

U.S. Technological Leadership



Global Competitiveness

Strong Industrial Capability

Success Through Teamwork

Aerospace Industries Association

1994 Annual Report

AIA is the nonprofit trade association representing the nation's manufacturers of commercial, military, and business aircraft, helicopters, aircraft engines, missiles, spacecraft, and related components and equipment.

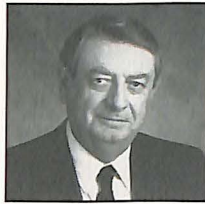
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Norman R. Augustine,
Chairman



Don Fuqua,
President

The year 1994 witnessed two aerospace milestones of note—both of them, coincidentally, occurring on the same day, September 30. That date marked the 75th anniversary of the Aerospace Industries Association (AIA) and the industry it serves. It also concluded fiscal year 1994, the ninth year of the industrial transition that began with a national decision to reduce U.S. defense appropriations and restructure the armed forces. The subsequent years have been difficult for the aerospace industry, characterized by continuing decline in defense production and, in recent years, a parallel recession in commercial aircraft manufacture.

The year 1994 was one of the most troublesome of the transition period. Overall sales, the principal yardstick of industry activity, were down by 9 percent, history's second largest single-year drop (after 1993's 10 percent) in terms of dollar value. This sales decline extended across the whole spectrum of product categories and forced further reduction of employment. By yearend, the industry had lost 495,000 people, 37 percent of the work force in place just five years earlier.

However, there are also some positive aspects. Our member companies have done a highly professional job of coping with the sharp declines in business volume. They have pursued new efficiencies in every facet of their operations and made marked reductions in costs; through consolidations, mergers, and other reorganizational measures, they have positioned themselves for maximal competitiveness in tomorrow's reinvigorated global aerospace market.

AIA has contributed importantly in support of its member companies throughout the transition period. The association has seen beneficial results from its efforts to bring about changes in laws, regulations, and policies that would help companies maintain their high-technology capabilities within a narrower industrial base.

AIA has sought to develop additional industry workload to offset the decline in traditional defense business, and to effect changes in existing legislation/regulations that would enable new efficiencies in the industry's operations. Among examples are AIA's spearhead role in advancing the acquisition reform legislation passed in 1994, a law that offers potential for billions of dollars in savings to both industry and government; the association's work in securing Department of Defense (DoD) support for more equitable government/industry sharing of the DoD depot maintenance workload; and AIA's successful efforts to gain greater government support for increased U.S. export volume.

The aerospace activity decline is a matter of concern to the industry's leaders and to the whole nation, but history suggests optimism about the industry's ability to adapt to changing circumstances.

By the nature of its work, the aerospace industry is particularly sensitive to world events, such as hostilities, up and down swings of the economy, and the shifting winds of politics and diplomatic relations. It is not surprising, therefore, that the industry's activity history has been a rollercoaster-like series of peaks and valleys.

Our industry invariably rebounds from periods of difficulty stronger than before, as it did in the post-World War I time of military retrenchment, again in the wake of World War II, after Korea and Vietnam, and after the post-Apollo aerospace recession of the 1970s.

We can do it again. For the near term, the industry faces further activity decline, more shrinkage, more loss of employment. But just beyond the new century's dawn, AIA sees a time of promise, a new era of aerospace progress led by record-level commercial aircraft manufacture and buttressed by stabilized defense and space programs. The challenge is to complete the transition while retaining the industry's core capabilities. Given a degree of government cooperation, the industry can meet that challenge.

Norman R. Augustine

Don Fuqua

AIA Board of Governors



Norman R. Augustine, Chairman and Chief Executive Officer, Martin Marietta Corporation



Phillip W. Farmer, President and Chief Operating Officer, Harris Corporation



Don Fuqua, President, Aerospace Industries Association



James F. Hardyman, Chairman and Chief Executive Officer, Textron Inc.



Sam F. Iacobellis, Executive Vice President and Deputy Chairman for Major Programs, Rockwell International Corporation



Kent Kresa, Chairman, President, and Chief Executive Officer, Northrop Grumman Corporation



Richard A. Linder, President, Electronic Systems, Westinghouse Electric Corporation



Harry C. Stonecipher, President and Chief Executive Officer, McDonnell Douglas Corporation

Officers

*Norman R. Augustine, Chairman**

Don Fuqua, President

George F. Copsey, Secretary-Treasurer

**Renzo L. Caporali, Chairman and Chief Executive Officer, Grumman Corporation (prior to the Northrop Grumman Corporation merger), served as chairman from January 1994 to May 1994. Mr. Augustine served as vice chairman during that time.*

Executive Committee

Norman R. Augustine, Chairman and Chief Executive Officer, Martin Marietta Corporation

Phillip W. Farmer, President and Chief Operating Officer, Harris Corporation

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Richard A. Linder, President, Electronic Systems, Westinghouse Electric Corporation

Harry C. Stonecipher, President and Chief Executive Officer, McDonnell Douglas Corporation

Members

C. Michael Armstrong, Chairman and Chief Executive Officer, General Motors Hughes Electronics

Jim O. Bean, Deputy Group President, Coltec Industries Inc

Max E. Bleck, President, Raytheon Company

Larry D. Brady, President, FMC Corporation

Fred A. Breidenbach, President and Chief Operating Officer, Gulfstream Aerospace Corporation

David L. Burner, President, Aerospace Division, The BFGoodrich Company

Daniel P. Burnham, President, AlliedSignal Aerospace

Felix W. Fenter, President, Loral Missiles Group, Loral Vought Systems Corporation

Louis J. Giuliano, Senior Vice President, ITT and President and Chief Executive Officer, ITT Defense and Electronics Inc.

Timothy W. Hannemann, Executive Vice President and General Manager, Space & Electronics Group, TRW Inc.

Stephen L. Hayes, President, Parker Berteau Aerospace Group and Vice President, Parker Hannifin Corporation

William F. Hayes, Executive Vice President, Texas Instruments Incorporated

Walter R. Kozlow, President, Kaman Aerospace Corporation

Michael S. Lipscomb, President and Chief Executive Officer, Argo-Tech Corporation

James R. Mellor, Chairman and Chief Executive Officer, General Dynamics Corporation

D. Larry Moore, President and Chief Operating Officer, Honeywell Inc.

Eugene F. Murphy, President and Chief Executive Officer, GE Aircraft Engines and Senior Vice President, General Electric Company

Donald J. O'Mara, President and Chief Operating Officer, Hexcel Corporation

William F. Paul, Senior Vice President, Government Affairs, United Technologies Corporation

Roger I. Ramseier, President, Aerojet, A Segment of GenCorp

Robert H. Rau, President and Chief Executive Officer, Rohr, Inc.

Richard Schwartz, President, Hercules Aerospace and Senior Vice President, Hercules Incorporated

Frank A. Shrontz, Chairman-Chief Executive Officer, The Boeing Company

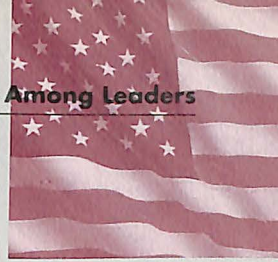
Robert J. Smuland, Executive Vice President and Chief Operating Officer-Aerospace, Sundstrand Corporation

Daniel M. Tellep, Chairman and Chief Executive Officer, Lockheed Corporation

William A. Wheeler, President, Dowty Aerospace Yakima

Sam B. Williams, President and Chairman, Williams International

Paul E. Wright, Chairman, Chrysler Technologies Corporation



The Aerospace Industries Association (AIA) is unique among trade associations. Founded in 1919, AIA has been bringing together the experience and expertise of its member companies' CEOs and senior executives for 75 years. By establishing goals and strategies and achieving consensus among its members, AIA creates an environment conducive to:

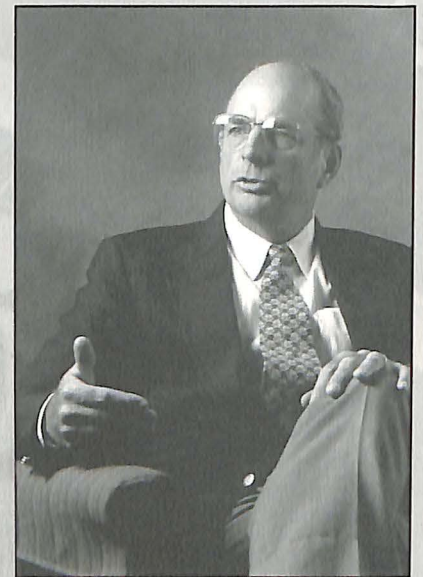
- Preserving U.S. technological leadership
- Monitoring and coordinating legislative and regulatory changes that affect industry
- Building a strong industrial capability
- Initiating actions for improving procurement and procurement-related issues
- Addressing international issues to improve global competitiveness
- Solving mutual problems

AIA is a nonprofit trade association that strengthens its membership through teamwork. Located in Washington, D.C.—in the center of the federal government decision-making process—AIA represents the nation's leading manufacturers of commercial, military, and business aircraft, helicopters, aircraft engines, missiles, spacecraft, and related components and equipment.

AIA speaks aggressively and effectively to convey industry goals and accomplishments and voice common concerns to Congress, all relevant federal agencies, the news media, and the American public.

AIA coordinates the efforts of more than 40 councils and committees, charged with studying and determining the best solutions to industry-wide problems. Senior executives from member companies serve on the councils and committees, sharing vast aerospace, aviation, and defense expertise from across the industry. Conclusions from the councils and committees are reported to AIA's president, who in turn may act on the recommendations, authorize action, transmit the recommendations to the Board of Governors, or refer them back to the council or committee for further study. In some cases, AIA also coordinates its efforts with other trade and professional organizations working on problems of mutual interest.

By taking the lead on key aerospace issues for the past 75 years, AIA has become an institution in the aerospace community, earning the right to be called *the premier trade association for aerospace industry leaders*. A leader among leaders.



"There are a lot of things that affect our companies that would take so much time for us to deal with individually that it's only through the combined efforts of AIA that we can afford to take them on," Norman R. Augustine, Chairman and Chief Executive Officer, Martin Marietta Corporation.



AIA's professional staff assists and supports its members by monitoring administrative and technical developments and relaying that information through regular and special meetings, workshops, seminars, reports, and publications. In addition, every year AIA identifies the aerospace industry's top 10 issues of importance, which encompass the broad objectives of the Board of Governors. Following are the top 10 issues for 1994, which are not arranged in any order of priority.

Nationalization of the Aerospace Industry

The lack of a clear defense industrial base policy is leading to the de facto nationalization of the high-tech aerospace industrial base. Government reliance on unbridled public/private competition for depot maintenance, on an uneven playing field, is resulting in the loss of full-service, private sector capabilities essential to a healthy base.

Economic Stability

The aerospace industry currently is undergoing a structural change, and it is important to the vitality of the industry, the economy, and our national security in the year 2000, that the process of change be supported by federal policies that create some measure of stability. In this critical period, government policies should foster investment, the blending of defense and commercial technologies, exports, diversification into new markets, and greater program certainty than now exists.

International Competitiveness

To maintain U.S. preeminence in a period of increased competition and consolidation in the global aerospace marketplace, we must promote U.S. aerospace products worldwide, pursue more equitable rules for fair trade, assure export financing, and minimize existing impediments to exports.

Health of the Air Transport System

The recommendations of the National Commission to Ensure a Strong and Competitive Airline Industry address areas that can have positive effects on the financially ailing civil aviation industry. These recommendations must be supported by industry and government.

Acquisition Reform

It is time for cultural change in government acquisition. As the defense budget shrinks, all non-value-added costs must be eliminated to ensure that scarce resources are not wasted and to ensure the future viability of the national technology and industrial base.



Sandra Carney-Talley, Assistant Vice President, Policy and Planning, AIA

Maintain the Industrial Base

A key concern during defense downsizing is ensuring an adequate industrial base to protect national security interests. Both industry and government must give continued attention to numerous, related building blocks which are part of a healthy, responsive industry.

Small Disadvantaged Businesses

The aerospace industry is playing a spearhead role in making Small Disadvantaged Businesses (SDB) an integral part of the industrial base by continuing increases in SDB subcontract awards to meet goals set by DoD and NASA.

Safety, Health, and the Environment

Finding low- or non-polluting materials and processes that meet stringent environmental regulations, while meeting product performance and safe worker requirements is a major challenge to the aerospace industry. Also, the costs of environmental remediation are necessary business costs.

Space Policy

Industry supports government investment to assure access to space for a balanced human and robotics space program, encourages space initiatives that yield rapid, less costly results, and promotes dual-use space technologies to encourage U.S. commercial development.

Government Regulatory Reform

The present government regulations need to be zero-based, rewritten, and maintained by a single council acting on behalf of all government agencies. The goals of rewriting must include shortening and simplifying, providing rationale for policy statements, clarity, flexibility for the user, and controls to limit growth.



AIA's Administrative Office guides and manages the association's daily business operations and activities of all program areas, and keeps member companies apprised of key membership issues.

The association's general administrative functions include financial management and accounting, personnel management, data information systems, purchasing, mail operations, telecommunications, industrial security, and office management. These operations are administered on a day-to-day basis by an 11-member staff.

In conjunction with the Office of Planning and Policy, the Administrative Office assists with preparing the program agenda, complete with background material, for the semiannual Board of Governors meetings and two membership meetings.

AIA's general counsel consults with the Administrative staff to review and revise the association's bylaws. The staff is responsible for incorporating any changes approved by the Board of Governors, and communicating those changes to the membership.

Another important function of the Administrative staff is industrial security. Under its contract with the Air Force, AIA provides various statistical analyses and reports relating to security. In addition, the Administrative Office conducts staff briefings on clearance procedures, and conducts periodic reviews, briefings, and debriefings when staff members travel to various sites and countries.

The Administrative Office staff serves as liaison to two standing Board committees: Finance and Nominating. The staff meets with the Finance Committee to review AIA's investments, budget, and other financial matters. With regard to the Nominating Committee, the staff is responsible for informing committee members of their responsibilities, developing criteria for selecting nominees to the Executive Board, and answering questions about the selection process. The staff prepares reports for both committees and communicates the results to AIA's members. The staff is also responsible for processing membership applications, and expediting the appointments of new member representatives to AIA's councils and committees.



George F. Copsey, Secretary-Treasurer, AIA



"Participation in AIA forums is really important in terms of keeping up with people in the industry and the issues. I really don't know how nonmembers keep up to date on what the real issues are and what we as an industry are doing about them if they're not a member of AIA," Harry C. Stonecipher, President and Chief Executive Officer, McDonnell Douglas Corporation.

AIJA's Aerospace Research Center researches, provides analyses, and prepares studies to bring perspective and a better understanding to the issues, problems, and policies of the aerospace industry.

After the Cold War

In September, the Research Center published Part 2 of a three-part report, *After the Cold War: The U.S. Aerospace Industry in the International Marketplace*. The report examined the aerospace industries and markets in Europe, the Commonwealth of Independent States, and the Asia-Pacific Rim. Part 3, expected in early 1995, will discuss U.S. policies that affect industry competitiveness.

Aerospace and the Environment

An intensive search is underway in aerospace companies for "environmentally friendly" materials and processes. A report on how this effort is proceeding was published in the form of several articles in a special environmental issue of the October 1994 *AIA Newsletter*. AIA believes regulators should adopt a more integrated, "holistic" approach than is currently being used to foster innovative technical solutions to environmental problems and requirements.

Facts & Perspective

Research Center staff published reports and analyses in a *Facts & Perspective* supplement to the *AIA Newsletter*. In November, a report on world defense trade showed the decline in world arms deliveries has been so dramatic that U.S. market share has risen. However, the absolute level of U.S. arms sales will be little changed during the next few years. New arms agreements call for deliveries to be spread out over a number of years.

Also in November, staff reviewed the aerospace industry's performance at mid-year. Through the first six months of 1994, sales and physical output declined compared to the same period in 1993. In contrast, industry orders increased relative to the first six months of 1993, thanks to foreign customers.

Depot Maintenance

Staff economist David Vadas worked full time for several months with the Industry Depot Task Force Support Group. At the request of the Defense Science Board's Depot Maintenance Task Force, the industry team examined the public/private allocation of maintenance and repair work at military service depots.



