

1919-1989 70 YEARS OF SERVICE TO AVIATION, SPACE, AND DEFENSE



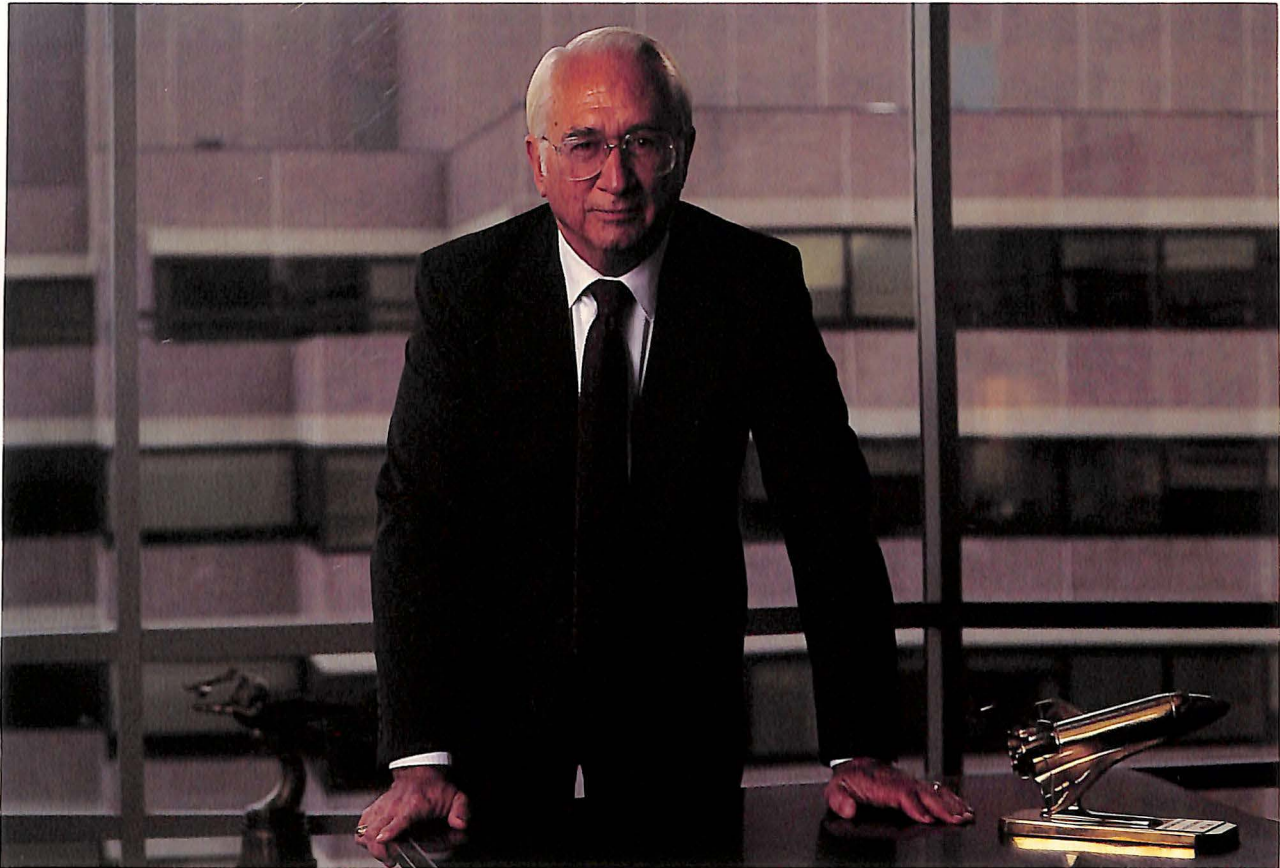


**T**he Aerospace Industries Association (AIA) exists to support industry in its responsibility for continued national security...to foster the peaceful conquest of space for the benefit of all mankind...to encourage economical commercial and private air transportation...and to promote the scientific, management, and manufacturing skills and techniques that will enhance the social, cultural, and economic well-being of the nation. AIA pledges the highest standards of ethical conduct and the fullest application of its resources and abilities to accomplishing these goals.

### About the Cover

The cover graphically depicts the phenomenal development of aviation over the period AIA has been serving the industry. The Curtis JN-4 "Jenny" was the trainer for many pilots after WWI as well as an air mail carrier. The Bell X-1 was the first manned aircraft to break Mach 1. The manned space station represents a new dimension of growth for the industry's next 70 years.

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**C**ongress and DoD have long urged the various components of our industry to speak as one voice to determine and expedite needed changes in the conduct of federal government procurement.

With that in mind, AIA's Board of Governors launched a program of action to correct the erroneous public perception of the aerospace industry. The primary objectives were threefold: 1) to focus attention on the reform measures adversely affecting the industry, 2) to restore the industry's proper image as an ethical supplier of high quality defense, aviation, and space equipment, and 3) to maintain our leadership in the world market.

Our member company CEOs and other key executives became an effective "AIA Team" by putting aside their competitiveness in the marketplace to address problems and challenges of common concern.

They participated in highly visible and successful briefings to the media, testified before Congressional committees, and took part in many small group discussions with high-level government officials. Their collective efforts expanded the channels of communication between Congress, DoD, and our industry in a three-way flow of information that has benefited all of us — but primarily it has benefited our country.

The year began on a high note with a meeting of AIA's Executive Committee with Secretary of Defense Frank C. Carlucci to discuss mutual concerns. In the months that followed, the "AIA Team" rallied behind two important Association studies released in 1988 — the Financial Impact Study and the Internationalization Study. They also joined in supporting and communicating information about our Key Technologies Program.

Briefing teams dialogued with the Pentagon and Congress on changes that were urgently needed

to preserve the defense industrial base. Tangible successes were realized.

Stan Pace, General Dynamics Corporation, and his teammates on the MRP Task Force were successful in resolving some long-standing and vital issues. Warde Wheaton, Honeywell Inc., spearheaded the effort to increase Congressional awareness of the importance of IR&D funding to the industrial base and the economy. Ed Hood, General Electric Company, was instrumental in conveying the important implications of the Internationalization Study to a variety of audiences. Among the exciting initiatives associated with the Key Technologies Program, headed up by John Swihart of The Boeing Company, was approval by AIA's Board of Governors to create a National Center for Advanced Technologies.

Quite unexpectedly, 1988 again focused the spotlight of adverse

publicity on our industry; however, the "AIA Team" stayed on course and remained an effective catalyst for creating public awareness of the realities and vital dimensions of aerospace.

As a result, I believe that we are beginning to see the emergence of another team — a broader team of the very finest individuals from the aerospace industry, Congress, and DoD. All share a dedicated and aggressive commitment to ensure our national security, continued prosperity, and world leadership.

I also believe that in 1988 AIA has established itself as the premier voice of the industry.

William C. Purple  
*Chairman of the Board*



## 1988: A Year of Challenges and Successes



**R**eflecting on events in 1988, I feel great pride in our industry and this Association. Under the astute leadership of our Chairman,

Executive Committee, and Board of Governors, we developed a strong game plan which we pursued aggressively and with considerable success — a plan to lead us toward a more enduring and technologically competitive industry. The announcement of the “Ill Wind” investigation at mid-year and the accompanying media hyperbole certainly made our task more difficult, but we accepted that as a new challenge and pressed forward.

The year began with an aggressive and sustained public information campaign and educational effort to define where we are as an industry — in terms of our financial health and future prospects, technological leadership, and competitive posture in the global market. Our goal was to illustrate with hard facts, figures, and trends analyses just what it will take to maintain U.S. preeminence worldwide in aviation, space, and defense.

### **Financial Outlook**

The Aerospace Highlights section of this report shows — again — solid accomplishments in the development and manufacture of products for defense, space, and civil aviation. America's return to



space with the successful launch and return of *Discovery* was a universally recognized technological achievement of the U.S. aerospace industry.

Financial statistics available at yearend indicate that the aerospace industry posted a record balance of trade and backlog of unfilled orders in 1988, despite a modest decline in sales to \$111 billion. Industry profits also increased for the second consecutive year in 1988 to \$5.1 billion, and there were increases in sales in every product category with the exception of military aircraft.

Although we anticipate that industry sales will rebound in 1989, 1988 marks the first sales decline in 17 years.

The record aerospace balance of trade and backlog levels can be attributed to a particularly robust commercial transport sector, but imports of aerospace products in 1988 were also a record.

Looking farther into the future, we see substantial declines in defense sales as we move into the early years of the 1990s. We hope — and believe — we will be able to offset such reductions by gains in other areas of our business.

### **Educational Initiatives**

We made significant efforts in 1988 toward promoting an informed and fair attitude toward the aerospace industry on the part of the Congress, the media, and the public.

The release in early 1988 of the jointly commissioned

AIA/EIA/NSIA study on "The Impact on Defense Industrial Capability of Changes in Procurement and Tax Policy 1984-1987" was a giant step in that direction. This study convincingly and clearly delineated a potential serious weakening of the defense industrial base — to the detriment of U.S. technology development, national security, and international competitiveness. The study became a catalyst for defense industry leaders to unite in a campaign to convince the Pentagon and Congress of needed changes to preserve the industrial base. Some significant changes in DoD and Congressional thinking have already occurred as a result.

Another AIA study released in 1988 — "The U.S. Aerospace Industry and the Trend Toward Internationalization" strongly advocated industry and government working together to maintain the technological edge and financial health of the U.S. aerospace industry. Again, AIA briefing teams set out to carry the facts of internationalization to key policymakers.

### **Taking the Lead**

Yet another major endeavor of the Association — and key to future technological leadership and competitiveness — that gained considerable momentum in 1988 was the "Key Technologies for the 1990s" program. This comprehensive

national technology development program is designed to restore U.S. competitiveness and reinstate the U.S. as the undisputed world technology leader.

Bolstering this effort was the completion in 1988 of several key technology roadmaps, the first meeting of the Aerospace Technology Policy Forum of industry, government, and university leaders, and plans for an industry-funded center for advanced technology development to oversee the Key Technologies Program.

