of Aviation Research (AAR)	http://research.faa.gov/aar/
FAA Office of Intelligence & Security (OIS)	http://152.122.41.10/
FAA William J. Hughes Technical Center	http://www.tc.faa.gov/
FAA Air Traffic Services (ATS)	http://www.faa.gov/ats/
FAA Associate Administrator for Commercial Space Transportation	http://ast.faa.gov/
FAA Civil Aviation Security	http://cas.faa.gov/
FAA Office of Airports	http://www.faa.gov/arp/arphome.htm
FAA Office of Regulation and Certification (AVR)	http://www.faa.gov/avr/index.cfm
Federal Highway Administration	http://www.fhwa.dot.gov
Federal Railroad Administration	http://www.fra.dot.gov/site/index.htm
Federal Transit Administration	http://www.fta.dot.gov/
Research and Special Programs Administration	http://www.rspa.dot.gov
Volpe National Transportation Systems Center	http://www.volpe.dot.gov
Transportation Security Administration	http://www.tsa.dot.gov
United States Coast Guard	http://www.uscg.mil/uscg.shtm
US Coast Guard – Vision 2020	http://www.uscg.mil/Commandant/2020/contents.htm
Department of the Treasury	http://www.ustreas.gov/
Department of Veteran Affairs	http://www.va.gov

Executive Branch Independent Agencies

Environmental Protection Agency	http://www.epa.gov/
Federal Emergency Management Agency	http://www.fema.gov/
General Services Administration	http://www.gsa.gov/
National Aeronautics and Space Administration	http://www.nasa.gov/
NASA Headquarters	http://www.hq.nasa.gov/
NASA Technology Plan	http://technologyplan.nasa.gov/default.cfm?id=frontend
NASA Centers	http://www.nasa.gov/hqpao/nasa_centers.html
NASA Ames Research Center	http://www.arc.nasa.gov/
NASA Dryden Flight Research Center	http://www.dfrc.nasa.gov/
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NASA Goddard Institute for Space Studies	http://www.giss.nasa.gov/
NASA Goddard Space Flight Center	http://www.gsfc.nasa.gov/
NASA Independent Verification & Validation Facility	http://www.ivv.nasa.gov/index.shtml
NASA Jet Propulsion Laboratory	http://www.jpl.nasa.gov/
NASA John C. Stennis Space Center	http://www.ssc.nasa.gov/
NASA Johnson Space Center	http://www.jsc.nasa.gov/
NASA Kennedy Space Center	http://www.ksc.nasa.gov
NASA Langley Research Center	http://www.larc.nasa.gov/
NASA Marshall Space Flight Center	http://www1.msfc.nasa.gov/
NASA Wallops Island Flight Test Facility	http://www.wff.nasa.gov
NASA White Sands Test Facility	http://www.wstf.nasa.gov/
Center for AeroSpace Information	http://www.sti.nasa.gov/RECONselect.html
NASA Library Documents	http://www.aero-space.nasa.gov/library/index.htm
Technical Briefs	http://www.nasatech.com/
Great Images in NASA	http://grin.hq.nasa.gov
National Science Foundation	http://www.nsf.gov/
National Transportation Safety Board	http://www.ntsb.gov/
Tennessee Valley Authority	http://www.tva.gov

Congress

United States Senate	http://www.senate.gov
Senate Committee on Appropriations	http://appropriations.senate.gov/
Senate Committee on Armed Services	http://www.senate.gov/~armed_services/
Senate Committee on Banking, Housing & Urban Affairs	http://www.senate.gov/~banking/
Senate Committee on Commerce, Science & Transportation	http://www.senate.gov/~commerce/

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Senate Committee on the Budget	http://www.senate.gov/~budget/
Senate Committee on the Judiciary	http://www.senate.gov/~judiciary/
Senate Select Committee on Intelligence	http://intelligence.senate.gov
United States House of Representatives	http://www.house.gov
House Committee on Appropriations	http://www.house.gov/appropriations
House Committee on Armed Services	http://www.house.gov/hasc
House Committee on Education and the Workforce	http://edworkforce.house.gov/
House Committee on Energy and Commerce	http://www.house.gov/commerce/
House Committee on Financial Services	http://www.house.gov/financialservices/
House Committee on Government Reform	http://www.house.gov/reform/
House Committee on International Relations	http://www.house.gov/international_relations/
House Committee on Science	http://www.house.gov/science/welcome.htm
House Committee on Small Business	http://www.house.gov/smbiz/
House Committee on the Budget	http://www.house.gov/budget/
House Committee on the Judiciary	http://www.house.gov/judiciary/
House Committee on Transportation & Infrastructure	http://www.house.gov/transportation
House Committee on Ways and Means	http://waysandmeans.house.gov/

Joint Committees, Offices and Agencies of Congress

Congressional Budget Office	http://www.cbo.gov
General Accounting Office	http://www.gao.gov
Government Printing Office	http://www.access.gpo.gov/
Library of Congress	http://www.loc.gov/

Commissions and Reports

Centennial of Flight Commission	**http://www.centennialofflight.gov**
Commission on Domestic Response to Terrorism Involving Weapons of Mass Destruction	**http://www.rand.org/nsrd/terrpanel/**
Commission on National Security in the 21st Century	**http://www.nssg.gov**
Commission on the Future of the U.S. Aerospace Industry	**http://www.ita.doc.gov/aerospace/aerospacecommission**
Commission on United States National Security Space Management & Organization	**http://www.defenselink.mil/pubs/spaceabout.html**

State Government

California Department of Transportation – Division of Aeronautics	**http://www.dot.ca.gov/hq/planning/aeronaut/**
California Space Authority	**http://www.californiaspaceauthority.org**
Florida Spaceport Authority	**http://www.spaceportflorida.com/**
Texas Aerospace Commission	**http://www.tac.state.tx.us**
Virginia Space Flight Center	**http://www.vaspace.org**

Appendix K

Acknowledgements and Commission Staff

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