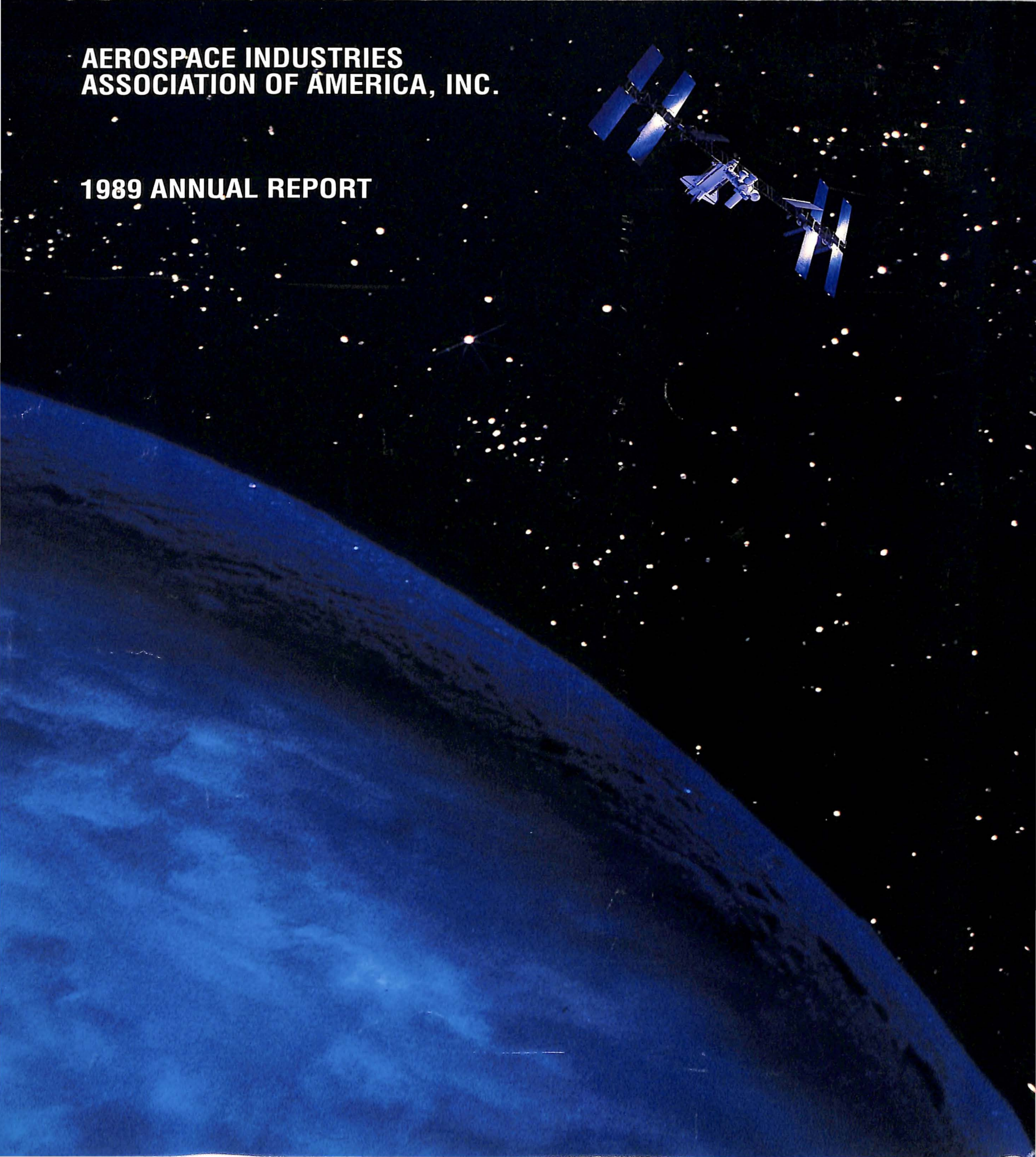


**AEROSPACE INDUSTRIES
ASSOCIATION OF AMERICA, INC.**

1989 ANNUAL REPORT



AIA PRESIDENT'S MESSAGE



he aerospace year 1989 was a year of change, a time of adjusting to new realities heralded by dramatic shifts in the world political environment, continuing competition in the global marketplace, and a major revision of U.S. defense goals.

It was also a year of encouraging progress for the Aerospace Industries Association and a year of solid accomplishment for the industry AIA represents. Preliminary data show that the aerospace industry set new records for sales (\$120.6 billion), backlog (\$223.1 billion), exports (\$31.4 billion), and trade balance (\$20.9 billion).

Despite the rise in sales volume, the industry's profit fell from \$4.9 billion in 1988 to \$4.3 billion in 1989. There are several reasons, among them profit-restricting government policies and practices, lower defense production rates, and a competitive squeeze on commercial sales.

For 1990, AIA is projecting total industry sales of \$137 billion. This sharp upturn is due, first of all, to an anticipated dramatic increase in commercial aircraft deliveries and, secondly, to the fact that long lead times have delayed the impact on industry sales of five consecutive negative-growth defense budgets.

However, the decline in defense activity is already evident in a substantially reduced flow of new orders for defense systems and that will translate into lower levels of defense sales in the 1990s. AIA believes that robust civil aircraft sales and significantly expanded space workload will offset to considerable degree the indicated reduction in defense business.

In AIA's view, therefore, reduced defense procurement funding may have a serious but not catastrophic effect on overall industry sales. For the industry as a whole, we are forecasting a moderate decline in real, inflation-adjusted sales volume for the decade of the 1990s.

Through its structure of staff offices, councils, and committees, AIA made notable progress toward attainment of industry objectives and resolution of major issues.

Much of the association's activity centered on the Top Ten Issues, those targeted for special attention by virtue of their singular importance to the aerospace industry. During the year AIA consolidated and refined the list to reflect changing circumstances and emerging new concerns. The revised list appears on page 51.

Among advancements of particular note within the issue framework were several pertinent to improvement of the industry's financial health.

Responding to an opportunity to present industry's views on the *Defense Management Report*, AIA sent a letter to the Deputy Secretary of Defense in September detailing twenty areas in which the aerospace industry urges policy changes by the Department of Defense (DoD). Additionally, AIA—through the Council of Defense and Space Industry Associations—endorsed DoD's effort to reform the procurement regulatory system, provided an initial input to DoD's comprehensive review of acquisition regulations, and initiated a Phase II effort to develop further the initial recommendations submitted to DoD.

In November, following up the 1988 MAC Group study of the aerospace industry's financial prospects in defense manufacturing, AIA established an ad hoc Committee on Financial Health. Composed of industry CEOs, the committee will seek to make the point with DoD and Congress that the MAC Group's predictions are, in fact, happening: industry profits are declining and industry debt is increasing dramatically as a result of restrictive government procurement policies that are working to the detriment of the industry's financial health and the defense industrial base.

AIA also renewed its efforts to spur increased public awareness of the benefits to the nation of Independent Research and Development (IR&D) and the need to recognize IR&D as a normal cost of doing business. In September, AIA—joined by NSIA and EIA—released an IR&D white paper and started a series of briefings to senior officials of DoD and Congress.

Among other activities of 1989 relative to the Top Ten Issues, AIA

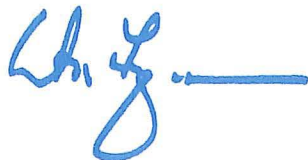
- Sought to enlist the support of other industry associations toward promoting broader defense industry participation in ethics and self-governance programs.
- Launched the industry-sponsored National Center for Advanced Technologies, formed to coordinate the *Key Technologies for the 1990s* program, and developed plans for a February 1990 symposium to seek a national consensus on a strategic plan for rocket propulsion development.
- Expanded the Office of Civil Aviation to reflect the growing importance of that activity and—in November—approved a charter to establish a Civil Aviation Council that will enable senior industry management to participate in determining civil aviation policy objectives.
- Made solid progress in increasing the percentage of subcontract awards to Small Disadvantaged Businesses from 1.9% at the beginning of the year to 2.3% at the end of September.
- Conducted the *Aerospace Education 2000* inventory of education concerns and resources to determine the industry's present and future workforce needs and to detail industry's current efforts toward improving education in the U.S.
- Initiated, in concert with other industry associations, the National Industrial Security Program intended to standardize security practices to improve protection while lowering costs through elimination of duplicative requirements.

We are fortunate to have the sincere commitment of top-level aerospace industry management to pursue aggressively the association's objectives. The support and active participation of our member companies' CEOs is truly impressive.

They are contributing generously of their time and expertise in service on the Board of Governors, the Executive Committee, and in a number of special CEO committees that are developing industry positions on such matters as tax reform, IR&D, materiel management accounting, civil aviation quality assurance, rights in technical data, and the financial health of the industry.

This extensive involvement of senior management, coupled with the broad expertise of our councils, committees, and professional staff has created a most effective "AIA Team" and established the association as the principal voice of our high-technology industry. Our dynamic teamwork encourages the conviction that we will successfully negotiate the hazards of a rapidly changing aerospace and defense environment.

Don Fuqua
President



1989 AIA BOARD OF GOVERNORS

Executive Committee

Member company representatives comprise AIA's Board of Governors. The board

supervises, manages, and directs the property, finances, and business of the association and determines its policies.

Each year the Board of Governors elects an Executive Committee from its members to exercise power when the board is not in session. The chairman and vice chairman of the board are elected from the Executive Committee. The president, who also serves as the association's general manager, directs AIA's activities and is supported by a professional staff.

The continued active involvement in 1989 of member company CEOs and other top management in conveying industry's message to Congress and other government officials evoked changes that benefited both the industry and the nation.

Officers

Caleb B. Hurtt, *Chairman*

Stanley C. Pace, *Vice Chairman*

Don Fuqua, *President*

George F. Copsey, *Secretary-Treasurer*

Executive Committee

William A. Anders, *Senior Executive Vice President, Operations, Textron Inc.*

Edsel D. Dunford, *Executive Vice President & General Manager, Space & Defense Sector, TRW Inc.*

D. Travis Engen, *President & Chief Executive Officer, ITT Defense, Inc.*

Don Fuqua, *President, Aerospace Industries Association*

Edward E. Hood, Jr., *Vice Chairman of the Board & Executive Officer, General Electric Company*

Caleb B. Hurtt, *President & Chief Operating Officer, Martin Marietta Corporation*

John O'Brien, *Chairman, President & Chief Executive Officer, Grumman Corporation*

Stanley C. Pace, *Chairman & Chief Executive Officer, General Dynamics Corporation*

Robert N. Burt, *Executive Vice President, FMC Corporation*

Leigh Carter, *President & Chief Operating Officer, The BF Goodrich Company*

Malcolm R. Currie, *Chairman & Chief Executive Officer, Hughes Aircraft Company, General Motors Corporation*

Gerald W. Ebker, *President, IBM Systems Integration Division, IBM Corporation*

Roy H. Ekrom, *President, Allied-Signal Aerospace Company*

Phillip W. Farmer, *President, Electronic Systems Sector, Harris Corporation*

U. Edwin Garrison, *President & Chief Executive Officer, Thiokol Corporation*

Raymond A. Hay, *Chairman & Chief Executive Officer, The LTV Corporation*

Sam F. Jacobellis, *President, Aerospace Operations, Rockwell International Corporation*

E. Gene Keiffer, *Chairman & Chief Executive Officer, E-Systems, Inc.*

Kent Kresa, *President & Chief Operating Officer, Northrop Corporation*

John F. McDonnell, *Chairman & Chief Executive Officer, McDonnell Douglas Corporation*

D. Larry Moore, *President, Space & Aviation Systems, Honeywell Inc.*

David H. Mullins, *Chairman, Chief Executive Officer & President, Argo-Tech Corporation*

Dennis J. Picard, *President, Raytheon Company*

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

Daniel M. Tellep, *Chairman & Chief Executive Officer, Lockheed Corporation*

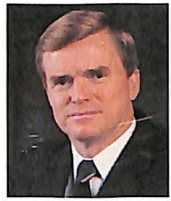
Harry W. Todd, *Chairman, President & Chief Executive Officer, Rohr Industries, Inc.*

Arthur E. Wegner, *Executive Vice President, United Technologies Corporation & President, Aerospace/Defense*

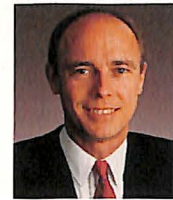
Ken E. Woodgrift, *President, Chief Executive Officer & Chairman, Ferranti Defense & Space Inc.*



William A. Anders, *Senior Executive Vice President, Operations, Textron Inc.*



Edsel D. Dunford, *Executive Vice President & General Manager, Space & Defense Sector, TRW Inc.*



D. Travis Engen, *President & Chief Executive Officer, ITT Defense, Inc.*



Don Fuqua, *President, Aerospace Industries Association*

Edward E. Hood, Jr., *Vice Chairman of the Board & Executive Officer, General Electric Company*

Caleb B. Hurtt, *President & Chief Operating Officer, Martin Marietta Corporation*



John O'Brien, *Chairman, President & Chief Executive Officer, Grumman Corporation*



Stanley C. Pace, *Chairman & Chief Executive Officer, General Dynamics Corporation*



Phillip W. Farmer, *President, Electronic Systems Sector, Harris Corporation*



U. Edwin Garrison, *President & Chief Executive Officer, Thiokol Corporation*

AIA SENIOR STAFF

T

o assist in fulfilling its mission to the aerospace industry, AIA is organized into departments, each led by a senior staff professional. Departments support the efforts of the member-comprised councils, committees, subcommittees,

task groups, advisory groups, and ad hoc groups.

AIA staff relays technical, policy, and administrative developments to members through regular and special meetings, workshops, seminars, special reports, routine memoranda, and regular publications.

A full report of association activities begins on page 26.



Seated, left to right: Stan Siegel, *Vice President, Technical and Operations*; George F. Copsey, *Secretary-Treasurer*; Sandra W. Wobbe, *Assistant Vice President, Policy and Planning*; Virginia C. Lopez, *Executive Director, Research Center*; Joel L. Johnson, *Vice President, International*; Herbert E. Hetu, *Vice President, Communications*
Standing, left to right: Robert E. Robeson, Jr., *Vice President, Civil Aviation*; Thomas N. Tate, *Vice President, Legislative Affairs*; Don Fuqua, *AIA President*; LeRoy J. Haugh, *Vice President, Procurement and Finance*; Daniel J. Nauer, *Vice President, Human Resources*

AEROSPACE HIGHLIGHTS 1989

Among the most significant events involving defense systems in 1989 was the successful first flight of the U.S. Air Force (USAF)/Northrop B-2 low-observable (stealth) bomber. The flight, on July 17, took the B-2 from the Palmdale, California, airport to the USAF's flight test center at Edwards Air Force Base, California. During the remainder of the year, seven additional test flights were accomplished.

Four General Electric (GE) F118-100 engines power the B-2. Other major subcontractors include The Boeing Company, LTV Aircraft Products Group, Hughes Radar Systems, Honeywell, and Link Flight Simulation Corporation.

The USAF's F-117A stealth fighter/bomber made its combat debut in December, conducting a token bombing mission during U.S. military operations in Panama. The Department of Defense (DoD) continued to maintain a shroud of secrecy about the F-117A, confirming only that—as of year-end—the USAF had taken delivery of 56 of the 59 airplanes ordered. Lockheed Corporation is prime contractor.

In other advanced aircraft developments, DoD—in October—decided to extend the evaluation time for the Air Force Advanced Tactical Fighter (ATF) program by six months; the Air Force targeted June 1991 for selecting the winning contractor team for full-scale development of the ATF's stealth technology.

The YF-23A ATF prototype being developed by the Northrop/McDonnell Douglas team was shipped to Edwards Air Force Base in October; the

In December, the USAF/Lockheed low-observable F-117A made its combat debut in Panama.



other prototype, the YF-22A being developed by Lockheed/General Dynamics/Boeing, was in final assembly at year-end. Both aircraft are expected to start their flight test programs in the first half of 1990. Each defines a Navy version of the ATF. United Technologies' Pratt & Whitney unit and General Electric are competing for the ATF engine contract; the P&W F119 will fly first in the YF-23A and later in the YF-22A, while GE's F120 will initially power the YF-22A, later its competitor.



The Air Force/Northrop stealth bomber made its first flight in July and eight more in 1989.



In development and targeted for first flight in 1991 was the USAF/McDonnell Douglas C-17 airlifter.

In photo, a Lockheed concept of the YF-22A Advanced Tactical Fighter prototype being developed by a Lockheed-Boeing-General Dynamics team. At year-end, the YF-22A and its competitor—the Northrop/McDonnell Douglas YF-23A—were being readied for 1990 first flights.



Planned for new production and conversion of earlier models was the Navy/Grumman F-14D upgrade.

In May, Pratt & Whitney shipped the first set of C-17 engines to LTV Aircraft Products Group for fitting with nacelle and thrust reverser hardware, shown undergoing ground test.



The Navy's A-12 Advanced Tactical Aircraft program progressed in 1989 with the start of ground testing of the General Electric F404/F502 engine in March. In April, prime contractors General Dynamics and McDonnell Douglas selected Westinghouse Electric Corporation as subcontractor for the A-12's multifunction radar. The Navy targeted first flight for mid-year 1990 and initial operational capability of the stealth-technology A-12, which will replace the Grumman A-6 carrier-based medium attack aircraft, for the mid-1990s. The Air Force also plans to use the A-12 as a replacement for the F-111 fighter-bomber, but production and operational dates had not been established at year-end.

The Bell-Boeing V-22 Osprey tilt-rotor military aircraft began its flight test program in March at the Bell Helicopter Textron facility in Arlington, Texas. Tests, including full conversions, continued throughout the year with two prototypes flying.

In development and early production status during the year was the USAF/McDonnell Douglas C-17 airlifter. In May Pratt & Whitney shipped the first set of C-17 engines to LTV Aircraft Products Group for fitting with nacelle and thrust reverser hardware. They were to be installed later in the year on the Number One C-17, targeted for first flight in 1991.

In progress during 1989 were a number of military aircraft upgrade programs intended to provide enhanced capability for 1990s operation of aircraft originally introduced to service in the 1980s or earlier. Among such programs were the USAF/General Dynamics Block 40 and Block 50 F-16. The Block 40 has provisions for two Low Altitude Navigation and Targeting Infrared for Night (Lantirn) pods. The Block 50 features an Improved Performance Engine (IPE), plus advances in radar, warning, and communications



The Bell-Boeing V-22 Osprey tilt rotor military aircraft began its flight test program in March. The photo shows the first formation flight of two prototypes, accomplished in November.



The Northrop-built Tacit Rainbow radar suppression missile, to be carried by Air Force and Navy aircraft, was successful in several test flights.

In August, Sikorsky delivered to the Navy the first of 18 HH-60H combat support helicopters.

equipment. Both Pratt & Whitney and General Electric's Aircraft Engine Division designed the IPE powerplant for the F-16 and made first deliveries just before year-end.

The Navy programmed both new production and remanufacture of earlier Grumman F-14s to the F-14D configuration, which features an advanced General Electric F110 engine, a new radar, digital avionics, and structural improvements.

The USAF/McDonnell Douglas F-15E made its first flight in July with power supplied by a General Electric F110-129 Improved Performance Engine. This marked the start of a 26-flight test program to evaluate the performance of the IPE-powered F-15.

The first of two Air Force YA-7F prototypes being built by LTV Aircraft Products Group made its initial flight in November; the second prototype was being readied for flight early in 1990. The YA-7F is an upgraded A-7D equipped with a Pratt & Whitney F100-200 turbo fan. A 10-month flight test program will provide a basis for determining whether all A-7Ds will be upgraded to A-7Fs for the Air National Guard.

Grumman was developing an upgraded version of its EA-6B Navy electronic warfare aircraft designated the EA-6B ADVCAP (for advanced capability). The new version features improvements in navigation systems, jamming capability, and aircraft maneuverability.

In August, McDonnell Douglas Helicopter Company received an Army contract for an AH-64 Apache helicopter upgrade program. The program



Planned for initial operational capability in April 1990, the Navy's Lockheed-built Trident II missile scored successes on several underwater launches.

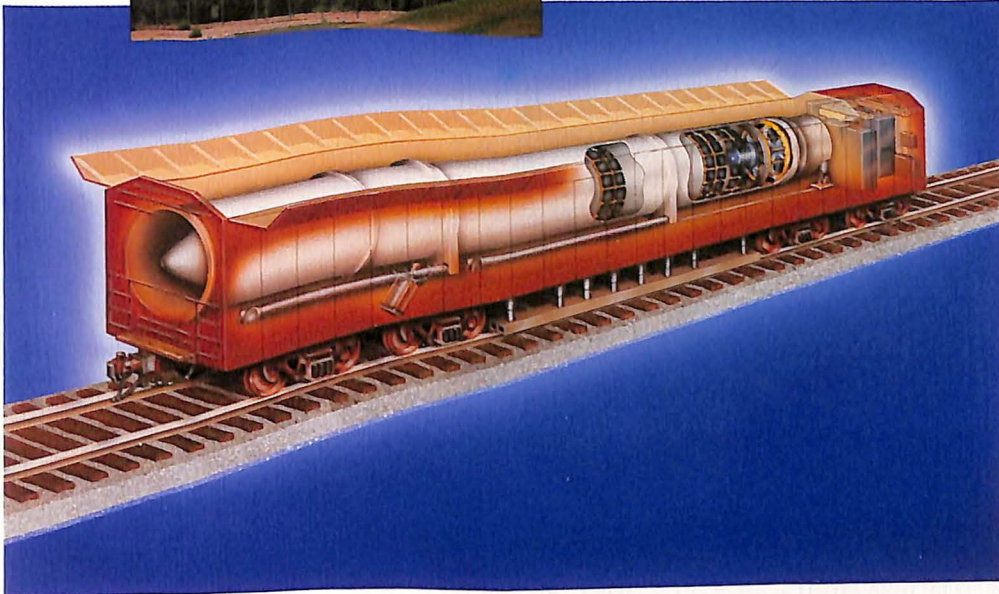


The first of two Air Force/LTV YA-7F prototypes made its initial flight in November.

In August, McDonnell Douglas Helicopter Company received an Army contract for an AH-64 helicopter upgrade program.



First flight of the Navy/Lockheed ES-3A electronic reconnaissance aircraft took place in September; Lockheed is modifying 16 S-3A patrol aircraft to the "E" configuration.



In December, the Air Force announced a plan to deploy 50 Peacekeeper ICBMs aboard rail cars at seven USAF bases. In the photo, the launch car and canister being developed by Westinghouse Electric Corporation's Marine Division.



In August, a second Joint STARS modified Boeing 707 joined the first prototype in a developmental flight test program. Grumman is prime contractor for Joint STARS, a USAF/Army airborne battlefield management system.



Developed by LTV Missiles and Electronics Group, the Army's TACMS (Tactical Missile System) completed its developmental test phase in December.

involves modification of 227 Apaches to incorporate a new fire-control radar, provisions for Stinger air-to-air missiles, and new navigational and cockpit systems.