In concert with these important educational initiatives was a host of related activities, including

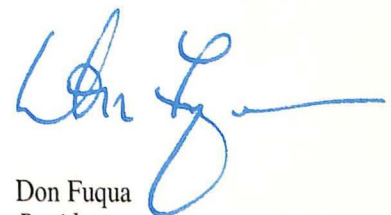
- the highly successful IMIP Forum on Capitol Hill,
- AIA/member-created informative brochures on IR&D and Total Quality Management,
- Congressional testimony, briefings, and position papers on procurement-related legislative and regulatory activity,
- the first Memorandum of Understanding between AIA and the Aerospace Industries Association of Canada,
- AIA liaison with FAA's "Operation Snapshot,"
- the establishment of the AIA Environmental Affairs Committee and the Information Technology Committee, and
- publication of the new, monthly *AIA Newsletter*.

### **The Public Perception**

The major blemish on a very successful year — the allegations and adverse publicity of the Justice Department's "Ill Wind" investigation — threatened to break our stride. However, we responded immediately with an offer to the Secretary of Defense and the chairmen of the House and Senate Armed Services committees to form a task force of top-level defense industry executives whose expertise could help correct problems identified by the investigations.

To ensure that industry's viewpoint was heard, AIA became the voice for the industry, decrying the trial by news media and calling for fairness and objectivity while the legal procedures ran their course. Spearheading that effort, I responded to invitations to appear on various evening network news and weekend talk shows, wrote letters to the editor and op ed articles, and participated in dozens of media interviews.

The successes of 1988 are due in large measure to the united efforts of many AIA committees. My sincere congratulations to the individuals on these committees and to the companies they represent.



Don Fuqua  
President



# 1988 AIA Board of Governors

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 the Association's activities and is supported by a professional staff.

The active involvement in 1988 of member company CEOs and other top management in conveying industry's message to Congress, government officials, the media, and the general public has been an effective catalyst for needed changes to benefit industry. It is through knowledge and expertise, communication, and cooperation that AIA's agenda is advanced.

## Officers

**William C. Purple**, *Chairman of the Board*

**Caleb B. Hurtt**, *Vice Chairman of the Board*

**Don Fuqua**, *President*

**George F. Copsey**, *Secretary-Treasurer*

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

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

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

**Evans W. Erikson**, *Chairman and Chief Executive Officer*, Sundstrand Corporation

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

**Thomas V. Jones**, *Chairman and Chief Executive Officer*, Northrop Corporation

**Lawrence O. Kitchen**, *Chairman and Chief Executive Officer*, Lockheed Corporation

**Walter R. Kozlow**, *President*, Kaman Aerospace Corporation

**George W. Leisz**, *President and Chief Executive Officer*, Aerojet General

**Richard A. Linder**, *President*, Defense, Westinghouse Electric Corporation

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

**Saleem S. Naber**, *President*, Lucas Western Inc.

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

**Robert R. Schwanhauser**, *President*, Teledyne CAE

**R. Gene Shelley**, *President*, Raytheon Company

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

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

**C. Edward Warner**, *Executive Vice President*, Colt Industries Inc.

**Arthur E. Wegner**, *Senior Vice President*, Power Group, United Technologies Corporation

**Warde F. Wheaton**, *President*, Defense and Marine Systems, Honeywell Inc.

## Executive Committee

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



**Don Fuqua**  
*President*  
Aerospace Industries Association



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



**William C. Purple**  
*Executive Vice President*  
Allied-Signal Aerospace Company



**Donald R. Beall**  
*Chairman and Chief Executive Officer*  
Rockwell International Corporation



**Edward E. Hood, Jr.**  
*Vice Chairman and Executive Officer*  
General Electric Company



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



**H. A. Schowengerdt**  
*Chairman*  
Aerospace Company, Hercules Incorporated





## AIA Senior Staff

To fulfill its mission to the aerospace industry, AIA is organized into various services, councils, and offices, each led by a senior staff professional and backed by an array of subcommittees, task groups, and ad hoc groups. AIA staff relays technical 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 24.



*Left to right:*  
Daniel J. Nauer, *Vice President*, Human Resources;  
Don Fuqua, *AIA President*; Stan Siegel, *Vice President*, Operations



*Seated, left to right:*  
Herbert E. Hetu, *Vice President*, Communications;  
E. Peter Smith, *Vice President*, International;  
*Standing, left to right:* Thomas N. Tate, *Vice President*, Legislative Affairs; Robert P. Schmermund, *Assistant Vice President*, Planning



*Seated, left to right:*  
C. Ronald Lowry, *Vice President*, Research and Technology; LeRoy J. Haugh, *Vice President*, Procurement and Finance; Virginia C. Lopez, *Director*, Research Center; *Standing, left to right:* George F. Copsy, *Secretary-Treasurer*; Robert E. Robeson, Jr., *Vice President*, Civil Aviation



## Defense

**A**mong the most significant events of the 1988 defense year were the official unveilings by the Department of Defense of two operational-type, low-observable (stealth) aircraft. On November 10 DoD introduced the USAF F-117A fighter, which had been kept secret over a 10-year development and production program. On November 22 the Air Force rolled out the four-engine, B-2, flying-wing bomber in a public ceremony.

DoD confirmed that Lockheed Corporation is prime contractor for the F-117A, that the airplane has been flying since June 1981 and operational since October 1983. The Air Force has ordered 59 F-117As and, at unveiling time, 52 of them had been delivered.

The B-2 was expected to make its first flight early in 1989. Plans call for procurement of six prototypes and 126 operational aircraft with production at an initial rate of 10 a year. Northrop Corporation is prime contractor; major subcontractors include General Electric Aircraft Engine Group, The Boeing Company, LTV Aircraft Products Group, Hughes Radar Systems, Honeywell, and Link Flight Simulation Corporation.

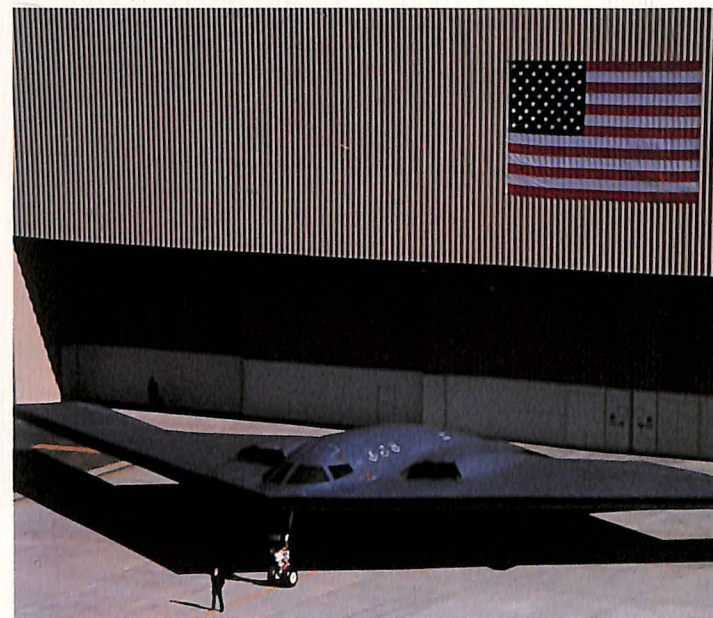
Another highlight of 1988 was the completion — two months ahead of schedule — of the six-year, B-1B development and production program. On April 30 prime

contractor Rockwell International delivered the 100th B-1B. The USAF planned further B-1B development to incorporate enhancement systems.

A good part of DoD's aircraft development effort was devoted to continuing "upgrade" programs that will provide enhanced capability in the 1990s for aircraft introduced to operational service in the 1980s or earlier. The Navy/Grumman F-14A Tomcat is undergoing a two-step upgrade. In April Grumman delivered to the Navy the first F-14A Plus, a re-engined Tomcat. Grumman was also developing an advanced technology F-14D featuring radar, information distribution, and self-protection enhancements.

McDonnell Douglas was working on an advanced USAF F-15E with a new radar and other major improvements. The F-15E will feature the Martin Marietta-developed LANTIRN (Low Altitude Navigation and Targeting Infrared System for Night) system as will the upgraded General Dynamics/Air Force F-16C and F-16D.

In October Lockheed Aeronautical Systems Company was selected to develop an advanced maritime patrol aircraft for Navy service in the 1990s, the Long-Range Air Anti-Submarine Warfare Capable Aircraft (LRAACA).



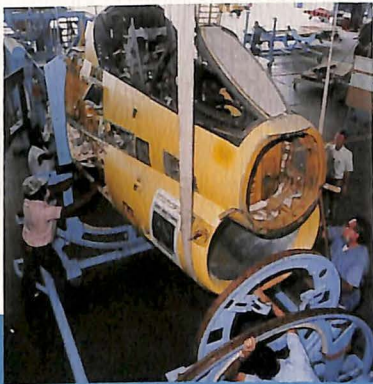
The Air Force/Northrop B-2 stealth bomber was rolled out in November.



The Bell Helicopter Textron/Boeing Helicopters V-22 Osprey tilt-rotor aircraft made its public debut in August. Scheduled for first flight early in 1989, the V-22 will be used for a variety of missions by the Navy, Marine Corps, and Air Force.



Representative of a number of military aircraft upgrade programs is The LTV Corporation's remanufactured A-7. The first YA-7F prototype was assembled late in 1988; first flight was scheduled for April 1989.



The Air Force/McDonnell Douglas F-15 STMD (Short Takeoff and Landing/Maneuver Technology Demonstrator) made its first flight in September.

Another major upgrade program is one involving remanufacture of 307 Air National Guard LTV A-7Ds and A-7Ks, which are re-engined with either Pratt & Whitney F-100-PW-220 or General Electric-GE-100 engines. The prototype YA-7F Corsair II was completed late in 1988 and targeted for initial flight in April 1989.

Among other military aircraft development programs,

- The Air Force's F-22 Advanced Tactical Fighter (ATF) program completed its second year of development, roughly the halfway mark in a 50-month demonstration/validation phase. Two industry teams — Lockheed/General Dynamics/Boeing and Northrop/McDonnell Douglas — were developing ATF prototypes.

