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Commission Charter
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: Lawrence B. Lindsey
Date: 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,

[Signature]

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 anywhere, 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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VI. Summary ................................................................. 15
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 & Starcyler

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 DTSL 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 & Stareycler

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:

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

9
- 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:


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)

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* 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
Scoping “Aerospace”

Donna Fossum, Dana Johnson, Lawrence Painter, Emile Etteedgui

DRR-2878

September 2002

Prepared for the Aerospace Commission

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.
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## Appendix D - Scoping Aerospace (RAND)

<p>| Infrastructure | FY 2018 | FY 2019 | FY 2020 | FY 2021 | FY 2022 | FY 2023 | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | FY 2029 | FY 2030 | FY 2031 | FY 2032 | FY 2033 | FY 2034 | FY 2035 | FY 2036 | FY 2037 | FY 2038 | FY 2039 | FY 2040 | FY 2041 | FY 2042 | FY 2043 | FY 2044 | FY 2045 | FY 2046 | FY 2047 | FY 2048 | FY 2049 | FY 2050 | FY 2051 | FY 2052 | FY 2053 | FY 2054 | FY 2055 | FY 2056 | FY 2057 | FY 2058 | FY 2059 | FY 2060 | FY 2061 | FY 2062 | FY 2063 | FY 2064 | FY 2065 | FY 2066 | FY 2067 | FY 2068 | FY 2069 | FY 2070 | FY 2071 | FY 2072 |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|</p>
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**Methodology:**

Delta revenues excluding Delta costs (717)

Delta revenues (715) = Capital costs (716) + Operating costs (717)
Appendix D – Scoping Aerospace (RAND)

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Appendix D – Scoping Aerospace (RAND)
Federal Aerospace Procurement Spending by Agency (6/10/02)

Table 2

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<td>1,431,000</td>
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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
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., geodesics, fish and wildlife preservation, mining reclamation and enforcement, national park surveys)
  - U.S. Geological Survey
Appendix F – Federal Departments and Agencies with Aerospace Responsibilities

- 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
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<th>Definition</th>
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<td>Joint Tactical Information Distribution System</td>
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<tr>
<td>K-12</td>
<td>Kindergarten through Twelfth Grade</td>
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<td>KSC</td>
<td>Kennedy Space Center</td>
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<tr>
<td>LCA</td>
<td>Large Civil Aircraft</td>
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<td>LEO</td>
<td>Low Earth Orbit</td>
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<td>LOI</td>
<td>Letter of Intent</td>
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<tr>
<td>MEO</td>
<td>Medium Earth Orbit</td>
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<td>NAI</td>
<td>National Aerospace Initiative</td>
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<td>NATO</td>
<td>North Atlantic Treaty Organization</td>
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<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
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<td>NEO</td>
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<td>National Foreign Trade Council</td>
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<td>National Oceanic and Atmospheric Administration</td>
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<td>NOx</td>
<td>Nitrogen Oxide</td>
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<td>National Security Council</td>
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<td>NSF</td>
<td>National Science Foundation</td>
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<tr>
<td>O&amp;S</td>
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<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
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<td>OEP</td>
<td>Operational Evolution Plan</td>
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<td>Office of Management and Budget</td>
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<td>Office of Science and Technology Policy</td>
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<td>PCC</td>
<td>Policy Coordinating Counsel</td>
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<td>PFC</td>
<td>Passenger Facility Charge</td>
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<td>P.L.</td>
<td>Public Law</td>
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<td>POC</td>
<td>Percent of Completion</td>
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<td>PPBS</td>
<td>Planning, Programming and Budgeting System</td>
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<td>QRE</td>
<td>Qualified Research Expenditure</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>R&amp;D</td>
<td>Research and Experimentation</td>
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<td>RDT&amp;E</td>
<td>Research, Development, Test and Evaluation</td>
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<td>RLV</td>
<td>Reusable Launch Vehicle</td>
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<td>RNP</td>
<td>Required Navigation Performance</td>
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<td>Revenue Passenger Miles</td>
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<td>S&amp;P</td>
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<td>STARS</td>
<td>Standard Terminal Automation Replacement System</td>
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<td>U.S. Munitions List</td>
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<td>VAATE</td>
<td>Versatile, Affordable, Advanced Turbine Engine Program</td>
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<td>VAT</td>
<td>Value-Added Tax</td>
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<td>WTO</td>
<td>World Trade Organization</td>
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**Airport Acronyms**

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<td>BWI</td>
<td>Baltimore-Washington International Airport</td>
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<td>CLT</td>
<td>Charlotte/Douglas International Airport</td>
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<tr>
<td>DEN</td>
<td>Denver International Airport</td>
</tr>
<tr>
<td>DFW</td>
<td>Dallas-Ft. Worth International Airport</td>
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<td>DTW</td>
<td>Detroit Metropolitan Wayne County Airport</td>
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<td>EWR</td>
<td>Newark International Airport</td>
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<td>IAD</td>
<td>Washington Dulles International Airport</td>
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<td>JFK</td>
<td>New York John F. Kennedy International Airport</td>
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<td>LAS</td>
<td>Las Vegas McCarran International Airport</td>
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<td>LAX</td>
<td>Los Angeles International Airport</td>
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<td>Airport Name</td>
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<td>LGA</td>
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<td>MEM</td>
<td>Memphis International Airport</td>
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<td>Minneapolis-St. Paul International Airport</td>
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<td>ORD</td>
<td>Chicago O’Hare International Airport</td>
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<td>PHL</td>
<td>Philadelphia International Airport</td>
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<td>Phoenix Sky Harbor International Airport</td>
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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  Analytical Graphics International
      The Boeing Company  Cessna
      Credit Suisse First Boston  Eclipse Aviation
      General Electric Company  Honeywell
      Kistler Aerospace Corporation  Lockheed Martin Corporation
      Microcosm  Morgan Stanley
      Northrop Grumman  Orbital Science Corporation
      Raytheon  Rolls-Royce North America
      Spectrum Astro  The Teal Group
      TRW  Vought
      United Technologies Corporation