In other military aircraft developments of 1989:

- The Navy/Lockheed ES-3A carrier-based electronic reconnaissance aircraft began a 21-month flight test program in September.

- McDonnell Douglas started deliveries of night attack F/A-18 Hornets in November. The night attack craft includes the F/A-18C single seater and the F/A-18D two-seat version; the Navy will use the latter as a trainer, the Marine Corps as an attack aircraft.

- The second prototype Joint STARS (Surveillance and Target Attack Radar System) aircraft made its first flight in August, joining the Number One aircraft already in flight test. Joint STARS aircraft are modified Boeing 707s being developed by Grumman Melbourne Systems for USAF/Army target detection and classification.

- In August, Sikorsky Aircraft delivered to the Navy the first of 18 HH-60H Helicopter Combat Support aircraft.

- In missile activity, the Lockheed-built Trident II (D-5) submarine-launched ballistic missile development program continued with a series of underwater launches from the *USS Tennessee*. In December, the Navy accelerated the test schedule to meet the targeted initial operational capability of April 1990.

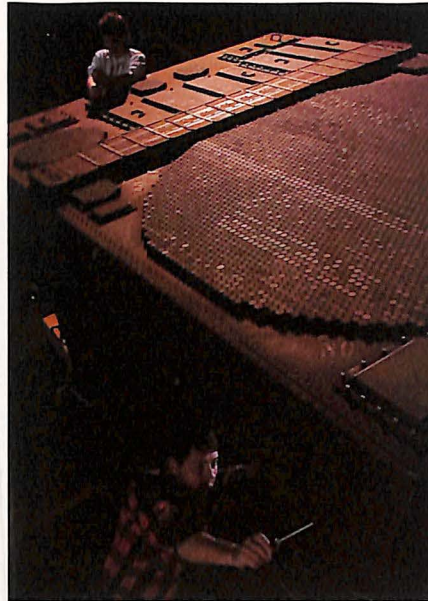
The Air Force announced a plan in December whereby the 50 Peacekeeper ICBM missiles now based in silos will be deployed in a mobile "rail garrison" mode. Under the plan, the missiles will be garrisoned at seven USAF bases aboard 25 rail cars, each carrying two missiles; in an emergency, the rail cars would be more widely dispersed on the U.S. commercial railway system. The Air Force scheduled the first rail garrison deployment for 1992 and set a tentative target of 1994 for completing the mode conversion.

Principal contractors for the rail mobile Peacekeeper System are Westinghouse Electric Corporation's Marine Division (missile launch car and canister) and Rockwell's Autonetics Electronics Systems (launch control system). Other major Peacekeeper contractors include Martin Marietta Aerospace (integration and assembly), Thiokol (first stage), Aerojet (second stage), Hercules Incorporated (third stage), Rockwell Rocketdyne (fourth stage), and Honeywell Inc. (guidance and control elements).

Development continued on the Small ICBM (SICBM) being considered as a complement to the Peacekeeper. Principal SICBM contractors are TRW Inc. (system engineering), Thiokol (first stage), Aerojet (second stage), Hercules (third stage), and Rockwell Autonetics (guidance).

The Navy's Tomahawk Sea-Launched Cruise Missile, designed for antiship operations was undergoing sea-launch tests from a submerged submarine to evaluate the weapon's capability for locating

In production was the phased array radar for the Army/Raytheon Patriot air defense missile system.



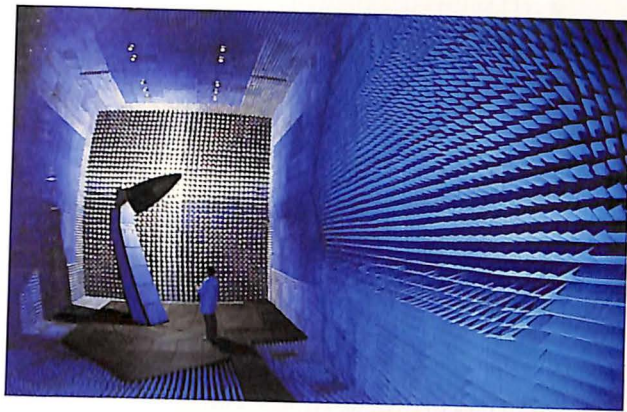
In development by Martin Marietta Electronics & Missiles Group, the Army's ADATS forward-heavy air defense system completed force development and technical testing; it was scheduled for operational tests in 1990.



The USAF West Coast Over-the Horizon (OTH) Radar System, in development by GE Aerospace, successfully passed initial tracking tests in December. The East Coast OTH has been undergoing test for two years. Two other installations are planned.



Shown undergoing test at Eglin Air Force Base, Florida, is a Hughes Aircraft-built AMRAAM (Advanced Medium Range Air-to-Air Missile). Raytheon Company is co-producer of AMRAAM, to be carried by several advanced USAF and Navy Aircraft.



E-Systems was developing advanced airborne sensors for military applications; in photo, the company's anechoic chamber used for sensor testing.

Celion Carbon Fibers, a unit of BASF Structural Materials, Inc., began construction of what will be the world's largest carbon fiber production line, to be operational in 1990.



In February, the Army announced award of a contract to the team of Texas Instruments and Martin Marietta for development of the AAWS-M (Advanced Antitank Weapon System-Medium).

intended to enhance the antiarmor and anti-aircraft capabilities of the AM-64 Apache and LHX helicopters. The development team is headed by Martin Marietta and Westinghouse, with Rockwell International a principal subcontractor for integration of the Hellfire missile into the system.

- In February, the Army announced award of a contract for development of the Advanced Antitank Weapon System-Medium (AAWS-M) to the industry team of Texas Instruments and Martin Marietta.

- In December, the Navy completed a 10-flight series of technical evaluation tests on the Standoff Land Attack Missile (SLAM) and prepared to start operational testing. McDonnell Douglas Missile Systems is prime contractor for development of SLAM, an air-launched Harpoon derivative.

- In November, the AGM-130 standoff weapon system successfully completed the sixth of a nine-flight operational test and evaluation series, the first flight employing the F-111 fighter/bomber as the launcher. The AGM is a powered derivative of the GBO-15 glide bomb developed by Rockwell Autonetics.

- In December, the Navy Crossbow air defense system completed a two-week sea trial. In development by LTV Missiles and Electronic Group, Crossbow features a stabilized platform that keeps weapons and sensors on target despite rough sea conditions. It is designed for use with several types of weapons, including Hellfire missiles.

and attacking sea targets. General Dynamics and McDonnell Douglas are the Sea Tomahawk's contractors.

In January, the Navy initiated flight testing of the Sea Lance antisubmarine cruise missile, which is being developed by Boeing Aerospace.

The Army's Tactical Missile System (TACMS) entered low-rate production and the Army completed the developmental test phase late in 1989.

Designed for antipersonnel and antiarmor operations, TACMS is fired from a modified version of the launcher/transporter originally developed for the Army's Multiple Launch Rocket System. LTV Missiles and Electronics Group is the TACMS prime contractor.

In other missile activity:

- Flight testing of the air-launched Air Force/Navy Tacit Rainbow radar suppression missile continued with several successes in nine of a planned 25 flights. Northrop Corporation is developing the air-launched version, Raytheon Company a ground-launched version.

- Development continued on the Navy AAAM (Advanced Air-to-Air Missile), a four-year demonstration/validation effort initiated in 1988. AAAM is intended as a replacement for the AIM-54 Phoenix. The two competing industry teams are Hughes/Raytheon and General Dynamics/Westinghouse Electric Systems.

- In development for the Army was the Airborne Adverse Weather Weapon System



Smiths Industries' Standard Flight Data Recorder was selected for the Navy P-7A antisubmarine warfare aircraft under development by Lockheed.



AEROSPACE HIGHLIGHTS 1989

The main highlights of the civil space year were two Space Shuttle flights that dispatched planetary explorers to Venus and Jupiter, marking the initial efforts in a reinvigorated National Aeronautics and Space Administration (NASA) Space Science Program.

On May 4, the Space Shuttle Orbiter *Atlantis* (STS-30) deployed the Magellan spacecraft, which was to make a 15-month journey to Venus, then conduct extensive radar mapping of the planet with unprecedented resolution. Martin Marietta Astronautics is prime contractor for the spacecraft and Hughes Aircraft developed the radar sensor.

Atlantis was again the Orbiter on Shuttle flight STS-51, launched October 18 to deploy the Galileo spacecraft, which began a circuitous six-year flight to Jupiter. En route to Jupiter, Galileo will fly close to and photograph a main belt asteroid known as Gaspra.

Arriving at Jupiter, the spacecraft will release a Jovian atmospheric probe, make its closest approach on December 7, 1995, then swing into orbit around Jupiter and become a man-made imaging satellite of Jupiter. Jet Propulsion Laboratory designed and built the main spacecraft, Hughes Aircraft the atmospheric probe.

In other Space Shuttle missions, the Orbiter *Discovery* was launched March 13 on a successful delivery of TDRS-4, the third operational Tracking and Data Relay Satellite. The satellites are built by the

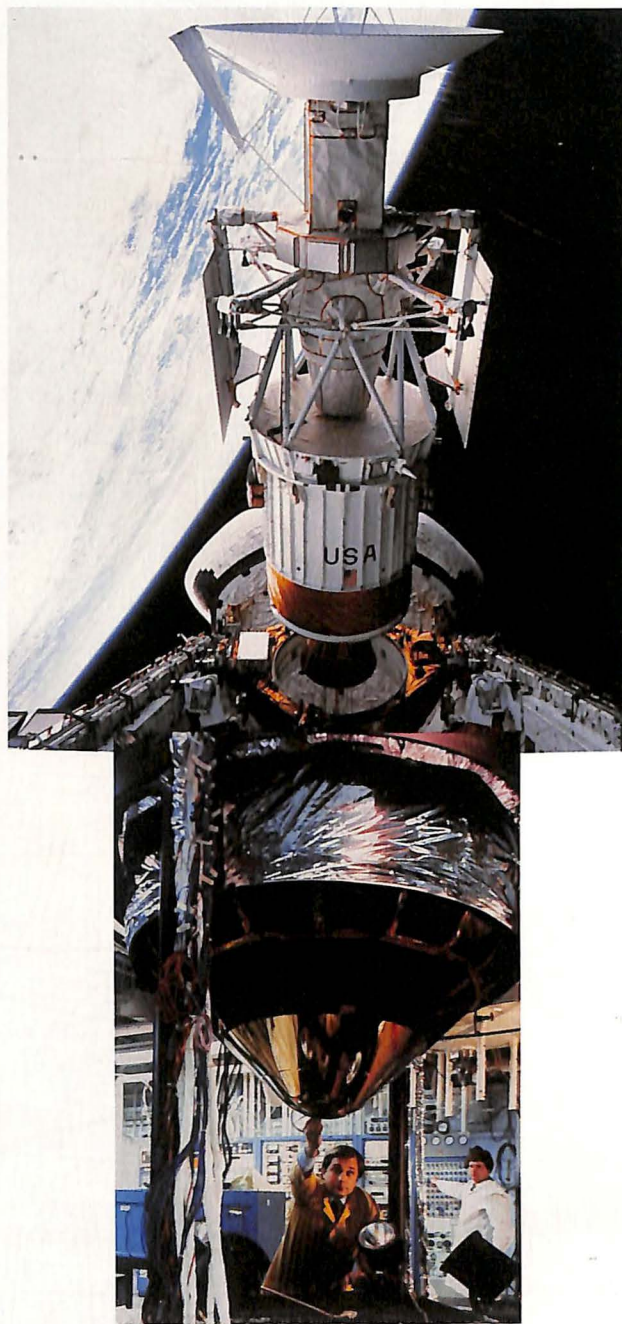
Defense and Space Systems Group of TRW Inc.

NASA launched STS-28, Shuttle Orbiter *Columbia*, on August 8 on a classified Department of Defense (DoD) mission. A second DoD mission (STS-33), also classified, was launched on November 22 aboard the Orbiter *Discovery*.

At year-end, Orbiter *Columbia* was on the launch pad at Kennedy Space Center being readied for STS-32, which involved delivery of the Navy/Hughes Syncom IV advanced fleet communications satellite and recovery of the multi-experiment LDEF (Long Duration Exposure Facility). (Note: both objectives were accomplished in January 1990.) Principal contractors for the Space Shuttle program are Rockwell International (Orbiter and main engines), Thiokol (solid rocket boosters), and Martin Marietta (external tank).



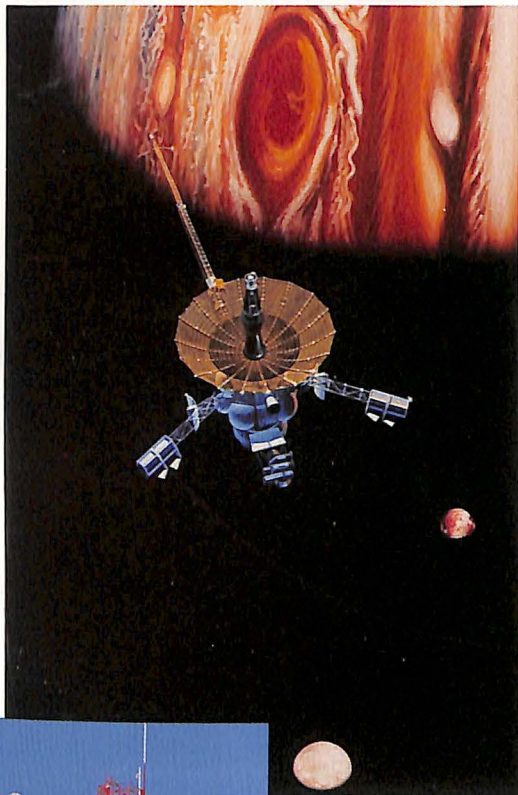
In May, NASA launched the Martin Marietta-built Magellan spacecraft toward Venus for extensive radar-mapping of the planet by a Hughes Aircraft radar sensor. A Thiokol STAR 48 rocket motor will thrust Magellan into Venesian orbit in August 1990.



Shown in pre-launch test is Hughes Aircraft's Galileo probe, which will depart the main spacecraft during approach to Jupiter and descend into the planet's atmosphere.

Orbiter *Discovery* launched the third TRW-built Tracking and Data Relay Satellite (TDRS) in March. Harris Corporation built the spacecraft antennas pictured and the antennas for the TDRS ground station at White Sands, New Mexico.

A Harris Corporation concept of the Galileo spacecraft at Jupiter. Galileo was launched in October on a six-year journey to the giant planet. Harris built the antenna system that will allow Earth/Galileo communication.



In other NASA activity, Voyager 2, 12 years out of home port Earth, made the first encounter with the planet Neptune, reaching its closest point on August 24. The Voyager mission is managed by Jet Propulsion Laboratory.

NASA used a McDonnell Douglas Delta vehicle to launch the Cosmic Background Explorer (COBE) on November 18. Equipped with extremely sensitive radiation-detection instruments, COBE is operating in a 560-mile circular orbit, seeking to find evidence to support the Big Bang theory of the origin of the universe.

August 27 marked the first flight of a U.S.-built commercial launch vehicle, the McDonnell Douglas Delta 4925. The Delta successfully delivered to orbit the Marcopolo direct TV broadcast satellite, built by Hughes Aircraft's Space and Communications Group for British Satellite Broadcasting.

The initial unit of another commercial launch vehicle—the Martin Marietta Commercial Titan III—was successfully launched on December 31



Shown in pre-launch checkout, the eighth and last TRW-built Navy Fleet Satellite Communications System was launched in September.

carrying one Japanese and one British communications satellite.

In final assembly status at year-end was a third U.S. commercial launch vehicle, General Dynamics' Atlas; it was scheduled for initial launch in June 1990.

Also being prepared for first flight in 1990 was the commercially-developed, air-launched Pegasus booster, a joint venture of Orbital Sciences Corporation and Hercules Aerospace Company. In November, a Pegasus test vehicle completed its first captive flight under the wing of a B-52.

In February, the U.S. Air Force (USAF) began orbital emplacement of its Block II Navstar Global Positioning System satellites, advanced versions that will replace the existing six-satellite Block I system with a 21-satellite operational network of Block IIs. The McDonnell Douglas Delta II booster was used to orbit five Block II satellites during the year. Built by Rockwell International, the Navstars will provide an orbital base point for precise location and navigation of air, sea, and land vehicles. GE Astro-Space was awarded a contract for development of a third-generation Navstar system.



A milestone in August—the first flight of a U.S.-built commercial launch vehicle, the McDonnell Douglas Delta 4925, which delivered to orbit a Hughes-built British TV satellite.



Being readied for first flight in 1990 was the commercially-developed, air-launched Pegasus booster, a joint venture of Orbital Sciences Corporation and Hercules Incorporated.



Planned for service in the mid-1990s is the third of NASA's Great Observatories, the Advanced X-ray Astrophysics Facility being developed by TRW.

The eighth and last Navy Fleet Satellite Communications System (FLTSATCOM) satellite was boosted to geostationary orbit by a General Dynamics Atlas Centaur launch vehicle on September 25. Built by TRW Inc., the FLTSATCOM system relays communications to small terminals used by aircraft, ships, submarines, and troop units.

On May 10, the USAF launched two more of the General Electric Astro-Space built DSCS-3 (Defense Satellite Communications Systems) satellites, bringing to five the number in operational service (on an orbiting spare). The two satellites were launched together by a USAF/Martin Marietta Titan 34D launch vehicle.

Another Titan 34D—the last of the series—successfully launched a classified payload on September 4. The final launch gave the vehicle 125 successes in 145 boost attempts.

The most powerful U.S. unmanned launch vehicle, the USAF Titan IV, made its initial flight on June 14. Built by Martin Marietta, Titan IV can carry payloads up to 39,000 pounds; it will be the USAF's heavy lift workhorse into the 21st century.

On May 24, the Strategic Defense Initiative Organization launched Delta Star, the third in a series of flight tests checking out new sensors and techniques for target acquisitions,

pointing, and tracking with strategic defense systems. Major industry participants were McDonnell Douglas (Delta booster, laser radar, and orbital operations control assembly), Johns Hopkins Applied Physics Laboratory (sensor module), General Electric Astro-Space, and Hughes Aircraft (sensors).

At year-end, three major space systems were being prepared for launch in 1990:

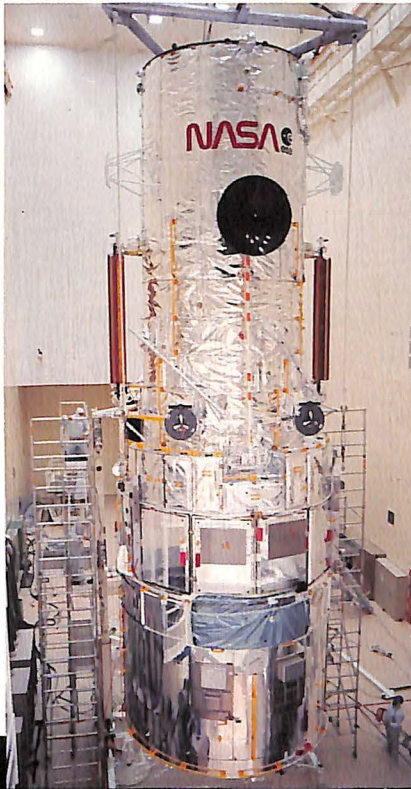
- The Hubble Space Telescope, first of NASA's planned four Great Observatories, an astronomical observatory capable of looking back in time 14-15 billion years. Hailed as the most important scientific payload ever produced, the spacecraft was developed by Lockheed Missiles & Space Company and the optical assembly by Perkin-Elmer Corporation.
- The Gamma Ray Observatory, second of the Great Observatories, which will investigate gamma radiation and its sources: pulsars, black holes, and other objects viewed only in the gamma wavelengths. TRW is NASA's development contractor.
- Ulysses, a joint NASA/European Space Agency (ESA) program involving a multiyear mission out of the plane of the ecliptic and around the poles of the Sun. Jet Propulsion Laboratory is NASA's project manager.

June 14 marked the initial flight of the USAF/Martin Marietta Titan IV, the nation's most powerful unmanned launch vehicle.



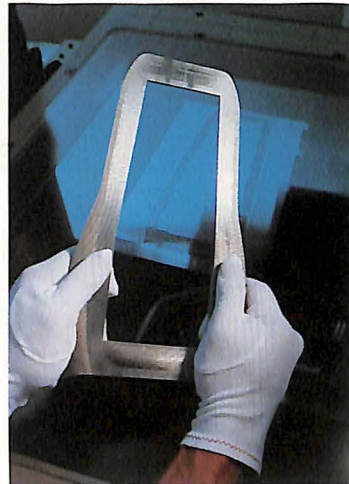
Sensors for the Defense Support System (DSP) satellites undergo test at GenCorp's Aerojet ElectroSystems plant. ElectroSystems developed the sensor payload for the TRW-built DSP satellites.

The Hubble Space Telescope was being readied for launch to orbit in April 1990. Lockheed Missiles & Space is NASA's spacecraft prime contractor.



In August, GE Astro-Space Division was selected to design and build the AT&T Telstar 4 communications satellite system. Telstar 4 will consist of three GE 7000 satellites like the one pictured.

Aerojet was employing platelet technology to cool the target-seeker window of the HEDI space interceptor, a key part of the Strategic Defense Initiative.



The centerpiece of the civil space program, Space Station *Freedom*, was undergoing design and schedule changes at year-end as a result of a shortfall in the FY 1990 budget. Changes involved some loss of capability and schedule slippage; NASA hoped to maintain the spring 1990 first Shuttle station assembly launch, but permanent manned capability with a full complement of eight astronauts may slip a year or more to 1998-99.

U.S. segments of the space station were being developed by four contractor teams headed by Boeing Aerospace Company, McDonnell Douglas, General Electric Astro-Space, and Rockwell International's Rocketdyne Division. A Grumman-led contractor team provides design and development support. One of the last major space station systems was assigned in the spring when NASA awarded a contract to Martin Marietta Space Systems for development of the Flight Telerobotic Servicer.

Under development by GE Astro-Space for 1991 launch is the Upper Atmosphere Research Satellite.



Among other NASA development programs in progress during 1989 were

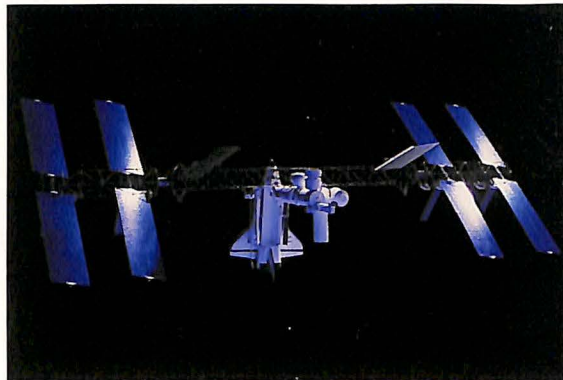
- The Orbital Maneuvering Vehicle (OMV), a remotely-piloted space tug capable of delivering, retrieving, or reboosting satellites in low Earth orbit, operating as a Space Shuttle or space station adjunct. The OMV is being developed by TRW Inc. for first flight in 1993.