Virginia C. Lopez, Executive Director,
Aerospace Research Center, AIA

Year-End Review and Forecast

In December, AIA released the Research Center's *Year-End Review and Forecast*. Research Center staff estimated 1994 and 1995 sales, employment, and other key indicators of industry activity. Aerospace sales declined from \$124 billion in 1993 to \$113 billion in 1994. Sales of \$109 billion are projected for 1995. A work force of 907,000 shrank to 836,000 in 1994 and is expected to decrease to 802,000 in 1995.

Industry Update

Research Center staff contributed an "Industry Update" to *Aerospace America*, the magazine of the American Institute of Aeronautics and Astronautics. This year's articles discussed current and projected aerospace business activity, the international marketplace, and world defense trade.

Aerospace Facts & Figures

AIA's statistical yearbook, *Aerospace Facts & Figures*, published in December, included 140 tables showing trends in the industry. Sales of *Facts & Figures* and other Research Center publications are handled by Research Center staff.

Employment Survey

In March, the annual AIA Aerospace Industry Employment Survey was released. It provided employment estimates for 1993 and forecasts for 1994. AIA projected 1994 industry employment would decline, with fewer jobs in all product sectors.

Statistical and Information Services

Research Center staff work to improve the quality of industry data. Through the National Association of Manufacturers, the staff joined a task force to discuss data issues with the Bureau of the Census. The bureau conducts industry surveys, including one on the aircraft industry, which AIA partially funds.

In 1994, the staff disseminated 22 statistical series to those who follow industry trends. They prepared quarterly *Aerospace Indicators* summaries for the *AIA Newsletter* and responded to data inquiries—about 250 phone calls per month.

Space Economic and Business Indicators

In November, the Research Center and The George Washington University's Space Policy Institute hosted a workshop on the need for improved space economic and business indicators. Industry, government, and academia participants explored options for developing a useful and comprehensive statistical report of the space sector. Government publications that report and analyze space business trends are no longer published.

Special Projects and Analyses

Research Center staff assisted other AIA departments by developing a presentation on world arms trade trends, and maintaining a matrix on export restrictions by country. They prepared a presentation on the industry outlook for a *Fortune* magazine editors' symposium, as well as one presented in conjunction with the release of a report on aerospace and the airline industry by the National Center for Policy.

Surveys

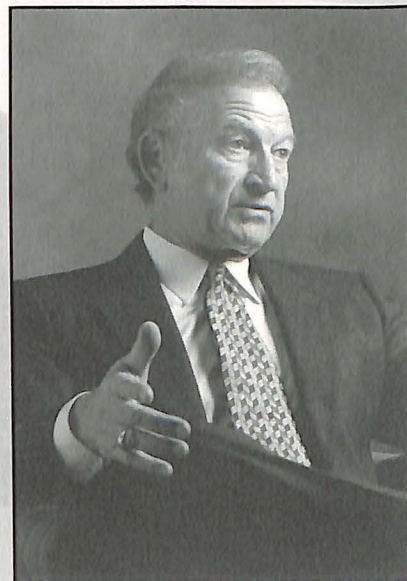
AIA councils and committees use surveys to obtain data that will help them shape positions on various issues. Research staff supported the Procurement and Finance Council's regular assessment of contractor progress payments, and implemented a new database program for the survey. Other surveys dealt with computation of the R&D credit for commercial and defense business; Department of Defense (DoD)-directed "Foreign Military Sales Only" export transactions; information technology expenses; the effectiveness of the current progress payment system; resources required to manage government property versus contractor-owned property; and the impact of eliminating "M" accounts as a funding source for DoD contracts.

Library

The AIA Library, part of the Research Center, maintains the association's records. The Librarian orders and files reference materials, including periodicals, books, and reports for AIA staff. The Library serves as an important information resource for industry analysts and scholars.



AIA brings together top industry executives, such as Westinghouse's Richard Linder (left), Harris' Phillip Farmer (center), and Northrop Grumman's Kent Kresa, to address key issues of mutual concern.



"The power of AIA is that it takes on issues collectively and makes the message very clear for the respondent to understand that this is what we really believe. The annual dues are minuscule compared to the leverage and effectiveness of AIA as an organization," Sam F. Iacobellis, Executive Vice President and Deputy Chairman for Major Programs, Rockwell International Corporation.



Civil Aviation

AIA's Civil Aviation Council works with domestic and international agencies, Congress, and others in the aviation community concerning the design, manufacture, and operation of rotorcraft, fixed-wing aircraft, engines, and systems.

In 1994, the Civil Aviation Council instituted a new management program to improve operational efficiency and raise the quality of the products of the working groups established under the authority of the council. In addition, the council recognized the need for a forum to address issues related to the development of the air traffic system of the future, and approved the charter for a Communication, Navigation, Surveillance/Air Traffic Management Committee. This committee will present AIA's views to the Federal Aviation Administration (FAA) and the International Civil Aviation Organization (ICAO).

National Institute for Aerospace Studies and Services

The National Institute for Aerospace Studies and Services (NIASS) is a nonprofit corporation created by AIA to perform aerospace-related projects and services in a wide variety of specialized areas, including engineering and scientific research. NIASS works with government and nongovernment organizations and provides a vehicle for AIA members to combine their expertise and be compensated for conducting studies and research to solve noncompetitive aerospace problems. In 1994, NIASS continued work under a series of FAA grants to study the effects of internal explosion on wide body aircraft structures. As a result of NIASS performance on this program, NIASS and the FAA initiated discussions on other possible research programs in aircraft fire safety, aging commuter aircraft, and high-altitude engine performance.

Federal Aviation Regulations and European Joint Airworthiness Requirements

In 1994, AIA, the FAA, the European Joint Aviation Authorities (JAA), and other industry organizations continued efforts to harmonize Federal Aviation Regulations (FAR) with European Joint Airworthiness Requirements (JAR). The first glimmers of success occurred with the adoption of the first rule changes for certifying transport category airplanes, and proposed rules for certifying rotorcraft and general aviation aircraft. AIA raised concern over the possibility that industry would lose its ability to participate with the FAA and JAA in joint management of the harmonization program, and continued to work this issue through 1994.

Robert E. Robeson, Vice President,
Civil Aviation, AIA



Robert A. Davis, The Boeing
Company, Chairman, Civil
Aviation Council



Norris Haight, McDonnell Douglas
Corporation, Chairman, Airplane
Noise Control Committee



Jim Phillips, McDonnell Douglas
Corporation, Chairman, Commercial
Customer Support Committee



JAR-21, Subpart N: Imported Products

JAR-21 establishes the overall framework for European aircraft certification activities, including issuance and acceptance of type certificates and production certificates. In July, AIA and other industry associations met with officials from the FAA, JAA, and Transport Canada to discuss JAR-21, Subpart N, which deals with acceptance of imported products in JAA member countries. Industry expressed concern about the potential adverse impact of Subpart N as written. The JAA representative accepted many of industry's concerns, and agreed to produce a revision for further consideration by AIA and other interested organizations.



Airplane Noise Control Committee

The Airplane Noise Control Committee (ANCC) initiated a major effort in the Aviation Rulemaking Advisory Committee (ARAC) to harmonize aircraft noise certification requirements. The ANCC is represented on the ARAC working group that was established to harmonize FAR-36 with JAR-36 and existing ICAO requirements. In 1994, the ANCC also addressed international efforts to increase the stringency of noise certification requirements. These efforts could dramatically affect the health of the airlines, which are already hard pressed to meet the Stage 2 phase-out deadline at the end of the decade. The ANCC, in conjunction with other members of the International Coordinating Council of Aerospace Industries Associations, developed studies that failed to validate an environmental benefit of increased stringency of noise standards, showing that forced increases in stringency based on existing technology would result in significant adverse economic fuel burn impact. These studies were submitted to the ICAO Committee on Aviation Environmental Protection.

Commercial Customer Support Committee

The Commercial Customer Support Committee focused on strengthening relations with operator associations, noncompetitive issues concerning the development of after-market product support systems, and regulations affecting product support. Non-competitive issues addressed by the committee included training; parts support; modernization and harmonization of regulations; cost management; specification development/implementation; materials management; and ensuring that manufacturers' activities have a positive impact for the customer.

Industry and Regulatory Affairs Committee

The Committee on Industry and Regulatory Affairs focused on the implementing legislation for the Uruguay Round of Trade Negotiations and the continuing negotiations on the Aircraft Agreement of the General Agreement on Tariffs and Trade (GATT). The committee worked to have language included in the Uruguay Round's implementing legislation which would preserve the gains won by industry in intense negotiations in December 1993. The committee also provided advice to the government throughout 1994 to ensure that the negotiations on the Aircraft Agreement would not result in an agreement that adversely affects the interests of AIA members.

Manufacturing, Maintenance, and Repair Committee

The Manufacturing, Maintenance, and Repair Committee continued to focus on certification procedures for production and for maintenance, rebuilding, alteration, and repair. An AIA-led

initiative (FAA Order 8110.XXX) reached industry-wide consensus within six months on a more strict interpretation of data necessary for the FAA to grant parts manufacturer approvals. The committee also played a leading role in developing a voluntary distributor accreditation program, Advisory Circular 20-DU. The committee continued to work on issues involving parts documentation, organizational (company) responsibility for training and managing FAA airworthiness designees, and bringing manufacturer maintenance facilities under FAR-145 rules, a FAR/JAR harmonization issue.

Susan Walsh, Pratt & Whitney,
Chairwoman, Committee on Industry
and Regulatory Affairs



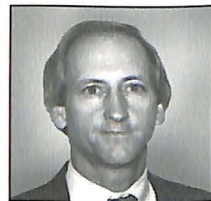
Peter Gallimore, The Boeing
Company, Chairman,
Manufacturing, Maintenance,
and Repair Committee



Jim Nolan, Pratt & Whitney,
Chairman, Propulsion Committee



Larry Plaster, McDonnell Douglas
Corporation, Chairman,
Rotorcraft Committee



Ed Kupcis, The Boeing Company,
Chairman, Transport Committee





Civil Aviation Continued

Propulsion Committee

The Propulsion Committee focused on regulatory harmonization in 1994. Two rules, vibration and windmilling, were submitted to the ARAC for formal publication. Another harmonized rule, fire precautions, was submitted to the FAA for economic and legal review. Substantial progress was also made on issues relating to rotor integrity, bird ingestion, and inclement weather. The committee also worked with other associations and AIA committees on the California Federal Implementation Plan for the Clean Air Act. Additional issues worked by the committee included auxiliary power unit certification, in-flight restart capability, FAA conformity inspection, and military specifications.

Rotorcraft Committee

The Rotorcraft Committee participated in several FAR/JAR harmonization activities. The final meeting of the Flight Issues Subgroup resulted in a recommendation to establish an ARAC project to incorporate proposed rule changes regarding performance and handling qualities. The committee also addressed JAA internal certification procedures for rotorcraft, and, as a result, the JAA agreed to provide both industry and the FAA with the draft procedures for review. In addition, the committee participated in ARAC projects on occupant restraint and external loads. On JAR-OPS-3, the committee continued its effort to eliminate prohibitions against certain operations for Performance Class 2 and 3 rotorcraft.

Transport Committee

The Transport Committee's activities centered on harmonization and the ARAC. The Flight Test Working Group completed the first four transport airplane harmonization items, and accepted two new harmonization items for work: flight deck gates for high-lift devices, and airplane performance and handling in icing conditions. At AIA's urging, the FAA accepted a project on "all weather operations," which concerns issues such as the application of Global Positioning by Satellite and Head-up Display. A Certification Maintenance Requirements Working Group examined ways to increase flexibility in the use of specific maintenance items that are established as required tasks as a condition of certification of an aircraft. The committee also continued work on delegation options and organizational delegations. The International Certification Procedures Task Force submitted a rule-making package to the FAA and JAA which would establish decision rules for application of later regulatory amendments to derivative type designs. Industry began using AIA/FAA-developed "Criteria for Assessing Transport Turbojet Fleet Thrust Reverser System Safety," issued by the FAA in June. Research

activity on the effect of reverser efflux on aircraft stability continued under the FAA's Research Engineering and Development Subcommittee on Aircraft Safety. As a result of sudden congressional interest in cabin air quality, AIA and the Air Transport Association formed a task force to present a common position.



AIA President Don Fuqua (center), shown here with Westinghouse's Richard Linder (right) and Martin Marietta's Norman Augustine, meets regularly with top aerospace leaders to develop solutions to common problems.



"AIA is unique because it's the only organization that really represents a cross-section of businesses within our industry. It's the only one among all organizations that has a broad cross-section of our members," David L. Burner, President, Aerospace Division, The BFGoodrich Company.



AIA's Communications Council supports the activities of the association's president and staff, and conveys industry goals, accomplishments, and concerns to AIA members, the news media, and the public.

AIA President Don Fuqua continued to serve as the lead spokesman for the aerospace industry. In 1994, Fuqua delivered 20 major speeches and participated in 31 news media interviews. Fuqua addressed breaking issues and added perspective to trends in the industry, such as restructuring, sales and employment, and international issues.

In early May, AIA and the American Institute of Aeronautics and Astronautics (AIAA) co-sponsored Global Air & Space '94, a gathering of 1,600 government and industry leaders from the United States and abroad, who addressed the theme *Challenges of Global Competition and Cooperation in Commercial Aviation, Space, and Defense*. Fuqua moderated three panels on defense export policy, the space budget, and procurement. Participants included Secretary of Commerce Ronald H. Brown, Secretary of Defense William J. Perry, NASA Administrator Daniel S. Goldin, Federal Aviation Administration (FAA) Administrator David R. Hinson, European Union Ambassador to the U.S. European Delegation Andreas van Agt, and National Space Development Agency of Japan President Masato Yamano.

At the 30th Annual Year-End Aerospace Review and Forecast Luncheon on December 14, Fuqua delivered the state of the industry address. It was attended by 294 people, including 136 from the news media, 26 government public affairs officers, 83 industry representatives, and 49 representatives from AIA and other aerospace-related organizations.

AIA's 75th Anniversary

AIA celebrated its 75th anniversary on September 30, 1994. AIA's Office of Communications initiated projects and activities throughout the year to highlight the association and the industry's "75 years of success." AIA held its 75th anniversary celebration on May 3, at the National Air and Space Museum. Nearly 700 guests from AIA member companies, Congress, federal agencies, the media, and AIA attended the event.

Another anniversary activity included a series of historical articles, written by well-known aerospace, aviation, and defense

Herbert E. Hetu, Vice President,
Communications, AIA



Tommy L. Wilson, Loral Vought
Systems Corporation, Chairman,
Communications Council



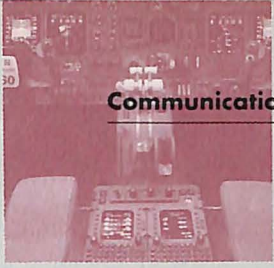
experts and featured in each issue of the *AIA Newsletter*. Each issue also included a chronology of industry achievements and a quote from the past. In December, AIA published the entire year's collection of historical articles, achievements, and quotes in a commemorative booklet.

Media Relations

AIA's Office of Communications is an important information source for the aerospace industry. News media interests in 1994 focused on consolidation of the aerospace industry, foreign arms transfers, and international and trade issues. In 1994, the Office of Communications distributed 39 news releases and 8 statements in support of the association's activities.

AIA issued nine news releases on Aerospace Research Center statistics and reports, including *After the Cold War: The U.S. Aerospace Industry in the International Marketplace*. Two of Fuqua's "Washington Pipeline" columns from the *AIA Newsletter* were distributed as news releases, supporting the extension of China's Most-Favored-Nation status and urging a renewed commitment to space exploration. AIA also released a letter from Fuqua to U.S. Ambassador Kantor concerning the industry's position on aircraft subsidies. The release generated considerable news media attention and provided a good opportunity to reassert AIA's interest in this issue and to discuss our position.

Broadcast media coverage of AIA issues included a "60 Minutes" segment on foreign arms transfers, in which Joel Johnson, AIA vice president, international, appeared in an interview with Ed Bradley. In 1994, the Office of Communications responded to 760



inquiries from the news media, arranged 206 staff interviews, and logged 520 news articles about the association and its activities. AIA continued to host quarterly breakfasts with the news media, which, since 1987, total 37 breakfasts with 168 reporters.

Member Relations

The Office of Communications continued to facilitate activities of the Communications Council and serve as an information source for industry public relations executives. In January, the third edition of the *AIA Directory of Member Company Public Information Representatives* was published and distributed to more than 1,700 people.