   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)
Appendix I – Summary of Commission Activities and Contracts

– 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)
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
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, CINCPACOM
   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&cAW
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
Appendix I – Summary of Commission Activities and Contracts

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
  U.S. Colleges & Universities ......................................................... J-2
  Foreign Colleges & Universities .................................................... J-4
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  Agencies of the Executive Office of the President ...................... J-14
  Executive Branch Departments ................................................... J-14
  Executive Branch Independent Agencies ..................................... J-19
  Congress ...................................................................................... J-19
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### Academia

**U.S. Colleges & Universities**

- Arizona State University – College of Engineering & Applied Science
- Auburn University – Department of Aerospace Engineering
- Brown University – Center for Fluid Mechanics, Turbulence and Computation
- California Institute of Technology
- California Institute of Technology – Graduate Aeronautical Laboratories
- California State Polytechnic University, Pomona – Aerospace Engineering
- Case Western Reserve University – Department of Mechanical & Aerospace Engineering
- Columbia University – School of Engineering and Applied Sciences
- Cornell University – Sibley School of Mechanical & Aerospace Engineering
- Embry-Riddle (Arizona)
- Embry-Riddle (Florida)
- Florida Institute of Technology – Division of Engineering Sciences
- George Mason University
- Georgia Institute of Technology – School of Aerospace Engineering
- Harvard University – Division of Engineering & Applied Sciences
- Iowa State University – Department of Aerospace Engineering and Engineering Mechanics
- John Hopkins University – School of Engineering
- Lansing Community College – Aviation Center
- Louisiana Tech – Department of Professional Aviation
- Massachusetts Institute of Technology – Department of Aeronautics and Astronautics
- Massachusetts Institute of Technology – School of Engineering
- Mississippi State University – Engineering Research Center
- North Carolina State University – Mechanical & Aerospace Engineering

### Website Addresses

- [http://www.eas.asu.edu](http://www.eas.asu.edu)
- [http://www.eng.auburn.edu/aero](http://www.eng.auburn.edu/aero)
- [http://www.cfm.brown.edu/](http://www.cfm.brown.edu/)
- [http://www.caltech.edu](http://www.caltech.edu)
- [http://www.galcit.caltech.edu](http://www.galcit.caltech.edu)
- [http://www.aro.csupomona.edu](http://www.aro.csupomona.edu)
- [http://mae1.cwru.edu/mae/](http://mae1.cwru.edu/mae/)
- [http://www.columbia.edu/cu/mechanical](http://www.columbia.edu/cu/mechanical)
- [http://www.mae.cornell.edu](http://www.mae.cornell.edu)
- [http://www.pr.erau.edu/](http://www.pr.erau.edu/)
- [http://www.db.erau.edu](http://www.db.erau.edu)
- [http://www.fit.edu/AcadRes/engsci/](http://www.fit.edu/AcadRes/engsci/)
- [http://www.gmu.edu](http://www.gmu.edu)
- [http://www.ae.gatech.edu](http://www.ae.gatech.edu)
- [http://www.deas.harvard.edu](http://www.deas.harvard.edu)
- [http://www.aeem.iastate.edu](http://www.aeem.iastate.edu)
- [http://www.wse.jhu.edu](http://www.wse.jhu.edu)
- [http://alpha.lansing.cc.mi.us/~whitehead/avmaint.html](http://alpha.lansing.cc.mi.us/~whitehead/avmaint.html)
- [http://www.aviation.latech.edu/](http://www.aviation.latech.edu/)
- [http://web.mit.edu/engineering/](http://web.mit.edu/engineering/)
- [http://www.erc.msstate.edu](http://www.erc.msstate.edu)
- [http://www.mae.ncsu.edu](http://www.mae.ncsu.edu)
Appendix J – Aerospace-related Websites—Partial List

Ohio State University – Department of Aerospace Engineering & Aviation  
Old Dominion University – College of Engineering & Technology  
Penn State University – Aerospace Engineering  
Polytechnic University – Department of Mechanical Engineering  
Princeton University – Mechanical & Aerospace Engineering  
Purdue University – School of Aeronautical and Astronautical Engineering  
San Diego State University – Department of Aerospace Engineering  
San Jose State University – College of Engineering  
Stanford University - Department of Aeronautics and Astronautics  
State University of New York – Farmingdale  
Texas A&M University – Department of Engineering  
United States Naval Academy  
United States Air Force Academy  
University of Akron – School of Engineering  
University of Alabama – Aerospace Engineering & Mechanics  
University of Alaska, Anchorage – Aviation Technology Division  
University of Arizona – Department of Aerospace & Mechanical Engineering  
University of California, Berkeley – Mechanical Engineering  
University of California, Irvine – Henry Samueli School of Engineering  
University of California, San Diego – Department of Mechanical & Aerospace Engineering  
University of Cincinnati – Aerospace Engineering & Engineering Mechanics  
University of Colorado at Boulder – Aerospace Engineering Sciences