- The Upper Atmosphere Research Satellite (UARS), which will report global data on the composition of the upper atmosphere over several years after launch in 1991. General Electric Astro-Space is principal contractor.

- TOPEX (Ocean Topography Experiment), a remote sensing satellite designed to expand knowledge of ocean dynamics and create a base for practical applications. Fairchild Space and Defense Corporation is developing the satellite.

- The Extreme Ultraviolet Explorer, planned for 1991 launch to investigate an unexplored wavelength band between the ultraviolet and x-ray ranges. Major contractors include Fairchild Space and Defense Corporation, GE Astro-Space, and McDonnell Douglas Astronautics.

- AXAF (Advanced X-ray Astrophysics Facility), third of the Great Observatories, targeted for launch in the mid-1990s to obtain high-resolution x-ray imagery of such subjects as black holes, clusters, and superclusters of galaxies. TRW Inc. is the major contractor.



A McDonnell Douglas concept of Space Station *Freedom*, being developed by contractor teams headed by Boeing Aerospace, GE Astro-Space, Rockwell Rocketdyne, and McDonnell Douglas.

- Mars Observer, scheduled for launch in 1992 to make a two-year study of Mars from orbit around the planet. GE Astro-Space is developing the spacecraft.

In 1989, Congress authorized two new planetary missions planned for launch in the mid-1990s: CRAF (Comet Rendezvous Asteroid Flyby), a joint mission with ESA involving an asteroid flyby followed by a rendezvous with Comet Kopff for long-duration close-up study, and Cassini, which will orbit Saturn over a four-year span and conduct a detailed exploration of Saturn and its moons.

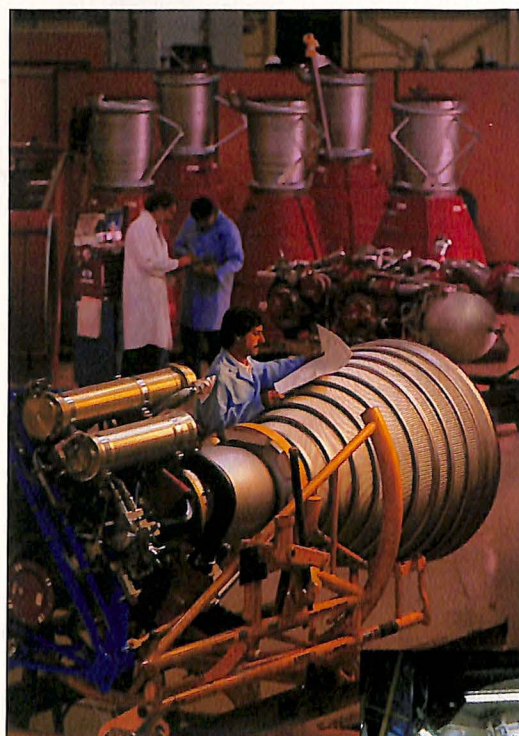
In addition to the earlier-mentioned Strategic Defense Initiative, DSCS, and Navstar programs, military space developments about which some information has been publicly released included the Milstar extra-secure, highly survivable defense communications satellite being developed by Lockheed Missiles & Space; an advanced technology Defense Meteorological Satellite Program Block 6 being studied by GE Astro-Space, Hughes Space and Communications Group, Lockheed Missiles & Space Company, and Ford Aerospace; and the Teal Ruby Satellite being developed by Rockwell



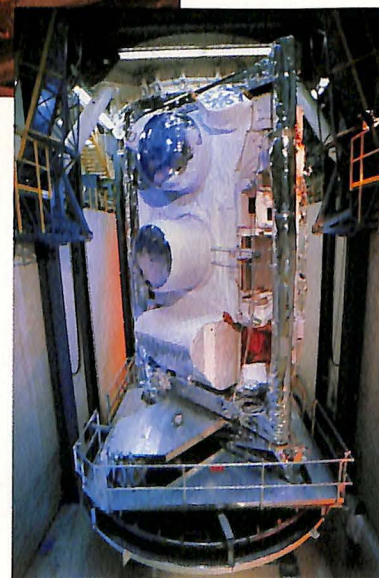
An Aerojet technician works on a Titan rocket engine thrust chamber. Aerojet provided the liquid rocket engine for the Titan IV military launch vehicle and the Commercial Titan.

International, an experiment in orbital detection and tracking of aircraft flying against Earth's background clutter.

In other space developmental activity, both NASA and DoD were engaged in research and development on new launch vehicles. The two agencies were jointly conducting the Advanced Launch System program, intended to provide a flexible, high-payload capacity vehicle capable of delivering payloads to orbit at significantly lower cost. NASA is also planning a Shuttle-C, an unmanned version of the Space Shuttle that would be able to boost 100,000-170,000 pounds to



Rockwell Rocketdyne specialists inspect Delta rocket engines; Rocketdyne was building engines for the Delta and Atlas expendable launch vehicles.



Scheduled for launch in 1990 is the 17-ton NASA Gamma Ray Observatory being developed by TRW.

Fairchild Space and Defense Corporation was developing for NASA the TOPEX ocean observation satellite.



In the photo, a TRW technician is working on a full-scale model of NASA's Orbital Maneuvering Vehicle, a remotely controlled space tug.



Space Station *Freedom's* orbit. Shuttle-C is in study status, with studies being conducted by United Technologies, Martin Marietta Aerospace, and Rockwell International.

NASA and DoD were also jointly engaged in development of the National Aero-Space Plane (NASP), a vehicle capable of horizontal, airplane-like takeoff and flight directly to orbit with low payload-delivery costs. A highlight of 1989 was the start of tests of a Pratt & Whitney-developed, hydrogen-powered scramjet engine at simulated NASP speeds of Mach 8. Plans call for continuing development of key NASP technologies and eventual construction of an X-30 single-stage-to-orbit research vehicle; decision on full-scale development of the X-30, earlier planned for 1990, was postponed. NASP engine contractors include Pratt & Whitney and Rocketdyne; Aerojet Techsystems and the Marquardt unit of Ferranti Defense & Space Inc. are building hypersonic engine test facilities. Airframe contractors are General Dynamics, McDonnell Douglas, and Rockwell International's North American Aircraft Operations Division.



A General Dynamics concept of the National Aero-Space Plane (NASP), a future vehicle capable of single-stage-to-orbit flight. Airframe contractors are McDonnell Douglas, Rockwell North American Aircraft Operations, and General Dynamics.

AEROSPACE HIGHLIGHTS 1989

In 1989, the world's scheduled airlines carried 1.12 billion passengers, up 3.4% from 1988's 1.04 billion, according to preliminary statistics published by the International Civil Aviation Organization (ICAO). It marked the third consecutive year that passengers boarded had topped one billion.

Passenger miles flown amounted to 1.117 trillion, up 5.5% over the 1.059 trillion flown in 1988. Scheduled capacity of carriers in ICAO-member nations increased by slightly more than 4% to 1.634 trillion available seat miles. Scheduled passenger load factor rose almost one percentage point to 68.4%.

Cargo traffic also gained, ICAO reported. ICAO-member airlines carried 20 million tons of cargo in 1989, up from 19.1 million tons in 1988; they flew just under 40 billion freight ton miles, which compares with roughly 37 billion in 1988.

U.S. scheduled airlines also reported passenger and cargo traffic gains, according to Air Transport Association's (ATA's) year-end review. Total passenger miles flown on U.S. airlines amounted to a record 430 billion miles, up 2% over 1988. The number of passengers boarded, however, dipped slightly—from 455 million in 1988 to 453 million in 1989.

ATA's cargo data covered only the first eleven months of 1989. During that period air freight increased 7% to 9.2 billion ton miles; the airlines also flew 1.6 billion ton miles of mail, a 2.6% increase.

U.S. carriers registered a net

profit of approximately \$700 million for the first three quarters of 1989, only half the profit recorded in the same period a year earlier. Net profit as a percentage of operating revenues was 1.4%. Operating profit—again for the first three quarters—was about \$2.3 billion, which compares with \$3 billion in the same period of 1988.

At year-end, U.S. airlines had committed more than \$100 billion to replace older jetliners and expand capacity. Some 250 transports were slated for 1990 delivery and that will enlarge the U.S. fleet to more than 4,000 airplanes.

U.S. commercial transport manufacturers delivered 396 airliners valued at \$14.1 billion; the dollar value was an all-time high.

In November, Douglas Aircraft Company launched a new transport program, the 153-seat MD-90-30, with a Delta Air Lines order for 50 airplanes and options for 110 more.



The Boeing 737-500 jetliner made its first flight in June and started a 350-hour test program.



At year-end, Douglas Aircraft Company was readying the MD-11 trijet for first flight in January 1990.

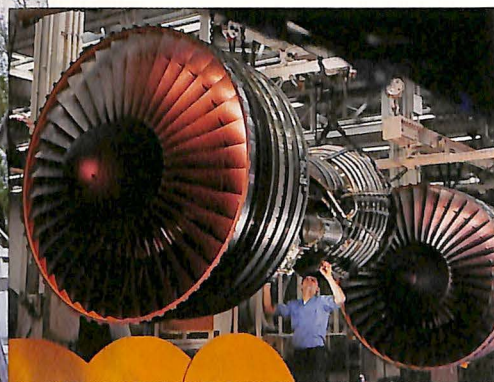
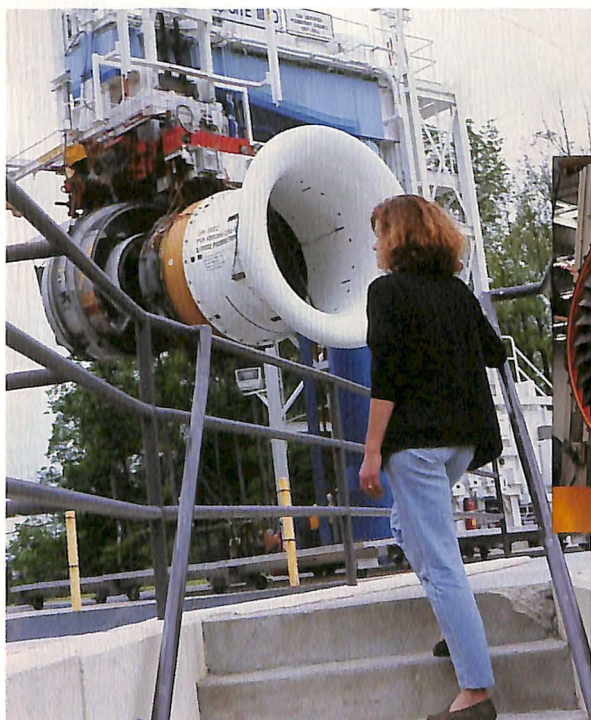
Boeing Commercial Airplane Company commenced deliveries of the new long-range 747-400 in August.



The world's airlines continued to place orders for new aircraft at an unprecedented pace. By September 30, the latest date for which figures are available, U.S. manufacturers had orders on the books for 1,805 aircraft worth almost \$77 billion, by far the greatest backlog in history. Orders from foreign customers amounted to \$48 billion, or 62.7% of the total backlog.

In both the civil helicopter and general aviation segments of the industry, deliveries increased in unit terms but dollar value declined. This was attributable, in large part, to renewed demand for piston-powered—rather than turbine-powered—aircraft, which are generally lower-valued. The industry delivered 499 helicopters in 1989, up from 383 in the previous year; dollar value was \$243 million, down from \$334 million. General aviation shipments totaled 1,535 units, up from 1,143; they were valued at \$1.7 billion, down from \$1.8 billion in 1988.

At the end of the third quarter of 1989 (latest date for which complete figures are available), Boeing Commercial Airplane Company was working on a record backlog of 1,252 airline transports, a figure 315 units higher than the backlog at the start of 1989. The largest segment of the backlog, 668 airplanes or more than half the total, was in orders for the short-to-medium range twin-engine 737. Boeing also had orders for 159 747s, 266 757s, and 159 767s.



Slated for flight test on the McDonnell Douglas MD-11 is the Pratt & Whitney PW 4000 turbofan.

General Electric Aircraft Engines' CF6-80C2 engine, shown prior to a ground test, is the initial engine for the MD-11 flight test program.

In August, Boeing started deliveries of the new 747-400. In June, the company flew the 737-500 for the first time and scheduled a 350-hour flight test program running into 1990. Initial deliveries were planned for the first quarter of 1990.

In December, Boeing's board approved marketing of the 777, a jetliner that would be between the 767 and 747 in size and carry about 350 passengers. A final go-ahead awaits firm orders for the 777. The company could start deliveries in 1995.

McDonnell Douglas Corporation's Douglas Aircraft Company had a September 30 backlog of 553 units, 435 of them MD-80 series aircraft and 118 of the MD-11 long-range trijet. At year-end, Douglas was preparing for the start of a five-aircraft, 2,000-hour MD-11 flight test program, with Federal Aviation Administration (FAA) certification expected in the fall of 1990. (Note: the MD-11 made its first flight on January 10, 1990.)

In the fall, Douglas began marketing two new versions of the twin-engine DC-9/MD-80/MD-90 series, a 114-passenger MD-90-10, and a 153-seat MD-90-30. The MD-90 program was formally launched in November when Delta Air Lines placed an order for 50 MD-90-30s and options for an additional 110 -30 aircraft. The planes will be powered by V2500 engines, built by the International Aero Engines Consortium, of which Pratt & Whitney is the U.S. member. Douglas planned to start -30

Garrett Auxiliary Power Division of Allied-Signal Aerospace Company started tests of a new GTCP331-350 Auxiliary Power Unit, which will be aboard Airbus Industrie's A330/A340 commercial transports.



deliveries in late 1994. The company was also considering an MD-90-40 stretched version seating 170-180 passengers.

In the rotorcraft segment of the civil aircraft manufacturing industry, the McDonnell Douglas MD530N helicopter made its initial flight on December 29. The 530N is a production version (122 on order at year-end) of the company's experimental NOTAR (No Tail Rotor) helicopter, essentially the basic MD500F airframe with a new rotorless tail boom assembly. Douglas is offering the new helicopter in two models both powered by Allison 250 engines of different power ratings. The company expected certification of both models in mid-year 1990 and start of deliveries early in 1991.

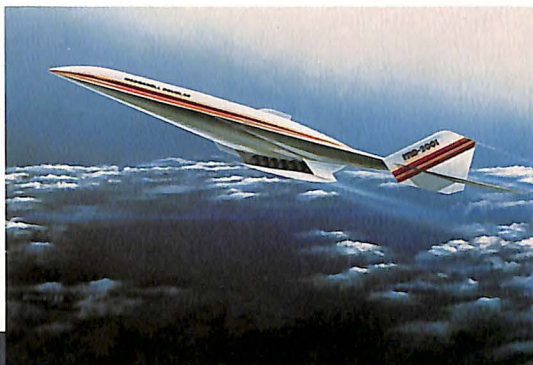


In February, Boeing Advanced Systems' company-developed Condor high-altitude, long-endurance, all-composite unmanned aircraft set two U.S. altitude records for piston-powered aircraft.



The first of more than 100 Westinghouse-developed ASR-9 FAA airport surveillance radars was installed in June.

A McDonnell Douglas concept of a Mach 5, 300-passenger civil transport, one of many possible designs studied in NASA's High Speed Civil Transport research program.



Beech Aircraft's all-composite Starship business turboprop completed production testing and special avionics testing.



McDonnell Douglas Helicopter Company's MD530N NOTAR (No Tail Rotor) helicopter made its first flight in December.



At year-end, Boeing Helicopters was preparing two 44-passenger Model 234 helicopters for delivery to Trump Airlines.

Boeing Helicopters sold two Model 234 helicopters to Trump Airlines. The 44-passenger helicopters will operate between New York City and casino facilities at Atlantic City, New Jersey.

Boeing Helicopters and its partner in development of the military V-22 Osprey tilt-rotor aircraft, Bell Helicopter Textron, continued to study the civil potential of the tilt-rotor.

Among FAA developments of 1989, the first of more than 100 Westinghouse-developed ASR-9 airport surveillance radars was dedicated at the Huntsville, Alabama, airport in June. The first in the world to display weather and aircraft simultaneously, the new radars will replace older vacuum tube units. They will provide air traffic controllers six levels of weather intensity and allow detection of aircraft in severe weather and ground clutter conditions.

In civil aviation research, the National Aeronautics and Space Administration (NASA) concluded a three-year High Speed Civil Transport (HSCT) program centered on studies of candidate second-generation supersonic transports by Boeing Commercial Airplane Company and McDonnell Douglas Corporation. The companies



Ground testing of CFM International's CFM56-5C2 engine, selected to power the long-range A340 Airbus, began in the latter part of 1989. CFM International is a 50/50 joint venture of General Electric Company and the French SNECMA.

concluded that the most viable area of development was a Mach 2 to 3 airplane carrying 250-300 passengers over distances of 5,000-6,000 nautical miles. NASA was planning a follow-on High Speed Research program that will focus on environmental issues—emissions, noise, sonic boom—related to supersonic transport operation.

NASA was also conducting high-speed flight research largely oriented toward military requirements but with potential applicability to civil aircraft.

Following a 242-flight evaluation concluded in December 1988 on the Air Force/NASA X-29 Advanced Technology Demonstrator, NASA initiated tests of the Number Two X-29 with the first flight on May 23, 1989. Built by Grumman Aerospace Corporation, the two X-29s feature forward-swept wings and a number of other advanced technologies.

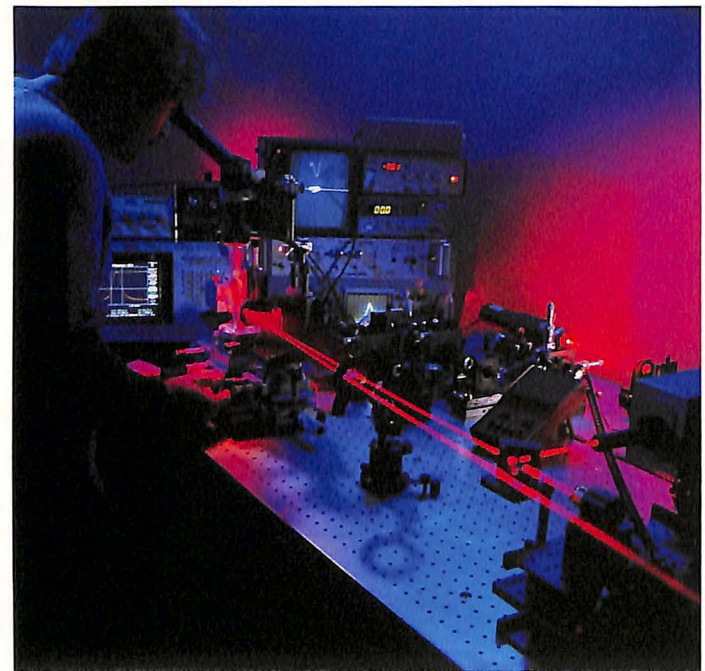
The Number Two X-29 is dedicated to evaluation of the foreswept wing at angles of attack up to 70 degrees (the Number One airplane was never flown beyond 22 degrees). High-angle tests got under way at Ames-Dryden

Flight Research Facility late in 1989; NASA's test program contemplated 70 flights running through 1990.

NASA was also flying a specially equipped and instrumented F-18 to investigate the performance of high-speed aircraft at high angles of attack. The program is aimed toward expanded knowledge of aerodynamics at angles of attack above 45 degrees; such knowledge could be applied to increase the maneuverability of high-speed military aircraft to provide means of preventing accidents related to high angles of attack.

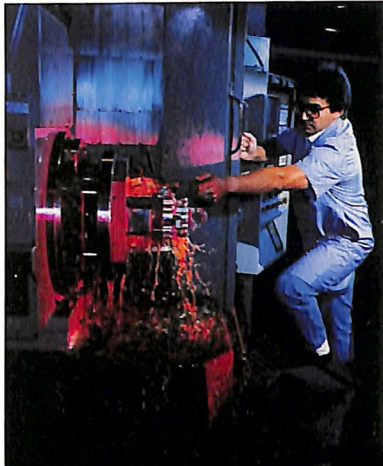
In the fall, F-18 flights were suspended to permit modification of the airplane for a new phase of the program: testing maneuverability and control with a new thrust vectoring system that involves deflecting engine exhaust. McDonnell Douglas, original builder of the F-18, was developing a thrust vectoring

Honeywell engineers conduct an avionics software test in a specially designed MD-11 simulator; Honeywell is avionics systems integrator for the MD-11 trijet.

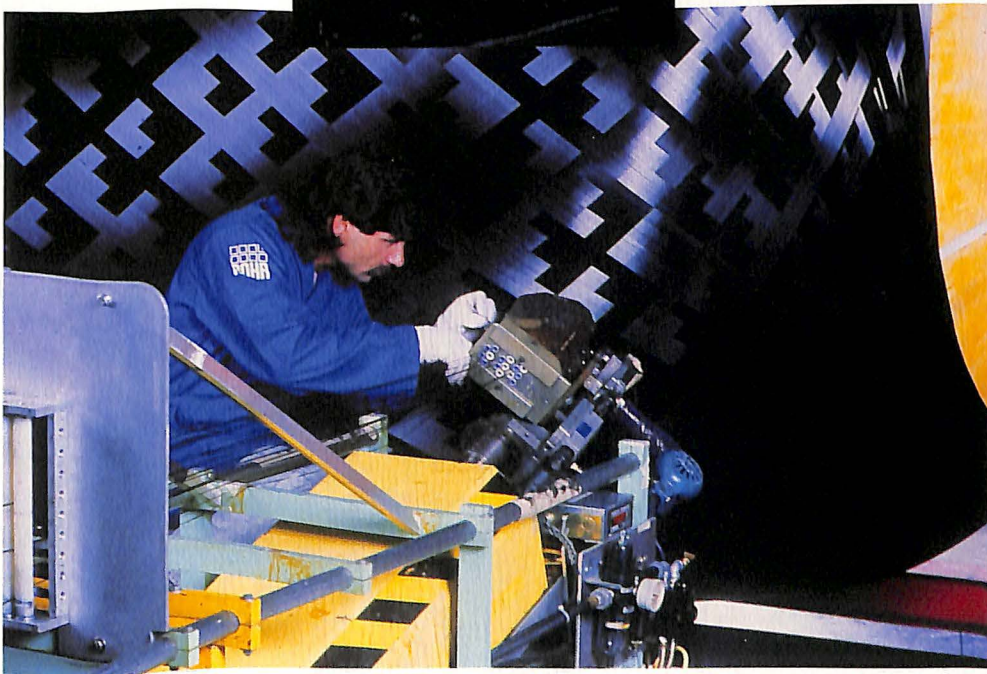


A technician uses a laser beam to inspect a multifunction integrated optic chip being developed at Honeywell's Systems and Research Center as part of the company's fiber optic gyroscope research and development program.