- General Dynamics and McDonnell Douglas, prime contractors for the Navy's A-12, low-observable Advanced Tactical Aircraft, announced a number of major subcontract awards: Westinghouse Electric Corporation (combined function, forward-looking

infrared system); United Technologies Norden Systems Division and Texas Instruments (multifunction radar); Harris Corporation (multifunction antenna system); General Electric's Aircraft Electronics Division (electronic support measures); Allied-Signal Aerospace Company's Garrett Controls (air data computer); Martin Marietta (forward-looking infrared navigation system); Sundstrand Corporation (auxiliary power unit); Allied-Signal Garrett Auxiliary Power Division (accessory drive gearbox); IBM Corporation (mission computer); Honeywell/Litton (inertial navigation system).

- In May Pratt & Whitney delivered the first F-117-PW-100 engine for the USAF/McDonnell Douglas C-17 airlifter five months ahead of schedule. USAF plans called for production of 210 C-17s beginning in 1989.

- In October the Navy selected Lockheed Corporation for development and production of a planned 125 Long-Range Air Antisubmarine Warfare Capability Aircraft (LRAACA). Lockheed's LRAACA, intended for initial operational service in 1995, is an advanced technology design, based on the company's P-3, that will incorporate the P-3C Update IV avionics suite being developed by Boeing Aerospace.

- In November Japan and the U.S. signed a major international defense agreement calling for joint development of an FSX close support fighter based on the

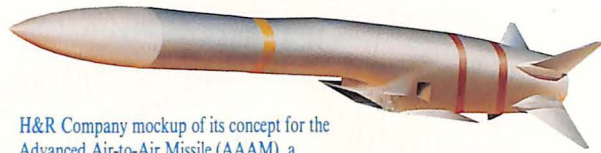


In May FMC Corporation started production of a new A2 model of the Army's Bradley Fighting Vehicle which features enhanced survivability.



Heath Techna Aerospace neared completion of the 60-foot wing-to-body fairing master model for the Air Force/McDonnell Douglas C-17 airlifter, scheduled for first operational service in 1992.





H&R Company mockup of its concept for the Advanced Air-to-Air Missile (AAAM), a long-range weapon planned for late 1990s deployment aboard Navy and USAF aircraft. H&R is a joint Hughes/Raytheon venture competing for AAAM development with a General Dynamics/Westinghouse team.

USAF/General Dynamics F-16C. Japan's Mitsubishi Heavy Industries will be prime contractor, General Dynamics principal subcontractor. First prototype flight was targeted for 1993. In another international action in October, the McDonnell Douglas F/A-18 Hornet was selected by the Swiss Government as its new fighter aircraft.

- In December the Air Force/Army and prime contractor Grumman Aerospace began tests of the Norden Systems radar for the Joint Surveillance Target Attack Radar System (Joint STARS) aboard a Boeing/Grumman E-8 aircraft, a 707 derivative.

- The Bell-Boeing Navy/Marine Corps/Air Force V-22 Osprey tilt-rotor aircraft was rolled out in May and at yearend was being readied for the start of an extensive flight test program.

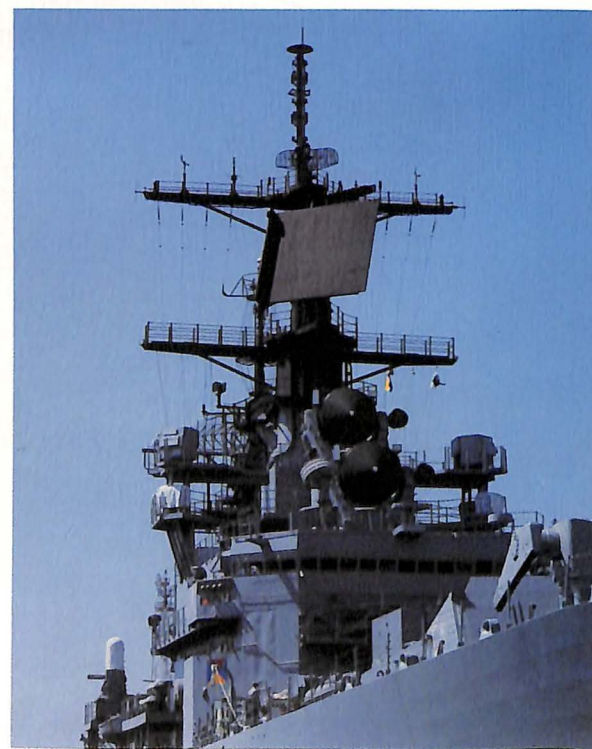
- In October the Boeing Helicopters/Sikorsky Aircraft team unveiled its preliminary design for the Army LHX light helicopter competition. The competing team for the development and production assignment is Bell Helicopter Textron/McDonnell Douglas Helicopters.

- In August the Navy Sikorsky HH-60H, combat-support helicopter made its initial flight. The Army member of the H-60 family, the UH-60A Black Hawk, marked delivery of the 1,000th aircraft in October.

In missile activity, installation of the first 50 Peacekeeper ICBMs in Minuteman silos neared completion at yearend 1988. In May the Air Force initiated development of a rail mobile Peacekeeper system with contract awards to Westinghouse Electric Corporation's Marine Division (missile launch car and canister) and Rockwell Autonetics Electronics Systems (launch control system). Both companies are participants in the silo-launch Peacekeeper program — Westinghouse for missile canisters, Autonetics for guidance and computers. Other Peacekeeper contractors include Martin Marietta Aerospace (assembly and test); Morton Thiokol (first stage); Aerojet General (second stage); Hercules Aerospace (third stage); Rockwell Rocketdyne (fourth stage); Avco and General Electric (re-entry systems); Boeing Aerospace (support equipment); TRW Inc. (engineering and technical support); Honeywell Inc. (guidance and control elements).

The Lockheed-built Trident II (D-5) submarine-launched ballistic missile development program continued on schedule with a series of land launches. In December the Navy launched the 17th D-5 test and scored the 13th success. Three additional land launches were planned for the first half of 1989,

The first Navy/Sikorsky HH-60H Helicopter Combat Support aircraft made its maiden flight in August.

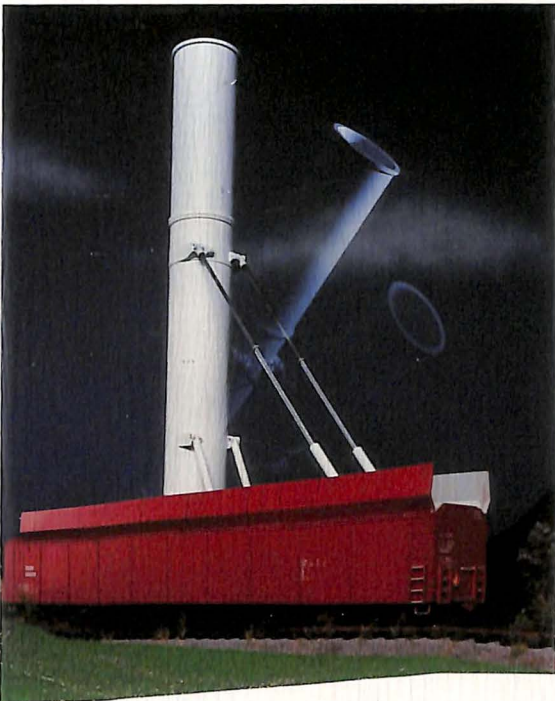


ITT/Gilfillan won a Navy contract for continued production of the AN/SPS-48E Long-Range Surveillance and Weapon-Control Radar system, here shown aboard the cruiser USS Leahy.





Honeywell developed an integrated helmet and display sighting system to aid military pilots at night, in bad weather, and at low altitude.



In May Westinghouse Electric Corporation won an Air Force competition to develop a missile launch car and canister (shown) for a rail mobile Peacekeeper system; Rockwell International was assigned development of the launch control system.



Martin Marietta Aero & Naval Systems developed a Tactical Multipurpose Automated Platform (TMAP) that can perform reconnaissance in high-threat battlefield areas as far as four miles from its soldier-operator.



Hughes Aircraft developed an advanced longwave infrared sensor that will be used to assess the feasibility of using optical sensors for ballistic missile tracking and detection.

The Allison-Garrett LHTEC T800 engine selected to power the Army's advanced LHX helicopter made its first flight in October aboard an Agusta A129.



followed by a mid-1989 start of a sub-launched test series.

Although the Tomahawk Ground-Launched Cruise Missiles were removed from service under the INF treaty, development and production of other versions of the Tomahawk continued with General Dynamics as primary manufacturer and McDonnell Douglas as second source. In November both companies received new contracts for extended production of the Tomahawk Sea-Launched Cruise Missile.

In September the Navy awarded a series of study contracts for various elements of a contemplated Advanced Sea-Launched Cruise Missile with a conventional warhead. Contractors included The Boeing Company, General Dynamics, Lockheed Missiles & Space Company, Martin Marietta, McDonnell Douglas, Northrop, Rockwell International, and TRW. The Air Force was considering a similar development called the Long-Range Conventional Cruise Missile.

In other missile activity,

- The Air Force continued developmental flight testing of the AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM), which was to extend into February 1989. In February second-source contractor Raytheon Company delivered its first qualification AMRAAM. In October lead producer Hughes Aircraft rolled out its first production AMRAAM.

- In November the four nations involved in planned development of the Advanced Short-Range Air-to-Air Missile (ASRAAM) agreed to a basic configuration, clearing the way for full-scale development. ASRAAM participants are the U.S., the United Kingdom, Norway, and the Federal Republic of Germany.

- In October the Navy awarded contracts for a four-year, demonstration/validation program on an Advanced Air-to-Air Missile (AAAM) intended as a replacement for the AIM-54 Phoenix. The two competing teams were General Dynamics/Westinghouse Electronic Systems and H&R Company, the latter a joint venture of Hughes Aircraft and Raytheon Company.

- Flight testing continued on the Advanced Cruise Missile (ACM), a longer-ranging replacement for the Boeing-built Air-Launched Cruise Missile. General Dynamics and McDonnell



Douglas are the USAF's ACM contractors.

- The Army initiated a competition for Advanced Antitank Weapon System-Medium (AAWS-M), expected to begin full-scale development in the spring of 1989. Competing contractor teams include General Dynamics/Ford Aerospace, Hughes Aircraft/Honeywell, and Martin Marietta/Texas Instruments.

- In April the Army and prime contractor LTV Aerospace and Defense Company conducted a successful first flight of the Army Tactical Missile System (ATACMS), which is launched from a modified Multiple-Launch Rocket System launcher, also built by LTV. The initial test series was to continue through the fall of 1989.