http://www.aerospace ohio-state.edu/  
http://www.odu.edu  
http://www.aero.psu.edu  
http://media.poly.edu/mechanical/template/HomeBody.cfm  
http://www.princeton.edu  
http://roger.ecn.purdue.edu/AAE/  
http://www.engineering.sdsu.edu/aerospace  
http://www.engr.sjsu.edu/  
http://aa.stanford.edu  
http://www.farmingdale.edu  
http://aggieengineer.tamu.edu/  
http://www.usna.navy.mil  
http://www.usafa.af.mil  
http://www.ecgf.uakron.edu  
http://aem.eng.ua.edu/  
http://www.uaa.alaska.edu/aviation/  
http://www.ame.arizona.edu  
http://www.me.berkeley.edu  
http://mae.eng.uci.edu  
http://maeweb.ucsd.edu/index.html  
http://www.ase.uc.edu  
http://aerospace.colorado.edu
University of Illinois (Urbana-Champaign) – Dept. of Aeronautical & Astronautical Engineering
University of Kansas – School of Engineering
University of Maryland – Department of Aerospace Engineering
University of Michigan – College of Engineering
University of Minnesota – Department of Aerospace Engineering & Mechanics
University of Missouri-Rolla – Mechanical & Aerospace Engineering and Engineering Mechanics
University of North Dakota – School of Aerospace Sciences
University of Notre Dame – Aerospace and Mechanical Engineering
University of Southern California – Department of Aerospace & Mechanical Engineering
University of Texas – Aerospace Engineering & Engineering Mechanics
University of Texas, Arlington – Department of Mechanical & Aerospace Engineering
University of Washington – Department of Aeronautics and Astronautics
Virginia Tech – Department of Aerospace and Ocean Engineering
Wichita State University – Department of Aerospace Engineering

Foreign Colleges & Universities
Australia – Royal Melbourne Institute of Technology – Department of Aerospace Engineering
Australia – University of New South Wales – School of Mechanical & Manufacturing Engineering
Australia – University of Queensland – Department of Mechanical Engineering
Australia – University of Sydney – Aerospace, Mechanical & Mechatronic Engineering
Belgium – Katholieke Universiteit Leuven
Belgium – Universite de Liege – Aerodynamics Group

http://www.aee.uiuc.edu
http://www.engr.ku.edu
http://www.enae.umd.edu
http://www.engin.umich.edu
http://www.aem.umn.edu
http://web.umr.edu/~maeem/
http://www.aero.und.edu/
http://www.nd.edu
http://ae-www.usc.edu/
http://www.ae.utexas.edu
http://www-mae.uta.edu
http://www.ae.utexas.edu
http://www.mae.uta.edu
http://www.aa.washington.edu
http://www.aoe.vt.edu/
http://www.engl.twsu.edu/ae

http://www.aero.rmit.edu.au
http://www.eng.unsw.edu.au/research/schools/mech.htm
http://www.uq.edu.au/mecheng/
http://www.ae.su.oz.au
http://www.mech.kuleuven.ac.be/default_en.phtml
http://www.ug.ac.be/aerody/
Appendix J – Aerospace-related Websites—Partial List

Canada – Carleton University – Department of Mechanical & Aerospace Engineering
Canada – Ryerson University
Canada – University of Toronto – Institute for Aerospace Studies
Finland – Helsinki University of Technology – Aeronautical Engineering
France – ENSICA
France – International Space University
France – SUPAERO
Germany – Institut fur Luft- und Raumfahr
Germany – University of Stuttgart – Institute for Statics & Dynamics
Japan – Civil Aviation College
Japan – Tokyo Metropolitan College of Aeronautical Engineering
Netherlands – Delft University of Technology – Aerospace Engineering
Sweden – Chalmers University – Department of Thermo & Fluid Dynamics
Sweden – Lulea University of Technology – Division of Fluid Mechanics
Sweden – Royal Institute of Technology – Department of Aeronautics
Turkey – Middle East Technical University
UK – Bristol University – Department of Aerospace Engineering
UK – Cambridge University – Department of Engineering
UK – Cranfield University – Computational Fluid Dynamics
UK – Imperial College of Science, Technology, and Medicine – Department of Aeronautics
UK – Loughborough University – Department of Aeronautical and Automotive Engineering
UK – University of Glasgow – Department of Aerospace Engineering

The National Academies
Aeronautics and Space Engineering Board
National Academy of Engineering

http://www.mae.carleton.ca
http://www.ryerson.ca
http://www.utias.utoronto.ca
http://www.aeronautics.hut.fi/
http://www.ensica.fr/index2fr.htm
http://www.isunet.edu
http://www.supaero.fr/
http://keynes.fb12.tu-berlin.de
http://www.isd.uni-stuttgart.de/
http://www.kouku-dai.ac.jp/
http://www.kouku-k.ac.jp/index_e.html
http://www.delftaerospace.com
http://www.tfd.chalmers.se/
http://www.luth.se/depts/mt/strl/
http://www.flyg.kth.se/
http://www.metu.edu.tr/
http://www.aer.bris.ac.uk/
http://www.eng.cam.ac.uk
http://www.cranfield.ac.uk/sme/cfd/
http://www.ae.ic.ac.uk/
http://info.lut.ac.uk/departments/tt/index.html
http://www.aero.gla.ac.uk/

http://www7.nationalacademies.org/aseb/
http://www.nae.edu/
Air Carriers and Airports
Air Carriers & Airports – Aerolink Directory