For the spring Communications Council meeting in Washington, D.C., the theme was "75 years of success." Discussions focused on working with the Clinton Administration, depot maintenance, environmental issues, emerging technology in electronic news, and the impact of mergers and acquisitions on the industry.

The fall Communications Council meeting was held in Fort Worth, Texas. Members discussed the status of the space station, media treatment of foreign defense sales, and communications strategies used for mergers and acquisitions. Council members also toured several aerospace facilities in the Fort Worth area. These included Lockheed's F-16 manufacturing facility, Bell Helicopter Textron's manufacturing facility, the FAA's Air Route Traffic Control Center, and the American Airlines Flight Academy.

In June, the Communications Council formed the GATT Task Group to develop a strategy to communicate the U.S. aerospace position to the media.

The Washington public relations representatives continued to meet on a monthly basis. In March, members met with Sandra Allen, deputy assistant administrator for FAA public affairs. Six months later, AIA and the Electronic Industries Association (EIA) co-hosted a breakfast featuring guest speaker Colonel Ronald T. Sconyers, USAF, director, Office of the Secretary of the Air Force/Public Affairs. The following month, AIA hosted guest speaker Laurie Boeder, associate administrator for NASA public affairs.

In November, the communications staff updated and redesigned the *AIA Washington Aerospace Media and Public Affairs Directory*. This directory was distributed to member company public affairs representatives.

Editorial Products

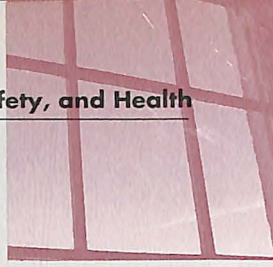
In its seventh year of publication, the *AIA Newsletter* continued to support the association and its members by reporting on issues of importance to industry, the news media, and the public. The *Newsletter* is published 10 times yearly and has more than 6,000 readers from industry, government, academia, the news media, Congress, and the financial community. AIA revamped the *Newsletter* distribution process, reducing the number of copies printed from 15,000 to 6,000, which, in 1995, will result in an overall cost savings of about \$21,000. The *Newsletter* was also redesigned in December to enhance readability and include a new feature that highlights the industry's top 10 issues of importance for 1995.

The 1993 Annual Report highlighted AIA's "75 years of success." The diamond anniversary provided an opportunity to reflect on aviation, aerospace, and defense achievements of the past, as well as to feature technological achievements of the present.

During the year, the communications staff continued to support other AIA departments by fulfilling a wide range of publishing and production needs using its desktop publishing system. Some of the types of services provided include editing, graphic design, and production services for brochures, reports, presentations, and studies.



AIA President Don Fuqua and AIA Communications Vice President Herb Hetu prepare for an interview with the Dow-Jones Investor Network. In 1994, AIA staff participated in more than 200 media interviews.



AIA's Environmental, Safety, and Health (ES&H) Committee is concerned with environmental and occupational safety and health issues affecting the aerospace industry. The ES&H Committee bears primary responsibility for coordinating AIA efforts relating to environment, safety, and health issues.

In January 1994, AIA's Occupational Safety and Health Committee merged with the Environmental Affairs Committee to form the ES&H Committee. The top two issues for the committee in 1994 included developing air regulations for the industry's Aerospace National Emission Standard for Hazardous Air Pollutants (NESHAP) and the Aerospace Control Techniques Guideline (CTG), and addressing the impact of environmental issues on Department of Defense (DoD) contracts.

Air Regulations

In June, after working for the last two years with an AIA Clean Air Task Group and other aerospace industry representatives, the Environmental Protection Agency (EPA) proposed the Aerospace NESHAP. The task group provided testimony at a public hearing in August. The task group continues to work with the EPA, DoD, NASA, the airlines, suppliers, and other aerospace organizations to develop efficient and workable air regulations that are due to be finalized in 1995.

DoD Contracting

AIA's Intercouncil Task Group worked with DoD to find appropriate methods for addressing new environmental concerns relating to DoD contracting. In cooperation with the military services, the task group developed a hazardous materials management program, known as National Aerospace Standard (NAS) 411, for use in contracting. The group currently oversees the implementation of NAS 411 and addresses other concerns such as proposed DoD audits of contractors' environmental performance.

Halon Replacement

The Federal Aviation Administration (FAA) and the U.S. Air Force are leading the effort to find a replacement for halons, the chief firefighting chemicals used in aviation. AIA's ES&H Committee and Civil Aviation Council monitor this research effort and continue to provide technical advice.

California Federal Implementation Plan

An ad hoc AIA Federal Implementation Plan (FIP) Task Group assisted the Air Transport Association (ATA) in its efforts to

G. Glynn Rountree, Director,
Environmental, Safety, and Health, AIA



Joseph H. Copeland, McDonnell
Douglas Corporation, Chairman,
Environmental, Safety, and
Health Committee



comment on the plan. AIA provided ATA with technical and economic data that relates to the potential effect of retrofitting the fleet to meet the FIP mandate of lower emissions from operating aircraft. AIA also provided the EPA with comments on whether stationary source emission reduction targets are appropriate for use with the aircraft strategy under the FIP.

Aircraft Engine Test Cells

During 1994, an AIA Aircraft Engine Test Cell Task Group worked with DoD and the airlines to assist the EPA in its study of aircraft engine test cells. The study, delivered to Congress in September, examined existing technologies to see if nitrogen oxide emissions from aircraft engine test cells could be reduced. No existing technologies were identified as appropriate for use on test cells.

Conferences and Workshops

AIA actively participated in a number of environmental conferences during 1994. Conference topics included the role of the military in protecting the ozone layer; nonozone depleting chemical cleaning and lubrication of space systems mechanical components for multiyear operations; hazardous materials management; and environmental, safety, and health considerations in the use of composite materials in the aerospace industry.



AIA's Human Resources Council addresses labor and employee relations, industrial security, and employee compensation issues as they relate to the aerospace industry.

Labor Management Relations

The Human Resources Council is concerned with the recent findings of the Commission on the Future of Worker-Management Relations to justify re-doing U.S. labor/management relations. Changes within organized labor are requiring a new look at the future of labor/management relations.

Work Force Administration and Diversity

Downsizing and consolidations within the industry require communicating to employees on actions that adversely affect them. This is essential to maintaining work force loyalty during layoffs.

Americans with Disabilities Act

Discrimination charges filed under the Americans with Disabilities Act rose 27.1 percent (13,651 charges) over last year's third quarter. These figures will impact industry's ability to treat all employees fairly.

Skill Education and Training

The Department of Labor's position that training and retraining are essential to solving unemployment and under-employment resulted in some members utilizing federal defense conversion funds to finance out-placement and retraining of laid-off employees.

Equal Employment Opportunity/Affirmative Action

Instead of creating a separate committee, the Human Resources Council joined with the Aerospace Corporate Compliance Council which offers a forum on equal employment opportunity/affirmative action issues.

Compensation Practices Committee

Managing Compensation Costs: Downsizing, consolidations, and mergers require integrating different corporate pay and benefits plans, developing single compensation philosophies from many, and communicating changes to established pay/benefit programs to customers, unions, the general public, and the community. Some nontraditional compensation concepts for managing labor costs include "spot" bonuses, lump-sum payments, and broadbanding, all of which accommodate a more diverse and mobile work force.

Daniel J. Nauer, Vice President,
Human Resources, AIA



Larry G. McKean, The Boeing Company,
Chairman, Human Resources Council



Brenda H. Moye, Harris Corporation,
Chairwoman, Compensation
Practices Committee



Michael S. Nicholson, Westinghouse
Electric Corporation, Chairman, Industrial
Security Committee

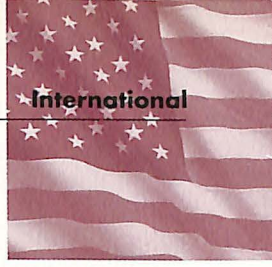


Executive Compensation: The Compensation Practices Committee is working on the "fairness" issue with the Defense Contract Audit Agency (DCAA), the impact of Financial Accounting Standards Board changes on long-term incentives, increased interest in executive pay by the Securities and Exchange Commission, and the impact of the Omnibus Budget Reconciliation Act on executive pay and benefits.

Summit Survey: For six years, this survey has compared the executive compensation of defense contractors and high-tech commercial companies. DCAA accepts AIA's data as valid and impartial.

Industrial Security Committee

The National Industrial Security Program (NISP) received substantial support from the Joint Security Commission, which issued a report that endorsed the NISP and employed many of its concepts.



AIA's International Council encourages government policies that assist AIA member companies to compete and, where appropriate, to cooperate in the international marketplace.

With the declining defense budget and continued financial problems for U.S. airlines, exports continued to increase in 1994 as a percentage of total aerospace production, likely surpassing one-third for the first time.

Defense Trade Committee

AIA continued to encourage the Clinton Administration to adopt a formal conventional arms transfer policy that recognizes the importance of an affirmative export policy to the defense industrial base. At year's end there were strong indications that such a policy would be adopted. AIA was particularly pleased that Congress passed an amendment to the Export-Import Bank Charter allowing the bank to provide guarantees and credits for exports of nonlethal, dual-use equipment that primarily will be used for commercial purposes. AIA testified in favor of the amendment, and worked with the Administration in drafting guidelines to implement the new measure.

AIA was disappointed that no progress was made on two critical issues—the establishment of an export finance facility for purely defense exports, and the repeal of the legal requirement for collecting recoupment charges on major defense equipment sold through government-to-government channels. AIA intends to work with the new Congress to see if these issues can be revisited.

With respect to offsets, Congress adopted an amendment that prohibits "third-party incentive payments" as a means of implementing offset requirements. AIA helped to mitigate the worst aspects of the amendment, and at year's end was working with the Administration to draft narrowly focused regulations to implement the amendment. AIA also succeeded in convincing the Department of Defense (DoD) to eliminate a requirement that customers must be formally notified that administrative costs associated with offsets may be part of the contract price in government-to-government sales.

Commercial Trade Committee

Given that China has become a huge actual and potential market for U.S. aerospace products, a major challenge for AIA was to convince the Administration to permanently extend Most-Favored-Nation (MFN) trading status to China. With strong personal

Joel L. Johnson, Vice President,
International, AIA



Willard Mitchell, Teledyne, Inc.,
Chairman, International Council



David Rogers, AlliedSignal Aerospace,
Vice Chairman, International Council



James Nelson, Martin Marietta
Corporation, Chairman, Defense
Trade Committee



involvement from the senior executives of several AIA member companies, and in concert with other trade associations, AIA ultimately was successful in persuading the Administration and Congress to drop the attempt to use trade as leverage on non-economic issues in the U.S.-China relationship.

The Commercial Trade Committee also worked with the Civil Aviation Council and the Legislative Affairs Office to assure that continued negotiations concerning the bilateral aircraft agreement would not involve expansion of the agreement to other sectors of the industry, nor restrict coverage of the new subsidies code to the aerospace industry. AIA efforts were successful, and language affirming the industry position was included in the legislation approving the Uruguay Round.

Export Controls Committee

The Export Controls Committee worked closely with an industry-wide coalition to press for a redrafted Export Administration Act (EAA) that would address several issues of importance to the aerospace industry. These included a more streamlined commodity jurisdiction process, a clear definition of defense articles, and language assuring that civilian aircraft be treated as commercial items during their development stage. In the end, jurisdictional gridlock on the Hill doomed the effort, which will be revisited in 1995.

The committee completed work on a draft Customs Guidebook to implement the new International Traffic in Arms Regulations, previously published in 1993, as well as a Country Matrix that catalogs the U.S. export controls with respect to every country in the world. These efforts are intended to help both government and company personnel keep up with changing export control regulations.


Legislative Committee

The Legislative Committee carried industry's views to Congress on such issues as China MFN, the EAA, the need for a defense export finance facility, and the importance of repealing R&D recoupment. Successes included defeating attempts to reverse the Administration's position on China MFN, and the passage of the dual-use amendment to the Export-Import Bank Charter.


International Exhibitions

In 1993, DoD, for the first time, formally "participated" in two international air shows—Singapore and Farnborough. DoD and the military services worked closely with AIA in identifying military equipment to bring to the show. AIA sponsored an operations center at both shows for use by DoD, and covered costs associated with housing and transporting air crews and security personnel associated with the aircraft. The close DoD-AIA cooperation allowed the government to demonstrate its continued commitment to Southeast Asia and Europe, while at the same time showcasing U.S. military equipment at a reasonable cost.


The International Council continued to press European show management to reduce the costs of air shows, and was pleased that Farnborough cut a day off its length and Paris eliminated two days from its show in 1995. At year's end the council, under the umbrella of its Export Trade Certificate of Review, prepared an options paper for the AIA Board of Governors as to future steps AIA might take to encourage further rationalization of European air shows and to reduce industry costs involved in show participation.



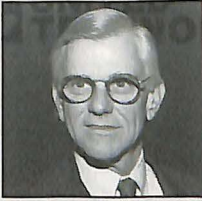
Richard Ridge, General Electric Company,
Chairman, Commercial Trade Committee



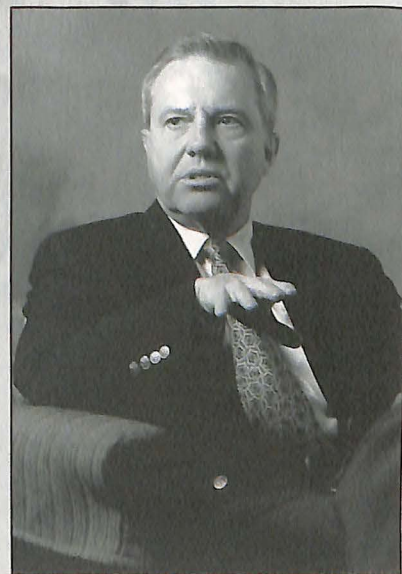
Darla Bonney, Textron Inc.,
Chairwoman, Export
Controls Committee



Richard Milburn, Northrop Grumman
Corporation, Chairman, Export Trade
Certificate Committee



Wade Robert, United Technologies
Corporation, Chairman,
Legislative Committee



"If you want to get involved, then you ought to think about AIA," James F. Hardymon, Chairman and Chief Executive Officer, Textron Inc.



AIA's Legislative Affairs Office monitors important policy matters that affect the aerospace industry, and prepares testimony that clearly and effectively communicates industry's viewpoint to Congress.

Federal Acquisition Streamlining Act of 1994

Incorporating better business practices into the federal purchasing system was a major effort undertaken by the Administration, Congress, and industry. Under the direction of Senator Jeff Bingaman (D-NM), Congress established a review panel to determine the efficiency and cost of the current procurement process, and change the way the Department of Defense (DoD) and other government agencies procure products and services. Known as the Section 800 Panel, this review effort comprised procurement experts, including AIA's LeRoy Haugh, vice president, procurement and finance.

In concert with this effort, Vice President Gore released his proposals for reform through the National Performance Review. With the strong support of the executive and legislative branches, procurement reform legislation was introduced in the fall of 1993 to streamline U.S. government acquisition by simultaneously implementing the recommendations of the Vice President and the Section 800 Panel.

AIA Executive Board Members Norman Augustine, chairman and chief executive officer, Martin Marietta Corporation, and Sam Iacobellis, executive vice president and deputy chairman for major programs, Rockwell International Corporation, appeared before Congress to support this effort, stress the importance of consistent, multiyear budgeting, and identify current impediments to government commercial product purchasing. After undergoing the review and approval of more than six congressional committees with jurisdiction, the final bill of the Federal Acquisition Streamlining Act of 1994 was passed by Congress on August 21, 1994, and signed by the President on October 13, 1994.

Legislation from this bill provides current government customers with the opportunity to provide products and services in a more timely and efficient manner, and represents the most voluminous procurement measure passed by Congress since 1947.

Depot Maintenance Policy

Continued emphasis was placed on the need to reduce the Cold War infrastructure that is currently in place to support a major military

contingency. After conclusion of the Defense Science Board study created by Congress, recommendations were released in support of defining those unique "core" capabilities that should be competed by the public sector and other activities to be competed by the private sector to ensure a flexible, ready, mobile military. Members of the study included government and private sector representatives.

Congressional reaction to the final report was negative. Members of the House included legislation in the fiscal year 1995 DoD Authorization Bill to protect depot facilities in their districts from closure during the next Base Realignment and Closure Commission review in 1995. AIA President Don Fuqua testified before the House Subcommittee on Readiness to present the position of the Industry Depot Maintenance Coalition, which included the participation of nine associations. AIA members garnered Senate support in opposition to the House bill which included restrictive provisions that were either amended or deleted in the final language of the DoD Authorization Bill for fiscal year 1995.