Parker Hannifin Corporation's Parker Berteau Aerospace Group uses an advanced six-axis numerically controlled machining center in manufacture of electronic systems and aerospace components.

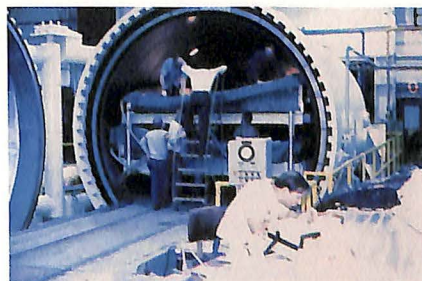


Undergoing test at Rohr Industries is a thrust reverser for a McDonnell Douglas MD-80 jetliner.



A Rohr Industries employee is filament-winding composite materials into a nacelle component for the General Electric CF6-80C2 engine.

Textron Aerostructures technicians are readying an autoclave for contour forming of a Gulfstream IV upper wing skin panel.



control system for installation in the aircraft. NASA planned to start the new phase of testing in the spring of 1990.

Using two General Dynamics-built F-16XL aircraft on loan from the Air Force, NASA was evaluating laminar flow control concepts designed to improve wing airflow in supersonic flight. Initial flights at Ames-Dryden involved tests of the suction mode of laminar flow control: a suction pump pulls airflow into the wing through millions of tiny laser-cut holes, smoothing turbulent airflow over the wings to significantly reduce fuel consumption. Information from this program is expected to aid design of future high-speed aircraft, including civil supersonic transports whose fuel consumption is critical to their economic viability.

NATIONAL CENTER FOR ADVANCED TECHNOLOGIES

John M. Swihart, President, NCAT

In January 1989 AIA established the National Center for Advanced Technologies (NCAT). NCAT is a non-profit foundation responsible for integrating and coordinating AIA's *Key Technologies for the 1990s* program and assisting in its implementation.

John M. Swihart, NCAT's president, retired in April 1989 as Vice President, International Affairs, The Boeing Company. In announcing his selection, AIA President Don Fuqua indicated how appropriate Swihart's extensive top management experience, coupled with his broad aircraft, NASA, and AIA background, is to the NCAT challenge. Swihart was also highly instrumental in planning, establishing, and overseeing the development of the *Key Technologies* program since its genesis in the mid-1980s.

"In industry, government, and academia, it frequently is said that 'Technology is the Future,' but, today, we—the aerospace industry—must emphasize that, indeed, 'Technology is Our Future'," Swihart stated in describing the *Key Technologies* program and NCAT's role in its implementation.

"While America's aerospace industry continues to be an economic leader, generating considerable foreign trade strength to the U.S. economy, we must provide aggressive and continuous support to the *Key Technologies* effort if our aerospace industries are to maintain worldwide dominance as we enter the 21st century," said Swihart.

Key Technologies Progress Report

The association's *Key Technologies* program made good progress in 1989. With strong industry and member support and participation, the selected technologies (listed to the right) are now in various phases of development with a series of major symposia planned through 1991.

The program's ultimate objective is to develop a broad-based, national consensus on the importance of these technology plans to future industrial competitiveness and effective national security. Understanding and consensus at the national level should lead to adequate and stable funding for these cooperative technology base programs, thus assuring their success.

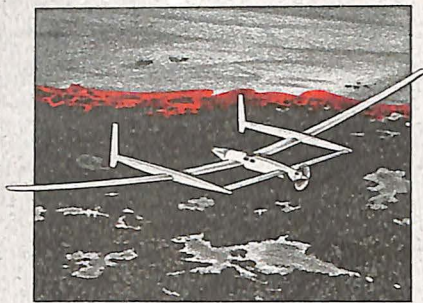
NCAT is sponsoring a February 15, 1990, national symposium on Rocket Propulsion Technology to be held in Washington, D.C., as its first formal introduction of the *Key Technologies* development plans. NCAT also set tentative dates for presenting the other technologies as follows: Composite Materials (fall 1990); Artificial Intelligence, Software Development, and related Computational Sciences areas (winter 1990-91); Advanced Sensors, Ultra-Reliable Electronic Systems, Optical Information Processing, and related Computational Sciences areas (spring 1991); Superconductivity (spring/summer 1991).

The remaining technology—Airbreathing Propulsion—fits closely with a comprehensive program sponsored by the Air Force. Consequently, the airbreathing propulsion work associated with the *Key Technologies* program is proceeding under Air Force leadership. No symposium is planned for this technology.

Very Large Scale Integrated Circuits (VLSIC) was originally one of AIA's *Key Technologies*; however, as work progressed, it was found that SEMATECH, a government-sponsored consortium, was giving VLSIC adequate attention. Therefore, the *Key Technologies* effort was restructured to ensure that SEMATECH is aware of aerospace requirements in the VLSIC area.

The overall goals of the *Key Technologies* program are to "leapfrog" present state-of-the-art system capabilities, reduce the development time to approximately half that now required, and cut development cost significantly.





Advanced Composites can make aircraft more fuel efficient, reduce structural weight of missiles and spacecraft, and allow for greater design innovation.

"The overriding aim," emphasized Swihart, "is to ensure continuing aerospace competitive superiority as we enter the next century—superiority in terms of technology, quality, service, and cost."

NCAT's Objectives and Strategies

In August 1989 Thomas F. Faught, Jr., joined NCAT as its Executive Director after completing his tenure as assistant secretary of the Navy where he managed Navy-wide research, development, and engineering. Faught is responsible for the day-to-day management of NCAT, coordinating with industry groups to carry out the Center's goals and objectives and working with government, industry, universities, professional societies, and trade associations to expedite the development of advanced technologies.

While independent in terms of its objectivity and impartiality, the National Center for Advanced Technologies depends on assistance from several AIA activities: Technical and Operations, Communications, Legislative Affairs, Procurement and Finance, and Accounting. The Technical and Operations Council and its Key Technologies Committee (which acts as the industry's steering activity for NCAT), the NCAT Board of Trustees, and the Aerospace Technology Policy Forum all provide technology direction and counsel.

The Aerospace Technology Policy Forum provides collegial oversight, advice, and guidance to NCAT activities. Senior officials of industry and representatives from research and teaching universities, the Departments of Defense, Energy, and Commerce, NASA, the Office of Science and Technology Policy, and the National Science Foundation are members of the Forum. They review and propose policies related to nationwide research and development, explore strategic research requirements, review key technology plans, and provide counsel on NCAT's national consensus approaches.

NCAT's principal objectives are

- Develop national consensus and support for *Key Technologies*.
- Support adequate and stable funding in the federal budget for an adequate technology base and also for specific *Key Technologies*.
- Utilize industry, government, and academia to reduce time and cost required for technological development.
- Encourage industry and government to adopt the *Key Technologies* development plans as their strategic research and development plans.
- Provide counsel to government departments, agencies, and others, regarding technology integration, planning, and policy.
- Act as an impartial "bridge" between industry, the administration, and Congress to encourage adequate and continuous support of all technology-related resources, such as manufacturing processes, testing and evaluation, and the education of science and technical personnel.

An important element of NCAT's goal is ensuring that the public, congressional representatives, the administration, industry, and academia are informed about the vital importance of *Key Technologies* development to our future industrial competitiveness and national security. This is being done through speeches, briefings, inter-association participation, and media information as well as through direct technical assistance.

The National Center for Advanced Technologies is a new concept, bringing together through direct industry sponsorship and support the best thinking available in government, universities, and corporations to develop nationwide understanding and consensus on a most important matter—the future technological strength of our nation.

AIA KEY TECHNOLOGIES for the 1990s

**Advanced Composites
Advanced Sensors
Airbreathing Propulsion
Rocket Propulsion
Artificial Intelligence
Computational Science
Optical Information
Processing
Software Development
Superconductivity
Ultrareliable Electronic
Systems**

ASSOCIATION ACTIVITIES 1989

Aerospace Research Center researches, provides analysis, and prepares studies to bring perspective and a broader understanding to the issues, problems, and policies of the industry.



Civil Aviation Issues

The Research Center published three issue papers on matters that will affect the future of U.S. civil aviation and civil aircraft manufacturing. The papers were the result of a joint study project between the center and AIA's Civil Aviation Office.

While the industry's commercial sector—especially commercial transport manufacturers—is doing very well today, future success will depend on how well the U.S. can respond to the changing world marketplace and to foreign competition. U.S. policies and policy implementation in many different areas will have an impact.

The papers looked at

- *Technology Readiness: Key to Long-Term Market Strength of U.S. Civil Aircraft Manufacturers.*
- *Maintaining a Strong Federal Aviation Administration: The FAA's Important Role in Aircraft Safety and the Development of U.S. Civil Aeronautics.*
- *National Air Transport Congestion and Capacity Problems: Their Impact on the Aviation Industry.*

AIA anticipates publishing additional papers in this series of civil aviation issues as appropriate.

Education

Using input from a Communications Council Task Force, the Research Center staff surveyed AIA member companies on workforce education issues. *Aerospace Education 2000: An AIA*

Inventory of Education Concerns and Resources produced a picture of the industry's concerns for its present and future workforce requirements and quantified some of the resources industry has directed toward improving the quality of education in the U.S. The association released its report on survey findings at the annual AIA Year-end Review and Forecast Luncheon in December.

In brief, member company responses indicated current shortages of scientists, engineers, technicians, and production workers—with even greater recruiting problems anticipated. Companies also cited a range of concerns about the education of the American workforce, many centering on insufficient attention to the "basics" of math, science, reading, and writing.

Internationalization

The Research Center's 1988 report on the globalization of the aerospace industry was one of the "best selling" AIA reports in recent years. Developed in coordination with the International Council, *The U.S. Aerospace Industry and the Trend Toward Internationalization* went into a second printing to meet the volume of requests. By the end of 1989, AIA had distributed more than 5,000 reports and was still receiving inquiries. Both member companies and

individuals from outside the industry were interested in the report as firms began reorienting their thinking to changes in the marketplace.

Because of continuing, significant changes in the global aerospace market, the Research Center planned a follow-up report in 1990 to provide further perspective on current trends. A major focus will be technology transfer, a pivotal issue for the industry.

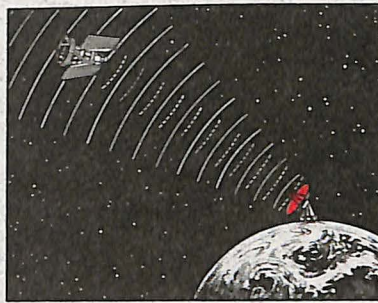
Aerospace Technology

Research Center staff wrote a background paper on the quickening pace of technological change. *U.S. Aerospace Technology Development—Stepping Up the Pace* describes the development of the AIA-sponsored National Center for Advanced Technologies (NCAT) and its focus—the *Key Technologies* program. By relating technology development programs in Europe and Japan, the paper shows why AIA's *Key Technologies* effort is so important.

The clear message is that the competition is strong and getting stronger and a sense of urgency is required in the U.S. response. We need new and better approaches to technology development, and the NCAT/*Key Technologies* efforts deserve support.

Europe 1992 - And Beyond

The July 1989 edition of the Research Center's *Facts & Perspective* series of data and issue briefs featured a report on



Advanced Sensor systems for the military will require an integrated multispectral capability. Commercial requirements for internal and external sensors are high reliability, fault tolerance, and low cost. These must be worked in parallel.

"The Implications of Europe 1992 for the U.S. Defense Industry." It examined the increasing importance of the export market to the U.S. defense industry because of the decline in U.S. military spending, and it described how the industry's primary export market, Europe, will be more difficult to penetrate as European unification proceeds.

A follow-up to this piece, *Beyond 1992—European Integration: Background and Definitions*, explained the roles and relationships of the profusion of organizations and coalitions involved in the European unification process. The Research Center and the International Council developed the guide.

Facts & Figures

In December AIA published the 37th edition of *Aerospace Facts & Figures*, the industry's statistical handbook. The Research Center's Economic Data Service developed the data for the 176-page volume. The 1989-90 edition commemorates AIA's 70th anniversary and draws attention to the association's continuing publication of key industry data since 1945.

For many years *Aviation Week & Space Technology*, a McGraw-Hill publication, distributed *Aerospace Facts & Figures* for AIA. In 1989, AIA began in-house distribution of the book. AIA also brought the *Facts & Figures* database of 130 tables in-house to make the data more readily available in electronic format for various uses. A local area network set up in the Research Center

makes this information instantaneously available to AIA research staff. The feasibility of making the database available electronically to members and the public is being explored.

Industry Indicators

Key industry indicators, including sales, backlog, trade, and profit figures were the basis for the Year-end Review & Forecast analysis prepared annually by the Research Center. The analysis uses a 15-month projection, based on actual 9-month figures from the current year and indications of business prospects in various industry sectors, to make the forecast.

The data and analysis package was part of the press kit released to media, government, and analysts at AIA's annual Year-end Review and Forecast Luncheon.

Data Assistance

Research Center staff provided research and data support to various AIA projects.

- For an AIA strategy to involve more Small Disadvantaged Businesses (SDBs) in defense work, the Research Center developed an AIA-member database that profiled member total sales, aerospace sales, government share of business, type of work, and prime vs. subcontractor relationship. The center provided this data to Conwal Incorporated, the contractor AIA hired to develop a full database incorporating potential SDB suppliers.

- The Research Center performed a series of multi-industry comparisons, including aerospace, for the AIA *Key Technologies* effort in the context of sales and R&D spending.

- The Research Center provided industry data and data review to the Partnership for Improved Air Travel industry coalition for its study showing the beneficial economic impact of civil aviation on the U.S. economy.

Surveys

The Research Center supported the on-going work of AIA councils by conducting surveys that examined

- Impediments to solving problems facing the Department of Defense and industry regarding Diminishing Manufacturing Sources.

- Government contractors' costs included in the Defense Contract Audit Agency's (DCAA) special review of consultant costs.

- AIA member-company inventor incentive awards programs.

- DCAA requests for AIA member corporate board meeting minutes.

- Company interpretation of *Federal Acquisition Regulation* language on the incentive approach to Value Engineering and Value Engineering Change Proposals.

- Cost accounting practices with respect to automatic data processing equipment costs.

Information Services

The Research Center regularly updated and published more than two dozen statistical series sent to industry,

government, the media, and the public. Research staff also responded to both internal AIA and external information queries.

Typical support activities included assisting AIA's president and council members with background and data for speeches, media interviews, and testimony before Congress; meeting with member company representatives (particularly those involved in marketing and strategic planning), government representatives, financial analysts, and researchers interested in the aerospace industry; representing AIA on data-related issues with government and industry groups; and speaking before research and industry groups on aerospace trends and issues.

Virginia C. Lopez
Executive Director
Aerospace Research
Center, AIA



ASSOCIATION ACTIVITIES 1989

Civil Aviation works with domestic and international agencies, Congress, and others in the aviation community concerning manufacture of civil aircraft, including commercial aircraft, business jets, and rotorcraft.



IA Reorganization

In November 1989 the AIA Board of Governors

approved the charter creating the Civil Aviation Council. The council is the focal point within AIA for all matters concerning civil aviation and vertical flight. The board's action recognized the increasing importance of commercial business in the industry.

Committees within the council are responsible for issues concerning airworthiness and certification, manufacturing, and customer support of a non-competitive nature and for policies affecting the general health of the commercial business.

Aviation Safety

In June, responding to a Federal Aviation Administration (FAA) request, AIA submitted a paper highlighting the aviation safety priorities of the industry. The paper heavily emphasized areas with the greatest potential for significant returns in increased safety.

AIA recommended improvements in simulation training, severe weather risk, controlled flight into terrain, approach path guidance, training for go/no-go takeoff decisions, flight data recorder monitoring, and checklist philosophy and training. Under maintenance, AIA recommended taking action on bogus parts, de-icing, and the use of surplus military parts. The association did not include aging aircraft and Traffic Alert and Collision Avoidance System recommendations as part of

this effort because industry and the FAA were already well along on those subjects.

Transportation Policy

Transportation Secretary Samuel Skinner asked for public comment on subjects that would formulate a National Transportation Policy. AIA submitted issue papers on *National Air Transport Congestion and Capacity Problems: Their Impact on the Aviation Industry; Technology Readiness: Key to Long-Term Market Strength of U.S. Civil Aircraft Manufacturers; and Maintaining a Strong Federal Aviation Administration: The FAA's Important Role in Aircraft Safety and the Development of U.S. Civil Aeronautics*. AIA also endorsed work done by the Human Factors Task Force chaired by the Air Transport Association (ATA).

In its comments AIA noted that the cooperative mechanism established for the FAA, operators, and manufacturers to work together on the aging aircraft issue is also being used as a model for other groups examining additional safety issues and that it appears to be working well. Nevertheless, AIA stated that the need for improved funding of FAA's technical services was still vital and could not be overemphasized. The association reiterated these points at the National Airspace Plan Users Conference in September.

Aging Aircraft

The FAA held an "Aging Aircraft Conference" in 1988 following an in-flight incident that received national attention. At this conference an offer by AIA and ATA resulted in the

creation of the Airworthiness Assurance Task Force (AATF), an international task force of operators, manufacturers, authorities, and academia. At the close of 1989, the FAA was in the rule-making process on AATF recommendations for McDonnell Douglas and Boeing airplanes.

In the latter half of 1989, the FAA formed a Transport Airplane Safety Subcommittee (TASS) under the FAA Research and Development Advisory Committee. The AATF will be a working group making recommendations to TASS.

Airworthiness Requirements

Demonstrating to and convincing Civil Aviation Authorities (CAAs) in different countries that a product meets or exceeds their airworthiness requirements is costly. When a manufacturer must get an airworthiness certificate for each country where the product is sold, the certification process becomes extremely expensive with no benefit either in improved safety or economic value-added.

AIA gave high priority to the harmonization of airworthiness certification requirements in 1989. The relevant committees communicated with their counterparts in the European industry association (AECMA) to establish industry positions on proposed rule changes and to exchange association positions.

Operation Snapshot

The FAA completed its special inspection (called Operation Snapshot) of civil aerospace manufacturing facilities, and the FAA certification management team approved it. At year-end the report had not been released.

While the FAA did not intend to institutionalize Operation Snapshot, a new audit program, based on the lessons learned from Operation Snapshot, was in the advanced planning stages at year-end. The FAA hoped to have a pilot program ready in early 1990.

Foreign Repair Stations

The FAA's final rule permitting routine maintenance and overhaul of U.S. registered aircraft at FAA-approved foreign repair stations took effect on December 22, 1988. The unions in the United States, though, mounted an effort in Congress to reverse the new rule by legislation.

AIA played a leading role in opposing any change to the new rule, testifying before the House Subcommittee on Aviation in June on this issue.



Brad Cvetovich
Douglas Aircraft
Company
Chairman, Commercial
Customer Support
Committee



John Diamond
Boeing Helicopters
Chairman, Rotorcraft
Advisory Group



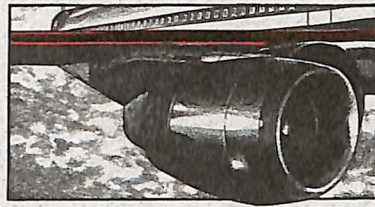
Steve Dooley
Boeing Helicopters
Chairman, Rotorcraft
Committee



Jim Gooch
Bell Helicopter Textron
Chairman,
Manufacturing Integrity
Committee



Airbreathing Propulsion may increase engine thrust-to-weight ratio by 2, reduce engine fuel consumption 30%-40%, and could reduce the DoD fuel bill by \$6 billion/year.



GATT and Civil Aircraft

Negotiations between the U.S. government and the European Communities progressed very little in 1989. The West German government's provision of exchange rate guarantees to Daimler Benz for future Airbus sales remained troubling. The administration was extremely concerned about the precedent of exchange rate guarantees and was examining whether or not they are legal under the General Agreement on Tariffs and Trade (GATT).

Leased Aircraft

The increasing growth of international leasing and transfer of aircraft became an important and complex issue in 1989. CAAs and industry needed to understand the regulatory problems in transferring leased airplanes and resolve them in a timely manner. Procedures were needed that would allow the transfer of airplanes between jurisdictions with minimum delay and no unnecessary reconfiguration and paperwork.

AIA and AECMA hosted a conference on aircraft leasing in April 1989. A broad representation of CAAs, leasing companies, airlines, and manufacturers from around the world attended the conference. One conference outcome was the formation of the International Transfer of Aircraft Committee (ITAC).

ITAC began work in the following areas: maintenance records, build standards, common flight manual, harmonization of regulations, acceptance of pilot and mechanics licenses, standard administrative procedures, and national laws. AIA also urged other countries to ratify Article

83 bis of the Chicago Convention, which provides a legal system allowing states to enter into bilateral arrangements that would transfer responsibilities for aircraft safety.

Committees

- **Transport.** The Transport Committee examined issues concerning airframe design, certification, and operation. Project groups, consisting of member company representatives with expertise in the appropriate discipline, addressed specific areas.

Major projects undertaken were Airplane Cabin Fire Safety, Lightning and High Energy Radiation Fields Effects on Aircraft Systems, Airplane Crashworthiness, Airplane Flight JAA (Joint Airworthiness Authorities)/FAA Common Flight Test Requirements, Computerized Flight Manual, and De-icing and Anti-icing Fluids.

- **Propulsion.** The Propulsion Committee oversaw issues involving airplane propulsion system design, certification, and operation. Major projects were Military Engine Specifications, Bird Ingestion, Engine Emissions, Propfan Certification Requirements, Icing, Engine Power Loss, and Instability in Inclement Weather.

- **Rotorcraft.** The Rotorcraft Committee (formerly the Rotorcraft Airworthiness Requirements Group) addressed such concerns as rotorcraft system design, certification, operation, and all aspects of vertical flight for both military and civil requirements. Major projects in 1989 were

Harmonization of FAA/JAA Helicopter Certification Requirements and New Helicopter Emergency Power Ratings.

- **Manufacturing Integrity.** The Manufacturing Integrity Committee (formerly the FAA Liaison Panel) addressed issues related to manufacture of aircraft, engines, parts, and systems. The committee met regularly in joint session with FAA officials to ensure open communications on these issues.

Major activities included Operation Snapshot, Part 185.31C Designated Manufacturing Inspection Representatives at Supplier Facility, Bogus Parts, Form 8130-3 Airworthiness Tag, Shipment of Model Unique Parts Prior to Model Type Certification, and Petitions for a Joint Project Office Type Certificate Involving a Consortium.

- **Commercial Customer Support.** The Commercial Customer Support Committee (formerly the Commercial Operators Interface Needs Panel) focused on non-competitive customer support issues affecting the entire industry. Meeting in formal session with representatives of ATA, the committee looked into broad policy matters and innovative generic solutions to customer support problems.