Website Address
http://www.aerolink.com/catairports.html

Website Addresses
http://www.arsa.org/
http://www.princeton.edu/~asmits/ADCA/adca.html
http://www.ai-aerospace.org/
http://www.aiac.ca/
http://www.afa.org/
https://www.alpa.org/home/index.html
http://www.atca.org/
http://www.air-transport.org
http://www.aea.net/
http://www.aopa.org/
http://www.dispatcher.org/
http://www.aci-na.org
http://www.aas.org/
http://www.airportnet.org/Index.htm
http://www.astronautical.org/
http://www.abanet.org/scitech/home.html
http://www.vtol.org/
http://www.aiaa.org/
http://www.amnh.org/rose
http://www.asme.org/offices.shtml
http://www.astanet.com/
http://www.quad-a.org/
http://www.awam.org/
http://www.adma.org/
http://www.bens.org/
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<tr>
<th>Website</th>
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<tr>
<td>Canadian Aeronautics and Space Institute</td>
<td><a href="http://www.casi.ca/">http://www.casi.ca/</a></td>
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<tr>
<td>Electronic Industries Alliance</td>
<td><a href="http://www.eia.org">http://www.eia.org</a></td>
</tr>
<tr>
<td>European Association of Aerospace Industries (AECMA)</td>
<td><a href="http://www.aecma.org">http://www.aecma.org</a></td>
</tr>
<tr>
<td>FAA National Coalition of Federal Aviation Employees with Disabilities</td>
<td><a href="http://www.faa.gov/acr/ncfaed.htm">http://www.faa.gov/acr/ncfaed.htm</a></td>
</tr>
<tr>
<td>FAA National Native American/Alaska Native Coalition of Federal Aviation Employees</td>
<td><a href="http://www.faa.gov/acr/naan.htm">http://www.faa.gov/acr/naan.htm</a></td>
</tr>
<tr>
<td>FAA Technical Women’s Organization</td>
<td><a href="http://two.faa.gov">http://two.faa.gov</a></td>
</tr>
<tr>
<td>Federation of American Scientists</td>
<td><a href="http://www.fas.org/">http://www.fas.org/</a></td>
</tr>
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<td>Flight Safety Foundation</td>
<td><a href="http://www.flightsafety.org/home.html">http://www.flightsafety.org/home.html</a></td>
</tr>
<tr>
<td>General Aviation Manufacturers Association</td>
<td><a href="http://www.generalaviation.org/main.shtml">http://www.generalaviation.org/main.shtml</a></td>
</tr>
<tr>
<td>Helicopter Association International</td>
<td><a href="http://www.rotor.com/">http://www.rotor.com/</a></td>
</tr>
<tr>
<td>Institute of Electrical and Electronics Engineers</td>
<td><a href="http://www.ieee.org/">http://www.ieee.org/</a></td>
</tr>
<tr>
<td>International Air Transport Association</td>
<td><a href="http://www.iata.org">http://www.iata.org</a></td>
</tr>
<tr>
<td>International Association of Machinists and Aerospace Workers</td>
<td><a href="http://www.iamaw.org">http://www.iamaw.org</a></td>
</tr>
<tr>
<td>International Civil Aviation Organization (ICAO)</td>
<td><a href="http://www.icao.org">http://www.icao.org</a></td>
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<tr>
<td>International Council of Aircraft Owner and Pilot Association</td>
<td><a href="http://www.iaopa.org/">http://www.iaopa.org/</a></td>
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<tr>
<td>International Council of the Aeronautical Sciences</td>
<td><a href="http://www.icas.org">http://www.icas.org</a></td>
</tr>
<tr>
<td>International Society of Women Airline Pilots</td>
<td><a href="http://www.iswap.org/">http://www.iswap.org/</a></td>
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<tr>
<td>National Aeronautic Association</td>
<td><a href="http://www.naa-usa.org/website/">http://www.naa-usa.org/website/</a></td>
</tr>
<tr>
<td>National Agricultural Aviation Association</td>
<td><a href="http://www.agaviation.org/">http://www.agaviation.org/</a></td>
</tr>
<tr>
<td>National Air Traffic Controllers Association</td>
<td><a href="http://www.natcadc.org">http://www.natcadc.org</a></td>
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<tr>
<td>National Air Transportation Association</td>
<td><a href="http://www.nata-online.org/">http://www.nata-online.org/</a></td>
</tr>
<tr>
<td>National Association of Air Traffic Specialists</td>
<td><a href="http://www.naats.org/">http://www.naats.org/</a></td>
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<tr>
<td>National Association of State Aviation Officials</td>
<td><a href="http://www.nasao.org">http://www.nasao.org</a></td>
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<tr>
<td>National Business Aviation Association</td>
<td><a href="http://www.nbaa.org/">http://www.nbaa.org/</a></td>
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<tr>
<td>National Center for Advanced Technologies</td>
<td><a href="http://www.ncat.com">http://www.ncat.com</a></td>
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<tr>
<td>National Defense Industrial Association</td>
<td><a href="http://www.adpa.org/">http://www.adpa.org/</a></td>
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<tr>
<td>National Education Association</td>
<td><a href="http://www.nea.org/">http://www.nea.org/</a></td>
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<tr>
<td>National Hispanic Coalition of Federal Aviation Employees</td>
<td><a href="http://www.nhcfae.com/">http://www.nhcfae.com/</a></td>
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<tr>
<td>National Science Teachers Association</td>
<td><a href="http://www.nsta.org/">http://www.nsta.org/</a></td>
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<tr>
<td>Navy League of the United States</td>
<td><a href="http://www.navyleague.org/index_flash.php">http://www.navyleague.org/index_flash.php</a></td>
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</tbody>
</table>
Professional Airways Systems Specialists
Professional Women Controllers, Inc.
Radio Technical Commission for Aeronautics
Regional Airline Association
Royal Aeronautical Society
Smithsonian Institution – National Air & Space Museum
Society of Airway Pioneers
Society of Automotive Engineers, International
Society of Women Engineers
Space Foundation
Space Frontier Foundation
Space Transportation Association
Women in Aviation
World Air Sports Federation (Federation Aeronautique International)