Trade

The second session of the 103rd Congress was good for the expansion of U.S. trade. In August 1994, the House overwhelmingly defeated efforts to overturn or significantly alter the President's decision to extend Most-Favored-Nation trading status to China. During a lame duck session following the November elections, Congress also approved the implementing legislation for the General Agreement on Tariffs and Trade, or GATT. AIA was successful in having language included in the implementing bill concerning aerospace manufacturers. Funding for the Export-Import Bank remained strong and the bank's charter was expanded to allow for loans for the export of dual-use items.

Unfortunately, Congress was unable to agree on the reform of the Export Administration Act (EAA), a bill that would ease export license restrictions of dual-use items. It also failed to pass legislation that would have eliminated R&D recoupment fees on Foreign Military Sales.



Thomas N. Tate, Vice President,
Legislative Affairs, AIA



Civil Aviation

In August 1994, President Clinton signed into law a bill that provides relief to the ailing general aviation industry. Public Law 103-298 establishes an 18-year Statute of Repose granting immunity from civil suits stemming from accidents for noncommercial aircraft that carry fewer than 20 passengers. AIA assisted its members and the General Aviation Manufacturers Association in an effort to obtain an extraordinary number of cosponsors in both the House and Senate, which ultimately aided in passage of this measure.

Environment and Safety

Progress on several key environmental measures was stalled due to a controversial provision requiring risk analysis prior to the adoption of new regulations. This issue was a factor in the consideration of the bill to elevate the EPA to a cabinet-level department, the Safe Drinking Water bill, and the Superfund bill.

While attempts to pass a compromise Superfund measure failed, AIA was successful in obtaining changes to the original draft of the bill which would have clarified possible misinterpretation of the intent of two sections of the legislation.

AIA worked with a business coalition to ensure that onerous reform legislation for the Occupational Safety and Health Act pending before Congress was not approved. An AIA white paper highlighting the concerns of the aerospace industry was circulated on Capitol Hill. The bill never made it to the House or Senate floors.



At AIA's semiannual Board of Governors meetings, CEOs and other top executives meet to discuss important, timely issues of concern to the industry as a whole. Shown here, from left to right, are Rockwell's Sam Iacobellis, Martin Marietta's Norman Augustine, AIA's Don Fuqua, Westinghouse's Richard Linder, and Argo-Tech's Michael Lipscomb.



"The association has done a very good job over the years of taking the views of the different members and making them heard on Capitol Hill," D. Larry Moore, President and Chief Operating Officer, Honeywell Inc.

AIA's Procurement and Finance (P&F) Council monitors and coordinates proposed legislative and regulatory changes, and often initiates proposed changes in procurement and procurement-related areas, including patents and data rights, to streamline and simplify the acquisition process. The P&F Executive Committee is the principal interface between the AIA Board of Governors and the P&F Council's functional committees.

This year was a milestone year for acquisition reform with the enactment of the Federal Acquisition Streamlining Act. The signing of the bill on October 13 culminated four years of sustained government-industry effort that originated with the Section 800 Panel in 1991. The P&F Executive Committee made significant input throughout the legislative process, while continuing to pursue policy and process improvements in areas not affected by the legislation.

AIA took the lead, under the guidance of the P&F Executive Committee, to establish a multiassociation Acquisition Reform Working Group (ARWG) to ensure timely input to the legislative process on this subject. Once the statute was enacted, AIA, through the Council of Defense and Space Industry Associations (COD-SIA), set up industry teams to provide input to the Federal Acquisition Regulation (FAR) Council throughout the regulatory implementation process. The following summaries illustrate the more significant issues of 1994.

Procurement Techniques Committee

The Procurement Techniques Committee (PTC) continued to serve as the focal point for all contract policy issues, and also took the lead to set up groups to address issues involving other functional areas.

Environmental Issues: The Intercouncil Environmental Task Group, chaired by the PTC, worked with the Department of Defense (DoD) and other agencies to ensure consistent implementation of environmental requirements. The task group took the lead to develop National Aerospace Standard (NAS) 411, an industry standard adopted by DoD to eliminate or reduce hazardous materials during design, manufacturing, operating, and final disposal of defense systems.

NASA Contracting Issues: NASA is considering modifying its Inspection and Correction of Defects Clause to include new penalties of 10 percent of the contract price, or 50 percent of the cost of correction, for defects attributable to contractor negligence, poor workmanship, etc. The NASA Contracting Task Group opposed the change and noted that NASA has sufficient flexibility to reward or penalize contractors through its award fee policy. AIA apprised NASA that such a change would undermine the agency's R&D mission.

Department of Energy (DoE) Contract Reform: DoE solicited comments on 45 recommendations for improving its contracting process, e.g., less reliance on cost type contracting, and competition at every level. DoE's aim is a more equitable assignment of risk and accountability. The PTC met with DoE to provide comments and offer assistance in implementing this initiative.

LeRoy J. Haugh, Vice President,
Procurement and Finance, AIA



Peter DeMayo, Martin Marietta
Corporation, Chairman, Procurement
and Finance Executive Committee

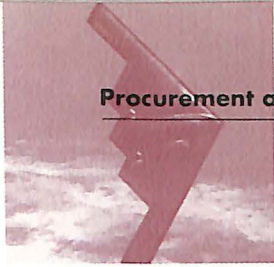


Charles E. Rumbaugh, General Motors
Hughes Electronics, Chairman,
Procurement Techniques Committee



Sally Couluris, Northrop Grumman
Corporation, Chairwoman, Economic
Advisory Committee





Cost/Pricing Data Requirements: An AIA survey found that contractors spend tens of millions of dollars annually preparing cost proposals that are unnecessary if a contract is awarded on the basis of adequate price competition. Such awards require only limited or no cost data and do not require cost or pricing data certified as "current, accurate, and complete." However, current pricing data forms do not provide the flexibility needed in such situations. The PTC proposed a simple new form, the SF 141X, which satisfies cost realism requirements in competitive procurements, but is less demanding than the data currently needed to certify cost or pricing data. The proposal has cleared DoD and is being considered by the Civilian Agency Acquisition Council.

Defense Contract Management Command (DCMC) Issues: In a memorandum to the military services, the DCMC advocated the use of contractor control of overhead costs as an evaluation criterion in award fee plans. The PTC advised the DCMC that since overhead is not program or contract specific, such a criterion in an award fee plan could inequitably penalize a contractor for events not within its control, and advocated the use of the Process Oriented Contract Administration (PROCAS) as a more effective tool to address overhead issues. The PTC led the preparation of CODSIA comments on proposed changes to DCMC's guidance on PROCAS.

The PTC also led CODSIA's effort to comment on the Defense Logistics Agency's (DLA) proposed Directive 8000.5 ("The One Book") that will replace all DLA manuals on contract administration. CODSIA provided 750 pages of comments but cautioned DLA that the many ongoing acquisition streamlining initiatives may result in the directive being obsolete on printing.

Economic Advisory Committee

Contract financing and payment were two issues that the Economic Advisory Committee (EAC) worked throughout 1994. Progress payments were reduced to 75 percent by a provision in the fiscal year 1994 Defense Appropriations Act. DoD interpreted this as permanent legislation and implemented it accordingly. The EAC urged that it be applied only to fiscal year 1994 appropriations. Even if DoD agrees, an increase in progress payments may not be forthcoming anytime soon because of the effect on outlays. However, since progress payments on Foreign Military Sales (FMS) do not affect outlays, AIA recommended that these payments be increased to 95 percent and further recommended retaining flexible progress payments.

Paul Cherecwich, Jr., Thiokol Corporation,
Chairman, Tax Matters Committee



Frank S. McDermid, McDonnell
Douglas Corporation, Chairman,
Facilities and Property Committee



William R. Phillips, Aerojet, A
Segment of GenCorp, Chairman,
Legal Committee



Samuel J. Hand, General Electric
Company, Chairman, Cost
Principles Committee



With respect to payment, the EAC and the Aerospace Research Center continued surveys of the performance of DoD and NASA contract payment offices. Survey data are used to identify unfavorable trends and system deficiencies for corrective actions.

Two issues of continuing concern include transfer of payment functions from the Defense Finance and Accounting Service's (DFAS) Albuquerque office to its Columbus office, and transition from Air Force Acquisition Management Information Systems to DFAS Mechanization of Contract Administration Systems. DFAS conducted a pilot test at two AIA member company locations to facilitate this move. In June, the EAC and DFAS held a planning conference for all companies that will be paid from the Columbus office.

Tax Matters Committee

The R&D tax credit will expire in June 1995. Currently, commercial activities are penalized if the base period for calculating incremental increases includes both defense and commercial research, since defense research is decreasing. The Tax Matters



Committee (TMC) continued to advocate that companies earning substantial gross revenues from defense contracts in prior years should not be subject to an incremental limitation.

In August, the TMC sponsored the filing of an amicus (friend of court) brief in a case involving research tax credits. Fairchild Industries received an adverse decision in the U.S. Court of Federal Claims on the issue of whether research Fairchild performed under a government contract was "funded" by the government as a result of Fairchild's receipt of progress payments, and therefore not eligible for the research tax credit. If upheld, this decision would have widespread implications for the aerospace industry. The court agreed to rehear the case *en banc*.

Other significant TMC issues included limited tax benefits provided to foreign sales corporations and the taxing of long-term contracts on the basis of progress payments rather than completed deliveries.

Facilities and Property Committee

Demilitarization Coding of Government Property: As a precaution against critical technology passing into the wrong hands, selected items of government property in the possession of contractors are subject to demilitarization when declared excess. Until August 1992, the government determined which items qualified for demilitarization. At that time, the DCMC issued new directions to its field activities, including a requirement that contractors assign a demilitarization code as part of the description of each excess item. Government personnel were instructed to reject inventory schedules that did not contain these codes.

AIA considered these as extra-contractual actions. Compliance would add significant additional cost and liability. Ultimately, the government suspended implementation. In March 1994, a proposed change to the Defense Acquisition Regulation, containing these same objectionable requirements, was published for public comment. The Facilities and Property Committee (FPC) submitted comments opposing the proposed rule, which has not yet been finalized.

Commercialization of Asset Management: In late 1992, DoD requested AIA to draft a rewrite of FAR Part 45, Government Property. As the only association with a standing committee on government property management, AIA is a principal contributor to Part 45, initiating more than 14 cost reducing changes in the last five years. The FPC completed the draft rewrite in December

Michael C. Mitchell, Lockheed Corporation, Chairman, Washington Procurement Committee



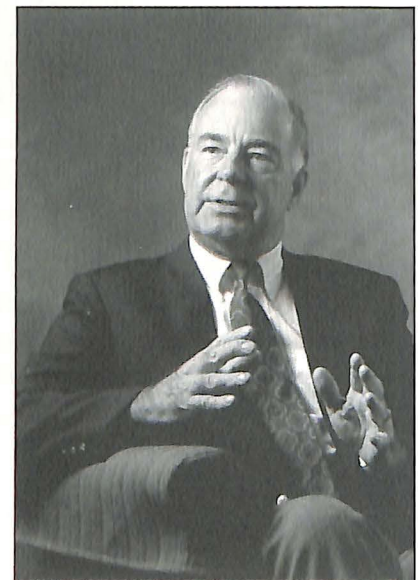
Troxell Snyder, United Technologies Corporation, Chairman, Intellectual Property Committee



David Buchanan, Martin Marietta Corporation, Chairman, Controller's Forum



1993. In conjunction with the rewrite, the committee also developed a white paper aimed at incorporating commercial business practices into the management of government property.



"The uniqueness of AIA is that you have the top management, the CEOs, the presidents, the top levels of the companies working the issues directly. And from that standpoint it makes it very powerful to have our voices heard," Richard A. Linder, President, Electronic Systems, Westinghouse Electric Corporation.



In November 1993, the Air Force established a joint Air Force-industry working group to explore one of the white paper's recommendations—the reduction in requirements for managing low dollar (under \$1,500) items. Independent of this initiative, an Army team made a similar recommendation. The teams have merged and are actively promoting the AIA concept within DoD.

In September 1994, DoD announced it would rewrite Part 45, using the AIA draft as a baseline. AIA testified at a DoD public hearing in November 1994, and recommended that the government reduce or eliminate many of the costs in the management of property valued at less than \$1,500; adopt commercial practices with regard to depreciation of assets; and improve both the acquisition and disposition of government property. Other industry and government organizations supported AIA's recommendations, especially the one on low-value property which has been made a top priority by DoD. This recommendation is expected to be adopted, saving both government and industry millions of dollars.

Legal Committee

The Legal Committee continued to monitor the antitrust actions of the Federal Trade Commission, the Justice Department, and DoD in member company acquisitions. In February 1994, the Air Force briefed the Legal Committee about Air Force initiatives in the use of alternative dispute resolution, which has become more popular.

Qui Tam: The Legal Committee continued to support the ad hoc group of general counsels opposed to certain provisions of a bill to amend the False Claims Act. AIA objected to extending the statute of limitations and retroactive extension of the 1986 amendments. These provisions were subsequently dropped in subcommittee, but four troublesome issues—voluntary disclosure, culpable relators, excessive penalties, and Contract Disputes Act remedies—were retained. Congress adjourned without further action on the bill, but AIA expects it to be reintroduced in the 104th Congress.

Cost Principles Committee

As downsizing continues and budgets are squeezed, agencies and Congress are looking for ways to shift additional costs to contractors. The Cost Principles Committee (CPC) is the focal point within AIA regarding any proposed changes in cost principles or cost accounting standards.

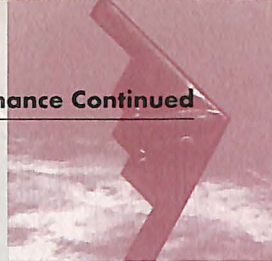
Environmental Cleanup Costs: The proliferation of environmental laws at state and federal levels over the last two decades has brought a corresponding growth in the cost of environmental

compliance and site remediation. Historically, these costs have generally been allowable, but a proposed cost principle would make them unallowable unless industry could demonstrate that it was not responsible for the pollution. When no contractor malfeasance exists, simple equity and the FAR allowability criteria dictate that the government should pay its fair share of environmental cleanup costs. Thus, AIA views the cost principle as not only unnecessary but inequitable. It has been on hold for the last two years pending the outcome of an environmental pilot program at five contractor locations. The CPC also is working with the Defense Contract Audit Agency to ensure that the audit guidance on cleanup costs is fair and equitable and recognizes that these are a necessary cost of doing business.

Restructuring Costs: A provision of the fiscal year 1995 Defense Authorization Act requires DoD to promulgate regulations on the allowability of restructuring costs resulting from mergers or acquisitions, including a requirement that such costs must be offset by auditable savings. The CPC presented its views to DoD regarding the scope of the regulations, and is preparing to comment on the proposed regulations as soon as they appear in the *Federal Register*.



"AIA speaks as a voice for industry and probably has the most leverage of any industrial association," Kent Kresa, Chairman, President, and Chief Executive Officer, Northrop Grumman Corporation.



Executive Compensation: The fiscal year 1995 Defense Appropriations Act included a provision limiting the allowability of executive compensation charged to defense contracts to \$250,000. This provision will apply to contracts entered into after April 15, 1995, using fiscal year 1995 appropriations. Compliance will entail significant record keeping burdens. Repeal of this provision may not be feasible, but AIA will do everything possible to keep it from being repeated in future Appropriations Acts.

Cost Accounting Standards (CAS): The CPC provided comments on several CAS Board initiatives regarding revised cost accounting standards for the composition, measurement, adjustment, and allocation of pension costs; a revised disclosure statement format; recognition and pricing of changing capital asset values resulting from mergers and business combinations by government contractors; and organizational changes and changes in cost accounting practices.