Activities in 1989 encompassed Leased Aircraft Support, FAA 8130-3 Airworthiness Tag, Bogus Parts, Inventory Forecasting, and Bar Coding.

- **Airplane Noise Control.** The Airplane Noise Control Committee made extensive comments to FAA

before the administration drafted its report to Congress on the Status of the U.S. Stage 2 Commercial Aircraft Fleet.

AIA had requested a national noise policy and stated that increased stringency beyond Stage 3 rule standards is not a viable alternative until new technology is developed. Additional activities were Propfan Noise Standards and Enroute Noise, Crew Rest Area Noise Requirements, and High-Speed Civil Transport Noise Standards.



Dave Gordon
Douglas Aircraft
Company
Chairman, Propulsion
Committee



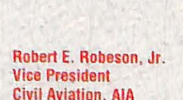
Brent Hardesty
McDonnell Douglas
Corporation
Chairman, Civil Aviation
Council



Webster Heath
Douglas Aircraft
Company
Chairman, Transport
Committee



Jack McCann
Pratt & Whitney
Chairman, Airplane
Noise Control
Committee



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



ASSOCIATION ACTIVITIES 1989

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



he Voice of the Industry

AIA's Top Ten Issues were the focal points for the three

functional areas of the Communications Office: media relations, member relations, and editorial products.

As the primary industry spokesman, AIA President Don Fuqua was the point man for many Communications activities. By year-end he had delivered 25 speeches and given nearly 50 news interviews. Additional exposure through *AIA Newsletter* columns, news media breakfasts, luncheon meetings, briefings, and articles quoting or citing him as a source established Fuqua as a primary industry spokesman.

Almost 400 people, including 150 members of the Washington press corps and 65 public affairs representatives from government agencies, attended the association's 25th Annual Year-end Review and Forecast Luncheon in December, breaking previous attendance records. In addition to the traditional year-end statistical report, Fuqua discussed the changing U.S. defense posture resulting from late year events in Eastern Europe and Defense Secretary Dick Cheney's initiatives to cut the defense budget.

Press reports of the luncheon included articles in the *Los Angeles Times*, the *Washington Times*, the *Baltimore Sun*, the *Seattle Post-Intelligencer*, the *St. Louis Post-Dispatch*, and numerous trade publications; various wire

services and National Public Radio picked up the news release on the event. Fuqua also appeared on ESPN's "Nation's Business Today."

Media Activities

In January 1989 when the U.S. District Attorney's Office and the Justice Department filed the first "Ill Wind" indictments, CBS and ABC national news interviewed Fuqua. Although media interest abated somewhat, AIA continued to respond to continuing questions concerning such things as certification, procurement integrity, and source selection.

To bring attention to the association's Electronic Mail (E-Mail) pilot program, Communications arranged a media briefing at a June demonstration in San Francisco presented by AIA's Information Technology Committee and the Electronic Mail Association. Coverage of AIA's E-Mail project included articles in *Business Week*, the *New York Times*, and scores of trade publications.

Communications supported the *Key Technologies for the 1990s* program and the National Center for Advanced Technologies (NCAT) with a breakfast in September to introduce the NCAT president and executive director to the media. As the Key Technologies Committee published each new technology roadmap, AIA issued a detailed news release; in addition, the *AIA Newsletter* featured monthly articles on *Key Technologies*.

Sixteen media representatives attended a September briefing of AIA's newly released IR&D white paper titled *Maintaining*

Technological Leadership: The Critical Role of IR&D/B&P.

In another area of major importance to AIA member companies—subcontract awards to Small Disadvantaged Businesses (SDBs)—Communications prepared a media plan, arranged regular media briefings, issued news releases on contract awards for an SDB database and study, and developed a mailing list to assure the information reached minority audiences.

Communications issued 46 news releases in 1989 and responded to nearly 1,000 requests for information from the media. Through these efforts AIA communicated the industry perspective on the association's ten major issues, the FSX, the industrial base, technology development, education, procurement matters, and industry statistics from the Research Center. Overall, association activities received positive and fair media treatment.

Member Relations

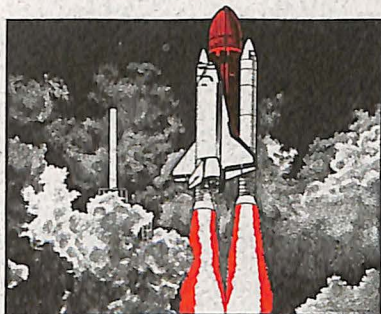
Through its Communications Council and member relations program, the Office of Communications provides members with essential information and timely forums for information exchange among specific audiences within member companies, such as the Washington-based public relations representatives, company speechwriters, and corporate contributions managers. Semi-annual council meetings, annual meetings of the speechwriters and contributions managers, and monthly meetings of the Washington group provide the framework for the member relations program.

Throughout the year distinguished guests spoke at various member meetings. The roster included Assistant Secretary of Defense for Public Affairs Pete Williams, the Director of Public Relations for the U.S. Arms Control and Disarmament Agency Barry Daniel, and Air Force Systems Command's General Bernard Randolph, USAF, plus various expert panels in the field of communications.

Communications Council task group activity increased in 1989. Most notably, the joint AIA/EIA (Electronic Industries Association) Local Initiatives Task Group, formed to address Nuclear Free Zone ordinances nationwide, expanded to include corporate legal representatives. In September Fuqua and EIA President Pete McCloskey briefed Deputy Secretary of Defense Donald Atwood and gave him a memorandum outlining the Department of Defense's statutory authority to issue regulations preempting nuclear free zones.

Council members and Communications staff collaborated on a 1989 *Directory of Public Relations Representatives of AIA Member Companies*, distributed to news media and government public affairs representatives as a source for spokesmen within the industry. At the council's request, Communications and the AIA Research Center developed a survey titled *Aerospace Education 2000: An AIA Inventory of Education Concerns and Resources*. The council also formed a task group to address education-related issues and explore the possibility of an AIA-sponsored education project.

Rocket Propulsion technology offers the potential of a 10-to-1 reduction in payload cost to orbit.



A new project, the Communications Office initiated quarterly meetings of public affairs representatives from the primary defense-related associations in Washington to exchange information and work together on common issues.

AIA Videos

Communications released a 21-minute video titled *WINNING: Aerospace—The Next Decade*. Designed to inspire junior high and high school students to enter math and science-related fields of study leading to aerospace careers, *WINNING* was filmed at member company facilities and includes interviews with young and veteran engineers. AIA developed a marketing brochure for the video and a facilitator's guide for teachers to use in showing the video. Distribution of *WINNING* to junior high and high schools will be accomplished through member companies and an outside distribution house.

AIA completed a second video—*The AIA...In Perspective*. Designed to orient potential members and others not familiar with AIA, it contains comments from AIA Executive Committee members.

70th Anniversary

AIA commemorated its 70th anniversary in 1989. To mark the event the Communications Council held its annual spring media reception at the National Air and Space Museum. Guests received a special limited edition anniversary booklet—*Pages from the Past*—, which featured an article from the *1919 Aircraft Year Book* on the "Future of Aviation." A

congratulatory message from President George Bush is bound into this collector's book.

AIA Newsletter

AIA distributes approximately 14,000 copies of the *AIA Newsletter* monthly to AIA members, Congress, government agencies and departments, universities, financial institutions, and the news media.

Feature articles covered a range of industry issues: SDB subcontracting, U.S. economic controls on high-tech exports, the economic impact of civil aviation on the U.S. economy and other civil aviation issues, the National Industrial Security Program, and the *Defense Management Report*.

Don Fuqua's monthly column addressed issues of importance to aerospace and defense including: Middle East defense sales, the FSX, a national transportation policy, the *Defense Management Report*, airworthiness of older aircraft, and an update on the MAC group report findings.

In addition to a monthly review of legislative activity, two new columns started in 1989 are Aerospace Education, designed to publicize public and private sector educational initiatives, and AIA Action Agenda, brief summaries of Council of Defense and Space Industry Associations (CODSIA) and AIA actions in the public policy arena.

In its second year of publication, the *Newsletter* gained credibility as an effective information tool. Through "house" advertisements it provided a routine vehicle for promoting AIA educational products and publications to other audiences.

Key Speeches

In 1989 the Communications Office published 10 issues of *Key Speeches* containing 35 full speech texts and 24 summaries. For AIA's 70th anniversary, the office published a special commemorative issue of *Key Speeches*—a reprint of historical speeches from the *1919 Aircraft Year Book*.

An impressive roster of key government and industry officials appeared in *Key Speeches* in 1989, including Martin Marietta Chairman and CEO Norman R. Augustine, Chairman and President of American Airlines Robert L. Crandall, Chairman of the Board and CEO of Northrop Corporation Thomas B. Jones, McDonnell Douglas President Gerry A. Johnston, U.S. Deputy Secretary of Defense Donald J. Atwood, NASA Administrator Richard H. Truly, Chairman and CEO of General Dynamics Stanley C. Pace, Secretary of Defense Dick Cheney, Under Secretary of Defense (Acquisition) John A. Betti, AFSC Commander General Randolph, and AIA President Don Fuqua.

AIA distributes 3,500 *Key Speeches* to AIA members, the media, and Congress. It is a useful vehicle for communicating industry and government viewpoints to other industry and government leaders.

1988 Annual Report

The *1988 Annual Report*, published in February 1989, is a "yearbook" and year-end report on the industry as well as on AIA activities. It features a full-color industry highlights section.

The report incorporated a 70th anniversary theme of "70 Years of Service to U.S. Aviation,

Space, and Defense," the anniversary seal, and an illustrated timeline of significant aviation and space feats over the 70-year time period 1919 to 1988.

AIA departments distributed about 4,000 copies of the annual report throughout the year to interested constituencies.

Other Editorial Products

In July the Communications Office began publishing a weekly internal newsletter called the *AIA Preview*. It "previews" meetings and other activities for the forthcoming week. Policy reminders, job opportunities, announcements, and employee recognition are some of the content areas covered.

Using the desktop publishing system, the Communications Office supported the publishing needs of other AIA departments from small-scale projects, such as fact sheets and organization/committee charts, to more complex projects, such as conference brochures, committee studies (*Space Station Freedom, PAS in Future Space Systems*), viewgraphs, and a reprint volume of *Newsletter Key Technologies* articles. AIA supported CODSIA with a revised organization and functions brochure.

Jack Boyd
Martin Marietta
Corporation
Chairman,
Communications
Council



Herbert E. Hetu
Vice President,
Communications, AIA



ASSOCIATION ACTIVITIES 1989

Human Resources deals with labor relations, industrial security, employee compensation, occupational safety and health, and the environment as related to the aerospace industry.



Health and Safety

• Composites.

In 1988 AIA's Occupational Safety and Health Committee formed a task-group to study the health effects of working with advanced composite materials. Its purpose is to 1) collect and evaluate information on the amount, kinds, and use of advanced composites, 2) establish an AIA database of how member companies use advanced composite materials, 3) coordinate these efforts and findings with other organizations having a mutual interest, and 4) make this information available to all AIA members.

The task group organized its activities into four phases:

- Phase I surveyed all members to identify companies using composites and established a composites contact at each company. Twenty-nine companies responded to this phase, which was completed in January 1989.

- Phase II, completed in July 1989, identified composite materials that participating companies use and placed each into a general category by composite type. Thirteen companies participated in Phase II.

- Phase III involves information collection on company experience with each composite type. AIA sent out questionnaires in November 1989 and undertook a toxicology review at the same time. Phase III will determine research needs, exposure routes, information gaps, and biological indicators.

- Phase IV will consolidate the information collected,

summarize AIA member experience with composite types, and provide participating companies with guidelines for monitoring and controlling exposures.

- **AIA/SACMA.** Early in November 1988, AIA held an exploratory meeting with members of the Suppliers of Advanced Composite Materials Association (SACMA). AIA and SACMA identified mutual concerns about advanced composites use, though from slightly different perspectives. By mid-December 1988 an AIA/SACMA Steering Committee was formed to identify and resolve issues of mutual concern, and AIA and SACMA signed a Memorandum of Understanding covering structure, operation, meetings, and issues to be studied.

Early in 1989 AIA and SACMA participated in the Air Force-sponsored "Conference on Occupational Health Aspects of Advanced Composite Technology in the Aerospace Industry" in Dayton, Ohio. Several AIA members gave presentations at this conference.

The AIA/SACMA Steering Committee met in August and October 1989. Three task groups began work on

1. Information exchange, standardizing Material Safety Data Sheet (MSDS) format, developing MSDS supplemental information, and establishing points of contact among AIA and SACMA members.

2. Combustion products, identifying chemicals released during runaway exothermic reactions, normal cures, and after aircraft accidents.

3. Composite dust, identifying free monomer in cured material, concentration, and size distribution of dust in air during trim and drill operations.

In addition, the steering committee began evaluating existing research on neurotoxicity studies, synergistic effects of composites-related chemicals, and allergic and sensitization reactions.

A labor organization asked SACMA to provide advanced composite training materials, and the Occupational Safety and Health Administration (OSHA) asked it to develop guidelines for inspecting composites operations. SACMA, in turn, asked AIA for comments from the user perspective on these guidelines and training materials.

• Ergonomics.

Ergonomics deals with the interface between workers and their physical surroundings (machines, furniture, tools, or equipment) and is fast becoming a major concern for AIA member companies as a result of increased public attention and scrutiny by OSHA and state regulatory agencies.

Historically, continuous, repetitive activities that cause cumulative traumas or long-term injury were associated with factory-type jobs. Today, as a result of the introduction of new, more sophisticated equipment, ergonomics is part of the office environment as well.

This increased attention to ergonomics results from eye strain and perceived radiation exposure from Video Display Terminal operation, repetitive motion (such as typing,

riveting, and cable splicing), and back-related injuries from lifting, twisting, or bending.

Recognizing member concern, AIA's Occupational Safety and Health Committee undertook to

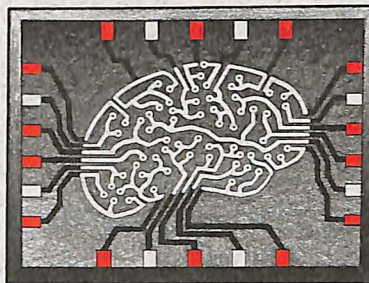
1. Identify ergonomics issues that are unique or present major problems to the aerospace industry.

2. Develop an exchange program for ergonomic data with member companies, other trade associations, and the National Safety Council.

3. Evaluate available training programs to determine those suitable to the aerospace industry.

4. Investigate the feasibility of developing an AIA ergonomics manual available to all members.

5. Provide an aerospace perspective in the development of a voluntary consensus standard on cumulative trauma disorders.



Artificial Intelligence offers potential improvements in performance, reliability, and maintainability for both military and civil aerospace systems.

Compensation Practices

• **AIA/DCAA Interface.** As part of AIA compensation practitioners' ongoing efforts to resolve the confrontational aspects of Defense Contract Audit Agency (DCAA) compensation audits, AIA hosted a "Compensation Survey Conference" at the Defense Contract Audit Institute in Memphis, Tennessee, in September 1989.

Representatives of major consulting firms met at the conference with AIA and DCAA representatives and discussed the compensation surveys defense contractors use to monitor their pay practices. AIA gave auditors a tool to aid their understanding of methodologies employed in survey analyses. Guidelines for assessing the accuracy and reliability of surveys in general were also provided.

Towers, Perrin, Forster and Crosby (TPF&C), a highly reputable compensation consulting firm, prepared a conference meeting summary that is a guide to proper survey use. TPF&C distributed it to conference participants and made it available to all AIA members.

• **Executive Compensation.** In 1989 AIA sponsored its second annual survey of executive pay practices. TPF&C conducted the survey with a steering committee of human resource professionals from AIA member companies. This blue chip survey, titled the "Summit Survey of Executive Compensation," includes premier employers in high-technology industries. "Blue chip" refers not only to the

survey participants but also to the reliability of the data, the careful statistical analysis, and the appropriateness of job matches.

The quality of the data is vital since the underlying objective of the survey is to establish a valid basis for comparing pay practices and pay levels between primarily defense and primarily commercial companies. Of 55 participants, the survey identified 20 companies as defense and 35 as commercial. The survey shows no significant difference in pay patterns between either group, even though the sample of companies in both groups increased substantially from the first survey.

As an ongoing database for drawing historical analyses, the survey requires several improvements. The definition of primarily defense companies needs fine-tuning, and more group and division-level jobs need to be included in an expanded database.

Environmental Concerns

The AIA Environmental Affairs Committee tracked federal government environmental restrictions and bans to reconcile them with customer-required use of hazardous materials in aerospace operations. The committee also encouraged development of acceptable non-hazardous material substitutes and continued to develop industry consensus positions on legislation and regulations negatively affecting aerospace operations.

The committee monitored and took action as appropriate on subjects of major concern to AIA members, such as

reauthorization of the Clean Air Act, air toxics regulations, banning or limiting the use of chlorofluorocarbons (CFCs), and hazardous waste reduction/minimization.

• **Clean Air Act.** The Clean Air Act must be written to give the aerospace industry sufficient regulatory flexibility to maintain control over its unique process technologies, manufacturing schedules, and high standards of product quality and reliability.

AIA met with congressional staff, the Environmental Protection Agency (EPA), the Department of Defense (DoD), the Office of Management and Budget (OMB), and White House staff and suggested amending the Clean Air Act to include an integrated guidance document for aerospace paints and coatings, CFCs, toxics, and ozone precursors. To help them understand the unique nature of the aerospace business, AIA conducted plant tours for House and Senate staff and EPA officials.

• **Air Toxics.** In 1989 AIA conducted an air toxics emissions and controls study. It identified the key aerospace emissions being considered for regulation and analyzed the level of control required of AIA members to meet health and technology-based standards common to federal legislation and state programs.

This study and analysis is based on EPA SARA (Superfund Amendments and Reauthorization) 313 public reports of participating members' facilities, information from a survey of emission

controls used at those facilities, and interviews of member company air emission control experts.

• **Chlorofluorocarbons.** Customer requirements mandate CFC use on certain products many years into the future. Partial destruction of the Earth's stratospheric ozone layer (seemingly caused by the release of CFCs), however, raised concern that the aerospace industry might be forced to curtail or shut down operations requiring use of CFCs before discovery and



Ronald W. Anders
Grumman Corporation
Chairman,
Compensation Practices
Committee



Rick Kuhn
McDonnell Aircraft
Company
Chairman, Occupational
Safety and Health
Committee

R. Jed Selter
The Boeing Company
Chairman, Industrial
Security Committee



Dave Smukowski
The Boeing Company
Chairman,
Environmental Affairs
Committee



approval of substitutes. In 1989 AIA continued working to reconcile regulations and legislation banning or restricting use of CFCs with customer requirements. AIA requested representation on a DoD/EPA Advisory Committee so that industry will have a voice in regulatory development.

• **Hazardous Waste Reduction/Minimization.** AIA focused its hazardous waste minimization activities on developing an internal inventory control/accountability mechanism for all required hazardous substances based on a standardized format for MSDSs and on warning labels. AIA's primary message is that hazardous material management must be based upon educating and training the entire workforce in proper purchasing, handling, storage, transporting, and disposal of these materials.

Industrial Security

For more than a year senior security officials from the leading defense contractors worked on a program to standardize security practices within industry. This program evolved into an industry initiative called the National Industrial Security Program (NISP).

The NISP would eliminate many overlapping industrial security programs presently imposed on industry. Instead, industry would comply with a single, coherent program of baseline security requirements and standards jointly developed by government and industry.

At the fall AIA/NSIA (National Security Industrial Association) Joint Industrial Security

meeting, security professionals spent more than two days detailing baseline security elements for later use with the government in developing the program. They discussed security issues central to industry's production, profit, and operational business needs, including the impact of direct versus overhead funding for security tasks, the protection of research and development technology, security clearance and personnel reliability requirements, security classifications of patents, and the impact of current regulations on foreign ownership of U.S. defense contractors (Foreign Ownership Control and Influence).

Also discussed was the usefulness of a trade policy that considers the life span of technologies essential to the nation's world leadership, refining the government technology export approval process, and coordinating international trade, defense, and security requirements relating to emerging global markets. The need for industry input in treaty negotiations (INF/START), recovery of treaty inspection security costs, and indemnification criteria for contractors who might be disqualified from future defense contract competition because of Soviet inspections and Soviet presence were additional topics for consideration.

In mid-October AIA President Don Fuqua wrote to National Security Advisor Brent Scowcroft with details on industry's proposed NISP. AIA is seeking White House approval to include industry as a full and continuing participant. Early in November Don Fuqua, Norm

Augustine, Chairman and CEO of Martin Marietta, and Harry Volz, Director of Security for Grumman Corporation, met with General Scowcroft. He was very interested in the NISP concept and encouraged AIA to continue efforts to gain support from other key government officials.

AIA briefed senior security representatives from most of the major government departments and agencies on the NISP concept. AIA meetings with key department secretaries and agency heads were planned or are underway.

Legislative Issues

• **Drug-Free Work Force.**

DoD's "Drug-Free Work Force" regulations implementing the requirements of the Drug-Free Workplace Act of 1988 (P.L. 100-690) were a major focus of the Human Resources Council activity in 1989. The council assisted in developing legislation to facilitate the achievement of strong, drug-free workplace programs in AIA companies.

This legislation, S.1903, "Quality Assurance in the Private Sector Drug Testing," would preempt state and local drug testing laws, place administrative enforcement in the Department of Labor with remedies limited to make whole relief, and establish drug testing standards, employee protections, and a drug testing laboratory certification program.

• **Employment Readiness.**

AIA companies were actively engaged in 1989 preparing minority high-school, college, and adult candidates for entry-level and advanced positions in the aerospace industry. Emphasis on education and employee training increased as the industry recognized the potential gap in the next decade between skills and employment requirements.

A position paper on H.R. 2235, *The Workforce 2000 Employment Readiness Act of 1989*, prepared with the assistance of the Human Resources Council, cited the burdensome requirements of this legislation. H.R. 2235 would enact into law portions of Executive Order 11246 and its implementing regulations, including a significant increase in employer reporting requirements, the expansion of litigation avenues and remedies, and the imposition of a special assessment on federal contractors for an Education Improvement Fund.

Charles R. Vennel
Rockwell International
Corporation
Chairman, Human
Resources Council



Daniel J. Nauer
Vice President
Human Resources, AIA



International addresses international issues affecting the commercial and military product segments of the industry, particularly the exporting segment.

The U.S. aerospace industry consistently proves its ability to excel in the world market. U.S. aerospace exports in 1989 were expected to total \$31.4 billion, exceeding imports by \$20.9 billion.

Several competing factors in today's market, however, require the industry to achieve a delicate balance between cooperating with foreign companies and countries when appropriate and, at the same time, assuring its overall ability to maintain national preeminence. These factors include increased costs and risks of launching new products, the desire of most industrialized and industrializing countries to have some share in the aerospace and defense industries, and declining U.S. defense budgets.