**Directories**

AERADE Aerospace and Defense Resources
Aero Images Military Library
Aerolink – the Internet’s Commercial Aviation Directory
Aeroseek – Aviation Search Engine
Astronomical Pictures & Animation
Astronomy.com
Aviation Image Archives
Dictionary of Technical Terms

Embry Riddle Virtual Libraries
Federal Agencies Directory
Gateway to U.S. Government Science & Technology Websites
Great Aviation Quotes
International Aviation Directory
Internet Aerospace Links

Jane’s Information Group
Landings Pages database
Library of Congress
Russian Space Science Internet

**Website Addresses**

http://www.passnational.org
http://www.pwcinc.org
http://www.rtca.org/
http://www.raa.org/
http://www.raes.org.uk/

http://www.nasm.si.edu/
http://www.airwaypioneers.com/
http://www.sae.org/servlets/index
http://www.swe.org/
http://www.spaceconnection.org
http://www.space-frontier.org
http://www.spacetransportation.org
http://www.womeninaviation.com

http://www.fai.org

http://www.aerade.cranfield.ac.uk
http://www.aeroimages.com/imagnili.htm
http://www.aerolink.com
http://www.aeroseek.com
http://graffiti.u-bordeaux.fr/MAPBX/roussel/astro.html
http://www.astronomy.com
http://www.landings.com/_landings/pages/images.html
http://roland.lerc.nasa.gov/~dglover/dictionary/_content.html
http://www.erau.edu/libraries/virtual/Aerospace/
http://www.lib.lsu.edu/gov/fedgov

http://www.scitech.gov
http://www.skygod.com/quotes/index.html
http://www.infomart.net/av/
http://www.alumni.caltech.edu/~padam/htmls/AeroLinks.html

http://www.janes.com
http://www.landings.com
http://lcweb.loc.gov
http://www.rssi.ru/
Appendix J – Aerospace-related Websites—Partial List

Science, Technology & Engineering – Kennedy Space Center
Space Jobs, Inc.
U.S. Space Walk of Fame
WWW Virtual Library of Logistics

Foreign Governments, Agencies, and Multinational Organizations

Aeronautics for Europe

Australia – Defense Science & Technology Organization
Belgium – Office of Scientific, Technical and Cultural Affairs
Brasil National Institute for Space Research
Canadian Herzberg Institute of Astrophysics
Canadian Space Agency
China National Space Administration
CNES – Centre National d’Etudes Spatiales
CSIRO Australia – Scientific & Industrial Research Organization
Euroconsult
European Aeronautic Defence and Space Company (EADS)
European Commission
European Space Agency
GIFAS – Groupement Des Industries Francaises Aeronautiques et Spatiales
Indian Space Research Organization
International Astronautical Federation
International Civil Aviation Organization
National Space Development Agency of Japan
North Atlantic Treaty Organization (NATO)

NATO Research & Technology Organization
Netherlands – National Aerospace Laboratory
Russian Aviation Page
Russian Space Agency
Russian Space Research Institute
UK Ministry of Defence

Website Addresses

http://europa.eu.int/comm/research/growth/aeronautics/en

http://www.spacejobs.com
http://www.spacewalkoffame.com
http://www.logisticsworld.com/logistics

http://www.belspo.be
http://www.inpe.br/english
http://cadcwww.dao.nrc.ca
http://www.space.gc.ca/
http://www.cnsa.gov.cn
http://www.cnes.fr
http://www.csiro.au
http://www.euroconsult-ec.com
http://www.eads.com/eads/index_no.htm
http://europa.eu.int
http://www.esa.int
http://www.gifas.asso.fr
http://www.isro.org
http://www.iastastro.com
http://www.icao.int
http://www.nasda.go.jp/index_e.html
http://www.nato.int/
http://www.rta.nato.int/
http://www.nlr.nl
http://aeroweb.lucia.it/~agretch/RAP.html
http://www.rosaviakosmos.ru/english/eindex.htm
http://www.iki.rssi.ru
http://www.mod.uk
United Nations
   International Telecommunications Union
   World Meteorological Organization
von Karmen Institute for Fluid Dynamics

**News and Print Media**
Aerospace Online – Marketplace for Industry Professionals
AeroSpaceNews
Aerotech News and Review
AeroWorldNet – Daily Aerospace Magazine on the Internet
Air & Space Smithsonian Magazine
Aviation Today
Aviation Week and Space Technology
Aviation Week’s AviationNow
Avweb
Defence Systems Daily
Defense News
DoD DefenseLINK News
Financial Times News and Analysis
Global Defence Review
GlobalAir.com – Connecting the Aviation Industry
Key Publishing, Ltd.
Space News
Space.com
World Spaceflight News

**U.S. Industry**
AAI Corporation
Aerojet
Aerospace Corporation
AeroVironment, Inc.
Aircraft Technical Publishers
Airtechnics, Inc.
Alaska Aerospace Development Corporation
Alliant Techsystems Incorporated
American Pacific Corporation
Analytical Graphics International

**Website Addresses**

**United Nations**
http://www.un.int/
http://www.itu.int/home/index.html
http://www.wmo.ch/index-en.html
http://www.vki.ac.be