- Also in April, Northrop conducted a successful air launch of Navy/Air Force AGM-136A Tacit Rainbow radar-suppression missile, the first launch of a production-configured missile. In May the USAF awarded contracts for further study of the Tacit Rainbow system, including definition of a ground-launched version and proposals for second-source qualification of the air-launched version. The contracts went to Northrop, Boeing, and Raytheon.

- In September Raytheon Company announced plans to develop an advanced version of the Patriot missile with anti-tactical missile and anti-airbreathing missile capability. Joining Raytheon in the program are Martin Marietta and

three West German companies. The advanced Patriot research is being jointly funded by the U.S. Army and the Federal Republic of Germany.

- In November McDonnell Douglas rolled out its first Standoff Land Attack Missile (SLAM), a derivative of the company's Navy antishipping missile, the Harpoon. SLAM is intended for air launch from carrier-based aircraft against land or shipping targets.

- In October GM Hughes Electronics' Hughes Aircraft Company delivered to the Navy its 1,000th AIM-54C Phoenix air-to-air missile.

- Also in October, the USAF launched an AIM-7 Sparrow all-weather medium-range missile from a General Dynamics F-16A aircraft for the first time. The missile gives the F-16 beyond-visual-range weapon capability. Earlier — in September — the USAF had launched an AGM-88 High-Speed Anti-Radiation Missile from the F-16 for the first time.

- In November the Army awarded LTV Missiles and Electronics Group a contract for integration of the warhead of the Sense-and-Destroy Armor (SADARM) rocket, an artillery rocket fired from a Multiple-Launch Rocket System battery. The warhead's submunitions are being developed by Aerojet General and Honeywell Inc.

Scheduled to begin testing in the spring of 1989, the second of two Grumman-built X-29 advanced technology demonstrators was delivered to NASA's Dryden Flight Research Facility in November.



Interlake Corporation developed an advanced proprietary process for producing titanium foil.



Precision Castparts Corporation initiated production of integrally cast titanium stators for Pratt & Whitney's F-100-PW-229 military aircraft engine, a "first" in titanium casting technology.



In June Martin Marietta's LANTIRN night navigation and targeting system (long pods) completed its 2,000th Air Force test flight.



BASF Structural Materials' Celion Carbon Fibers division completed construction of a facility for production of new types of "melt-spun" noncircular fibers that offer improved strength in composite applications.



Bell Aerospace Textron was awarded an Air Force contract to develop a Mobile Microwave Landing System, enabling aircraft to locate and land at strips in a forward battle area.

- In December the Boeing/Hughes Aircraft team was selected by the Army for full-scale development of the Fiber-Optic Guided Missile (FOG-M), an advanced antihelicopter, antitank weapon immune to electronic jamming. The development program will run to mid-1992; flight tests were targeted for early 1991.

- In November the USAF/Rockwell International AGM-130A powered glide bomb successfully completed a series of test launches from an F-4 aircraft. A follow-on test series from an F-111 was planned.

In other aerospace activity, DoD was conducting a number of advanced aircraft research projects, including three major "X-plane" programs:

- In 1988 the Grumman-built Defense Advanced Research Projects Agency (DARPA) X-29 advanced technology demonstrator completed second-phase flight testing, which

focused on such investigations as flight characteristics of the foreswept wing and canards and the aircraft's control system and handling qualities. In November Grumman Aerospace delivered the second X-29 to NASA Dryden; it will conduct tests of the foreswept wing configuration at high angles of attack beginning in the spring of 1989.

- The Air Force took over from DARPA management of the X-30 National Aero-Space Plane (NASP) project, which aims to develop technology for a hypersonic, horizontal-takeoff, single-stage-to-orbit vehicle. In February tests were initiated on components of a scramjet engine system intended to operate at Mach 14. Five contractors submitted conceptual designs. General Dynamics, McDonnell Douglas, and Rockwell International are competing in the field of aircraft design, Pratt & Whitney and Rockwell Rocketdyne in scramjet propulsion. A decision whether to build a flight test NASP vehicle will be made in 1990.

- At yearend the first of two Navy/DARPA/West Germany X-31A enhanced fighter maneuverability technology demonstrators was in assembly status and targeted for flight late in 1989. Rockwell North American Aircraft and Messerschmitt-Boelkow-Blohm are associate contractors for the joint U.S./West Germany program.



E-Systems won a DARPA contract for a Distributed Wargaming System (DWS), a sophisticated network of computers and communications equipment to be used by military commanders in Europe.



## Space

**T**he highlight of the civil space year was the resumption of Space Shuttle operations after a 32-month hiatus with the flawless September 29 launch of the Shuttle Orbiter *Discovery*. NASA mission STS-26 was a four-day flight whose principal activity was the successful deployment of the NASA/TRW Tracking and Data Relay Satellite (TDRS) and its boost to geostationary orbit by a Boeing Inertial Upper Stage (IUS).

On December 2 NASA followed with the second Shuttle launch of the year, mission STS-27, a classified Department of Defense flight of the Orbiter *Atlantis* reportedly dedicated to deployment of a reconnaissance satellite. *Atlantis* returned to a smooth landing at Edwards AFB, California, on December 6. Principal contractors for the Space Shuttle program are Rockwell International (Orbiter and main engines), Morton Thiokol (solid rocket boosters), and Martin Marietta (external tank).

The TDRS-3 deployed on the *Discovery* flight was NASA's main payload of the year. It joined TDRS-1, launched in September 1983, in a system intended to collect communications signals from Shuttle Orbiters, plus as many as 40 unmanned satellites, and relay the signals to a central ground station. The station at White Sands, New Mexico, was jointly built by TRW, Harris Corporation, and Space

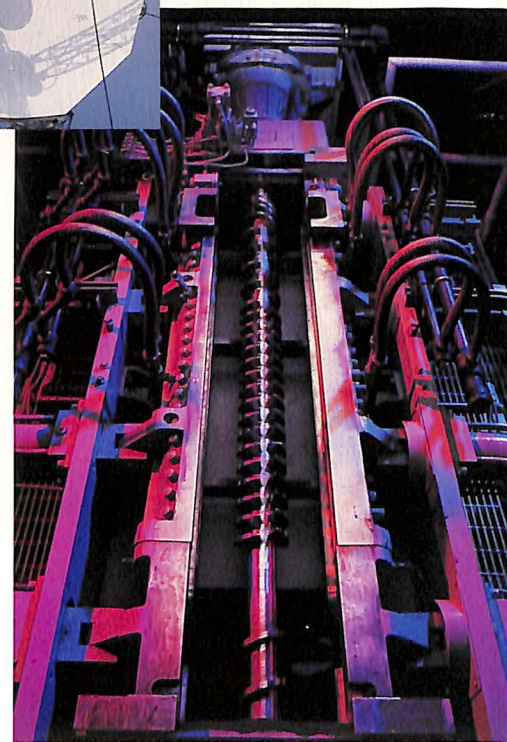
Communications Company, which operates the TDRS system for NASA. The system will include a third TDRS.

In another civil space launch, the National Oceanic and Atmospheric Administration launched its NOAA-11 meteorological satellite, built by General Electric Astro-Space. NOAA-11 carried a number of advanced instruments, in particular instruments for improved monitoring of ozone levels in the atmosphere and a Search and Rescue Satellite Aided Tracking (SARSAT) system. This provided a second SARSAT to team with two Soviet COSPAS satellites in the international COSPAS/SARSAT network.

In military launch activity, the USAF launched the last of its Martin Marietta 34D boosters on November 6 with a classified payload aboard. At yearend the Air Force was readying the new Martin Marietta Titan IV heavy lift launch vehicle for first flight early in 1989.

A major event of the military year in space was the February 8 launch of the Delta 181 mission, a

Representative of the vast array of ground-based equipment supporting the STS-26 flight is this dish antenna at NASA's Merritt Island Tracking Station, operated by Allied Signal's Bendix Field Engineering unit.



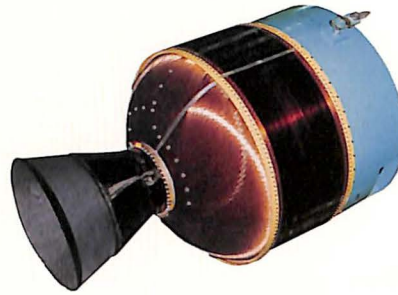
In 1988 Aerojet General installed a fully automated propellant manufacturing process as part of its bid for the Space Shuttle Advanced Solid Rocket Motor. Teamed with Lockheed, Aerojet is competing against a Hercules/Atlantic Research team.



The fifth Shuttle Orbiter, replacement for the lost *Challenger*, began to take shape at Rockwell International's assembly facility; here workers install reentry insulation tiles on the lower mid fuselage.



The September launch of Space Shuttle flight STS-26 marked the resumption of U.S. manned space operations. Rockwell International built the Orbiter *Discovery*, Morton Thiokol the solid rockets, Martin Marietta the external tank.



Developed by United Technologies' Chemical Systems Division, this 10-foot Orbus-21 solid rocket motor aboard the Boeing-built Inertial Upper Stage provided the boost power that sent the Tracking and Data Relay Satellite to geosynchronous orbit on STS-26.



Principal payload of STS-26 was the TRW-built Tracking and Data Relay Satellite. Visible at top photo are the large umbrella-like parabolic antennas developed by Harris Corporation.

Strategic Defense Initiative project intended to test the detection and discriminatory capabilities of a wide range of sensory devices. The McDonnell Douglas-built Delta vehicle ejected 14 test objects which the sensors — successfully in most cases — sought to detect and characterize. The sensors were also tested for their ability to detect ballistic missile plumes, simulated by aircraft-launched rockets. The highly successful test was hailed as a major step that contributed a wealth of information toward development of a missile defense system.

Among other DoD launches, the Air Force sent into orbit — on February 2 — a Defense Meteorological System Program (DMSP) satellite built by GE Astro-Space; it gave the USAF two operational DMSP spacecraft. DoD also conducted four launches of the LTV Scout vehicle, orbiting one scientific satellite and three Navy Transit navigation satellites.