AIA's International Council has the task of formulating industry positions on such matters and explaining them to the American public, its political leaders, and foreign counterparts. AIA representatives and member companies addressed the "globalization" or "internationalization" of the aerospace industry in various forums with the executive branch and before congressional bodies. AIA International Council Chairman, Edward C. Bursk, Jr., in testimony before the House Subcommittee on Economic Stabilization raised issues explored in the 1988 AIA internationalization study (*The U.S. Aerospace Industry and the Trend Toward Internationalization*). Top government and industry representatives attended the

1989 International Council Conference on "Coexistence, Competition, and Cooperation" in an increasingly globalized aerospace industry.

European Integration

The International Council reviewed implications of a trend to integrate the commercial and defense industries. The council began by looking at the European Community's Europe 1992 program and parallel activity of the Independent European Program Group (IEPG), which is attempting to rationalize European defense production and procurement.

Four representatives from AIA and four from the Society of British Aerospace Companies met in Brussels for two days to analyze the situation. The analysis concluded that commercial aerospace activities will be only marginally affected in areas such as standards and labor relations. If the IEPG succeeds in coordinating European development and procurement of defense equipment, however, U.S. firms could face greater difficulty in marketing products in Europe. Furthermore, larger and more efficient European companies emerging from the current wave of consolidation will create tougher competition in Third-World markets and in our own market, particularly for helicopters and missiles.

The meetings led to several conclusions. Trends could be offset only if the U.S. government

- Confirms its technology transfer regulations with those of our European allies.

- Puts greater support behind development and production of North Atlantic Treaty Organization (NATO) defense systems.

- Addresses fundamental differences between procurement systems in Europe and the U.S.

- Provides strong support for U.S. defense exporters (including defense export financing) in competition with European counterparts in the Third World.

Barring such changes, the U.S. defense industry may have to choose between either increasing its research and production activity in Europe or relinquishing some share of both European and Third-World markets.

The Defense Policy Advisory Committee on Trade (DPACT) study on *European Integration*, conducted over the same time frame, heavily incorporated AIA's work on this subject. The International Council also collaborated with AIA's Research Center on a widely circulated guide for the U.S. aerospace industry on European integration (*European Integration: Background and Definitions*).

The extraordinary changes currently underway in Eastern Europe will affect the pace and extent of integration in Western Europe and the degree to which new defense products are actually developed and procured by West European countries.

Defense Trade

AIA supports an improved legislative framework for defense trade. Activities in 1989 focused on three areas:

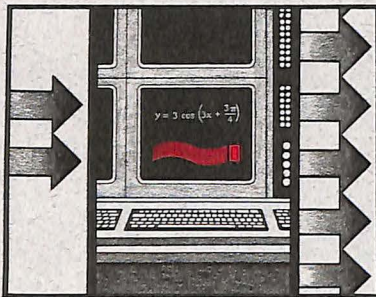
- **Arms Export Control Act (AECA) Rewrite.** The House passed legislation that would have extensively rewritten the AECA. In two policy papers presented to the House Foreign Affairs Committee, AIA suggested several issues to address in the new legislation, including more clearly recognizing the economic impact of defense trade and reviewing the foreign availability of defense equipment when evaluating a proposed U.S. arms sale.

Patrick A. Briggs
Bell Helicopter Textron
Chairman, U.S./Canada/
Australia Committee



Edward C. Bursk, Jr.
Raytheon Company
Chairman,
International Council





Computational Science is a new look at hardware, software, and algorithms in relation to the Federal High Performance Computing Initiative fostered by the Office of Science & Technology Policy.

The suggested new name (the Defense Trade and Export Control Act) of the AECA and several new provisions reflect the success of AIA's efforts. While the Senate did not pass a similar bill, it may do so in 1990.

- **Defense Policy Advisory Committee on Trade.** AIA members and staff supported the efforts of the DPACT in its advisory role to the Secretary of Defense and the U.S. Trade Representative (USTR). In 1989 AIA provided input on issues including technology transfer, European integration, defense trade, and defense industry competitiveness.

- **Arms Transfers.** AIA assisted the new administration to prepare for consulting with Congress on prospective sales of defense equipment and provided support for specific arms sales, such as the FSX program with Japan and the M1A2 tank sale to Saudi Arabia.

Industrial Base

Congress and some parts of the executive branch are more and more concerned that the increased globalization of the aerospace industry may harm certain segments of the U.S. defense industrial base. AIA is striving to put such concerns in perspective.

- **Defense Production Act (DPA).** Congress extended the DPA, set to expire in 1989, to August 10, 1990, with further debate likely during the second session of the 101st Congress. House and Senate bills to renew the act contain several protectionist provisions that would impede aerospace companies from marketing their products internationally and

deny contractors the ability to incorporate components of the highest quality at the lowest price in their products. The International Council worked with other AIA Councils to draft a DPA bill that industry could support.

- **Offset Policy.** The issue of offsets is highly contentious in Congress and in some parts of the executive branch. AIA contends, however, that unilateral restrictions on U.S. industry will not resolve the problem; rather, it must be addressed multilaterally with our major trading partners. AIA worked with members of an interagency task force, chaired by the National Security Council, that will establish the Bush administration's policy on offsets.

AIA agreed to collaborate with the Defense Industry Offset Association on a Spring 1990 half-day seminar on offsets and the globalization of the aerospace industry for Capitol Hill and executive branch staff.

Japan

- **FSX.** AIA provided strong, public defense of the FSX fighter aircraft co-development program with Japan. AIA members and staff testified before the House and Senate on several occasions and were extensively quoted in the media.

AIA argued that the FSX agreement negotiated between the U.S. and Japanese governments was the best obtainable and would, on balance, help U.S. aerospace

retain its single-most important overseas market. Legislation to block or unduly control the agreement was defeated.

- **Better Monitoring of Japanese Aerospace Trade.**

The U.S. needs to better understand current aerospace industry developments in Japan and the make-up and growth of trade between the aerospace sectors of the two countries. AIA began working with the Department of Commerce, the Aviation Industry Association—Japan, and AIA's Research Center to fill this information void. The focus is on Japanese aerospace objectives, research, production, and exports.

- **Future Cooperation with Japan.** AIA and its counterpart, the Society of Japanese Aerospace Companies (SJAC), sponsored a one-day symposium in January 1989 on each country's plans and perspectives regarding high-speed civil transport Research and Development (R&D).

During the year, SJAC used AIA several times to convey information to U.S. industry on specific future cooperative R&D programs. For 1990, AIA and SJAC planned to build consensus in both U.S. industry and government on areas best suited for close cooperation between the two countries and industries and the possibilities of such cooperation.

Export Controls

U.S. government-imposed export controls are a great impediment for U.S. aerospace exporters.

The International Council stressed to Congress and the executive branch that U.S. export controls must be made consistent with competitors,

both in what is controlled and how efficiently the control process is administered. Without this structuring, the U.S. government accomplishes nothing more than transferring product sourcing from the U.S. to other countries and does not advance U.S. policy objectives.

With declining defense budgets, this added constraint on U.S. exports has a particularly negative impact on the defense industrial base. AIA members and staff strenuously addressed this issue in a DPACT paper presented to senior Department of Defense and USTR officials in November 1989.



Raymond Garcia
Rockwell International Corporation
Chairman, Defense Production Act Committee



Hugo M. Kann
Rockwell International Corporation
Chairman, Export Control Reforms/Technology Transfer Committee

James R. Nelson
Martin Marietta Corporation
Chairman, Defense Trade & Cooperation Committee



• **Office of Munitions**

Control. AIA continued working with the State Department and Congress to improve the functioning of the department's Office of Munitions Control (OMC). In addition to writing a briefing book on OMC performance for meetings with key congressional staff, AIA gained language in the FY 1990 State Department authorization legislation earmarking personnel slots and funds for OMC administration and conference language setting specific time targets for OMC to process licenses. While President Bush vetoed the bill at the last minute (for unrelated reasons), congressional staff assured AIA that the issue is on the 1990 agenda.

In response to increased industry frustrations with OMC's performance, AIA President Don Fuqua met with Deputy Secretary of State Lawrence Eagleburger and Assistant Secretary of State Richard Clarke to press for needed improvements.

• **Commodity Jurisdiction.** AIA consistently sought a more balanced and streamlined jurisdiction process to determine which agency has authority over a specific commodity and to assure that products used primarily for commercial purposes are not included on the OMC list. AIA continued working with personnel from the departments of Commerce, State, and Defense and the National Security Council on these problems as they relate to developmental aircraft and engine hot section technology.

• **National Academy of Sciences (NAS) Study.** NAS plans to publish a follow-on study to its 1988 report titled *Balancing the National Interest*. The 1988 study recommended a better balance between national security and economic competitiveness and was the basis for significant improvements in streamlining the export control system.

Planned for completion in Spring 1991, the new study will focus on the commercial aerospace industry, one of three sectoral case studies to be included in the study. AIA contributed preliminary comments during the developmental phase of the study and will contribute also to the commercial aerospace section.

New Controls Legislation

During 1989 AIA consulted with the executive branch and congressional staff to discourage or modify legislation that would impose unilateral foreign policy controls and extraterritorial sanctions. These included:

• **Antiterrorism Bill.** At year-end Congress finally passed a bill to retaliate against countries and companies supporting terrorism. Significant provisions concerning the definition of defense articles for inclusion on the U.S. Munitions List were amended to reflect the need for a coordinated interagency review process and for presidential arbitrating authority in questions of commodity jurisdiction.

• **Missile Proliferation.**

AIA formed a working group to deal with several bills introduced in 1989 that would amend U.S. policy implementing the Missile Technology Control Regime. While congressional intention is to limit the proliferation of missile technology among Third-World countries, legislation introduced includes unilateral and extraterritorial sanctions that would seriously undermine the international agreement.

AIA obtained specific changes that make the laws less onerous to the immediate exporting community; however, the association believes that unilateral sanctions jeopardize the integrity of the original agreement and any additional control efforts are best addressed in a multilateral context.

Canada

Representatives of the Aerospace Industries Association of Canada and AIA held two joint meetings in 1989 in furtherance of a cooperative Memorandum of Understanding between the associations. Both are cooperating in work on offsets and air shows. Regarding air shows, AIA, the Commerce Department, and other interested U.S. trade associations planned a study in 1990 of industry attitudes towards air shows and U.S. government support for participating in such shows.

Overseas Counterparts

The presidents of AIA's counterparts from France, Germany, the United Kingdom, Canada, Australia, and Japan participated in the annual AIA International Council meeting in New Orleans in October. They discussed numerous issues of mutual concern and agreed on joint studies of interest to respective industries.



Richard Ridge
General Electric
Company
Chairman, U.S./Japan
Committee



Susan M. Walsh
United Technologies
Corporation
Chairman, Europe 1992
Committee

Joel L. Johnson
Vice President
International, AIA



ASSOCIATION ACTIVITIES 1989

Legislative Affairs monitors policy matters affecting the industry and prepares testimony that communicates industry's viewpoint to Congress.

Defense **Industrial Base** Revitalization and maintenance of the defense industrial base remained a high priority for both the aerospace industry and Congress in 1989. With this mutual goal in mind, AIA conveyed the need for improvement in the financial health and competitive posture of the aerospace industry in discussions with Congress on issues such as tax policy, export controls, procurement reform, critical technology planning and funding, and foreign military sales. Unfortunately, the atmosphere of distrust that characterizes industry and government relations often prevented the message from being heard.

Internationalization

In addition to domestic industrial base needs, AIA articulated the growing internationalization of the aerospace industry. With the emergence of a unified European Community and the political developments in Eastern Europe, Congress and industry must now consider the global marketplace in determining policy needs. AIA presented testimony to Congress using findings in the association's 1988 study *The U.S. Aerospace Industry and the Trend Toward Internationalization* to emphasize its concerns.

Arms Sales

Foreign military sales are an important aspect of the global marketplace. AIA ultimately achieved success in its battle for co-development of the FSX with modifications to the

original agreement now guaranteeing the U.S. a greater share of Japanese technology. This high-profile skirmish, however, has paved the way for increased congressional micromanagement of foreign arms sales in 1990.

Key Technologies for the 1990s

AIA successfully promoted its *Key Technologies for the 1990s* concept in meetings with congressional staff. Representatives from the National Center for Advanced Technologies, the oversight body of the AIA *Key Technologies* program, conveyed the ever increasing national need to identify and develop the critical technologies required for future global competitiveness.

Lawmakers realized the significance of technological leadership in our expanding global environment and included this concept in the Defense Authorization Act of FY 1990/91. The act established a National Critical Technologies Panel to identify critical technologies needed by the year 2000.

Procurement Integrity

As industry voiced strident opposition to draft regulations covering procurement integrity, Congress continued to tinker with Section 27 of the Office of Federal Procurement Policy Act. AIA kept Congress informed about its efforts to create sound regulations for procurement integrity and maintained the position that any changes to the statute should be both comprehensive in nature and beneficial to all affected parties.

Finally, during consideration of pay raise and ethics legislation in the closing days of the first session of the 101st Congress, the House and Senate agreed to postpone implementation of the procurement integrity regulations for one calendar year.

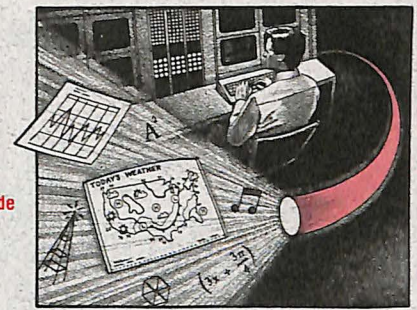
Procurement Reform

AIA developed a comprehensive series of positions on procurement reform provisions contained in the House and Senate versions of the 1990/91 Defense Authorization Act. AIA communicated these positions to all conferees; the House/Senate conference adopted several industry recommendations. For example, lawmakers dropped changes to the Cargo Preference Act that would have significantly increased the paperwork burden for U.S. manufacturers and strengthened initiatives to increase the use of commercial products and create uniform rules on dissemination of acquisition information.

Tax Issues

Similarly, in the final budget reconciliation package, Congress renewed several expiring tax code provisions favorable to AIA member companies and their employees. Recognizing the importance of a well-educated workforce, AIA supported excluding educational assistance provided to employees from employee gross income.

Optical Information Processing may provide a vast improvement over conventional electronic systems in information processing performance.



Regarding the allocation of foreign source income, lawmakers did not amend the language to include allocating research and development expenses in computing the combined taxable income of domestic international or foreign sales corporations as AIA had recommended. Congress did, however, amend the internal revenue code to allow allocating a greater percentage of such expenses to income from sources within the U.S.

Although budget reconciliation became a death knell for the completed contract method of accounting, legislators did enact a 10% cliff for determining when income is taxable under the percentage of contract completion method.

Byrd Amendment

AIA quickly marshalled its forces to make sure that the normal business activities of its member companies would not be considered prohibited behavior under the Byrd Amendment to the FY 1990 Interior Appropriations Bill. House and Senate conferees changed the language of the amendment so that normal marketing activities, such as those associated with preparation of bids and proposals, negotiations, and direct selling, could be paid for using appropriated funds.

Minority Subcontracting

AIA and its member companies moved expeditiously in conveying to Congress and the minority business community their sincere intent to increase minority participation in subcontracting. AIA stood firmly by its commitment to Small Disadvantaged Businesses (SDBs) by supporting the House of Representatives' successful initiative to extend for three years Section 1207 of the FY 1987 Defense Authorization Act.

In looking for ways to provide greater opportunities for SDBs, AIA relayed its unwavering support for a three-year, voluntary test program for company-wide/division-wide subcontracting. The language for this test program passed the lengthy defense authorization conference and was targeted for implementation by the close of 1990.

Clean Air Act

The aerospace industry relayed to Congress its commitment to achieving the overall emission reductions required to attain air quality standards. Industry emphasized, however, that it needs flexibility to accomplish this goal in a manner best accommodating its need to meet national product performance and safety requirements while remaining competitive in the world market. AIA worked extensively with Congress to address the industry's unique concerns.

Aging Aircraft

In 1989 Congress began focusing on the issue of aging aircraft and introduced legislative responses to this growing safety concern late in the session. AIA committed to working with Congress to develop an acceptable solution for dealing with the aging commercial transport fleet.

Foreign Repair Stations

AIA informed Congress that it supports the Federal Aviation Administration (FAA) rule allowing routine maintenance and overhaul of U.S. registered aircraft at FAA-approved foreign repair stations. The association expected no further action on legislation repealing this rule unless increased pressure from unions causes the Aviation Subcommittee to resume action on the bill.

Space Policy

The year 1989 marked the 20th Anniversary of the Apollo 11 Moon landing, and President Bush inspired the nation on July 20, 1989, as he spoke of all the men and women who were instrumental in making missions into space a reality. The president set the tone for capturing the spirit of space exploration as he charged the aerospace industry and others to become key players in the exploration of the Moon, Mars, and beyond. As a representative of the majority of the aerospace industry, AIA closely monitored NASA appropriations in the HUD (Housing and Urban Development), VA (Veterans Administration), and Independent Agencies Act for FY 1990.

Fastener Quality Act

After years of difficulty trying to reach a compromise on the final language, the House of Representatives supported the expeditious passage of H.R. 3000. The bill requires federal laboratories to certify all manufactured fasteners, domestic and imported. The Senate, however, has not resolved this issue nor has the act gained substantial momentum since being introduced to Senate members.

Thomas N. Tate
Vice President
Legislative Affairs, AIA



ASSOCIATION ACTIVITIES 1989

Procurement and Finance keeps up with legislative and regulatory changes and initiates actions for improvement in procurement and procurement-related issues, including patents and data rights.

In a September 28, 1989, letter to Deputy Secretary of Defense Donald Atwood, AIA

President Don Fuqua endorsed the thrust of the acquisition initiatives in the *Defense Management Report* (DMR) released in July 1989. However, Fuqua noted that "...there are several policy areas that are important to a strong industrial base...not addressed in the DMR or may not be covered adequately in the regulatory review."

Attachment 1 to AIA's letter to Atwood summarizes 20 areas in which industry urges policy changes by the Department of Defense (DoD), including DoD support for necessary legislative changes. These 20 policy recommendations described below are the focal point for Procurement and Finance Council and committee actions for 1990 and beyond. Many were the focus of the council's 1989 activities.

A. Policy Changes Needed to Ensure the Financial Health of the Defense Industry

1. Increase progress payments 5%—from 80% to 85% for large business and from 85% to 90% for small business.
2. Recognize Independent Research and Development and Bid and Proposal efforts (IR&D/B&P) as a normal cost of doing business and improve their administration.

- Require DoD to accept its full allocable share of contractors' IR&D/B&P costs.
- Streamline the technical review process.

- Centralize the Tri-Service negotiation function.

3. Permit dual sourcing only when clear economic benefit is assured.
4. Abolish phased reimbursement for special tooling costs.
5. Increase negotiated profit objectives (rates) by 1%.
6. Restrict the arbitrary and unilateral withholding of progress payments.
7. Eliminate fixed-price production options from Full Scale Development (FSD) contracts.
8. Urge and support the restoration of the Completed Contract Method of Accounting (CCM) for long-term contracts.

B. Policy Changes Needed to Ensure Uniform and Effective Rulemaking

1. Establish firm Under Secretary of Defense (Acquisition) (USD(A)) control over the entire *Defense Federal Acquisition Regulation Supplement* (DFARS) process to ensure a single DoD policy.
2. Eliminate abuses in service and lower-level supplements to the DFARS.
3. Require industry participation in the initial development of future regulatory changes.

C. Policy Changes Needed to Streamline and Improve the Contract Award and Administration Process

1. Establish clear DoD guidance on information that contractors are not entitled to in connection with a contract solicitation. Assure that contractors are able to acquire all other procurement information.

2. Reduce oversight—audits, inspections, etc.
3. Eliminate existing impediments to using commercial procurement practices and the procurement of commercial products.
4. Clarify the authority of contracting officers; restore a proper balance between efficient contract administration and "policing" of contractors.
5. Clarify industry ownership of technical data rights for any item, component, or process developed at private expense.
6. Increase cost or pricing data certification threshold to \$1 million.
7. Assure certified cost or pricing data is not required for competitive procurements. Where price analysis is undertaken, require only summary level data.
8. Pursue the technical corrections that are needed to Section 6 (Procurement Integrity) of the Office of Federal Procurement Policy (OFPP) Reauthorization Act.
9. Pursue the reduction of congressional micro-management of the acquisition process.

Attachment 2 to AIA's letter consists of point papers supporting each of the foregoing recommendations.

Several other issues of significant interest to the Procurement and Finance Council pursued in 1989 are summarized in the following paragraphs.

DMR Regulatory Review

One of the most important features of the DMR is a zero-based review of acquisition regulations. USD(A) John Betti invited CODSIA (Council of

Defense and Space Industry Associations) participation in the review that focuses on guidance that imposes unnecessary costs, discourages sound business practices (such as "best value" competitive practices), and inhibits procurement of commercially available products.

Several AIA committees participated in preparing a September 29, 1989, CODSIA input that endorsed DoD's efforts to reform the procurement regulatory system. CODSIA indicated that this was an initial input and that it planned to pursue a Phase II effort to develop in greater detail the initial recommendations made on 18 parts of the *Federal Acquisition Regulation* (FAR) and DFARS.

Software Development requires focus on several areas such as languages, tools, and methods to provide trusted (ultra-reliable, secure) software for the future.



The CODSIA letter also recommended reforms in lower-level regulations and clauses and suggested further examination of the requirements for representations and certifications and raising the dollar level of the nearly 500 regulatory thresholds. CODSIA urged DoD to continue to invite industry participation in the department's regulatory review efforts.

DoD/Industry Relations and Self Governance

DoD/industry relations may never be completely non-adversarial, but they have been particularly troublesome over the past few years, beginning with the spare parts problem in 1983. The public perception that the industry is riddled with fraud, waste, and abuse is continually fueled by new disclosures such as "Ill Wind." These instances of wrongdoing add to the public perception and create an atmosphere of mistrust that, in turn, leads to additional legislation and regulations.

In this same time period industry made significant strides to improve its performance, adopt and enforce codes of ethics, and attempt to regain DoD's confidence and the general public's as well. Much more needs to be done, however, to improve the image of the industry and to restore confidence and balance in DoD/industry relations.

The Secretary of Defense, in releasing the DMR, stated that DoD would not mandate a self-governance program for its contractors. However, it challenged industry to demonstrate its commitment to business integrity by adopting

such programs. In addition, the Defense Advisory Panel on Government/Industry Relations (DAPGIR), which completed its work in September 1989, strongly endorsed self-governance in its report to the Secretary of Defense.