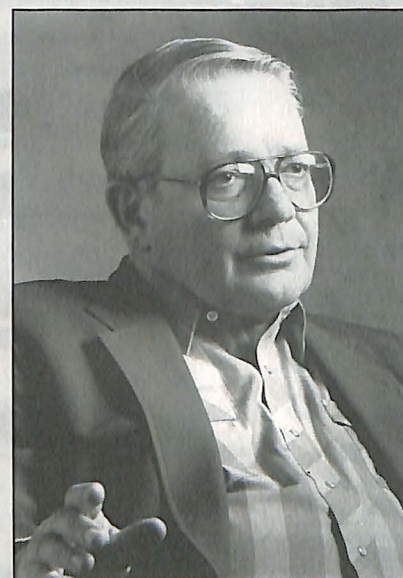
Washington Procurement Committee

The primary focus of the Washington Procurement Committee (WPC) is legislative issues that affect government procurement policy, but it also works high-profile regulatory issues that require a concerted effort in Washington. The WPC's principal issues in 1994 were attempted repeal of the statutory requirement for Recoupment of Nonrecurring Costs; acquisition reform; NASA procurement policies; environmental issues; depot maintenance; federal laboratory policy; lobbying reform; procurement provisions in DoD authorization and appropriations bills; and progress payments on FMS.

Intellectual Property Committee

Rights in technical data continued to be the most important and most time consuming issue for the Intellectual Property Committee (IPC). DoD's effort to promulgate regulations on this subject is now entering its second decade. Significant progress was made when DoD accepted the December 1993 draft recommendations from a government-industry group (the Section 807 Committee). DoD published the 807 Committee language in the *Federal Register* in June 1994, and received approximately 45 sets of comments. The IPC took the lead in preparing industry comments, which were signed by 10 associations. One-third of the comments were from gear manufacturers, represented by the Independent Defense Contractors Association (the Replicators). The Replicators and the Small Business Administration were the only ones to strongly object, alleging procedural inadequacies. AIA

noted that there were still some potential problems, but urged that the regulation be adopted without further substantive changes. Except for a few technical corrections, AIA believes DoD is leaning toward publishing the regulation without change. However, as 1994 came to a close, the final regulation still appeared to be several months away.



"To those of us who are primarily in the aircraft and support business, AIA is a unique group. We think that we should be tied into the people who have the same destiny we do, and that's the aerospace industry," Vincent E. Kearns, President, B.H. Aircraft Company, Inc.



AIA's Technical and Operations Council focuses on all aspects of technological, operational, and engineering efforts to advance all aspects of program management, development, engineering, testing, manufacturing, quality, materiel management, and product support to better address the issues stemming from the production of aircraft, missiles, and space vehicles.

Acquisition Reform of Specifications and Standards

Throughout 1994, AIA worked with the Department of Defense (DoD) to simplify the use of government standards, and to determine ways of reducing cost by using commercial specifications and standards. In a letter to the deputy under secretary for acquisition reform, AIA set forth its position that all process and management standards should be issued for guidance only. It appears that the letter had a positive reception, because AIA's suggestions were endorsed in a June 29 DoD memorandum, "Specifications and Standards—A New Way of Doing Business." AIA suggested there have been many past studies on this issue with a number of worthwhile recommendations, but the major failure has been the difficulty of implementing the military specifications and standards process at the working level.

Based on a meeting with the Office of the Secretary of Defense (OSD) and the June 29 DoD memorandum, AIA took note of a waiver process that allows the use of selected government specifications. OSD indicated that several military specifications will be continued for political reasons and for efficiency. In addition, interim specifications will be issued until commercialized versions become available. AIA argued that the whole effort could lose credibility if such exceptions were permitted. AIA currently is reviewing a list of specifications proposed for deletion by an industry ad hoc group. AIA is the lead on an industry/Air Force integrated product team which is addressing migration of military standards to nongovernment standards, and determining criteria for source selection/proposal evaluation.

Benchmarking Surveys

AIA sponsored several surveys to assess the maturity of benchmarking practices in the aerospace and defense industries, and to provide AIA members an opportunity to share their best practices. Respondents to the survey evidenced a significant interest in using this tool for process improvements. Of the members surveyed, 88 percent reported they are using the benchmarking process, 82 percent plan to continue benchmarking their design process, and 82 percent believe that benchmarking has been beneficial. At least



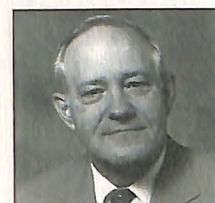
Stan Siegel, Vice President, Technical and Operations, AIA



Samuel A. Musa, E-Systems, Inc., Chairman, Technical and Operations Council



R. P. Caren, Lockheed Corporation, Chairman, Competitive Technologies Committee



Gerald S. Ustach, Westinghouse Electric Corporation, Chairman, Electronic Systems Committee

70 percent of the respondents are interested in sharing best practices with others in the industry. To this end, AIA provided a simple set of procedures for those interested in benchmarking the design process.

Space Advocacy

AIA developed a series of papers to highlight space infrastructure needs and its concomitant potential for America. The papers discuss the benefits that can be achieved from maintaining adequate space investments, by addressing such issues as humans in space, long-term economic growth, earthly benefits, and inspiring the next generation of scientists, engineers, and mathematicians. Five papers were published and a sixth paper will be distributed in early 1995.



Manufacturing Initiatives

The Manufacturing Committee is interfacing with the government through the activities of the National Center for Advanced Technologies (NCAT). Under NCAT, the committee is working with the MultiAssociation Industry Affordability Task Force, which is interfacing with the Defense Manufacturing Council. The committee completed two reports for the task force and continues to lead the Joint Manufacturing Working Group, which supports the executive committee of the task force. The Manufacturing Committee also participated in the NASA-led Aeronautics Materials and Manufacturing Technologies Initiative.

Manufacturing Science and Technology

The Manufacturing Committee continued to foster a DoD Manufacturing Science and Technology (MS&T) Program that includes the efforts of industry and DoD manufacturing centers. As part of NCAT's Affordability Task Force, the Joint Manufacturing Working Group, under the leadership of AIA, has defined gaps in the MS&T Program that are not being addressed by the federal Technology Reinvestment Program or Advanced Technology Projects. As a result, the working group developed a white paper on advanced manufacturing which supports \$388 million in funds for an industry/DoD program. An MS&T Roundtable was held at the 1994 Defense Manufacturing Conference and included participants from industry and government.

Supplier Rating Systems

The Air Force, with support from AIA, began an initiative to obtain DoD acceptance of supplier rating systems that consider quality, schedule, and performance factors, rather than just price, when choosing subcontractors. A proposed rule states that contractors and subcontractors may select proposals offering the greatest value to the government in terms of performance and other factors, and that supplier rating systems are a valuable tool in establishing best value sources.

Electronic Data Interchange

With the downsizing of the industry, subcontracting and purchasing workloads have remained constant, while manpower in the materiel management function has been substantially reduced. Electronic data interchange (EDI) is a productivity enhancing tool that is a necessity for the materiel management function. The Materiel Management Committee completed a survey to identify barriers that prevent AIA companies from implementing EDI at the same rate as other industries. The committee will consider implementing recommendations that address these barriers for 1995.



Terry R. Snyder, General Motors Hughes Electronics, Chairman, Embedded Computer Software Committee



Anthony J. Gentile, Coltec Industries Inc, Chairman, Engineering Division



Dean Allen, Lockheed Corporation, Chairman, Information Technology Committee



Vincent G. De Stefano, Northrop Grumman Corporation, Chairman, Manufacturing Committee

Small Disadvantaged Businesses

AIA's Small Business Development Panel provided information about companies presently in the Comprehensive Subcontracting Plan test program being conducted by DoD and a minority business group. The survey reported that, despite a sharp decline in the national defense budget, the Comprehensive Subcontracting Plan approach allowed test program participants to increase their use of small disadvantaged businesses (SDB), and that stronger ties between SDBs and defense companies are being forged. The test program has been extended and expanded through fiscal year 1998. At the end of the third quarter, DoD reported subcontract awards at 4.7 percent (5 percent goal) and NASA reported total awards of 9.3 percent (8 percent goal) to SDBs, with subcontract awards contributing 5.1 percent.

Strategic Quality Plan

AIA continued working with DoD and NASA to develop a strategic plan that improves the quality and value of products and services provided to the government. The plan will provide a



framework that embraces the adoption of commercial standards and best industrial practices that facilitate industry movement toward dual-use facilities and international competitiveness.

Performance Assessment Reviews

With the Defense Contract Management Command's (DCMC) endorsement, AIA initiated a project to improve the current process of performance assessment reviews. The goal is to develop a system that is less costly to government and industry. AIA recommended changes to the audit program in a position paper, which the DCMC agreed to consider and provide responses for joint discussion at future meetings.

Internet Network Security

AIA is developing a project to analyze the Internet infrastructure and identify security deficiencies. Internet use by AIA members is increasingly being required by the government, yet there is a lack of fundamental security mechanisms and standard protocols among companies. The project will address guidelines transmitted on the Internet and provide guidelines for member use.

Network Interconnections/Data Dialtone

Aerospace firms are competitively inhibited by the failure of U.S. telecommunications service providers to interconnect their services for other than electronic messaging, bulletin board service, and formatted data exchange. The Information Technology Committee initiated a program to encourage the development of an open systems data infrastructure for the transmission of high-volume technical data. A comprehensive report covering this subject has been completed and distributed to interested members of Congress, select members of the Administration, other concerned industry groups, and the network service providers. Follow-up contact will be made to encourage development of the desired open systems infrastructure.

Product Support

In 1994, attention was focused on appropriate public-private sector balance in a downsized defense industrial base. A DoD report to Congress on depot maintenance supported industry on such issues as "minimum organic core workload," elimination of public-private competition, private sector performance of major modifications and upgrades, and elimination of excesses from the government depot infrastructure. The fiscal year 1995 Defense Authorization Bill did not include provisions further inhibiting closures by the 1995 Base Realignment and Closure Commission. The Product Support Committee concentrated on joint projects to retain industry capabilities with the appropriate public-private balance to ensure readiness and sustainability.



Martin J. Kane, Raytheon Company, Chairman, Materiel Management Committee



Jerry Jaeb, The Boeing Company, Chairman, Materials and Structures Committee



Hester Moore Cripe, Texas Instruments Incorporated, Chairwoman, National Aerospace Standards Committee



John E. Conn, Martin Marietta Corporation, Chairman, Product Support Committee

Surplus Army Helicopters

A white paper in final development highlights the negative effects that the Army surplus of 6,000 utility helicopters has had on the rotary-wing market and associated industrial base. Industry recommendations from the paper already have been included in a draft revision of the Army plan.

Contractor Supply Support Study

At OSD's request, AIA provided views on industry assuming a much greater responsibility in the item introduction phase of weapon systems management. DoD is exploring the possibility of industry extending its management and logistics control of design-unstable systems and components to reduce cost and supportability impacts.

Logistics Support Analysis: Military Standard 1388

AIA is working with OSD to simplify and improve the present logistics support analysis process. This effort is driven primarily by Defense Secretary Perry's June 29 memorandum on reducing military specifications and standards.



DoD Surplus Sale of Scrap and Components

Industry has identified serious shortcomings in DoD's procedures for sale of new and used surplus aviation equipment and parts. Existing disposal procedures do not prevent "scrap" parts from entering the commercial market improperly.

Provisioning Implementation Coordination Team

The government-industry Provisioning Implementation Coordination Team monitored DoD implementation of improved provisioning process changes recommended by a joint Provisioning Process Action Team. Efforts are focused on integrating needed changes into the DoD Materiel Management Standard System being developed by the Joint Logistics Systems Center.

Defense Industrial Service Center Material

AIA is working with the Defense Logistics Agency on the direct purchase of government material by contractors. As a result, industry gains an additional source for contractor parts, and the government disposes of excess material.

Reprocurement Technical Data Tri-Service Process Action Team

This activity addressed issues related to the quality of technical data as well as digital generation, transmission, and storage. AIA meets periodically with the team to provide industry views.



"The most unique thing about AIA is the level of senior management involvement, and that's real critical if you want change or if you want to agree on doing things differently," Phillip W. Farmer, President and Chief Operating Officer, Harris Corporation.



Richard S. Sapp, Lockheed Corporation, Chairman, Quality Assurance Committee



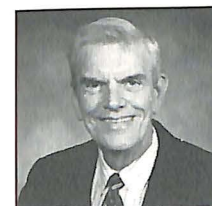
Robert Jackson, McDonnell Douglas Corporation, Chairman, Service Publications Committee



Oren B. Phillips, Thiokol Corporation, Chairman, Space Committee



Ron G. Hodson, Lockheed Corporation, Chairman, Spare Parts Committee



Gordon F. Neary, McDonnell Douglas Corporation, Chairman, Technical Management Committee

Annual AIA/Tri-Service Technical Publications Workshops

These workshops addressed issues arising from the digitalization of technical data. Joint project groups pursued specific initiatives identified during the workshops.

Joint Aviation Logistics Board

AIA participated in the Joint Aviation Logistics Board, chartered to standardize DoD logistics processes wherever possible. Ongoing efforts include depot maintenance inventory optimization, joint service depot operations, metrics of readiness measurement and reporting, integrated logistics support, standardized architecture, and the unified numbering system.



International Standardization

The Aerospace Technical Committee of the International Organization for Standardization is the management body for 11 subcommittees and five working groups, addressing an extensive work program covering all aspects of aerospace standardization. AIA President Don Fuqua serves as chairman and AIA serves as the secretariat of the committee. Some 38 delegates, representing nine countries, participated in the committee's 33rd plenary meeting, which focused on the need for the committee and its subcommittees to become more responsive and cost effective. As a result, the committee implemented a procedure for the "recognition" of existing aerospace standards already used internationally, and passed a resolution stating that the use of a single language would accelerate progress and reduce meeting costs. The committee provided information to the subcommittees and working groups on the airlines' needs for international standards, and asked them to take the information into account when they review and prioritize their work programs.

Software Issues

Defense Secretary Perry's June 29 memorandum on specifications and standards impacted several software issues of concern to AIA. The new DoD software development standard, MIL-STD-498, will only be published as an interim standard. To replace the standard and satisfy the need for an industry-wide document on software development practices, MIL-STD-498 will be converted to a commercial standard by an industry-led group. Another DoD-industry group is addressing how to include software reuse in a DoD "performance" specification. The group will determine how DoD can reduce the amount of direction and oversight it includes in Requests for Proposals and Statements of Work, while at the same time clarifying DoD's desire to see productivity improvements based on systematic software reuse.

National Aerospace Standards

The National Aerospace Standards Committee continually maintains the current body of more than 3,000 aerospace standards and develops new standards as needed. During 1994, the committee published three new standards, revised 148 standards, reaffirmed 32 standards, and inactivated or canceled five standards. The committee is also actively exploring ways to replace materials that pose potential environmental hazards.

Standards Go Commercial

AIA plays an active role in ensuring that its members have the standards they need to function effectively during defense downsizing. In response to DoD directives to use commercial specifications and performance specifications in lieu of military

specifications, some DoD offices are seeking to cancel their standards. AIA committees are actively exploring ways to convert many of these standards to AIA National Aerospace Standards (NAS). Several military parts standards are being converted to NASs by the Defense Electronic Supply Center. The Air Force Materiel Command has approached AIA to convert nearly 300 of its standards to NASs. These documents cover such things as standard parts, quality systems, materials, and test methods.

Competitive Technologies

The Competitive Technologies Committee continued to provide guidance to NCAT activities and serve as a strong link to industry through the AIA Technical and Operations Council. Some areas in which the committee actively participated were affordability; aeronautics materials and manufacturing technologies; remote sensing; manufacturing, science, and technology; manufacturing infrastructure; and defense conversion.



"The reason we joined AIA was to get closer to our customers. For us it's been very, very useful. We have 30 different people on committees and councils at AIA," William O. McCabe, Director, Aerospace Enterprise, DuPont Company.

The National Center for Advanced Technologies (NCAT) is a not-for-profit research and education foundation dedicated to the advancement of product and process technology. NCAT's activity is predicated upon a cooperative relationship between industry, government, and academia in the public and national interest.

NCAT was incorporated in 1989 to coordinate and implement AIA's Key Technologies for the Year 2000 Program. Expertise is drawn from technical experts in industry, government, and university laboratories. NCAT also taps technical expertise from other trade and professional associations.

NCAT's program originally was designed to produce cooperative efforts on national consensus plans for 11 key technologies. A team was formed in each technology area. The teams produced nine roadmaps and seven national technology strategic plans for the next 10 years, providing a bottom-up view of the future. A group of senior officials from government, universities, and industry, collectively known as the Aerospace Technology Policy Forum, was formed to provide a top-down view to the technology development community; the group has met 14 times since July 1988. NCAT highlights for 1994 follow.