**News and Print Media**
http://www.aerospaceonline.com/
http://www.aerospacenews.com/
http://www.aerotechnews.com/
http://www.aeroworldnet.com/
http://www.airspacemag.com/
http://www.aviationtoday.com/index.html
http://www.awgnet.com/aviation
http://www.aviationnow.com/
http://www.avweb.com/
http://www.defence-data.com/index2/index2.shtml
http://www.defensenews.com
http://news.ft.com/home/us/
http://www.global-defence.com
http://www.globalair.com/
http://www.keypublishing.com/flash.html
http://www.space.com/spacenews/
http://www.space.com/
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**U.S. Industry**
http://www.aaicorp.com
http://www.aerojet.com
http://www.aero.org
http://www.aerovironment.com
http://www.atp.com
http://www.airtechnics.com
http://www.akaerospace.com
http://www.atk.com
http://american-pacific-corp.com
http://www.analyticalgraphics.com
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<td>Argo-Rech Corporation</td>
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<td>ATK-Thiokol</td>
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<td>Atlantic Research Corporation</td>
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<td>Aviall Incorporated</td>
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<td>Avidyne Corporation</td>
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<td>AXA Space</td>
<td><a href="http://www.axa.com">http://www.axa.com</a></td>
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<td>B/E Aerospace</td>
<td><a href="http://www.beaerospace.com">http://www.beaerospace.com</a></td>
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<td>Ball Aerospace &amp; Technologies Corporation</td>
<td><a href="http://www.ball.com/aerospace">http://www.ball.com/aerospace</a></td>
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<td>Barnes Aerospace</td>
<td><a href="http://www.barnesaero.com">http://www.barnesaero.com</a></td>
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<td>Battelle</td>
<td><a href="http://www.battelle.org/">http://www.battelle.org/</a></td>
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<td>BF Goodrich Aerospace</td>
<td><a href="http://www.goodrich.com">http://www.goodrich.com</a></td>
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<td>Boeing</td>
<td><a href="http://www.boeing.com">http://www.boeing.com</a></td>
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<td>Boeing Business Jets</td>
<td><a href="http://www.boeing.com/commercial/bbj">http://www.boeing.com/commercial/bbj</a></td>
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<td>Century Flight Systems</td>
<td><a href="http://www.centuryflight.com">http://www.centuryflight.com</a></td>
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<td>Cessna</td>
<td><a href="http://www.cessna.com">http://www.cessna.com</a></td>
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<td>Commander Aircraft Company</td>
<td><a href="http://www.commanderair.com">http://www.commanderair.com</a></td>
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<tr>
<td>Computer Sciences Corporation</td>
<td><a href="http://www.csc.com">http://www.csc.com</a></td>
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<td>Cordiem, LLC</td>
<td><a href="http://www.cordiem.com">http://www.cordiem.com</a></td>
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<td>Crane Aerospace</td>
<td><a href="http://www.craneaerospace.com">http://www.craneaerospace.com</a></td>
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<td>Cubic Corporation</td>
<td><a href="http://www.cts-nordic.dk">http://www.cts-nordic.dk</a></td>
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<td>Curtiss-Wright Corporation</td>
<td><a href="http://www.curtisswright.com">http://www.curtisswright.com</a></td>
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<td>Dassault Falcon Jet Corporation</td>
<td><a href="http://www.dassaultfalcon.com">http://www.dassaultfalcon.com</a></td>
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<td>DeCrane Aircraft Holdings, Inc.</td>
<td><a href="http://www.decraneaircraft.com">http://www.decraneaircraft.com</a></td>
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<tr>
<td>DRS Technologies, Incorporated</td>
<td><a href="http://www.drs.com">http://www.drs.com</a></td>
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<td>Dukemin Incorporated</td>
<td><a href="http://www.dukemin.com">http://www.dukemin.com</a></td>
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<td>Dukemin Aerospace</td>
<td><a href="http://www.dukemin.com">http://www.dukemin.com</a></td>
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<td>Dupont Company</td>
<td><a href="http://www.dupont.com">http://www.dupont.com</a></td>
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<td>Eclipse Aviation</td>
<td><a href="http://www.eclipseaviation.com">http://www.eclipseaviation.com</a></td>
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<td>EDO Corporation</td>
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<td>EFW Incorporated</td>
<td><a href="http://www.efw.com">http://www.efw.com</a></td>
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<td>Embraer Aircraft Holding, Incorporated</td>
<td><a href="http://www.embraer.com">http://www.embraer.com</a></td>
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<td>ESIS Incorporated</td>
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<td>Esterline Technologies</td>
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<td>Exostar LLC</td>
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<td>Fairchild Corporation</td>
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<td>FlightSafety International</td>
<td><a href="http://www.flightsafety.com">http://www.flightsafety.com</a></td>
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<td>GARMIN International</td>
<td><a href="http://www.garmin.com">http://www.garmin.com</a></td>
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<td>General Dynamics Corporation</td>
<td><a href="http://www.generaldynamics.com">http://www.generaldynamics.com</a></td>
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<td>General Electric – Aircraft Engines</td>
<td><a href="http://www.geae.com">http://www.geae.com</a></td>
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<td>GKN Aerospace Services</td>
<td><a href="http://www.aero.glknpic.com">http://www.aero.glknpic.com</a></td>
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<td>Goodrich Corporation</td>
<td><a href="http://www.aerospace.goodrich.com">http://www.aerospace.goodrich.com</a></td>
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<td>Groen Brothers Aviation, Incorporated</td>
<td><a href="http://www.gbagyro.com">http://www.gbagyro.com</a></td>
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<td>Gulfstream Aerospace Corporation</td>
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<td>Hamilton-Sundstrand Corporation</td>
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<td>Harris Corporation</td>
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<td>HEICO Corporation</td>
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<td>Honeywell</td>
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<td>Hughes</td>
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<td>i2 Technologies</td>
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<td>Jeppesen</td>
<td><a href="http://www.jeppesen.com">http://www.jeppesen.com</a></td>
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<td>KAMAN Aerospace Corporation</td>
<td><a href="http://www.kaman.aero">http://www.kaman.aero</a></td>
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<td>Kelly Aerospace</td>
<td><a href="http://www.kellyaerospace.com">http://www.kellyaerospace.com</a></td>
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<td>Kistler Aerospace Corporation</td>
<td><a href="http://www.kistleraerospace.com">http://www.kistleraerospace.com</a></td>
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<td>L-3 Communications</td>
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<td>Lockheed Martin</td>
<td><a href="http://www.lockheedmartin.com">http://www.lockheedmartin.com</a></td>
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<td>Lockheed Martin Space Systems</td>
<td><a href="http://lmms.external.lmco.com">http://lmms.external.lmco.com</a></td>
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<td>Martin-Baker America Incorporated</td>
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<td>MatrixOne Incorporated</td>
<td><a href="http://www.matrix-one.com">http://www.matrix-one.com</a></td>
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<td>MD Helicopters, Incorporated</td>
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<td>Meggitt Avionics/S-TEC</td>
<td><a href="http://www.s-tec.com">http://www.s-tec.com</a></td>
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<td>MOOG Incorporated</td>
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<td>Northrop Grumman Corporation</td>
<td><a href="http://www.northgrum.com">http://www.northgrum.com</a></td>
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<td>Omega Air, Incorporated</td>
<td><a href="http://www.omegaair.ie">http://www.omegaair.ie</a></td>
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<td>Omega Airline Software</td>
<td><a href="http://www.omegaair.ca">http://www.omegaair.ca</a></td>
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<td>Orbital Sciences Corporation</td>
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<td>Parker Aerospace</td>
<td><a href="http://www.parker.com/">http://www.parker.com/</a></td>
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<td>Parker Hannifin Corporation</td>
<td><a href="http://www.parker.com">http://www.parker.com</a></td>
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<td>PerkinElmer Fluid Sciences</td>
<td><a href="http://www1.perkinelmer.com">http://www1.perkinelmer.com</a></td>
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<td>PPG Industries Aerospace</td>
<td><a href="http://www.ppg.com">http://www.ppg.com</a></td>
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<td>Pratt &amp; Whitney</td>
<td><a href="http://www.pratt-whitney.com/">http://www.pratt-whitney.com/</a></td>
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<td>Precision Aerospace Corporation</td>
<td><a href="http://www.prec-aero.com">http://www.prec-aero.com</a></td>
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<td>Raytheon</td>
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<td>Raytheon Aircraft Company</td>
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<td>Remmele Engineering, Incorporated</td>
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<td>Rockwell International</td>
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<td>Rolls-Royce North America</td>
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<td>Sabreliner Corporation</td>
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<td>Safe Flight Instrument Corporation</td>
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<td>Sea Launch Company LLC</td>
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<td>Sikorsky Aircraft</td>
<td><a href="http://www.sikorsky.com">http://www.sikorsky.com</a></td>
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<td>Smiths Aerospace</td>
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<td>Textron Lycoming</td>
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<td>The Aerostructures Corporation</td>
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<td>United Defense</td>
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<td><a href="http://www.utc.com/index1.htm">http://www.utc.com/index1.htm</a></td>
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Universal Avionics Systems
UPS Aviation Technologies, Inc.
Vertical Aeronautics International
Vought Aircraft Industries
Vought Aircraft Industries
W.L. Gore & Associates, Incorporated
Williams International
Woodward Governor Company