The DAPGIR also supported the Contractor Risk Assessment Guide (CRAG) as an element of a self-governance program that would demonstrate industry's commitment to improve and would reduce some of the audit and oversight to which industry is now subjected. Finally, the DAPGIR recommended that a permanent panel on Government/Industry Relations be established to provide a forum for resolving problems such as those considered by the DAPGIR.

The Procurement and Finance Council began working with representatives of other associations in an attempt to develop a set of principles or guidelines—less onerous than the requirements of the Defense Industry Initiatives (DII) but stronger than a simple requirement for a code of ethics—that every company could subscribe to and tailor to its particular needs.

CRAG

Defense Secretary Frank Carlucci formally proposed the CRAG program in a letter to 100 CEOs on May 9, 1988. The program is designed to encourage contractor self-governance and reduce DoD oversight in areas deemed to have adequate internal control systems.

The areas covered by the voluntary program include labor charging, indirect cost submissions, materiel management and accounting systems, estimating systems, and purchasing systems. Contractors meeting the requirements could possibly be audited less often. The Carlucci letter requested comment on the proposed program and referenced a joint CODSIA/DoD effort to improve the draft CRAG document.

CODSIA formed a steering committee and established working groups for each chapter of the CRAG. Companies submitted individual comments in June 1988, which were shared with the CODSIA group. DoD and CODSIA worked together during the summer of 1988 to improve the initial draft guide because it was too detailed, too rigid, and contradicted existing regulations in many areas. These problems were successfully addressed in the final document agreed to by DoD and CODSIA steering groups in October 1988 and issued by Secretary Carlucci on November 25, 1988.

Robert A. Fuhrman, Vice-Chairman, Defense Advisory Panel on Government/Industry Relations, solicited industry's comments on the CRAG implementation in June 1989. The CODSIA response, dated July 18, 1989, indicated that participation in CRAG runs from companies with full and dedicated participation to those companies seeing no present benefit from initiating the CRAG process.

Dale Babione
The Boeing Company
Chairman, Executive
Group, Procurement and
Finance Council



John J. Brown, Jr.
Hughes Aircraft
Company
Chairman, Tax Matters
Committee



AIA/CODSIA offered to continue a cooperative interchange with DoD as implementation of CRAG continues.

Pension Funding

For the past several years the federal government has been concerned that several contractor pension plan asset values equal or exceed actuarial liabilities. A pension plan at this point is at the Full Funding Limitation (FFL). The Internal Revenue Code denies current tax deductibility and imposes a 10% excise tax on contributions to pension plans that exceed the FFL. An excess contribution, if made, is treated as a prepayment applicable to future periods.

Some contractors in full funding make no further contributions and record no additional pension costs until the overfunding is liquidated. Others (generally with government acquiescence) interpret Cost Accounting Standard (CAS) 412 to require accrual for pension expense regardless of the FFL. However, FAR 31.205-6(j) requires pension costs to be funded in order to be allowable. Funding would subject them to the FFL and tax penalty. One approach to resolving this dilemma is using an advance agreement providing for the CAS computation but having the year-end adjustment reflect the impact of FFL on contracts.

In September 1986 DoD issued interim guidance advocating using advance agreements to adjust contract prices for any "actuarial surplus" arising because the pension plan exceeds the FFL. The agreement would permit adjusting fixed-price type

contracts where cost and pricing data had been submitted. While some contractors thought this to be the least objectionable approach, others strongly objected to the concept of adjusting fixed-price type contracts. The matter remains fluid, but the government (auditors and contract administration personnel) is questioning pension costs that exceed FFL.

In August 1988 the Defense Contract Audit Agency (DCAA) issued guidance that defined the FFL as occurring when assets exceed the lesser of either 1) 150% of current liabilities or 2) accrued liabilities. DCAA stated, however, that no pension expense can be charged to current contracts when assets exceed 150% of current liabilities but do not exceed accrued liabilities. Furthermore, when a contractor comes out of an FFL position, he cannot charge these lost expense dollars because of the constraints of CAS 412/413.

The DoD CAS Policy Group initially proposed (in early 1987) revision of CAS relative to overfunded pension plans to include a "saving clause" in contracts to reopen fixed-price type contracts. Eleanor Spector, the Deputy Assistant Secretary of Defense for Procurement (DASD(P)), rejected this approach. Currently, any revision of CAS must await reestablishment of the CAS Board, which is provided for in OFPP legislation.

In the latter half of 1989, AIA, NSIA (the National Security Industrial Association) and the DASD(P) discussed a possible waiver to CAS 412. As a result of

these discussions, on September 11, 1989, Spector wrote to Allan Burman, Acting Administrator of OFPP, requesting authority to waive CAS 412 on a case-by-case basis. This matter was still pending at year-end.

MRP/MMAS

Progress continued in achieving compliance with DoD requirements for acceptable Materiel Management and Accounting Systems (MMAS). In May AIA briefed Representative John R. Kasich (R-Ohio), Bill Reed, DCAA Director, Eleanor Spector, DASD(P), and Derek Vander Schaaf, Deputy DoD Inspector General, on industry's efforts to achieve compliance, emphasizing that there is no need for certification.

Favorably impressed, Kasich requested a follow-up briefing on the progress being made. Subsequently, on September 21, 1989, Don Fuqua and Jim Cunnane, General Dynamics, held a briefing, and it appeared that Kasich was satisfied industry was making significant progress and legislation, including certification, was not needed.

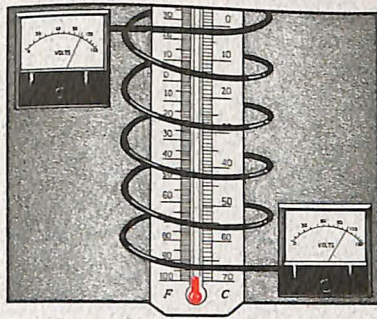
AIA scheduled another status briefing to Rep. Kasich for January 1990 at which time it was expected that 92% of the sites will have taken sufficient action to improve their systems in the government's interest. Action to achieve full compliance should be completed by 1991.

Kenneth J. Brown
The Boeing Company
Chairman, Legal
Committee



Alan Chvotkin
Sundstrand Corporation
Chairman, Procurement
Techniques Committee





Superconductivity, the ability of new materials to conduct electricity without resistance, is being aggressively pursued in laboratories. AIA's roadmap will give a detailed view of probable applications.

Qui Tam

In 1989 AIA took an active role on behalf of its member companies regarding *qui tam* suits and filed *Amicus* briefs in four cases: *Trulong v. Northrop* (Central District of California), *Hyatt v. Northrop* (Central District of California), *Stillwell v. Hughes* (Central District of California), *Krindler & Krindler v. United Technologies* (Northern District of New York).

At year-end it was too early in the judicial process to assess the potential outcome of these actions. AIA's Legal Committee is monitoring this matter for the Procurement and Finance Council.

Total Quality Management

AIA joined DoD in supporting the Total Quality Management (TQM) philosophy and its objective of continuous improvement. However, AIA and the other member associations of CODSIA were concerned with DoD's proposed approach to implementing TQM using a formal DoD Directive (DoDD).

Among other things, the proposed DoDD 5000.51, Total Quality Management, would make TQM a key consideration in source selection. CODSIA, in an August 25, 1989, letter to Assistant Secretary of Defense (Production and Logistics) Jack Katzen, contended that the appropriate focus of source selection and performance incentives should be on the end results of well-managed, continuous improvement efforts, not on the TQM process itself.

Since TQM is a management philosophy, CODSIA argued that DoD should never impose TQM by contract clauses, statements of work, data items, or contract-incorporated publications. DoD

agreed with these arguments at a policy level; however, TQM occasionally cropped up at purchasing activity levels as a solicitation requirement. In addition, DoD, even at the policy level, proposes to use TQM as a source selection factor. CODSIA took a strong position against this.

RFP Streamlining

In late 1988 Air Force Systems Command (AFSC) initiated a Request for Proposal (RFP) process review using the TQM philosophy. AFSC formed a team for this effort and invited industry participation. AIA, through CODSIA, formed an industry task group with a broad functional representation to work with the AFSC and ensure that the industry perspective was appropriately considered in developing a streamlined RFP process.

Several joint AFSC/industry meetings were held in the first half of 1989 to identify opportune targets for streamlining the RFP process. Shortly after a July 13, 1989, briefing on the results of this effort at the AFSC Commanders/Chief Executive Officers Conference at Kirtland Air Force Base, New Mexico, the joint AFSC/industry group began to formulate action teams and plans to pursue the targets of opportunity identified.

Four action teams addressed the following issues: 1) authority, team formation, and scheduling; acquisition document review and approval; concurrency, 2) communication with offerors; acquisition strategy development, 3)

tailoring; data and data call, and 4) RFP congruency and format; RFP formal and practical training.

Work Measurement

In August 1989 AFSC invited industry participation on a process action team to apply the principles of TQM to Work Measurement. This led to a joint Air Force/industry team with Dick Engwall from Westinghouse heading the multi-association industry group.

This team met several times for week-long sessions in 1989 and planned to continue such meetings in 1990.

The team defined work measurement as a process used to assist in continuously improving the use of touch labor so that total product life cycle cost can be minimized. Work measurement should give enough visibility to touch labor performance that estimating, negotiating, improving methods, reducing variance, and measuring and evaluating performance can be better accomplished.

The team agreed on its mission: using TQM to determine the extent to which government work measurement requirements, policies, and procedures must remain unchanged, be modified, or be eliminated in order to achieve continual improvement in cost estimating, negotiation, and administration and to minimize total product life cycle cost. The team planned to make specific recommendations to AFSC Commander General Bernard

James J. Cunnane
General Dynamics
Corporation
Chairman, Financial
Committee



Robert E. Deppe II
General Electric
Company
Chairman, Cost
Principles Committee



Randolph and other government decision makers as appropriate.

Though the review is limited to touch labor as defined in MIL-STD-1567A, there are no limitations on the degree of recommendations to the government. The team may recommend use as is, make appropriate changes to any or all government work measurement policies and procedures, or abolish all government requirements.

The Byrd Amendment

The Byrd Amendment to the Department of Interior Appropriations Act states that "None of the funds appropriated by any act may be expended by the recipient of a federal contract, grant, loan, or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with any federal action described in paragraph (2) of this subsection."

Paragraph 2 describes the "federal actions" covered as the awarding of any federal contract, the making of any federal grant, the making of any federal loan, and the entering into of any cooperative agreement, as well as the extension, continuation, renewal, amendment, and modification of any of these.

The Byrd Amendment could create a number of problems depending on how broadly or narrowly the language is interpreted. It exempts reasonable compensation paid to employees for agency and

legislative liaison activities, including providing information to a federal agency and making presentations to a federal agency. It also excludes or exempts reasonable payments to consultants for professional, technical, or other similar services in connection with meeting requirements for receiving federal contracts. Reasonable payment to employees or compensation to an officer or employee of a company is exempt if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of a bid or proposal or to meet the requirements for receiving a contract.

The bill clearly prohibits influencing or attempting to influence executive or legislative branch decision-making in connection with the award or extension of contracts, grants, etc. The bill could also be read to have little or no impact on contracting activities since any activities designed to improperly influence award of a contract are already unallowable under the cost principles. On the other hand, depending on how the regulation drafters interpret the language of the amendment, they could conceivably use it as the basis for new and stricter regulations.

The bill became effective on December 23, 1989. OMB was assigned the responsibility to issue guidance for agency implementation and compliance with the requirements of the amendment. Procurement and Finance Council representatives

participated in drafting a CODSIA letter to Richard Darman, Director of the Office of Management and Budget (OMB), and a more detailed follow-up letter to Allan Burman, OFPP Acting Administrator, stating industry's concerns and making recommendations as to what the regulatory guidance should contain.

OMB published interim, final guidance in the *Federal Register* on December 20, 1989, and requested public comments within 60 days. The guidance is very detailed and is in regulation format. Thus, except for editing by the DAR Council and the Civilian Agency Acquisition Council and whatever revisions might be made as a result of public comments, there does not appear to be much left to do regarding implementing regulations.

The guidance rejected industry's recommendations that the Byrd Amendment proscriptions be treated as a cost allowability matter and chose, instead, to require certification from contractors and subcontractors for all procurements over \$100,000 regardless of whether cost or pricing data had been furnished. Hence, it covers price competitive procurements and commercial procurements as well as those negotiated on the basis of cost or pricing data.

Robert W. Keller
TRW Inc.
Chairman, Intellectual
Property Committee



David Koonce
Martin Marietta
Corporation
Chairman, Economic
Advisory Committee



Dick Wangenheim
Martin Marietta
Corporation
Chairman, Facilities
and Property
Committee



LeRoy J. Haugh
Vice President
Procurement and
Finance, AIA



Technical and Operations focuses on all aspects of technological, operations, and engineering efforts to advance all aspects of program management, industrial base, engineering, development, test, manufacturing, quality, materiel management, product support, and information to better address issues stemming from the production of aircraft, missiles, and space vehicles.

Key Technologies AIA's Key Technologies for the 1990s program gained momentum during 1989. Five technology roadmaps (Rocket Propulsion, Advanced Sensors, Software Development, Artificial Intelligence, and Advanced Composites) were published; two (Airbreathing Propulsion and Optical Information Processing) were in final coordination, and three (Ultra Reliable Electronic Systems, Superconductivity, and Computational Science) were still in process at the close of 1989.

Technology teams began work on national technology development plans for these roadmaps, and interest and involvement by government, industry, and the academic technical community increased in 1989. The National Center for Advanced Technologies (NCAT) chose the Rocket Propulsion Strategic Plan as the topic of its first symposium on February 15, 1990. The Rocket Propulsion team anticipated finalizing the plan after the symposium.

The Aerospace Technology Policy Forum, chaired by Don Fuqua, held two meetings in 1988. Due to the delay in nomination and confirmation of senior officials in the new administration, the only 1989 meeting was held in November. This high-level policy group was formed to oversee the technology efforts and provides policy guidance to help facilitate

cooperative technology development initiatives. Four AIA industry and two NCAT representatives sat on the forum; government participants included a representative of President Bush's Science Advisor, the top technology person in the Commerce Department, and representatives from the Office of the Secretary of Defense (OSD), the Energy Department, NASA, and the three military services. Two leaders of major research and engineering universities represented the university community.

Flight Testing

The Flight Test Group periodically revisits Air Force Regulation 55-22, Contractor Aircraft Flight and Ground Operations. This regulation permits military encroachment into a contractor's engineering and performance flight testing programs during the development, pre-production, and production phases of aircraft acquisitions. The excessive and restrictive management control the regulation imposes can seriously affect development schedules for a new system, add significantly to the cost of the production system, and inhibit achieving technically superior aircraft weapon systems.

AIA provided comments to the Air Force Systems Command (AFSC) but expected the Air Force to delay any action until a *Defense Management Report* recommendation to integrate the military services and Defense Logistics Agency (DLA)

auditing functions under one organization (responsible to the Under Secretary of Defense for Acquisition) is finalized. Accordingly, the Flight Test Group planned to review and reaffirm a National Aerospace Standard on Contractor Flight Operations to submit to the new organization when formed. The standard could be used in lieu of procedures outlined in the joint regulation by the services and DLA.

Space Station

The Space Committee developed a forceful paper describing how Space Station *Freedom* fits into an orderly overall NASA space program. The committee subsequently published a brochure, distributed to congressional leaders, NASA, selected military service representatives, and the media, that stressed the space station as an essential precursor to future space activities.

In addition to highlighting eight benefits to be derived from Space Station *Freedom* investigations, the brochure also illustrated how spin-offs from U.S. science, space, and technology programs contribute to our economic well-being and technological leadership.

Acquisition Streamlining

AIA developed a list of technical documents considered counterproductive to the orderly acquisition of weapon systems. The list went to the Department of Defense (DoD) and service acquisition streamlining executives; a response from

OSD indicated that nearly two-thirds of the 50 counterproductive documents would be revamped or modified by the end of 1989.

At the request of the Assistant Secretary of Defense (Production and Logistics), the Technical Management Committee planned to review several specifications in the reliability area and identify industry concerns by paragraph for each specification.



J.R. Burnett
TRW Space & Defense
Sector
Chairman, Key
Technologies
Committee



Walter S. Cebulak
Aluminum Company of
America
Chairman, Engineering
Standards Division

Lawrence R. Cecchini
E-Systems Inc.
Chairman, Electronic
Systems Committee

Norm Collins
The Boeing Company
Chairman, Information
Technology Committee



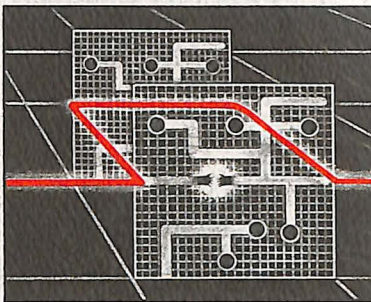
Felix W. Fenter
The LTV Corporation
Chairman, Technical
and Operations Council



Stan Friesen
General Electric
Company
Chairman, Materials
and Structures
Committee



Ultrareliable Electronic Systems will develop the theory and practice to provide communications equipment that will operate for the lifetime of the vehicle.



Systems Engineering

The AFSC planned to revise MIL-STD-499A, Systems Engineering Management. This military standard provides guidelines and requirements for the program manager, a methodology for system engineering actions during a system's life cycle, and guidance to ensure that system definition and design reflect requirements for all elements of the system.

AIA reviewed the document and questioned the need for the specification, suggesting that AFSC needs a better understanding of the relationship among DoD initiatives on concurrent engineering, transition from development to production, and Total Quality Management (TQM). The proposed document inadequately addressed the use of value engineering and human engineering and inappropriately mixed engineering management with program management.

AFSC intends to revise the document and format it similarly to the computer standard DOD-STD-2167A. AIA expects major delay in the publication of this standard.

Awards to SDBs

Under a May 1989 AIA Board of Governors' resolution, the Small Disadvantaged Business (SDB) Panel of the Materiel Management Committee took further actions toward helping member companies increase their subcontract awards to SDBs. In June AIA awarded a six-month study contract to the School of Business and Industry (SBI) Florida A&M and Harbridge House (HH) to develop subcontract award strategies for member companies.

The SDB Development Panel met with SBI and HH in June and reviewed the statement of work, presented the AIA SDB survey data, and explained how the aerospace industry does business. In August the panel finalized the schedule and milestones.

SBI and HH also conducted special focus groups with buyers, purchasing managers, high-level management, engineers, SDB liaison officers, and SDB CEOs to develop strategies.

Under a separate 24-month contract AIA awarded in April, Conwal Incorporated, a management consulting firm and certified SDB, surveyed member companies to establish an AIA database of SDBs for all members to share. The association sent a database to each member company in August and released an update in October. The update brought the total number of SDBs to more than 2,600.

SDBs in the database show 49% in manufacturing, 25% in wholesale trade, 16% in services, and 10% in other categories. Conwal's validation and verification process eliminated 53 SDB companies from the database no longer in business. Conwal also began an outreach program to add additional SDBs to the database.

To fulfill a recommendation of an Air Force/SDB/AIA meeting in March 1989, AIA hosted a conference between AIA member company representatives and 30 SDB CEOs in September. The conference identified and discussed the barriers to doing

business with SDBs and explored actions to overcome these barriers. The SBI and HH final report will include conference results.

DoD Report on CIM

House Armed Services Committee (HASC) Report Number 100-58 states that a shrinking defense budget means every effort must be made to achieve effective cost discipline through increased production efficiency, strong and innovative management practices, and quality. One area offering this potential is Computer Integrated Manufacturing (CIM).

Because a congressional review of current defense production practices revealed only limited use of this approach, the HASC directed DoD to examine whether or not CIM could be used more widely in the defense production sector. AIA subsequently commented to DoD in June 1989 on the interim CIM report and found it lacking in some areas.

AIA's Computer Aided Manufacturing advisory group criticized the report for not fully addressing the value and benefits of successful implementation of CIM. University and special focus consultants heavily influenced the report, highlighting only generic and relatively unconvincing examples of CIM. The aerospace industry has significant examples of CIM in planning, execution, and benefits, especially under the Industrial Modernization Incentives Program, that were not included in the report.

The report also overlooked the necessary government directives and regulations, long-

term planning, procurement policies, and multi-year contracts required to foster CIM. Lessons learned and needed management challenges for the 1990s, including cultural attitude, organizational changes, and long-term investment justification were not considered.

The final CIM study to the HASC was sent in November 1989.



Louis J. Giuliano
ITT Defense Technology
Corporation
Chairman, Operations
Division



Allen E. Heyson
General Electric
Company
Chairman, International
Standardization Advisory
Group



James J. Kenna, Jr.
Bell Helicopter Textron
Chairman,
Manufacturing
Committee



Richard L. Kline
Grumman Corporation
Chairman, Space
Committee



Torrey D. Larsen
Lockheed Corporation
Chairman, Flight Test
Group



Craig A. Lenius
General Electric
Company
Chairman, National
Aerospace Standards
Committee



Torrey D. Larsen
Lockheed Corporation
Chairman, Flight Test
Group



Craig A. Lenius
General Electric
Company
Chairman, National
Aerospace Standards
Committee

Industrial Modernization

To improve the negotiation process for Industrial Modernization Incentives Program (IMIP) projects, AIA's Industrial Modernization Committee (IMC) worked with the Air Force to make the National Aerospace Standard (NAS) Discounted Cash Flow Model compatible with Air Force computers. The committee also ensured that the Cash Flow Model was acceptable to the Army and Navy and began coordinating it with the DLA. The revised NAS was targeted for publication by January 1990.

The committee's proposal that the exhibits and key speeches at the traditionally closed annual MTAG (Manufacturing Technology Advisory Group)/IMIP Conference (November 27—December 1, 1989) be open to members of Congress, their staffs, and the news media was accepted. AIA member companies contribute to this conference with displays describing industrial modernization successes. The presence of these proposed invitees at the conference aids in publicizing these accomplishments and gaining support for IMIP.

DoD agreed to include IMIP project data in the Manufacturing Technology Information Analysis Center (MTIAC), and the IMC began developing the format for this data input. When completed, companies will be able to query MTIAC on ManTech projects and IMIPs and discuss what has already been accomplished. This information will help to avoid duplication of effort and be the basis for developing new projects and programs.

Competition

At the request of the Air Force Competition Advocate General, the AIA Competition Advocate Working Group (CAWG) met with Air Force competition advocates from several commands to discuss topics such as buying best value rather than lowest cost, SDBs, qualification requirements for breakout of spare parts, and the definition of competition, impediments to competition, and competition audits.

The Air Force accepted the CAWG's industry standards for competition coding of purchase commitments, and the Air Force Competition Advocate General also committed to working with the DLA and the other services for broader acceptance of these standards. Industry is concerned that the same purchase commitment during audits can be scored as both competitive or non-competitive depending upon the service or agency performing the audit. This can affect whether or not a company's purchasing system is acceptable to a service or agency.

DLA and the other services assured the Air Force Competition Advocate that the AIA standard definitions for competition coding are acceptable. The AIA Materiel Management Committee will publish the definitions as a National Aerospace Standard.