Industry Task Force for Affordability

At the Department of Defense's (DoD) request, NCAT provides DoD with industry insight on affordability technologies for future systems. NCAT's largest ongoing effort continues to be the Multi-Association Industry Task Force on Affordability, which serves as the industry focal point for working with DoD's Defense Manufacturing Council. Meetings have taken place at the task force and task group levels to provide industry input to the Defense Manufacturing Council.

Aeronautics Materials and Manufacturing Technologies

NCAT worked with the National Science and Technology Council (NSTC) on Aeronautics Materials and Manufacturing Technologies (AMMT). The process and procedure for this effort were very interesting in that industry was asked to state its needs, and then the government and industry reviewed current programs related to those needs and offered a series of goals that should receive additional emphasis. The industry-government working group then developed recommendations, which were presented in August to a conference of industry, government, and university

*Prior to Stan Siegel, Cliff Schoep served as NCAT president from April 1993 to August 1994.

Stan Siegel, Acting President, National Center for Advanced Technologies*



participants. In September, NCAT provided a status report to the NSTC's Materials, Manufacturing Infrastructure, and Aeronautics Subcommittees. No further action is expected until 1995.

Remote Sensing

Over the past 18 months, NCAT held three meetings with industry, government (Ballistic Missiles and Defense Organization, Advanced Research Projects Agency, U.S. Air Force, Department of Commerce, NASA, Department of Energy), and users of remote sensing information to determine areas for cooperation that could lead to accelerating the commercialization of remote sensing technology. There was interest in the topic and an administration policy on remote sensing was released in early March 1994. Based on these meetings and the new policy, some companies have received licenses from the Department of Commerce for high-resolution systems.

Manufacturing Science and Technology

NCAT invited selected industry participants to attend meetings of the Joint Directors of Laboratories (JDL) Panel on Manufacturing Science and Technology to provide input early in the planning process. If successful, this type of activity could be offered to other JDL technology panels in the future.

Manufacturing Infrastructure

NCAT hosted a workshop for industry, government, and academia, whereby industry comments were solicited for a series of five "white papers" developed by the NSTC's Manufacturing Infrastructure Subcommittee.

Technology Reinvestment Program

NCAT hosted a meeting on Technology Reinvestment Program (TRP) focus areas in July. The Advanced Research Projects Agency (ARPA), the TRP's sponsor, presented many proposed focus areas to an industry audience. ARPA announced its fiscal year 1995 list of focus areas in mid-October, which reflected industry input. The dialogue was fruitful and another similar meeting is likely.



NORTHROP GRUMMAN CORPORATION

This underbelly view highlights the armament of the Navy/Marine Corps F/A-18 Hornet strike fighter, built by McDonnell Douglas and principal subcontractor Northrop Grumman.

MARTIN MARIETTA CORPORATION



Enroute to space is the Titan IV, the largest expendable launch vehicle in the U.S. inventory; it is built by Martin Marietta.

For the U.S. aerospace industry, 1994 was a difficult year with respect to declining activity and employment, yet a progressive year as the industry continued to manage its enforced downsizing effectively. Overall sales fell \$11 billion, or 9 percent. Dwindling activity in both civil and military production compelled the industry to layoff another 71,000 people, bringing employment down to 836,000 by yearend. That was the lowest level since the mid-1950s.

As was to be expected, sales to the Department of Defense declined for the seventh straight year. However, sales of civil aircraft, particularly airline transports, experienced an even greater decline. The industry delivered only 306 jetliners in 1994, compared with an annual average over the previous five years of just under 500.

New orders for aerospace products increased in 1994, but slightly, only a fraction of 1 percent; they remained near the lowest level in more than a decade. The aerospace backlog fell further to \$165 billion, which is some \$76 billion below the 1991 peak.

Export sales volume declined by \$1 billion, to \$38.5 billion. Although the latter figure is some 15 percent below the record level of 1992, it is regarded as an excellent industry performance in international trade, considering the generally depressed global aerospace market. Aerospace imports increased by 5 percent and, as a consequence, the aerospace balance of trade declined from \$27.2 billion in 1993 to \$25.6 billion in 1994.

Ironically, in a year of general decline, the industry's net earnings (\$5.2 billion) reached a record level. It was, however, a record of questionable validity, because the profit gain was due largely to byproducts of downsizing: sharply lower payroll costs, reduced investments in plant and equipment, and income from sales of assets. Despite reduced activity in both of the industry's main product lines—defense systems and civil aircraft—industry firms achieved a wide range of technological advances. The highlights are described in the illustrated summary that follows.

McDonnell Douglas' MD-11 long-range trijets near completion at the company's Long Beach, California assembly facility.



MCDONNELL DOUGLAS CORPORATION



BELL HELICOPTER TEXTRON, BOEING HELICOPTERS

In December, the Department of Defense announced a plan to proceed with initial production of the V-22 Osprey tiltrotor transport, developed for the Marine Corps and the Special Operations Command.

ROCKWELL INTERNATIONAL CORPORATION

In August, the X-31 Enhanced Fighter Maneuverability Demonstrator, a joint development of Rockwell and Deutsche Aerospace, set a record for experimental planes (438 flights).



The Air Force C-17 Globemaster III airlifter undergoes a test of its new self-defense system (countermeasure flares for protection against heat-seeking missiles).



MCDONNELL DOUGLAS CORPORATION



VOUGHT AIRCRAFT COMPANY

In July, Vought employees got their first look at the C-17 Globemaster III they are helping to build. The company produces nacelles, vertical and horizontal tail sections, and the aerial refueling receptacle.

In December 1994, the Department of Defense (DoD) announced another modification of the defense restructuring program, one that essentially postponed a number of modernization programs until the 21st century to allow greater near-term focus on maintaining force readiness and improving the quality of life for the people of the armed forces.

The revised program would add \$25 billion to the defense budget during the six fiscal years (FY) 1996-2001. Cuts in modernization programs would make available \$8 billion in immediate future years; these cuts would be offset later—in FY 2000-2001—by

planned growth in the defense budget of at least 1 percent a year. The added funding, the announcement said, “will support substantial increases in defense procurement accounts for modernization.”

The modernization changes were made after reevaluations of nine major programs. Two of them were left unchanged: the Army’s Advanced Field Artillery System and the Joint Primary Aircraft Training System (JPATS). DoD reduced by two ships production of DDG-51 Aegis destroyers, from 18 to 16 vessels in the FY 1996-2001 period, and scheduled production of four New Attack Submarines.

Powerful radars and high-speed data processors provide real time battle management information to operators in the E-8C Joint Surveillance Target Attack Radar System (Joint STARS). Northrop Grumman is building 19 E-8C aircraft for deliveries starting in 1996.



AAI CORPORATION

AAI developed the MTSII Moving Target Simulator, which provides a realistic environment for training gunners on a number of weapon systems.



DIGITAL EQUIPMENT CORPORATION

In November, Digital introduced the AlphaServer multiprocessing system (shown) and the AlphaStation workstation.



Other changes include:

- Cancellation of the TSSAM (Tri-Service Standoff Attack Missile) under development by Northrop Grumman.
- Restructuring the Army's Comanche scout helicopter program (Boeing-Sikorsky) as a technology development effort that includes construction of two flyable prototypes.
- A DoD commitment to production of the V-22 Osprey tiltrotor transport to meet medium lift requirements for the Marine Corps and Special Operations Command (SOCOM).
- Delaying by two years the development of the Marine Corps Advanced Amphibious Assault Vehicle.
- Cutting by 10 percent the R&D funding for the Air Force F-22 fighter in the FY 1996 budget; this, said DoD, will delay the F-22's initial operating capability by "a few months."

Among DoD's aircraft programs, development of a new generation strike aircraft began in May with the award of a series of concept exploration contracts under the Joint Advanced Strike Technology (JAST) program. The largest contract went to Boeing Defense and Space Group for study of a "modular multi-service airframe." Other contracts, for a variety of studies ranging from affordability to weapon carriage options, went to Lockheed Fort Worth, McDonnell Douglas Aerospace, Northrop Grumman, Hughes Missile Systems, Honeywell Inc., Cambridge Research, and Litton Amercom. In July, DoD awarded additional JAST contracts for propulsion studies to Pratt & Whitney, Allison, and General Electric Company.

Late in December, DoD launched a major JAST thrust with the award of 24 contracts for concept definition and design research. Major contracts for weapon system concepts went to McDonnell Douglas Aerospace, Northrop Grumman, Lockheed Fort Worth, Hughes Missile Systems, and Boeing Defense and Space Group.

In other aircraft development highlights:

- The Air Force Lockheed-Boeing F-22 advanced tactical fighter moved a step closer to flight status when Lockheed Aeronautical Systems Company began fabricating flight-ready parts for the first F-22 in the fall. In September, the F-22's AN/APG-77 radar passed its Critical Design Review (CDR); a Westinghouse-led team that includes Boeing Military Aircraft and Texas Instruments is developing the radar. The F-22's electronic warfare system also passed its CDR; contractors include Lockheed Fort Worth, Lockheed Sanders, and Martin Marietta. First flight had been planned for the latter part of 1997 prior to the funding cut announced by the Pentagon. DoD's procurement plan calls for the production of 442 F-22s.

**AEROSPACE HIGHLIGHTS 1994
DEFENSE**



CHRYSLER TECHNOLOGIES CORPORATION

Chrysler's ElectroSpace Systems, Inc. is producing the AS-3399/WSC antenna, a major component of the Navy's AN/WSC-6 shipboard Satellite Communications Terminal.

MCDONNELL DOUGLAS CORPORATION



In October, the Department of Defense gave the go-ahead for initial production of the AH-64D Apache Longbow, produced by McDonnell Douglas Helicopter Systems.

TEXTRON INC.



Representative of the candidate aircraft competing for the Air Force/Navy Joint Primary Aircraft System are the Ranger 2000 (at right), developed by Rockwell's North American Aircraft, and the Model 526 CitationJet, built by Textron's Cessna Aircraft Company.

ROCKWELL INTERNATIONAL CORPORATION



- The Navy F/A-18E/F Hornet advanced tactical fighter passed its CDR in June. First flight was targeted for McDonnell Douglas, Northrop Grumman, General Electric, and Hughes Aircraft.
- The Marine Corps/SOCOM V-22 Osprey, under joint development by Bell Helicopter Textron and Boeing Helicopters, passed its CDR in December. The commitment announced by DoD cleared the way for an initial low-level production phase involving construction of 37 aircraft over the six-year span of FY 1996-2001. Ultimately, the Bell-Boeing team expected production of more than 400 V-22s.
- Restructuring of the Army/Boeing-Sikorsky RAH-66 Comanche reconnaissance/light attack helicopter program essentially amounts to a three-to four-year stretchout of the demonstration/validation phase. The DoD six-year plan (FY 1996-2001) contains no procurement funding for the Comanche.
- In October, the Army gave McDonnell Douglas Helicopter Systems a go-ahead to proceed with the AH-64D Apache Longbow modernization program. DoD authorized advance funding for initial production of Longbow Apaches.
- In November, the Air Force/McDonnell Douglas C-17 airlifter successfully completed a 45,000-hour durability test program. The C-17 was subjected to stresses created by hydraulic actuators in a special fixture designed to enable simulation of more than 12,000 flights.
- In August, the X-31 Enhanced Fighter Maneuverability Demonstrator set an X-plane record of 438 flights. In an extensive program of close-in-combat (dogfighting) against some of the most advanced U.S. aircraft, the two X-31 prototypes demonstrated exceptional maneuverability and an impressive "kill" ratio against adversary aircraft. The X-31 is a joint development of Rockwell Aerospace and Deutsche Aerospace.
- In March, a Navy/McDonnell Douglas T-45A Goshawk—equipped with Cockpit-21, an advanced digital cockpit designed to enable pilot trainees to transition more effectively to operational aircraft—made its initial flight. Beginning with Goshawks delivered in October 1996, all T-45s will feature the new cockpit. Earlier T-45s with standard cockpits will be retrofitted.

TEXAS INSTRUMENTS INCORPORATED



LUCAS AEROSPACE INC.

In production at Lucas Aerospace Power Systems is an electric motor-driven linear actuator that raises the launch platform of the Patriot missile launcher.



In February, Texas Instruments' Defense Systems & Electronics Group received a contract from IBM Federal Systems to build a combined Forward Looking Infrared (FLIR)/Laser Designator set for the Navy's SH-60B LAMPS Mark III helicopter.

KAMAN AEROSPACE CORPORATION



In November, Kaman Aerospace was awarded a contract for 10 remanufactured and upgraded SH-2G helicopters for the Egyptian government. The SH-2G is in service with the U.S. Navy.

Among DoD missile development highlights, the Army contracted with Loral Vought Systems for development of an extended-range version of the Army Tactical Missile System (ATACMS). In November, the Army conducted a successful test of the Block 1A (extended range) ATACMS as part of a Joint Precision Strike Advanced Technology Program. ATACMS is fired from the Multiple Launch Rocket System (MLRS), which is also manufactured by Loral Vought. The Block 1A version of ATACMS has a Global Positioning System receiver and antenna, allowing the missile to receive guidance updates.

In other missile developments:

- The Air Force initiated a series of tests in which ground-based missile components (Scud type) are subjected to laser attack. The tests are part of the Airborne Laser (ABL) program aimed at developing technology for a weapons-class laser that would be launched from aircraft at theater ballistic missiles. The Air Force has contracted with two industry teams for ABL technology development: one team includes Boeing, TRW, and Lockheed, the other Rockwell International, Hughes Aircraft, and E-Systems. The laser is known as MIRACL, for Mid-Infrared Advanced Chemical Laser.



LORAL VOUGHT SYSTEMS CORPORATION

In October, Loral Vought was awarded a Ballistic Missile Defense Organization contract for development of the Patriot Advanced Capability (PAC-3) extended-range interceptor.

AEROSPACE HIGHLIGHTS 1994 DEFENSE

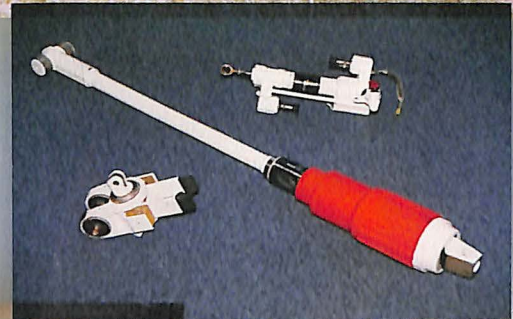
Production was initiated on the Javelin antitank weapon jointly developed by Texas Instruments and Martin Marietta for the Army and Marine Corps.

TEXAS INSTRUMENTS INCORPORATED, MARTIN MARIETTA CORPORATION



CHRYSLER TECHNOLOGIES CORPORATION

Chrysler's Airborne Systems, Incorporated developed the Advanced Quickfix system for the Army EH-60L helicopter; the company was responsible for modification of the helicopter and flight testing of the Electronic Warfare Common Sensor Suite.



DOWTY AEROSPACE

In production at Dowty Aerospace Yakima are several types of actuators for the Navy F/A-18E/F advanced tactical fighters.

E-SYSTEMS, INC.

As part of the Army's Team Apache, Serv-Air is converting damaged AH-64 Apache helicopters into specialized maintenance trainers.

- In December, the Navy completed a series of tests of the SM-2 Block IV missile defense weapon under development by Raytheon Company. In July, the SM-2 Block IV was fired at subsonic and supersonic targets in benign and severe jamming environments. A second phase in October repeated the engagements with subsonic/supersonic targets and included a test against a simulated antiship cruise missile attaching at wavetop altitude.
- Production was initiated in 1994 on the Javelin manportable, shoulder-fired antitank weapon being developed for the Army and Marine Corps by Texas Instruments and Martin Marietta. Deployment with the first Army unit was targeted for mid-1966.
- The Navy/McDonnell Douglas SLAM-ER (Standoff Land Attack Missile-Expanded Response) demonstrated its ability to penetrate hardened targets in a July test at the Navy's China Lake (California) facility.
- In October, Loral Vought Systems received a contract from the Ballistic Missile Defense Organization for engineering and manufacturing development of the Patriot Advanced Capability (PAC-3) missile, an extended-range interceptor.

GEC-MARCONI ELECTRONIC SYSTEMS CORPORATION

The Joint Tactical Information Distribution System (JTIDS), a secure, jam-resistant digital voice and data system, successfully completed its Navy operational evaluation and Air Force/Army user evaluations. GEC-Marconi is JTIDS lead design and development contractor.



HARRIS CORPORATION

Harris is developing advanced fiber optic systems to allow rapid communication among the many avionics systems on the Air Force F-22 tactical fighter.