http://www.uasc.com
http://www.upsat.com
http://www.heliports.com
http://www.vought.com/
http://www.vought.com/
http://www.wlgore.com
http://www.williams-int.com/
http://www.woodward.com

U.S. Government

Agencies of the Executive Office of the President
Central Intelligence Agency
Council of Economic Advisors
Council on Environmental Quality
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

Website Addresses

http://www.odci.gov/
http://www.whitehouse.gov/cea
http://www.whitehouse.gov/ceq
http://www.whitehouse.gov/nec/
http://www.whitehouse.gov/nsc/
http://www.whitehouse.gov/omb/budget
http://www.ostp.gov/
http://www.ostp.gov/pcast/pcast.html
http://www.ustr.gov

Executive Branch Departments

Department of Agriculture
Department of Commerce
  International Trade Administration
  National Oceanic & Atmospheric Administration – Satellites
  Critical Infrastructure Assurance Office
Department of Defense
  Secretary & Deputy Secretary of Defense
  Under Secretary of Defense (Acquisition, Technology & Logistics)
    Deputy Undersecretary of Defense, Acquisition Reform
    Deputy Undersecretary of Defense, Industrial Affairs
  Director, Defense Research and Engineering

http://www.usda.gov
http://www.commerce.gov
http://www.ita.doc.gov
http://www.noaa.gov/satellites.html
http://www.ciao.gov/
http://www.dod.mil/
http://www.defenselink.mil/osd/topleaders.html
http://www.acq.osd.mil/
http://www.acq.osd.mil/ar/
http://www.acq.osd.mil/ia/
http://www.dod.mil/ddre/
Appendix J – Aerospace-related Websites—Partial List

Director, Operational Test and Evaluation
http://www.dote.osd.mil/

Director, Defense Procurement
http://www.acq.osd.mil/dp/

National Security Space Architect
http://www.acq.osd.mil/nssa/

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.defense.gov/policy

Assistant Secretary of Defense (International Security Affairs)
http://www.defense.gov/policy/isa/