Producibility

At DoD's request AIA reviewed two new draft documents: DODI 5000.xx *Producibility Assessment* and *Producibility Assessment*

Guidelines. The Methods, Processes, and Equipment (MPE) MTAG subsequently recommended that DoD not publish the documents because other military standards and DoD directives covered producibility extensively. DoD responded that they would still publish both documents, however.

The Manufacturing Executive Committee directed the MPE MTAG to further analyze the two drafts. Their paragraph-by-paragraph analysis showed that similar direction already existed in the military standards and DoD directives on producibility. Working through a Council of Defense and Space Industry Associations' (CODSIA) group on "Streamline Acquisition," the Manufacturing Executive Committee influenced DoD's decision in June not to publish the draft documents.

MTIAC

In 1989 the Manufacturing Management System (MMS) MTAG surveyed manufacturing representatives from member companies to determine if contractors were using the MTIAC. Since 1986 the center has housed ManTech data from Army, Navy, and Air Force files in order to better use the data and avoid duplication.

Only 60% of survey respondents were aware of the MTIAC and only 45% knew how to access the information. More than 90%, however, had a need for the MTIAC service and thought the cost reasonable; nearly 65% wanted to see other data, particularly IMIP information, in MTIAC, and, in

fact, DoD responded favorably to including IMIP information in the MTIAC. To improve awareness of MTIAC and its services, AIA planned to distribute the MTIAC newsletter to the manufacturing representatives of member companies in 1990.

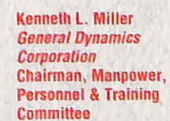
The MMS MTAG began plans to establish another project in 1990 that would increase member company utilization of data from the MTIAC database.



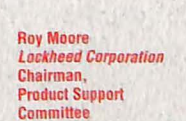
Joel W. Marsh
United Technologies
Corporation
Chairman, Competition
Advocate Working
Group



W.R. Middleton
Westinghouse Electric
Corporation
Chairman, Service
Publications Committee



Kenneth L. Miller
General Dynamics
Corporation
Chairman, Manpower,
Personnel & Training
Committee



Roy Moore
Lockheed Corporation
Chairman,
Product Support
Committee



Software Initiatives

AIA worked on several initiatives in the embedded software area. Working with CODSIA, AIA completed a review of MIL-HDBK-287, *A Tailoring Guide for DOD-STD-2167A, Defense System Software Development*. The CODSIA group accepted the handbook because the initial release accommodated many of industry's concerns. A revised document, due by the close of 1990, should resolve remaining comments.

In another CODSIA Case (10-89) AIA worked with the Air Force Software Action Team on an implementation plan that responds to the Air Force Study Board's report, *Adapting Software Management Policies to Modern Technologies*. Released August 1, 1989, the plan contains recommendations in several specific areas that require continued industry involvement.

In September AIA's Embedded Computer Software Committee and the Software Engineering Institute co-sponsored a successful workshop on software research issues. Sixty invited attendees from industry, academia, and government met to identify and discuss major software technology problems in an attempt to influence funding for future research. The focus of this initial effort was parallel/distributed computing. Future workshops on other topics were being considered.

Standardization and EC '92

The European Community (EC) continued moving aggressively toward harmonizing standards, testing, and certification requirements among its 12 member states in

its program to create a single, internal market by 1992. The United States is concerned that harmonized European standards could hinder market access for U.S. products, especially considering that the European standards development process is closed to U.S. participation.

AECMA, the association of nine European aerospace manufacturing nations, has been publishing European standards in the aerospace field at a fast pace. AIA visibility on these developments is limited, and divergence between European and U.S. standards could complicate future joint ventures and create problems for U.S. suppliers to European programs.

In October AIA representatives and delegates from other aerospace-producing nations of the world met with representatives of the AECMA standardization program at the plenary session of ISO/TC 20, the international aerospace standards committee. Don Fuqua chaired that meeting. The U.S. used the opportunity to pursue dialogue with AECMA for closer coordination on standards.

DoD and industry began revising current military specifications covering quality program requirements to harmonize them with the relevant international standards (ISO 9000 series).

Non-Government Standards

DoD has been eliminating many military specifications and standards and replacing them with non-government standards. AIA supports this approach when military standards and specifications are

outdated, behind technology developments, or cost drivers.

Where certain specifications for parts and materials are being widely used by defense contractors, precipitous DoD actions have, however, created delays and added costs to aerospace programs.

AIA contends that industry-developed standards to replace these military documents would be costly and achieve no clear benefit. AIA is also concerned that, in some cases, a non-government standard has replaced a military specification and does not provide an adequate level of performance, reliability, and safety for aerospace applications.

In a September 22, 1989, letter to the Under Secretary of Defense (Acquisition), AIA addressed its concerns and offered to work closely with DoD in determining which military documents DoD could replace with non-government standards and which ones would be more cost effective to retain as military specifications. DoD responded that the standards review would take into account AIA's concerns and that needed military specifications would not be cancelled.

AIA, DoD, and eight standards developing organizations co-sponsored a conference November 14-16 in Williamsburg, Virginia, on DoD use of industry standards. The "Equal Partners" Conference, attended by more than 200 representatives from government and industry, explored problems, solutions, and successes in DoD use of non-government standards.

AIA Standardization

The National Aerospace Standards Committee (NASC) continued working on AIA's body of more than 2,800 National Aerospace Standards (NAS) and metric NAS.

During 1989 the NASC published 81 new or revised standards on such items as fittings, O-rings, electrical parts, and numerous types of aerospace fasteners and reviewed 56 standards for updating or inactivation. These standards support competitive sourcing by insuring functional interchangeability among various manufacturers' products.

In June 1987 the NASC began a program to develop an additional 300 metric standards to support the LHX helicopter program and future metric programs. While the NASC substantially increased its metric effort under this program, it did not meet the agreed to schedule calling for completion of the first group of

Robert E. Morris
General Electric
Company
Chairman, Industrial
Modernization
Committee



Jerome P. Mullin
Sundstrand Corporation
Chairman, Technical
Division



40 standards by December 1988 and 40 more standards by December 1989.

Concerned about the NASC's slow progress, the Army LHX program office requested a meeting with the committee to discuss the problem and find a means to accelerate the effort. At the NASC September meeting the Army LHX program office representatives said they were open to a proposal from AIA for funds supporting the development of the required metric standards. AIA is waiting to develop a proposal and to negotiate acceptable terms.

AIA began final negotiations with three commercial distributors of technical information to develop and market AIA's NAS in computer-accessible formats. The products will increase the efficiency of engineering and manufacturing users and will vary in sophistication to serve different marketplace needs.

Total Quality Management

The Quality Assurance Committee worked with the Office of the Assistant Secretary of Defense (Production and Logistics), the services, and DLA to implement government initiatives under the TQM program. After several meetings, industry submitted comments on the DoD *TQM Implementation Guide* and offered resources to assist in developing an education and training program. AIA, the National Security Industrial Association (NSIA), and the Electronic Industries Association (EIA) reviewed quality program requirements under the TQM philosophy with DLA.

DoD Directive on TQM

DoD served notice in the *Federal Register* of a proposed rule establishing policy and assigning responsibility for implementing the TQM concept in DoD. AIA, EIA, and NSIA jointly expressed concerns about codifying policy guidance on TQM.

Industry is particularly troubled by language purporting that acquisition strategies must address plans to measure process improvement and that TQM would be a key consideration in source selection. Industry submitted to the Assistant Secretary of Defense (Production and Logistics) that TQM should be a guiding philosophy for defense companies, not a deciding factor in contract award.

DoD withheld further action on the directive and requested industry participation in a process action team on source selection so that DoD could write more appropriate and acceptable language for the directive.

Nonconforming Material

DoD officially released the joint regulation on nonconforming material in July. The regulation establishes DoD policy on product nonconformance reduction and requirements for improving product quality. Its purpose is to achieve a unified government approach by replacing individual service and DLA initiatives.

The regulation calls for joint contractor/government quality improvement agreements in situations where the contractor has not demonstrated evidence of continuous process improvement. AIA received

notice, however, of individual service and agency initiatives that pressured contractors to sign punitive Memorandums of Agreement contrary to this provision. AIA expressed concern to DoD about these continuing efforts to obtain contractual commitments related to nonconformance reduction when a sound quality system is already in place. AIA urged OSD and the services to comply with the intent and letter of the regulation.

Fastener Audit

Using guidelines prescribed by AIA's general counsel, the AIA Joint Prime Contractor Fastener Audit Program completed five audits of manufacturers and another four were in process at the end of 1989. AIA's Quality Assurance Committee, which conducts the program, began restructuring it in 1989 to include fastener distributors as part of the overall approach to ascertaining product quality.

Members of the audit team also began working with the American Society of Mechanical Engineers to develop a national program for accrediting fastener manufacturers and distributors. Once in place, the AIA fastener audit will be discontinued.

Because of the program's success, DLA asked AIA to support its post-investigation activities with manufacturers and distributors. The Quality Assurance Committee was reviewing the request at year-end.

CALS Program

The Computer-Aided Acquisition and Logistics Support (CALs) Industry Steering Group reorganized in midyear so that task group activities would more closely resemble the functional alignments of the supporting CALs associations (EIA and NSIA). The focal point for this liaison activity is the AIA Information Technology Committee.

The new CALs format calls for using existing industry expertise wherever possible and assigning projects to member association committees. The new alignment also places greater emphasis on concurrent engineering initiatives, consolidates logistics activities under a new Logistics Process Task Group, and strengthens the security program by assigning the Acquisition Task Group responsibility for coordinating intellectual property security issues and the Information Management Task Group responsibility for system/data protection.

CALs member associations were asked to identify ongoing projects related to the overall CALs initiative. Dr. Michael McGrath, Director of the CALs program in OSD, reviewed the CALs Master Plan. It is

Paul H. Roth
General Electric
Company
Chairman, Spare Parts
Committee



Robert W. Smiley
Aerojet Solid
Propulsion Company
Chairman, Quality
Assurance Committee



anticipated that the Industry Steering Group will be able to review the draft by first quarter 1990. The final 1989 CALS Program Office agenda concentrated on increased testing of the CALS network by the National Institute of Standards and Technology and infrastructure development and revision to existing standards.

Electronic Mail

Directed by the Information Technology Committee, members of the Electronic Mail (E-Mail) Pilot Project completed a successful demonstration in June 1989 involving eight member companies and eight network service providers. The demonstration showed the progress made in achieving connection between various E-mail services so that global network applications can eventually be utilized for the exchange of notes, messages, and revisable documents. This concluded Phase I of the project.

An additional 10 AIA members became involved in Phase II. Phase II continues the development of the AIA network plus makes the network connections commercially available to other E-Mail users. With this accomplished, AIA members will then be able to factor these electronic links into their business planning and promote them to internal users.

As the 10 new AIA member participants began working with the network service providers to continue testing interconnections, Phase I participants were testing results of all-in-place

interconnection. When completed, reports will be available to network participants and for AIA's internal use.

Manufacturing Sources

Diminishing Manufacturing Sources (DMS) has long been a concern for both government and industry. During 1989 AIA participated in a multi-association ad hoc working group that provided industry input on the DMS problem.

In May NSIA gave DoD a report from 149 companies that cited a lack of communication both within and between government and industry on DMS and provided numerous recommendations and courses of action. DoD will incorporate industry's comments into an action plan for publication in early 1990. The industry ad hoc working group offered to assist the government in implementing the plan.

Critical Parts

AIA members are deeply concerned about the safety and quality aspects of DoD's competitive breakout of flight safety critical parts. Congress directed the General Accounting Office (GAO) to report on the adequacy of procedures the military services use during breakout to ensure appropriate levels of quality.

The GAO provided an interim report to Congress in October 1989 and will conduct in-depth analyses of specific spare parts procurements—initially at the San Antonio Air Logistics Center—in 1990. AIA members from the Product Support Committee and the Competition

Advocate Working Group monitored GAO activity and provided industry input.

Repair Contracts

In late 1988 the Navy asked AIA to participate in a joint project investigating the acquisition, handling, and reporting procedures of repair material, either government-furnished, contractor-furnished, or both.

The AIA Spare Parts Committee reported its results to the Navy in August 1989 and suggested several concepts for solving existing problems and inefficiencies and for enhancing the overall process of contractor overhaul and repair services to the Navy and other military services. The Navy Aviation Supply Office acted upon several recommendations and was also reviewing existing procedures. The OSD and the other services have copies of the AIA report.

Electronic Publishing

Significant advances occurred during 1989 in the CALS-related areas of electronic publishing. A joint industry/government Pageless Technical Manual study group, chaired by the AIA Service Publications Committee, worked to develop generic functional specifications so that technical data could be presented electronically in a paperless environment.

Generic specifications are required, for example, for the writing of specifications, delivery of specifications, and data interchange of information.

The CALS Industry Steering Group received the completed interchange specification in August 1989. Work continued on the writing and delivery specifications.

Logistics Support Standard

DoD updated the military standard that establishes the requirement for a Logistics Support Analysis Record and forms the basis for provisioning data requirements in 1989. The major change to the standard incorporates the concept of "relational data tables" and would replace the current 80-card-column format with a pageless electronic environment.

The Product Support Committee provided DoD with AIA member comments in October 1989. While the revised standard is a great improvement over previous versions, it needs additional refinement and clarification before it can be published. AIA continued working with the government and other industry associations on this important document.



P.L. Sterling
General Dynamics
Corporation
Chairman, Technical
Management
Committee



G. Allan Whittaker
Honeywell, Inc.
Chairman, Embedded
Computer Software
Committee

Charles T. Wood
Martin Marietta
Corporation
Chairman, Materiel
Management
Committee

Stan Siegel
Vice President
Technical and
Operations, AIA



Policy and Planning coordinates the key policy issues identified by the association's Board of Governors, including the annual review and revision of AIA's Top Ten Issues, so that goals and strategies for achieving consensus and action on behalf of the aerospace industry can be established.



AIA's Top Ten Issues

The Aerospace Industries Association identified the

Top Ten Issues of importance to the aerospace industry for the year 1990. New to the list is Education, which has been recognized as a key concern of aerospace. Small Disadvantaged Business Subcontracting, previously under the Defense and Aerospace Industrial Base, now stands alone to underscore AIA's commitment to increasing subcontract awards to this segment of the defense/aerospace industrial base.

Government/Industry Relations

Restoration of public confidence in the defense industry is essential to improving government/industry relations. Despite industry's conscientious efforts to promote ethics and self governance through programs such as the Defense Industry Initiatives, a public perception remains that industry is not committed to improvement.

Financial Health of the Industry

Legislative and regulatory changes continue to threaten the industrial base. These must be modified or reversed to ensure a viable industry and a strong national defense.

Key Technologies for the 1990s

Key Technologies for the 1990s is an industry-led cooperative effort, with government and university

participation, to develop national technology plans emphasizing high-leverage technologies for use in aerospace products for the year 2000.

Small Disadvantaged Business Subcontracting

In 1987 and 1988 legislation, Congress challenged the industry to increase its subcontract awards to Small Disadvantaged Businesses (SDBs) by more than 100%. The AIA Board of Governors adopted resolutions of commitment to take up this challenge and increase industry's awards to SDBs. The purpose of this effort is to increase the quality and quantity of industrial base suppliers.

Maintaining the Lead in a World Market

The U.S. aerospace industry is the world leader. To remain so, it must operate in a global context and continue to encourage government policies that strongly support U.S. exports. Our companies must have access to foreign markets on an equitable basis and be able to work with foreign partners to spread risk, raise capital, improve market access, and develop new technology.

Defense and Aerospace Industrial Base

Congress, the Department of Defense, and AIA member companies consider the erosion of the defense and aerospace industrial base as a critical problem in developing, producing, and supporting systems for our national defense and in competing for global market share. Industry

initiatives to slow down and stop this erosion begin with Total Quality Management, cooperative relations with the government, plant modernization, utilization of commercial manufacturing process and product specifications, concurrent engineering, acquisition streamlining, improvement of the technical skill base, university expertise and programs in manufacturing, and excellence of management at all levels.

National Civil Space Policy

President Bush's proposed establishment of permanent manned presence in space is the first stage of a three-phase program that includes a manned lunar base and a manned expedition to Mars. Critical to this mission is the need for reliable economic transportation and development of critical technologies to assure the health, safety, and productivity of humans in space. Fostering international cooperation where appropriate is pivotal to such large ventures.

Civil Aviation

Manufacturers of civil aviation products are entering a critical period. Major regulatory and policy issues are being addressed by industry and government, and the solutions will have a major effect on the industry for years to come. Broadly speaking, areas of important activity include the search for agreed rules covering the involvement of governments in support of civil programs, continuing efforts to improve safety, maintaining the role of the FAA as the world's

preeminent airworthiness authority, the development of a coherent national transportation policy, and a more logical approach to export controls.

Education

U.S. aerospace capacity for innovation and its success in the future will depend upon a workforce capable of meeting the productivity and manufacturing quality demands of a fast-changing marketplace. The industry is concerned about assessments that U.S. students frequently do not measure up to their foreign counterparts in science and math skills and that fewer U.S. students are opting for science- and math-related careers.

Environmental Concerns/Initiatives

The aerospace industry is committed to protecting the environment and ensuring the occupational safety of its workers. Aerospace needs to maintain the flexibility to produce a competitive, safe, and reliable product, which requires a consistent, unified voice to represent all interests. To achieve this, AIA will coordinate with appropriate government regulatory agencies and with customers.

Sandra W. Wobbe
Assistant Vice
President, Policy and
Planning, AIA



1990 AIA BOARD OF GOVERNORS

Officers

Stanley C. Pace, *Chairman*
Edsel D. Dunford, *Vice Chairman*
Don Fuqua, *President*
George F. Copsey, *Secretary-Treasurer*

Executive Committee

Edsel D. Dunford, *Executive Vice President & General Manager, Space & Defense Sector, TRW Inc.*
D. Travis Engen, *President & Chief Executive Officer, ITT Defense, Inc.*
Don Fuqua, *President, Aerospace Industries Association*
Edward E. Hood, Jr., *Vice Chairman of the Board & Executive Officer, General Electric Company*
John F. McDonnell, *Chairman & Chief Executive Officer, McDonnell Douglas Corporation*
John O'Brien, *Chairman, President & Chief Executive Officer, Grumman Corporation*
Stanley C. Pace, *Chairman & Chief Executive Officer, General Dynamics Corporation*
Daniel M. Tellep, *Chairman & Chief Executive Officer, Lockheed Corporation*

Members

Norman R. Augustine, *Chairman & Chief Executive Officer, Martin Marietta Corporation*
Fred L. Buckner, *President & Chief Operating Officer, Hercules Aerospace Company*
Robert N. Burt, *Executive Vice President, FMC Corporation*
Malcolm R. Currie, *Chairman & Chief Executive Officer, Hughes Aircraft Company, General Motors Corporation*
Beverly F. Dolan, *Chairman & Chief Executive Officer, Textron Inc.*
Roy H. Ekrom, *President & Chief Executive Officer, Allied-Signal Aerospace Company*
Phillip W. Farmer, *President, Electronic Systems Sector, Harris Corporation*
U. Edwin Garrison, *President & Chief Executive Officer, Thiokol Corporation*
Clyde R. Gillespie, *Vice President, Engineered Products, Aluminum Company of America*
Raymond A. Hay, *Chairman & Chief Executive Officer, The LTV Corporation*
Sam F. Iacobellis, *President, Aerospace Operations & Executive Vice President, Rockwell International Corporation*
E. Gene Keiffer, *Chairman of the Board & Chief Executive Officer, E-Systems, Inc.*
Kent Kresa, *President & Chief Executive Officer, Northrop Corporation*
Richard A. Linder, *President, Electronic Systems Group, Westinghouse Electric Corporation*
William B. Mitchell, *President, Defense Systems & Electronics Group, Texas Instruments Incorporated*
Dennis J. Picard, *President, Raytheon Company*
Roger I. Ramseier, *President & Chief Executive Officer, Aerojet*
Paul G. Schloemer, *President & Chief Executive Officer, Parker Hannifin Corporation*
Robert R. Schwanhauser, *President, Teledyne CAE*
Frank A. Shrontz, *Chairman-Chief Executive Officer, The Boeing Company*
Harry Stonecipher, *President & Chief Executive Officer, Sundstrand Corporation*
Arthur E. Wegner, *Executive Vice President, United Technologies Corporation & President, Aerospace/Defense*
Robert L. Witt, *President & Chairman of the Board, Hexcel Corporation*
Paul E. Wright, *Chairman, Chrysler Technologies Corporation*

AIA MEMBER COMPANIES

Aerojet
**Aeronca, Inc., A Fleet
Aerospace Company**
**Allied-Signal Aerospace
Company**
**Aluminum Company of
America**
Argo-Tech Corporation
B.H. Aircraft Company, Inc.
The Boeing Company
Celion Carbon Fibers
A Division of BASF Structural
Materials, Inc.
**Chrysler Technologies
Corporation**
Colt Industries Inc
Chandler Evans
Menasco Aerosystems
Walbar
E-Systems, Inc.
**Fairchild Industries, Inc./
Banner Industries**
**Fairchild Space and Defense
Corporation**
**Ferranti Defense & Space
Inc.**
Marquardt
Ferranti Defense Systems
Cardion Electronics
Ferranti Electro-Magnetic
Processes
Ferranti Datacom/Microwave
FMC Corporation
**General Dynamics
Corporation**
General Electric Company
General Motors Corporation
**General Motors Hughes
Electronics**
Delco Electronics
Hughes Aircraft Company
**Allison Gas Turbine
Division**
The BF Goodrich Company
Grumman Corporation
Harris Corporation
**Heath Tecna Aerospace
Company**
Hercules Incorporated
Hexcel Corporation

Honeywell Inc.
IBM Corporation
Systems Integration Division
The Interlake Corporation
ITT Defense, Inc.
**Kaman Aerospace
Corporation**
Lear Astronics Corporation
Lockheed Corporation
Lord Corporation
The LTV Corporation
Lucas Aerospace, Inc.
Martin Marietta Corporation
**McDonnell Douglas
Corporation**
Northrop Corporation
Ontario Corporation
Parker Hannifin Corporation
Precision Castparts Corp.
Raytheon Company
**Rockwell International
Corporation**
Rohr Industries, Inc.
**Smiths Industries
Aerospace & Defense
Systems, Inc.**
Sundstrand Corporation
Teledyne CAE
**Texas Instruments
Incorporated**
Defense Systems &
Electronics Group
Textron Inc.
Thiokol Corporation
TRW Inc.
Unisys Corporation
**United Technologies
Corporation**
Aerospace/Defense:
Pratt & Whitney
Sikorsky
Hamilton Standard
Missiles and Space
Systems
Norden
**Westinghouse Electric
Corporation**
Electronic Systems Group
Williams International



1250 Eye Street, N.W.
Washington, D.C. 20015
(202) 371-8400



Aerospace
Industries
Association