The Space Station Freedom program progressed as NASA

completed negotiations with its international partners — Canada, the European Space Agency (ESA), and Japan — and signed formal agreements on September 29 spelling out the assignments of each participant.

On the same day NASA announced that it had concluded negotiations with four contractor team leaders and settled the terms of 10-year Space Station contracts. Boeing Aerospace Company will build the U.S. laboratory and habitation modules, plus associated structures and systems; Boeing's industry teammates are Lockheed Missiles & Space, Teledyne-Brown Engineering, United Technologies' Hamilton Standard Division, Fairchild-Weston Systems, Garrett AiResearch, Grumman Aerospace, and ILC Systems.

McDonnell Douglas will build the station's truss structure and the mobile servicing transporter system, outfit the resource nodes, and provide hardware and software for data management, communications, guidance and navigation, and other Space Station components. Teamed with McDonnell Douglas are IBM, Lockheed Missiles & Space, General Electric, and Honeywell.

General Electric Astro-Space will provide the free-flying, polar orbiting, U.S. unmanned platform associated with the Space Station and related systems; Astro's teammate is TRW Inc.

Rockwell International's Rocketdyne Division will produce the solar electric power and



Newest addition to the Hughes Aircraft satellite family is the body-stabilized HS601, a flexible design that can accommodate multiple payloads. First launch is targeted for 1991.



distribution systems for both the Space Station and the polar orbiting platform with teammates Ford Aerospace, Garrett-Tempe, General Dynamics, Harris Corporation, and Lockheed.

Under an earlier-awarded contract, a Grumman-led contractor team will provide support for design and development of the Space Station.

During 1988 the appropriation for the Space Station was extensively debated by Congress, and the program's schedule was seriously threatened by proposed cutbacks. In the end, however, Congress passed an appropriation, subject to confirmation by the Bush Administration, that would permit maintaining the schedule, assuming continuing Administration and Congressional support.

The schedule calls for a spring 1995 start of assembly operations with Shuttle delivery of an initial set of components. Over the following three years there will be 19 additional Shuttle flights and two flights of the European Ariane vehicle delivering components, habitation modules, logistics modules, and three associated unmanned platforms. About yearend 1995 the Space Station will have a capability for part-time, man-tended operations, and after the 11th flight in late 1996, it will be ready for permanent human occupancy.

Among other NASA programs were three major scientific spacecraft being readied for 1989 launches:

- Planned for Shuttle launch in April is the first NASA planetary mission launched since 1977, the *Magellan* imaging spacecraft that will conduct high resolution mapping of the surface of Venus as part of continuing comparative studies of Earth and its neighbor planet. Under management of NASA's Jet Propulsion Laboratory (JPL), Martin Marietta developed the spacecraft and Hughes Aircraft the imaging radar.

- Scheduled for October departure on a six-year trip to Jupiter is the dual spacecraft *Galileo*, which includes a main spacecraft that will orbit Jupiter for at least two years and an instrumental probe that will descend by parachute into the Jovian atmosphere. The main spacecraft was built by project manager JPL, the probe by Hughes Aircraft and General Electric.

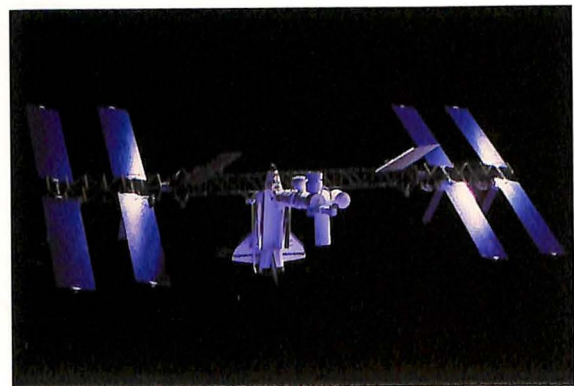
- The Hubble Space Telescope (HST), a 12½-ton astronomical observatory capable of looking back in time some 14 billion years, was targeted for Shuttle launch in December. Hailed as the most important scientific payload ever produced, the spacecraft was developed by Lockheed Missiles &

A McDonnell Douglas concept of the Space Station Freedom. NASA awarded development contracts for station components to contractor teams led by Boeing Aerospace, GE Astro-Space, McDonnell Douglas, and Rockwell International.

NASA's *Magellan* spacecraft, which will map Venus after April 1989 launch, is shown being prepared for a stress test. Martin Marietta is spacecraft contractor.



An engineer is making an adjustment to a full-scale model of the Orbital Maneuvering Vehicle being developed for NASA by TRW Space & Technology group.







A miniature thruster (right) for a Strategic Defense Initiative system is compared with a previous configuration of comparable power by a technician of The Marquardt Company, a subsidiary of ISC Defense and Space.



A Martin Marietta concept of the Flight Telerobotic Servicer that will assist crews in servicing the Space Station and station-docked spacecraft. Martin Marietta and Grumman are working on NASA study contracts.



In development at TRW Inc. is NASA's 17-ton Gamma Ray Observatory.

Shown undergoing test at Goddard Space Flight Center is Fairchild Space Company's Multimission Modular Spacecraft, which will be the platform for the GE-instrumented Upper Atmosphere Research Satellite.

Space Company and the optical assembly by Perkin-Elmer Corporation. The HST is the first of NASA's planned four Great Observatories.

Among other NASA programs in development for service in the 1990s are

- The Gamma Ray Observatory (GRO), second of the Great Observatories, which will investigate gamma radiation and its sources — pulsars, quasars, black holes and other objects viewed only in the gamma wavelengths. TRW is NASA's development contractor.
- The Advanced X-Ray Astrophysics Facility (AXAF), third of the Great Observatories, a 10-ton serviceable-in-orbit spacecraft that will have instruments 100 times more sensitive than those of any previous X-ray investigation. In August NASA selected TRW as AXAF prime contractor.

• *Ulysses*, a joint NASA/ESA program which will embark in 1990 on a multiyear mission out of the

plane of the ecliptic and around the poles of the Sun. JPL is NASA's project manager.

• *Mars Observer*, targeted for launch in 1992, which will become a man-made moon of Mars, reporting high resolution data on Mars geoscience and climatology. General Electric's Astro-Space Division is developing the spacecraft under JPL management.

• The Upper Atmosphere Research Satellite (UARS), a major effort that will report global data on the composition and dynamics of the upper atmosphere over a period of several years. Goddard Space Flight Center manages the project; GE Astro-Space is principal contractor.

• The Advanced Communications Technology Satellite (ACTS), which incorporates several advanced technologies to make more efficient use of available frequencies and to increase message-handling capacity of the individual satellite. ACTS is being developed by GE Astro-Space under Lewis Research Center management.

• TOPEX (Ocean Topography Experiment), a remote sensing satellite designed to expand knowledge of ocean dynamics and create a base for practical applications.

• The International Solar Terrestrial Physics (ISTP) program, part of a broader Global Geospace Science program being undertaken in cooperation with ESA and Japan.





The ISTP will employ three spacecraft operating in different orbits to study the physical processes that link Earth and the Sun. Japan will supply a spacecraft called *Geotail*; the U.S. will contribute two spacecraft, designated *Polar* and *Wind*, to be developed by GE Astro-Space.

In military space, the pace of Strategic Defense Initiative hardware and software development stepped up in 1988 and paved the way for a number of important space tests in 1989. Among them are Delta Star, third of the series of Delta sensor and system tests; Bear, a particle beam test; and the first test of the HEDI (High Endoatmospheric Defense Interceptor), a ground-based experimental weapon. Also in development for test in the 1990s are a boost surveillance tracking system satellite, a midcourse surveillance tracking system satellite, the Starlab Shuttle-based experiment package, and the Zenith Star space-based laser experiment.

Among DoD developmental programs about which information has been publicly released are

- The Defense Meteorological Satellite Program (DMSP), whose current Block 5 satellites, replaced periodically, are expected to operate through most of the 1990s. The Air Force is planning development of

an advanced technology DMSP Block 6; in April study contracts were awarded to General Electric, Hughes Space and Communications Group, Lockheed Missiles & Space Company, and Ford Aerospace.

- The Defense Satellite Communications System (DSCS), a continuing series being developed in advanced versions; GE Astro-Space is principal contractor.

- The Navstar Global Positioning System being developed by Rockwell International for precise location of air, sea, and land vehicles.

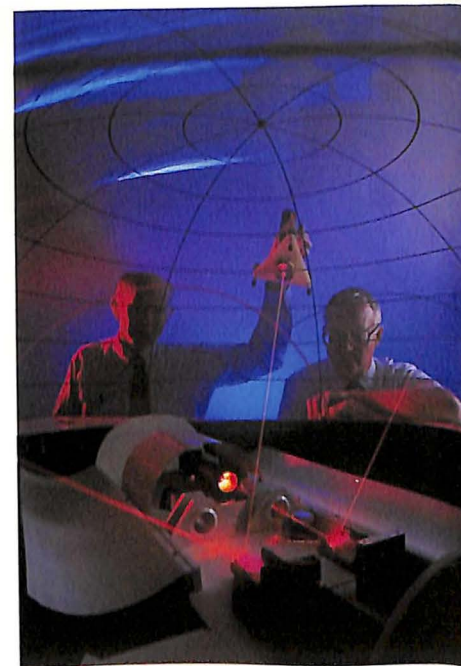
- The Milstar extra-secure, highly survivable military communications satellite system being developed by Lockheed Missiles & Space.

- The Teal Ruby satellite; an experiment in orbital detection and tracking of aircraft flying against Earth's background clutter; Rockwell International is prime contractor.

- The Advanced Launch System, a heavy-lift space booster targeted for service in the late 1990s. In August the Air Force selected contractor teams headed by Boeing Aerospace, General Dynamics, and Martin Marietta/McDonnell Douglas for development of designs and technology demonstrations. A final concept will be determined in 1990 for full-scale development.