Defense Technology Security Administration
http://www.dtra.mil/

Advisory Committees

Advisory Committee to Assess Domestic Response to Terrorism Involving WMD – Charter

Ballistic Missile Defense Advisory Committee – Charter

Defense Policy Board Advisory Committee – Charter
http://www.acq.osd.mil/dsb

Defense Science Board
http://www.acq.osd.mil/dsb

Defense Agencies
http://www.acq.osd.mil/bmdo/

Missile Defense Agency
http://www.nima.mil/

National Imagery & Mapping Agency
http://www.dia.mil/

Defense Intelligence Agency
http://www.arpa.mil/

Defense Advanced Research Projects Agency
http://www.darpa.mil/tto/

DARPA Tactical Technology Office
http://www.nsa.gov/

National Security Agency
http://www.nro.gov/

National Reconnaissance Office

Joint Service Schools
http://www.ndu.edu

National Defense University

Joint Chiefs of Staff
http://www.jcs.mil

Joint Vision 2020
http://www.jv2020.org

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
US Air Force Vision 2020
Office of the Secretary of the Air Force – Acquisition (SAF/AQ)
Assistant Secretary of the Air Force – Space Operations (SAF/USI)
Air Force Scientific Advisory Board – Charter
Office of Scientific Research
Air Combat Command
Air Education and Training Command
Air Force Space Command Headquarters
Air Force Link – Library
Air Force Research Laboratory
  Arnold Engineering Development Center
Air National Guard
Air War College
Air Force Institute of Technology
US Air Force – Thunderbirds

United States Army
US Army Vision
US Army Science Board – Charter
US Army Materiel Command
US Army Parachute Team

United States Navy
US Navy Vision – From the Sea
CNO Executive Panel – Charter
CNO Space, Information Warfare, Command & Control Directorate (N6)
Office of Naval Research
  Naval Research Laboratory
  Naval Research Advisory Council – Charter
Naval Air Systems Command
  Naval Air Warfare Center – Aircraft Division
  Naval Air Warfare Center – Weapons Division

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US Navy – Flight Test
Naval Center for Space Technology
Naval Facilities Engineering Command
Naval Network & Space Operations Command
Naval Sea Systems Command
Space & Naval Warfare Systems Command
Naval Test Pilot School
Naval Postgraduate School
US Navy – Blue Angels
US Navy – Leap Frogs
United States Marine Corps
USMC Vision

Department of Education

Department of Energy
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National Energy Technology Laboratory
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Department of Health and Human Services
Centers for Disease Control & Prevention

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National Institute for Occupational Safety & Health
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Research and Special Programs Administration
  Volpe National Transportation Systems Center
Transportation Security Administration
United States Coast Guard
  US Coast Guard – Vision 2020
Department of the Treasury
Department of Veteran Affairs

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Executive Branch Independent Agencies

Environmental Protection Agency  http://www.epa.gov/
General Services Administration  http://www.gsa.gov/
National Aeronautics and Space Administration
  NASA Headquarters  http://www.nasa.gov/
  NASA Technology Plan  http://technologyplan.nasa.gov/default.cfm?id=frontend
  NASA Centers
    NASA Ames Research Center  http://www.arc.nasa.gov/
    NASA Dryden Flight Research Center  http://www.dfrc.nasa.gov/
    NASA Glenn Research Center  http://www.lerc.nasa.gov/
    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
  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
  Senate Committee on Appropriations  http://www.appropriations.senate.gov/
  Senate Committee on Armed Services  http://www.senate.gov/-armed_services/
  Senate Committee on Banking, Housing & Urban Affairs
  Senate Committee on Commerce, Science & Transportation  http://www.senate.gov/-commerce/
### Commissions and Reports

- Centennial of Flight Commission  
  [http://www.centennialofflight.gov](http://www.centennialofflight.gov)
- Commission on Domestic Response to Terrorism Involving Weapons of Mass Destruction  
- Commission on National Security in the 21st Century  
  [http://www.nssg.gov](http://www.nssg.gov)
- Commission on the Future of the U.S. Aerospace Industry  
- Commission on United States National Security Space Management & Organization  

### State Government

- California Department of Transportation – Division of Aeronautics  
- California Space Authority  
  [http://www.californiaspaceauthority.org](http://www.californiaspaceauthority.org)
- Florida Spaceport Authority  
- Texas Aerospace Commission  
  [http://www.tac.state.tx.us](http://www.tac.state.tx.us)
- Virginia Space Flight Center  
  [http://www.vaspacespace.org](http://www.vaspacespace.org)
Appendix K

Acknowledgements and Commission Staff
The Commissioners would like to acknowledge the contribution of the following federal departments and agencies who provided support to the Commission: The Department of Commerce, The Department of Defense, the Department of Education, the Department of Labor, the Department of State, the Department of Transportation and its Federal Aviation Administration, and the National Aeronautics and Space Administration. Particular thanks goes to the Department of Defense for its generous contributions of funding, personnel, facilities and administrative support, and to the National Aeronautics and Space Administration for its generous contribution of personnel and funding. Following are the individual staff members, and their organizations, that played an important part in the work of the Commission.

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The Commissioners would also like to acknowledge the following contractors who contributed their time and talent in support of the Commission: Hicks and Associates, Inc., DFI International, Inc. and The Flowers Group, RAND Corporation, Content First, Massachusetts Institute of Technology, Aviation Systems Engineering, Dr. Marianne Pietras, Biznews24, and LiveWire Corporate Communications, Inc.