LOCKHEED CORPORATION

Lockheed Sanders is producing the ALQ-144A countermeasure system, which radiates heat to foil infrared-guided missiles.



THE BFGOODRICH COMPANY

In production is the landing gear for the Air Force C-17 Globemaster III.



HEATH TECNA AEROSPACE COMPANY

In support of McDonnell Douglas' C-17 cost reduction program, Heath Tecna Aerospace developed final assembly tooling for the C-17 wing fillet.



GENERAL MOTORS CORPORATION

In May, Hughes Aircraft delivered the first operational Navy F/A-18C strike fighters equipped with the upgraded APG-73 radar, produced by Hughes under contract to McDonnell Douglas. The APG-73 will be installed on the advanced F/A-18E/F.

- In March, the Army Missile Command awarded a contract to TRW Space & Electronics Group for a demonstration quantity of gel propulsion systems. TRW will provide units for six flight demonstrations of the Army Combined Weapons Systems (TACAWS), a "smart" missile capable of slowing down to search for targets. Although gel propulsion systems have been successfully demonstrated on the ground, the TACAWS program will mark the first flight tests of gel propulsion on a missile.
- In April, the Air Force awarded contracts to McDonnell Douglas and Martin Marietta for concept demonstrations of a Joint Direct Attack Munitions (JDAM) system. JDAM is intended to enable all-weather precision stricken with heavy bombs. The contractors' assignments involve development of low-cost, satellite-aided inertial guidance kits for 1,000-pound and 2,000-pound guided bombs.
- In October, the Navy selected Westinghouse Electric Corporation as the winner of a competition to design and build dry combat submersibles for the Sea-Air-Land (SEAL) Special Operations forces.

AEROSPACE HIGHLIGHTS 1994 CIVIL AVIATION

In November, McDonnell Douglas received FAA certification for the MD-90, a stretched version of the MD-80 twinjet series.

A June highlight was the initial flight of the Boeing 777 advanced technology long-range twinjet, scheduled for airline service in 1995.

BOEING COMMERCIAL AIRPLANE GROUP



MCDONNELL DOUGLAS CORPORATION

MCDONNELL DOUGLAS CORPORATION

Awaiting go-ahead at yearend was a new twinjet development in the 100-passenger class, the MD-95.



COMPUTING DEVICES INTERNATIONAL

Working with U.S. and foreign airlines and aircraft manufacturers, Computing Devices is developing an integrated information management system that eliminates the need for paper documents in the cockpit.



For the U.S. scheduled airlines, 1994 was a disappointing year in which earnings fell far below expectations despite substantial increases in both passenger and cargo traffic. Where Wall Street analysts had predicted a \$1 billion profit for the industry, actual earnings are expected to wind up somewhere between \$200 million and \$500 million, according to preliminary estimates made by the Air Transport Association.

A record 517 million passengers boarded U.S. scheduled airlines in 1994, an increase of more than 6 percent over 1993's 487 million. For the first 10 months of the year, air freight traffic

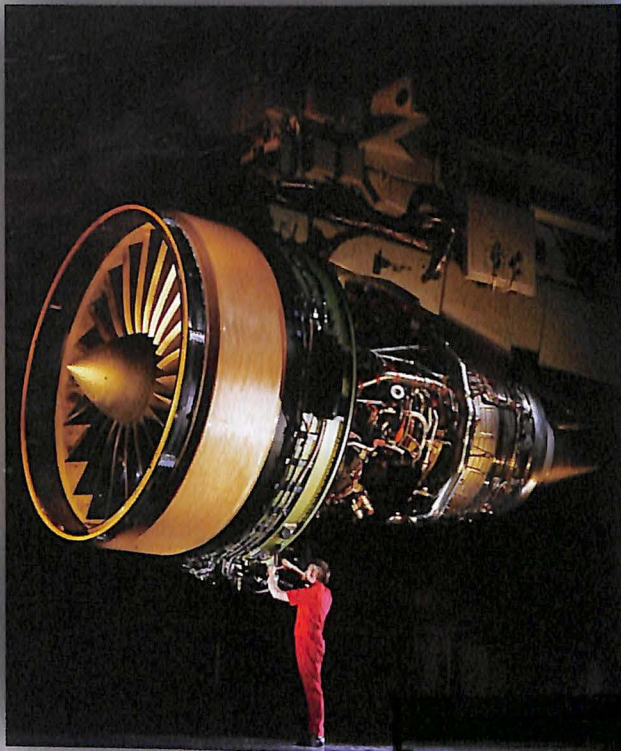
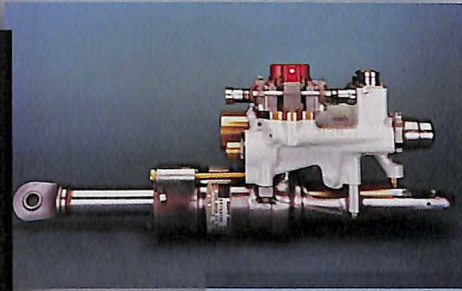
increased 10.6 percent, to 12.1 billion "ton" miles. However, intensive fare competition sharply reduced revenues; more than 92 percent of domestic passengers used some form of discount fare. This resulted in a slim net profit for the industry after cumulative losses of \$12.8 billion for 1990-1993.

Although earnings data were not available at publication time, it appeared that the world's airlines would report a year in the black after a \$2.5 billion aggregate loss in 1993. However, 1994 gains were expected to be moderate, restrained by continuing high operating costs and large interest burdens on debt incurred during the devastating losses of 1990-1993, which totaled some \$14 billion. Part-year traffic statistics offered encouragement for a bigger rebound in 1995; through the first nine months of 1994, worldwide passenger traffic was up 8.2 percent and cargo traffic increased 13.2 percent, according to Airports Council International data.

The airlines' continuing financial problems were reflected in the reduced sales volume for jetliners reported by the industry's commercial transport manufacturing segment. Sales, which are based on deliveries, dropped sharply in 1994 to \$20.9 billion, compared with \$26.4 billion in 1993.

DOWTY AEROSPACE, LOS ANGELES

A Dowty-developed, fly-by-wire rudder control system entered service aboard the SAAB 2000 in September.



GENERAL ELECTRIC COMPANY

At yearend, GE Aircraft Engines anticipated early 1995 certification of the GE-90 90,000-pound-thrust engine, scheduled for initial service aboard the Boeing 777 in September 1995.



THE BFGOODRICH COMPANY

A highlight for BFGoodrich Aerospace was wheel and brake certification for the Boeing 777.



LUCAS AEROSPACE INC.

At Lucas Aerospace Flight Structures, a Mazak H630 five-axis horizontal machining center is used for machining complex aluminum and stainless steel parts for the McDonnell Douglas MD-11 and Boeing 747, 767, and 737 jetliners.

The backlog of orders for commercial transports also dropped. As of September 30, 1994, the total backlog was 1,140 aircraft with an aggregate value of \$69.8 billion; this compares with 1,358 aircraft worth \$77.7 billion at the end of 1993. Orders from foreign airlines totaled 533 units worth \$43.9 billion; in terms of value, foreign orders represented 62.9 percent of the total backlog.

As of September 30, Boeing Commercial Airplane Group had orders on the books for 969 aircraft. The largest component of the Boeing backlog was 380 orders for the B-737 short-to-medium range twinjet. Other aircraft on order included 198 B-757s, 147 of the new B-777s, 126 B-767s, and 118 B-747s.

Boeing's highlight of the year was the June 12 initial flight of the B-777 advanced technology, long-range twinjet. The flight kicked

off a planned 10-month test program toward Federal Aviation Administration (FAA) certification for extended range twin operations (ETOPS). In October, Boeing started the crucial 1,000-flight ETOPS validation tests with three 777s, and by yearend a fourth aircraft had joined the program. First deliveries are planned for the spring of 1995.

In October, Boeing launched the development of a new version of the 737 twinjet, to be known as the 737-800. The new aircraft will be a stretched version of the 737, capable of carrying 164-189 passengers. Boeing started development on the strength of airline commitments for 62 aircraft. The target date for first deliveries is 1998.

AEROSPACE HIGHLIGHTS 1994 CIVIL AVIATION



KAMAN AEROSPACE CORPORATION

In August, Kaman received FAA type certification for the K-MAX "aerial truck" commercial helicopter.

TEXTRON INC. CESSNA

The Citation X business jet was undergoing flight test at yearend toward 1995 certification.



TELEFLEX AEROSPACE/DEFENSE

Teleflex developed a Mechanical Engine Control System for the McDonnell Douglas MD Explorer helicopter.



MCDONNELL DOUGLAS HELICOPTER SYSTEMS

McDonnell Douglas started deliveries of the MD Explorer twin turbine helicopter, which features the NOTAR (no tail rotor) antitorque design.



McDonnell Douglas transport orders (as of September 30) included 46 MD-11 long-range trijets and 125 of the MD-80/90 series twinjets. In November, McDonnell Douglas received FAA airworthiness certification for the MD-90, a stretched version of the MD-80 with 153 seats. At yearend, McDonnell Douglas was deliberating the launch of a new development program for an MD-95 twinjet in the 100-passenger class. The company studied three versions: a basic MD-95-30 carrying 100 passengers up to 1,700 nautical miles; an extended-range MD-95-30ER, 100 passengers, 2,300 miles; and an MD-95-50, 122 passengers, 1,650 miles. McDonnell Douglas hopes to launch the program in 1995, begin flight testing in 1996, and start deliveries in 1998.

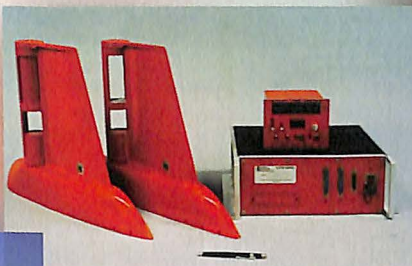
Among business jet developments, Textron Inc. Cessna continued flight tests of the mid-size Citation X; certification is expected in 1995.

At yearend, the first of Gulfstream Aerospace Corporation's Gulfstream V corporate jet was nearing final assembly status. The company plans flight testing in 1995 and service introduction in 1996. The Gulfstream V is designed to fly nonstop from New York to Tokyo.

McDonnell Douglas Helicopter Systems initiated deliveries of its twin-turbine MD Explorer, which features the NOTAR (no tail rotor) antitorque design.

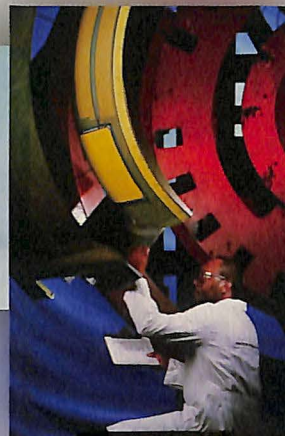
DYNAMIC ENGINEERING INCORPORATED

Dynamic Engineering developed a Flight Flutter Test Excitation System that includes exciters (rudder-like devices at left), a cockpit controller (small box), and an avionics box.



MARTIN MARIETTA CORPORATION

A technician inspects a General Electric jet engine thrust reverser manufactured by Martin Marietta's Aero & Naval Systems.



PARKER HANNIFIN CORPORATION

With Douglas Aircraft Company, Parker Bertea Aerospace developed and certified a digital fuel quantity indicator system for the MD-90 twinjet.



HARRIS CORPORATION

Harris developed a new voice communications system that significantly improves communications between air traffic controllers and aircrews; controllers test the system at the FAA's Seattle regional facility.

ROCKWELL INTERNATIONAL CORPORATION

Rockwell's Highway Transport Electronics developed the Pro2000SL Communications System that enables highly reliable two-way data communications using both satellite and land-based communication paths, and includes a Global Positioning System for precise vehicle location.

In November, Bell Helicopter Textron started flight tests of the new Bell 430 twin-engine helicopter. The helicopter has a four-bladed bearingless rotor system, and its Allison 250-C40 engines provide 10 percent more power than the engines of the Bell 230. Certification of the Model 430 is expected in November 1995.

In the field of aircraft propulsion, testing continued on two U.S. high-thrust engines (84,000 pounds-90,000 pounds), the Pratt & Whitney 4084 and the General Electric GE-90. In June, the PW-4084 received FAA certification and powered the Boeing 777 on its initial flight. The GE-90 is expected to be certified and to fly on the 777 early in 1995; company officials say the engine is on schedule for its planned service introduction aboard a British Airways 777 in September 1995.

In other areas of civil aviation, a major development was FAA's November certification of the first predictive windshear detection system, the Bendix RDR-4B airborne weather radar developed by AlliedSignal Commercial Avionics Systems. On November 30, Continental Airlines flew a windshear-detector-equipped Boeing 737 on a Washington-Cleveland flight that marked the first airline use of a predictive windshear system.

Continental announced that it will retrofit its fleet with the RDR-4B system, which employs pulse Doppler technology to detect a potentially hazardous windshear area ahead of the plane and provides both visual and aural warnings to the crew. Nine other airlines, seven foreign and two U.S. carriers, had committed to purchasing the predictive system by yearend.

AEROSPACE HIGHLIGHTS 1994 CIVIL AVIATION



ALLIEDSIGNAL AEROSPACE

A major commercial aviation milestone was the November FAA certification of the Bendix RDR-4B airborne radar with windshear detection and prediction capability. Engineers of AlliedSignal Commercial Avionics Systems, which developed the radar, study returns on board a Convair C-580 test aircraft.



GULFSTREAM AEROSPACE CORPORATION

In advanced construction status at yearend, the Gulfstream V long-range corporate jet is slated for initial flight in 1995 and first deliveries in 1996.



VOUGHT AIRCRAFT COMPANY

In January, Vought began cutting metal on its first parts for the Gulfstream V; in photo, a 15-pound machined aluminum rib. Vought is building the wings for the long-range corporate jet.

ROHR, INC.

A Rohr technician assembles a pylon for an MD-11 jetliner.



In May, the congressionally mandated Civil Tiltrotor Advisory Committee initiated an extensive study aimed at defining the benefit, potential, and viability of tiltrotor aircraft in the national air transportation system. The first meeting of the 29 panel members focused on the status of the military V-22 Osprey, the most advanced tiltrotor. The committee includes representatives of the Department of Transportation, FAA, NASA, the National Transportation Safety Board, and Bell Helicopter Textron/Boeing Helicopters (builders of the V-22), along with representatives of airlines, airports, city planners, the financial community, and others.

The committee will evaluate the technical and economic feasibility of commercial tiltrotor transports, the essential supporting infrastructure, required airspace regulation changes, and economic/research benefits that would accrue to the nation. The group will make recommendations as to how aircraft and infrastructure development costs should be shared by government and industry. Its report is to be submitted to Congress by May 20, 1995.

In other aeronautical research, NASA's High Speed Research (HSR) program, which is exploring a second-generation supersonic transport, moved into Phase II with the July award of a contract to Boeing and McDonnell Douglas for advanced airframe research (Boeing is the prime contractor and McDonnell Douglas is the principal contractor for airframe studies of the potential HSCT, or High Speed Civil Transport). Other principal team members include Pratt & Whitney and General Electric (propulsion); Honeywell Inc. (controls, guidance, and synthetic vision technology); and NASA's Lewis, Langley, and Ames Research Centers, along with the agency's Dryden Flight Research Facility.



AMERICAN PACIFIC CORPORATION

In development at American Pacific's Halotron, Inc. subsidiary, under an FAA cooperative R&D agreement, is Halotron I, a planned replacement for the halon 1211 firefighting chemical. In photo, a test of Halotron I's penetration and extinguishment capabilities.



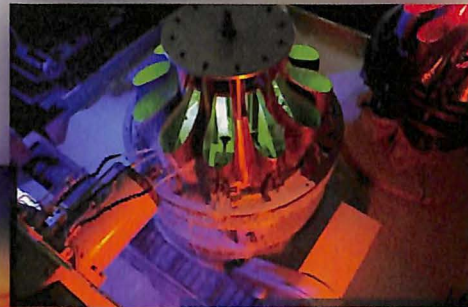
DUPONT COMPANY

As part of NASA's Advanced Composite Technology Program, DuPont's KOREX aramid honeycomb core is evaluated for primary transport fuselage structures.



AAI CORPORATION

More than 140 units of AAI's Automated Surface Observing System were installed at U.S. airports in 1994.



B. H. AIRCRAFT COMPANY, INC.

In production at B.H. Aircraft are turbine engine gas mixers (pictured), nozzles, and ejectors for compliance with FAA Stage III noise regulations.