In commercial space activity, the fledgling U.S. commercial launch industry picked up momentum in 1988 with additional firm orders

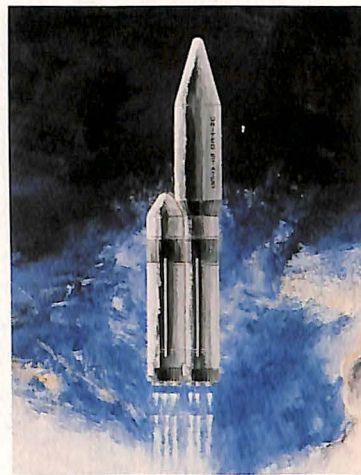
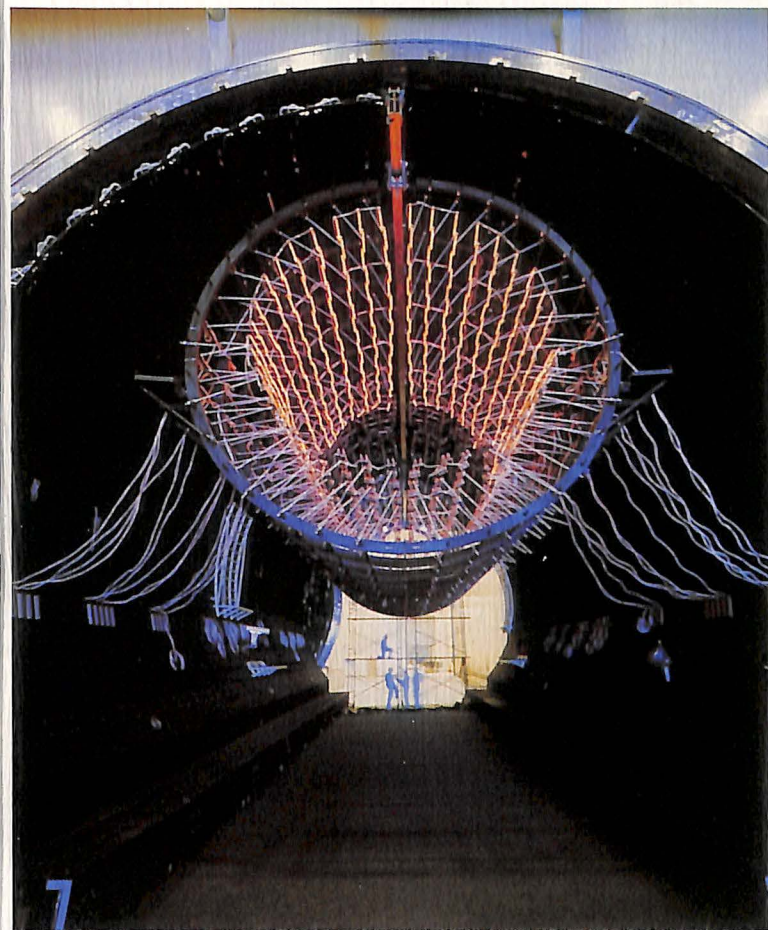
Artist's concept of the Pegasus air-launched space booster after separation from its carrier aircraft. Pegasus, targeted for mid-1989 first flight, is a private development of Hercules Aerospace and Orbital Sciences Corporation.



Kaman Aerospace scientists study laser optical principles in preparation for Starlab, a Strategic Defense Initiative orbital pointing and tracking experiment.



Lockheed Missiles & Space Company's thermal vacuum chamber, used for testing large satellites such as the Milstar advanced military communications satellite.



A General Dynamics concept for the planned extra heavy lift Advanced Launch System. The Air Force awarded design contracts to Boeing Aerospace, General Dynamics, and Martin Marietta/McDonnell Douglas.

and options for launch services from U.S. and foreign civil and military customers. The industry — whose principal members are General Dynamics (Atlas vehicles), The LTV Corporation (Scout), Martin Marietta (Commercial Titan), and McDonnell Douglas (Delta) — also concluded a number of agreements for use of government payload processing and launch facilities. The first U.S. commercial launch was expected in April 1989 when a McDonnell Douglas Delta will loft Insat ID, an Indian government communications satellite.

In other space commercial activity, industry firms were developing free-flying orbital experiment/production facilities, experiment modules for use aboard the Space Shuttle or Space Station, advanced commercial resources survey satellites, and a satellite system that would allow companies to track and communicate with their mobile fleets of trucks, ships, trains, or aircraft. In its annual *U.S. Industrial Outlook*, the Department of Commerce projected that commercial space revenues — including both launch service and orbital equipment sales — would reach \$2.7 billion in 1989.



The Air Force/Martin Marietta Titan IV heavy lift expendable launch vehicle was being readied at yearend for first flight in 1989.

Scheduled for first launch in 1989 is the Commercial Titan launch vehicle being developed by Martin Marietta Astronautics Group.





## Civil Aviation

In 1988 the world's airlines carried more than one billion passengers and, for the first time, topped one trillion revenue passenger miles, according to preliminary estimates of the International Civil Aviation Organization (ICAO).

The passenger traffic curve, which has experienced a steady climb throughout the 1980s, mounted by almost 7 percent. Passenger boardings increased by 4.2 percent to 1.07 billion enplanements, marking the second consecutive year in which the airlines boarded more than one billion people. Load factor was 68 percent, the highest level of the 1980s.

ICAO estimated that air freight also grew impressively — by almost 10 percent — to 36.3 billion ton miles. Air mail increased about 3 percent to 3.3 billion ton miles.

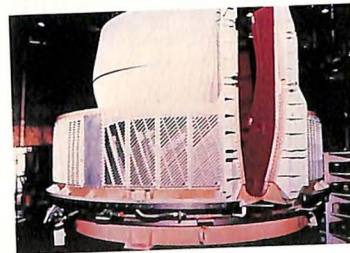
While citing no specifics, a spokesman for the International Air Transport Association said that 1988 was the best year in more than a decade in financial terms. He reported that international traffic gained 10 percent, capacity 9 percent, and that there are no signs of a slowdown in airline business.

As in the previous year, the restored financial health of the airlines sparked another round of aircraft procurement to replace

Two newcomers to the Boeing commercial transport line, the 747-400 (top), first flown in April, and the 737-400, first flown in February and initially delivered in September.



Heath Tecna Aerospace initiated fabrication of the all-graphite MD-11 center engine inlet duct, designed for substantial weight saving.



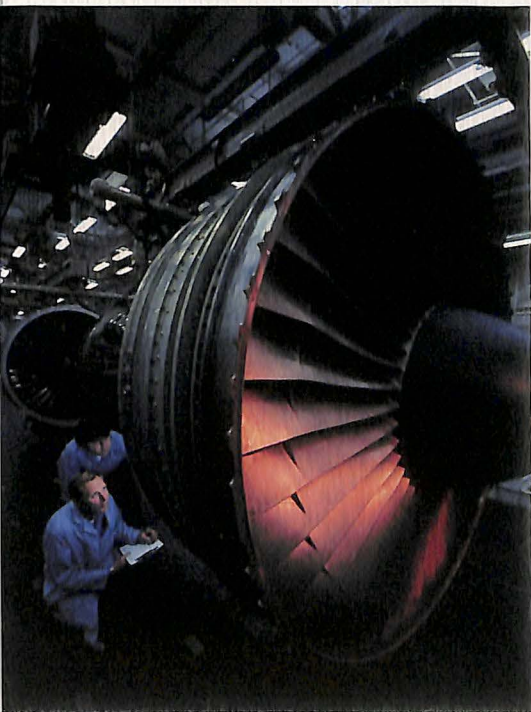
A Kaman Aerospace product, the thrust reverser for the General Electric CF6-80C2 engine.



Lucas Aerospace was producing these components for the Boeing 747, units associated with the gearbox drive that moves cargo containers into and out of the airplane.



At yearend McDonnell Douglas had orders for more than 250 of the MD-80 series and was planning development of two propfan-powered versions.



Pratt & Whitney's new technology PW 4000 engine, which powered a Boeing 747-400 to a record heaviest airplane takeoff (892,450 pounds), was selected by 15 new customers in 1988.



First unit of the McDonnell Douglas MD-11 trijet neared completion at yearend and first flight was scheduled for April 1989.

older planes and to expand fleet capacities for the continuing traffic growth expected in the 1990s.

For U.S. commercial transport manufacturers, 1988 was a banner year in terms of both new orders and deliveries of aircraft earlier ordered. Sales (based on deliveries) increased by more than 25 percent to a record \$13.2 billion. The industry delivered 405 airline transports, also a record.

But, impressive as were the sales figures, they paled in comparison with the flood of new orders and new aircraft contracted for lease. Through September 30, 1988, the latest date for which complete figures are available, U.S. transport builders had received orders for 491 planes valued at just under \$20 billion. With another quarter-year to go, the backlog was already \$10 billion above the previous record, yearend 1987's \$32.4 billion.

In unit terms, backlogged orders numbered 1,018 as of September 30 (the figure was at least 100 units higher at yearend). Orders from foreign customers accounted for 622 aircraft, more than 61 percent of the total; in dollar terms, they totaled just under \$30 billion, roughly 71 percent of the total.

The general aviation and helicopter segments of the U.S. civil aircraft industry did not fare as well, according to preliminary figures compiled by AIA. General aviation shipments increased very slightly, from 1,085 units in 1987 to 1,100 in 1988. Dollar value, however, increased to \$1.6 billion (up from \$1.4 billion) due to strong sales in the higher-value business jet category.

Unit shipments of civil helicopters dipped to 339 (down from 358) and dollar value fell from \$277 million in 1987 to \$223 million, a drop of almost 20 percent. AIA stated that the long decline in helicopter and general aviation shipments may be over and that both markets may have stabilized.

At yearend Boeing Commercial Airplane Company was working on a record backlog of 1,107 commercial transports. The company was building several variations of four basic types: the short-range twin-engine 737, the larger two-engine 757, the widebody 767, and the long-range, high-capacity 747. The largest backlog, more than half of the total, was in orders for the 737.



Among new models, the first 737-400, largest of the 737 family, was delivered to Piedmont Airlines in September. The latest of the 747 line, the very long-range 747-400, made its first flight in April; by yearend there were four aircraft in flight test and Boeing was readying the first 747-400s for delivery. Boeing was also considering a new derivative program tentatively designated 767-X, a larger version of the twin widebody with a new or substantially modified wing.

McDonnell Douglas' Douglas Aircraft Company was producing the long-range trijet MD-11 transport and several models of the basic twin-engine MD-80 design. Wing/fuselage mating for the first MD-11 took place in October. The airplane was scheduled for completion in February 1989 and first flight in April. As of September 30, 1988, there were 46 MD-11s on order, 42 of them from foreign customers. Orders for the MD-80 series totaled 249.

McDonnell Douglas completed a series of flight tests of General Electric's UDF (Unducted Fan) demonstration engine aboard a modified MD-80. The UDF propfan, earlier tested on a Boeing 727, demonstrated fuel savings of 45-50 percent in the MD-80 installation. At yearend McDonnell Douglas was readying the MD-80 test bed for a series of tests of

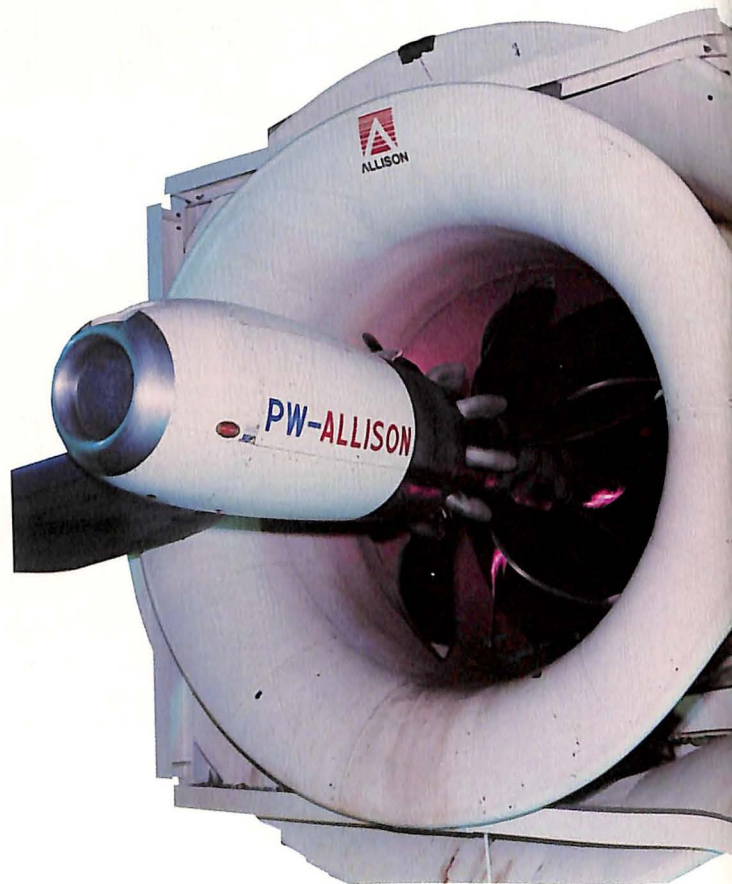
another propfan, the 21,000-pound-thrust 578-DX engine being jointly developed by Pratt & Whitney, Allison Gas Turbine Division of General Motors, and Hamilton Standard Division of United Technologies.

Although McDonnell Douglas had not formally launched a propfan transport program by yearend, the company was proposing to airlines propfan derivatives of the MD-80, including a MD-91 short fuselage version and a MD-92 stretched version. Also being studied were two stretched versions of the MD-11, a Medium Range Stretch, and a Super Stretch, the latter with a modified wing.

In June the U.S. Customs Service took delivery of its first Lockheed P-3 early warning aircraft for use in its drug interdiction operations. The radar-equipped P-3 gives Customs a capability for long-endurance, antidrug surveillance missions. At yearend Lockheed was modifying a second P-3 for Customs and the agency had options for two more.

In the rotary wing segment of the civil aircraft manufacturing industry, the team of Bell Helicopter Textron and Boeing Helicopters continued to study a civil version of the Navy/Marine Corps/Air Force V-22 Osprey tilt-rotor aircraft and formally applied for type certification.

Honeywell developed an advanced avionics package for the integrated cockpit of the Gulfstream IV.



The Pratt & Whitney/Allison 578-DX propfan system completed its preliminary flight rating tests and was shipped to McDonnell Douglas for installation in a MD-80 test bed.



An LTV Aircraft Products Group employee inspects an aluminum sheet preparatory to application of a polyethylene film. The company developed a one-of-a-kind applicator to apply the film used to keep airliner parts shiny and defect free.



An engineer of BF Goodrich's BFG De-Icing Systems profiles a de-icer design for the Beech Starship.

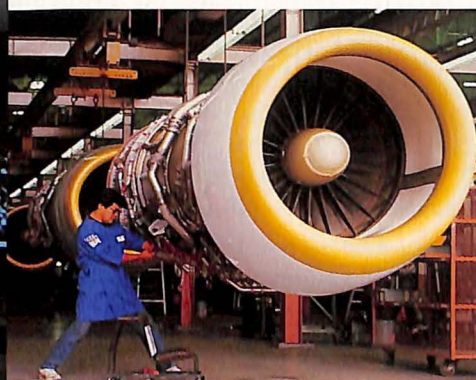


In November Sikorsky Aircraft delivered the first VH-60 VIP transport helicopter for transportation of the President and other dignitaries. A derivative of the Army's UH-60A Black Hawk, the VH-60 will be operated by Marine Corps Squadron HMX-1. Nine of the VIP transports were to be delivered by early 1989.

McDonnell Douglas Helicopter Company was planning development of an MDX civil helicopter featuring a No Tail Rotor (NOTAR) design.

Among NASA aviation research activities were several test programs of high-performance aircraft that are largely oriented to military requirements but have potential for future application to civil aircraft. They include

- The High Alpha Technology Program, which involves investigation of the extremely complex airflow around an airplane at high angles of attack. A capability for predicting such airflow interactions could greatly increase the maneuverability of high-performance aircraft and lead to design measures for preventing spins and related accidents. At Dryden Flight Research Facility, NASA was conducting "high alpha" (high angle of attack) research with a specially instrumented F/A-18 Hornet on loan from the Navy.



Rohr Industries was installing engine systems and nacelle components on Pratt & Whitney JT-8D engines for the McDonnell Douglas MD-80.

Harris Corporation employed communications, digital mapping, and weather information technologies in a sophisticated system for real-time surveillance of the nation's borders, an aid to the Customs Service in drug interdiction. Pictured: a regional center at March AFB, California.





- The Grumman-built X-29 advanced technology demonstrator, which features a forward-swept all composite wing, completed Phase II of its flight test program and essentially confirmed that the combination of technologies — composites, foresweep, flaperons and computer-adjusted canard wings — makes it possible to build smaller, lighter, and more efficient aircraft without sacrificing performance. At yearend the Number Two X-29 was at Dryden being readied for a new test series that will focus on high-angle-of-attack research.

- Also in Phase II test status at yearend was the NASA/Air Force Mission Adaptive Wing (MAW) research aircraft, an extensively modified F-111 built by Boeing Military Airplane Company. The MAW program involves investigation of the potential of the variable camber wing that can be changed in flight for best flight efficiency.

- The Highly Integrated Digital Electronic Control (HIDEC) program seeks to extend the lifetimes of existing jet engines by employing new engine/flight control integration technology that offers major thrust and fuel economy gains. HIDEC is a cooperative program involving NASA, the Air Force, McDonnell Douglas (builder of the F-15 research aircraft), and Pratt & Whitney.

McDonnell Douglas Helicopter Company was conducting research with an experimental NOTAR (No Tail Rotor) helicopter.



Under a Federal Aviation Administration contract, Raytheon Company was producing more than 5,000 advanced common consoles for use by air traffic controllers in en route and terminal approach control centers.

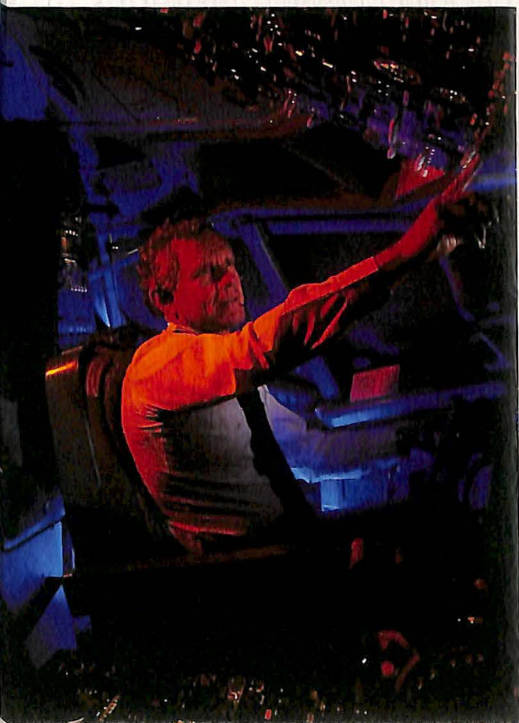
Westinghouse Electronic Systems Group was working on an order for 40 long-range ARSR—three dimensional radar systems for joint use by the Federal Aviation Administration for air traffic control and the USAF for air defense.



In flight test status was the record-setting all composite EGRETT, intended for such applications as search/rescue, geophysical survey, and coastal/border patrol. Powered by a Garrett turboprop, it was jointly developed by E-Systems and the West German firm Grob TFE.



In production at Sikorsky Aircraft, the S-76 helicopter; the division was expanding its S-76 commercial marketing effort.



- The E-7 STOVL (Short Takeoff and Vertical Landing) research program involves wind tunnel testing of a full-scale model supersonic fighter-type design at Ames Research Center. This is a cooperative program of NASA, DoD, and the Canadian government. The model was designed by General Dynamics and built by The Boeing Company's DeHavilland of Canada subsidiary.

- In addition to those programs, NASA was engaged in studies of tomorrow's advanced civil aircraft. NASA conducted a High-Speed Civil Transport study program to identify design approaches to the next generation commercial supersonic transport. Study contractors Boeing and McDonnell Douglas both concluded that the near-term state-of-the-art will not support a big speed leap to Mach 5, an often-suggested possibility, but that with predictable research advances, a commercially viable Mach 2-3 transport is feasible.

In cooperation with the Federal Aviation Administration (FAA), NASA was also studying the commercial potential of the tilt-rotor transport.