WESTINGHOUSE ELECTRIC CORPORATION

Westinghouse received final acceptance of the air route surveillance radar (ARSR-4), which will serve the FAA's air traffic control needs and Air Force's air defense requirements.

The HSR program, launched in 1990, focused initially on the environmental hurdles that must be cleared before proceeding with full-scale development of the HSCT; this Phase I effort will continue until 1996. In the airframe segment of Phase II, Boeing and McDonnell Douglas will address both subsonic and supersonic performance of the HSCT. They will study component design, with emphasis on wing and tail components; they will research ways to build lighter and less expensive wing/fuselage structures; and they will explore materials capable of withstanding friction temperatures of up to 350 degrees Fahrenheit, which the HSCT would encounter at cruise speeds in the Mach 2.4-2.5 range.

In a parallel development, Boeing and McDonnell Douglas were selected by NASA for five-year contracts to develop new techniques for designing jetliner wings as part of the agency's Advanced Subsonic Technology (AST) program. The companies will seek ways to improve overall aircraft performance while cutting design cycle time and costs. NASA's AST program is devoted to developing technology that will improve the international competitive position of U.S. industry in the subsonic commercial transport market.

The joint DoD/NASA HySTP (Hypersonic Systems Technology Program) advanced with the mid-year start of ground tests of a one-third scale Concept Demonstration Engine that will be "flown" at simulated speeds of up to Mach 7. These tests are a major milestone toward the HySTP goal of developing a scramjet (supersonic combustion ramjet) engine capable of propelling a vehicle at Mach 15 and beyond.

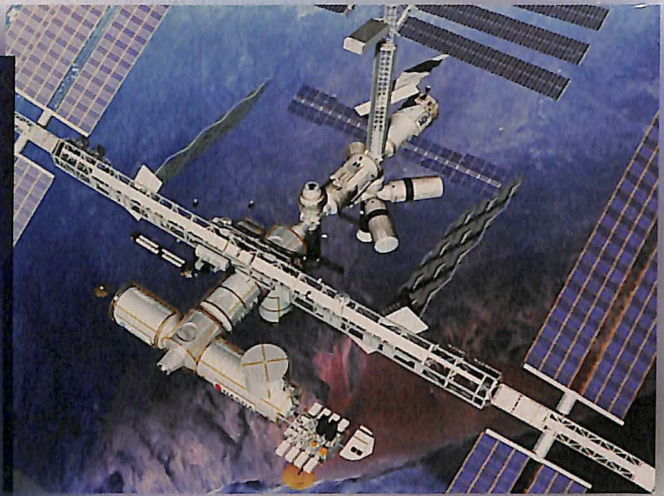
In a restructuring of the research effort earlier known as the National Aerospace Plane (NASP) program, DoD and NASA dropped plans to build a scramjet-powered single-stage-to-orbit vehicle. Instead, under the HySTP program, subscale unpiloted scramjet test vehicles will be boosted by surplus intercontinental ballistic missiles for tests of hypersonic propulsion technologies.

The DoD/NASA plan contemplates a series of flight tests beginning in 1997 and running through the year 2000 at the rate of one a year. The program is managed by a DoD/NASA Joint Program Office at Wright-Patterson Air Force Base. Complementing the work of NASA and DoD is a contractor team that includes Lockheed Fort Worth, McDonnell Douglas, Rockwell North American, Rockwell Rocketdyne, and Pratt & Whitney, a division of United Technologies Corporation.



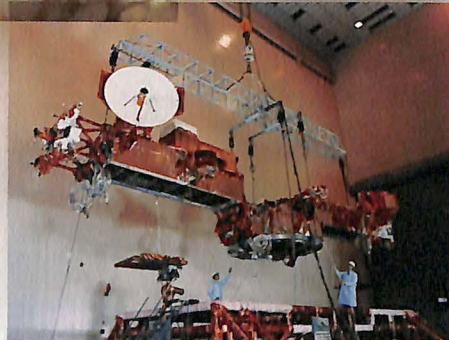
ROCKWELL INTERNATIONAL CORPORATION

Space Shuttle *Columbia* is launched from Kennedy Space Center on mission STS-62. The March flight was one of seven successful Shuttle missions in 1994.



BOEING DEFENSE & SPACE GROUP

A new international Space Station design was approved and Russia formally became a member of the development team. Boeing was awarded the prime contract for Station development and integration; principal subcontractors are McDonnell Douglas Aerospace and Rockwell Rocketdyne.



LOCKHEED MISSILES & SPACE COMPANY

In February, the first Air Force/Lockheed Milstar military communications satellite was delivered to orbit. Milstar is pictured in pre-launch preparation for a thermal vacuum chamber test.

The major civil space highlight of the year was another restructuring of NASA's Space Station program in which the Space Station *Freedom* plan was scrapped in favor of a redesigned project with a leaner management team, a smaller price tag, and a faster development schedule. Responsibility for design, development, and integration of the International Space Station was assigned in a single prime contract awarded to Boeing Defense & Space Group; co-anchors of the contractor team are McDonnell Douglas Aerospace and Rockwell Rocketdyne.

In June, Russia was formally brought into the International Space Station partnership. A U.S.-Russia agreement called for a Phase I effort in which Russian cosmonauts will fly on Space Shuttle missions and U.S. astronauts will visit the *Mir* Space Station; a Phase II effort in which Russian equipment will be used in assembling the initial human-tended configuration of the Space Station; and

a Phase III effort involving full Russian participation in Space Station development, component launches, and assembly.

In flight activity, NASA launched seven successful Space Shuttle missions with a total flight time of 81 days in orbit. The missions included:

- STS-60, Orbiter *Discovery*, launched February 4, which carried NASA's experimental Wake Shield Facility for crystal growing in microgravity, and kicked off the U.S.-Russia crew exchange effort with cosmonaut Sergei Krikalev aboard the Orbiter.
- STS-62, Orbiter *Columbia*, March 4, which carried into orbit for the second time the U.S. Microgravity Payload, a group of experiments intended to advance technology for better semiconductors and stronger metal alloys.

McDONNELL DOUGLAS AEROSPACE

In June, the company's DC-X single-stage-to-orbit prototype flew a successful suborbital flight. In August, the company received a NASA contract for reconfiguring the DC-X to test advanced space-boost technologies.



The Air Force Global Positioning System (GPS) achieved full operational capability with the launch of the 24th Rockwell-built GPS satellite in March. It was launched by a McDonnell Douglas *Delta II* booster.



HUGHES SPACE AND COMMUNICATIONS COMPANY

In June, a Martin Marietta *Atlas I* launch vehicle orbited the Navy's Ultra-High Frequency Follow-On Satellite, built by Hughes and one of a constellation of 10 that will provide global communications for the Department of Defense.

The first launch of the Air Force *Titan IV* with the new Centaur upper stage took place in February. The payload was the Lockheed-built Milstar satellite.



MARTIN MARIETTA ASTRONAUTICS

- STS-59, Orbiter *Endeavour*, April 9, the first of two 1994 flights of the International Space Radar Laboratory.
- STS-65, Orbiter *Columbia*, July 8, the second flight of the International Microgravity Laboratory.
- STS-64, Orbiter *Discovery*, September 9, a demonstration of space-based laser utility in atmosphere sensing, together with deployment and retrieval of the SPARTAN free-flying solar observatory.
- STS-68, Orbiter *Endeavour*, September 30, the second flight of the International Space Radar Laboratory.
- STS-66, Orbiter *Atlantis*, November 3, the third flight of the Atmospheric Laboratory for Applications and Sciences.

Principal Space Shuttle contractors are Rockwell International Corporation (Orbiters and main engines), Thiokol Corporation (solid rocket boosters), and Martin Marietta Corporation (external tank).

In other spaceflight activity:

- In January, the *Clementine* low-cost space probe, developed by the Ballistic Missile Defense Organization, successfully completed a Moon-mapping project.
- In February, the first Air Force Milstar high-capacity communications satellite, built by Lockheed Missiles & Space Company, was boosted into orbit by a Martin Marietta *Titan IV* launch vehicle.
- In March, the 24th Block II Navstar Global Positioning System (GPS) satellite, built by Rockwell International, was successfully deployed in orbit, completing the GPS constellation.



AEROJET, A SEGMENT OF GENCORP

Aerojet signed an agreement with the Russian Samara Scientific/Technical Complex to adapt and market the NK-33 rocket engine (shown) and future derivatives for use on U.S. launch vehicles.

MARTIN MARIETTA ASTRONAUTICS

Technicians examine solar panels for the Telstar 401 communications satellite in development.



LOCKHEED MISSILES & SPACE COMPANY

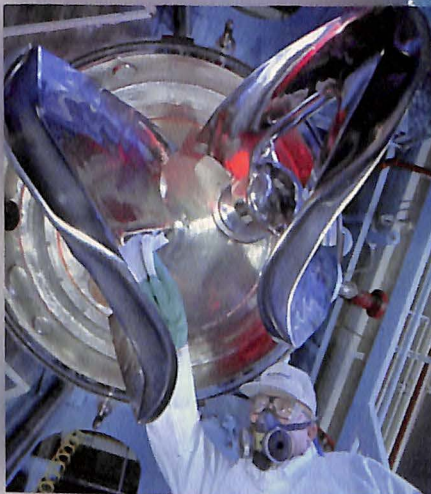
An inert engineering model of Lockheed's *Pathfinder* Launch Vehicle-1 stands on the launch pad at Vandenberg Air Force Base's Launch Complex 6.

- In June, an *Atlas I* launch vehicle orbited the Navy's Ultra-High Frequency Follow-On Satellite, one of a constellation built by Hughes Space and Communications Company. The launch of the *Atlas* was the first under the aegis of Martin Marietta.
- In June, the McDonnell Douglas DC-X prototype space booster flew a 136-second suborbital flight and descended vertically to a landing. In August, McDonnell Douglas Aerospace received a NASA contract for reconfiguration of the DC-X to test new technologies designed for lower-cost access to space. The first flight of the modified vehicle was targeted for the spring of 1996.
- The *Ulysses* spacecraft became the first vehicle in history to reach a polar region of the Sun when it passed over the southern polar area on June 26, after a journey of almost four years.
- The GOES-8 (Geostationary Operational Environmental Satellite), operated by the National Oceanic and Atmospheric Administration, was launched into orbit in April. Space Systems/Loral is the spacecraft contractor, and ITT Aerospace/Communications is a major subcontractor for the Imager and Sounder subsystems.
- In August, a *Pegasus XL* air-launched booster successfully launched the Air Force Advanced Photovoltaic and Electronic Experiments (APEX) spacecraft, intended for study of space radiation and plasma. *Pegasus* is built by Orbital Sciences Corporation.
- Hughes Aircraft's DirecTV, DBS-2 satellite was delivered to orbit by an *Atlas IIA* rocket built by Martin Marietta Commercial Launch Services. Launched in August, the satellite is operated by Hughes DirecTV Inc., a subsidiary of General Motors Hughes Electronics.

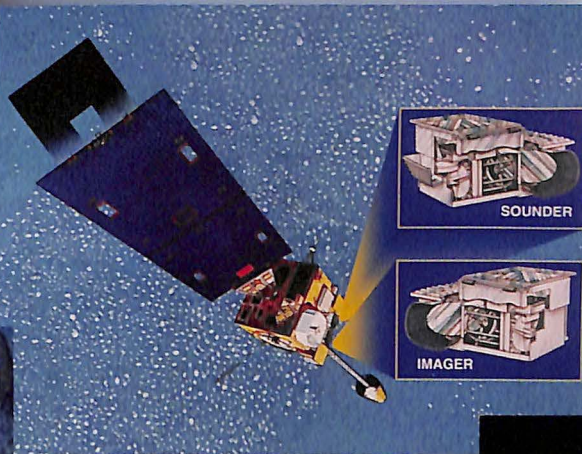


MCDONNELL DOUGLAS AEROSPACE

Integrated with the Russian-built Mars Rover, a robotic manipulator developed by McDonnell Douglas conducted scientific tests at a crater in the Mojave Desert. The findings are to be incorporated into future telerobotic planetary explorers.



LORAL VOUGHT SYSTEMS CORPORATION, ITT DEFENSE AND ELECTRONICS INC.



The National Oceanic and Atmospheric Administration's GOES-8 advanced meteorological satellite was orbited in April. Space Systems/Loral built the spacecraft, and ITT Aerospace/Communications built the Sounder and Imager subsystems.

THIOKOL CORPORATION

Thiokol solid rocket boosters were used on seven Space Shuttle missions in 1994. In photo, a motor is undergoing inspection at Thiokol's main plant.



ROHR, INC.

In production at Rohr are solid rocket motor casings for the Martin Marietta Titan IV launch vehicle.

- In August, a Martin Marietta *Atlas E* boosted into orbit the Defense Meteorological Satellite Program's F-12 weather satellite, the seventh of nine spacecraft in the Block 50-2 series. The satellite is built by Martin Marietta Astro Space.
- In October, an Intelsat 703 communications satellite, built by Space Systems/Loral, was boosted into orbit by a Martin Marietta *Atlas II*.
- In November, a McDonnell Douglas *Delta II* booster launched NASA's *Wind* scientific spacecraft to study the properties of the solar wind as it interacts with Earth's magnetic field and atmosphere. The satellite is built by Martin Marietta Astro Space.
- In December, the National Oceanic and Atmospheric Administration's NOAA-14 weather satellite was successfully sent into orbit. The spacecraft was built by Martin Marietta.

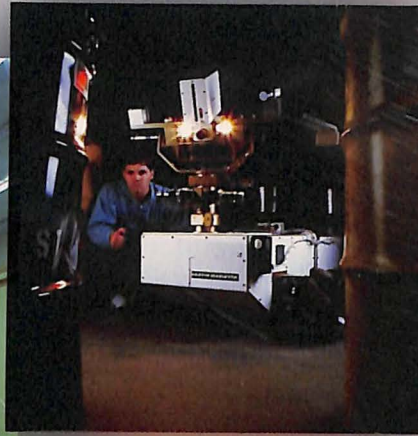
Among major development programs, NASA listed as its "top priority" a new low-cost reusable launch vehicle to replace the Space Shuttle. Tentatively known as the RLV (Reusable Launch Vehicle), the craft would be a single-stage-to-orbit (SSTO) vehicle with faster turnaround times than the Shuttle can achieve.

NASA plans a two-year program of SSTO technology development, focusing on those technologies needed for construction of an experimental X-33 SSTO vehicle to be test flown in the late 1990s. A key part of this program will be flights of an extensively modified McDonnell Douglas DC-X, a subscale SSTO prototype. The DC-X will be a flying testbed for evaluating advanced composite materials technology, which NASA sees as the critical factor in developing a second-generation RLV.



ROCKWELL INTERNATIONAL CORPORATION

In development at Rockwell's Space Systems Division is the U.S. segment of the Space Shuttle/*Mir* docking system.



MARTIN MARIETTA ASTRONAUTICS

An engineer tests the Hazmat Rover robot developed by Martin Marietta to test and monitor stored hazardous materials.



MARTIN MARIETTA ASTRONAUTICS, LORAL VUGHT SYSTEMS CORPORATION

In October, a Martin Marietta *Atlas II* successfully boosted the Intelsat 703 communications satellite into geosynchronous orbit. Space Systems/Loral built the spacecraft.



WESTINGHOUSE ELECTRIC CORPORATION

Westinghouse's Space Division developed a mass solder reflow process in which solder paste applied between electrical components is melted, allowing the paste to bond chemically. This is one of several automation advancements in the division's manufacture of space electronics.

In other developmental areas:

- Martin Marietta Technologies, Inc. was selected by NASA to build the first spacecraft in the Mars Surveyor program, a decade-long effort designed to send both an orbiter and a surface lander to the Red Planet about every two years. Martin Marietta will build the Mars Global Surveyor, scheduled for launch in November 1996. Martin Marietta also won a NASA contract for construction of the Mars *Pathfinder* "aeroshell," a heat shield and casing made of advanced composite materials; the aeroshell will slow the *Pathfinder* for a Mars landing.
- The Air Force is developing an advanced Milstar II military communications satellite system, with Lockheed Missiles & Space Company as prime contractor and Hughes Aircraft/TRW Inc. as major subcontractors for communications payloads. The Air Force plans to orbit four Milstar IIs through 2004.

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from January 1994 to May 1994. Mr.
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that time.

Executive Committee

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