FAA activities in 1988 included continuing development of the Microwave Landing System, intended as the future primary

instrument approach system, and further development of the National Airspace System (NAS) plan. Among major NAS advances were the first delivery of the Norden Systems ASDE-3 airport surface detection radar; production of the advanced Westinghouse ASR-9 airport surveillance radar, which is capable of simultaneously displaying both weather and traffic information; and continuing development of IBM Corporation's Advanced Automation System for the 1990s, a system of advanced workstations designed for significant increase in air traffic controller productivity.

In another NAS development, Raytheon Company won a major FAA contract for provision of technical services in support of NAS implementation. A subsidiary, Raytheon Service Company (RSC), will provide project management, engineering, construction management, and equipment installation services. Among tasks RSC will perform are relocation of 50 solid-state terminal air traffic control radars, site preparation for installation of a new beacon interrogation system, installation of visual aids landing systems, and installation of the Automated Weather Observation System.

A leading supplier of avionics for commercial aircraft, Honeywell reported milestone advances in windshear alert and guidance technology and in traffic/collision avoidance.



### Aerospace Operations Service

*Operations supports the functional activities of the industry by addressing issues involving quality assurance, manufacturing technology and productivity, material, product support, and information exchange.*

#### **DoD — Total Quality Management Program**

Throughout 1988 members of the Quality Assurance Committee continued their interface with the Office of the Assistant Secretary of Defense to develop a sound approach in implementing the government initiative to achieve continuous improvement in the manufacture of defense products.

As a result of a series of meetings, industry identified barriers to implementation and DoD has incorporated the barriers, as well as recommendations for solutions, into the DoD Master Plan.

Under the Total Quality Management (TQM) program, industry commented on the Navy's Exemplary Facilities concept. This is an initiative that acknowledges contractor facilities which consistently deliver quality products and provides incentives for such performance. AIA has, in addition, expressed concerns about DoD plans for developing specific DoD Federal Acquisition Regulation Supplement (DFARS) cases on the overall TQM approach and on Statistical Process Controls.

#### **DoD Joint Regulation on Nonconforming Material**

In October DoD released an advance copy of a joint service regulation to implement DoD policy on nonconformance material reduction. The proposed regulation was scheduled for publication in the

*Federal Register* for general comment at a later date.

A joint AIA/National Security Industrial Association (NSIA) response to the regulation will be submitted to DoD. Initial industry reaction is negative.

The regulation establishes policy and requirements to address improving quality through reduction in the cost and incidence of nonconforming products. It would replace individual service and agency programs, such as the Air Force Get SPEC and the Defense Logistics Agency (DLA) Regulation 8200-10.

#### **Joint Prime Contractor Audit Program**

A Quality Assurance subcommittee responsible for control of supplier quality has developed a joint contractor audit program. The program is intended to fulfill the DoD system audit requirements to 1) flow down appropriate technical and quality system requirements to suppliers and 2) assure these suppliers have adequate systems for implementing these requirements. In late 1988 the program was expanded to address, specifically, the problem of fastener quality.

The benefits of the joint program are threefold. 1) it reduces audit redundancy, 2) it develops consistent, documented requirements, and 3) it derives economic benefits for both the supplier and prime contractor through the use of experienced

personnel drawn from team members. In addition, the contractual requirement to audit suppliers is met for any company represented on the audit team.

The program has been well received by DLA.

#### **Fastener Quality Assurance Act 1988 — HR 5051**

In 1987 the House Committee on Energy and Commerce held initial hearings to address the problem of counterfeit fasteners.

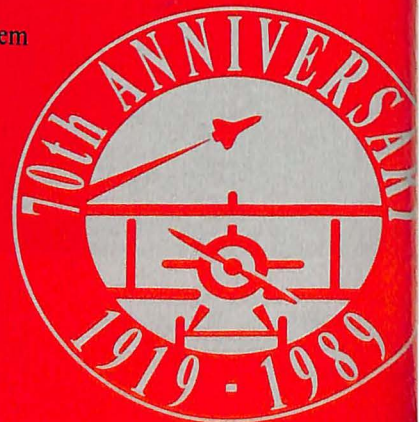
Congressional investigations and reports from the DLA indicated a substantial number of counterfeit fasteners were in use and also present in government inventories. At the urging of DLA and NASA, later investigations of aerospace inventories confirmed that fasteners not meeting military specifications were in stock and being used in production.

In April 1988 AIA participated in discussions on draft legislation and was asked to comment on the impact of counterfeit fasteners in aerospace and, in particular, on the probable causes of the problem and any possible solutions.

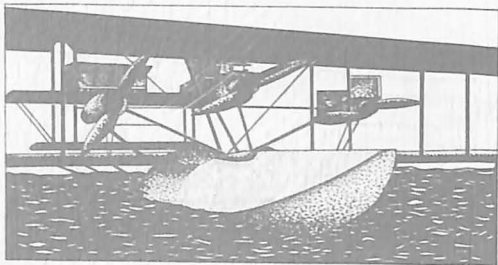
In correspondence with the committee, AIA noted that the principle reason behind the problem

had to do with an absence of pro control over distributors of fasteners particularly from off-shore sources.

In testimony submitted at August 1988 hearings, AIA suggested that a third-party system of accreditation of distributors should be included in any legislation and the accreditation should be endorsed by the appropriate agency within the federal government.







Navy Curtiss flying boat NC-4 completed first trans-Atlantic air crossing, 57 hrs/ 16 mins. 1919

### Quality Resources Study

The 1987 Quality Resources Study, distributed on June 17, 1988, presents an overview of the aerospace industry's allocation and use of quality resources. It contains 8 quality cost measurements and manpower ratios. Data is presented at the total industry level and by manufacturing type.

The study provides AIA member companies with a means to identify areas and activities within their organization that are responsible for quality resource consumption. Companies participating in the study can determine how their use of quality resources compares with that of industry and similar manufacturing groups.

### Conference on Quality

The annual joint AIA Quality Assurance Committee/NSIA Quality and Reliability Assurance Committee Industry/Government Conference on Quality was held in Norfolk, Virginia, on October 4-6, 1988. The theme was "Total Quality Management."

Keynote speaker Mr. Jack Katzen, Assistant Secretary of Defense, Production and Logistics (P&L), emphasized DoD's commitment to the Total Quality Management program and the establishment of a continuous quality improvement process as an integral element of the entire acquisition process.

Industry spokesmen presented their approach to implementing TQM in the areas of advanced

planning, systems, quality, engineering, manufacturing, human resources, and logistics. Quality representatives from DoD, Air Force, Navy, Army, and DLA presented TQM implementation within their areas of responsibility.

### Efforts to Bolster The Industrial Base

In 1987 Dr. Robert Costello, then Assistant Secretary of Defense for Production and Logistics, launched the DoD strategy for Bolstering Industrial Competitiveness.

The initiative was born from concerns over America's ability to compete in the international marketplace and over the erosion of the defense production base. A declining defense industrial base decreases our nation's capabilities to produce critical items necessary to our national security.

If the recommendations contained in Dr. Costello's "Bolstering Defense Industrial Competitiveness" (1988) are implemented, AIA believes that the erosion of the defense industrial base can be stopped.

Industry accepted the challenge to participate in non-adversarial communications with DoD through a Defense Manufacturing Board; factory modernization through the Industrial Modernization Incentives Program (IMIP); utilization of commercial manufacturing process and product specifications; the development and application of effective, advanced process technologies concurrent with basic science and technology programs; the improvement of the technical

skill base in manufacturing; achievement of manufacturing management excellence and competitiveness; and, developing an effective "quality first" program.

Dr. Costello is also committed to the adoption of two-year budget cycles, multi-year contracts, a more realistic five-year program, and coherent tax, trade, and domestic policies.

### The IMIP Forum

The AIA IMIP Working Group, established in 1986 to stabilize, promote, and obtain increased funding for IMIP, held a day-long Forum on May 24, 1988, in the House of Representatives Cannon Building.

The activities included a press event with DoD Assistant Secretary (P&L) Katzen, Senator Jeff Bingaman (D-NM), Congressman Nick Mavroules (D-MA), and AIA President Don Fuqua, and a discussion of the importance and benefits of IMIP among AIA representatives, more than 150 Congressmen and staff members, and 30 DoD officials.

The forum helped increase the priority and importance of IMIP in DoD. IMIP is now an integral part of DoD's Total Quality Management concept and DoD's plan to bolster industrial competitiveness.

DoD has formed a DoD IMIP Steering Group to work this problem. The Army has included funds for IMIP in its 1989 budget, and the Navy increased IMIP priority by changing management responsibility for the program.

John A. Beetham  
General Motors  
Corporation  
Chairman, Product  
Support Committee

John R. Boase  
Pneumo Abex  
Corporation  
Chairman, Quality  
Assurance Committee



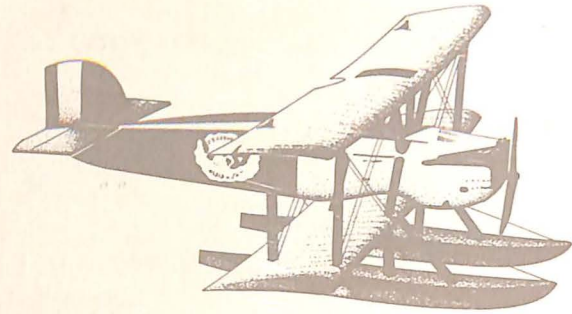
Dick Howard  
Northrop Corporation  
Chairman, Information  
Technology Committee

Thomas L. Plein  
McDonnell Douglas  
Corporation  
Chairman, Manpower,  
Personnel & Training  
Committee





Douglas World Cruisers *Chicago* and *New Orleans* flew around the world, Seattle to Seattle, 371 hrs/11 mins, using only a compass, an altimeter, and a turn-and-bank indicator. 1924



**IMIP and the DoD IG**  
The DoD Inspector General (IG) met with staff members of AIA to obtain the Association's view of IMIP.

The IG stated that it could not track IMIP savings and that the administration of IMIP was overly complex and burdensome. Their report on the program would be negative.

The IMIP Working Group initiated a study to provide constructive recommendations on IMIP for industry and government to ensure a program which achieves its goals, builds on the success realized through IMIP's first decade, and answers the IG's concerns. The report was completed and delivered to the IG and has been praised as the "how to" handbook on implementing IMIP successfully.

### Manufacturing Committee Activities Report

The AIA Manufacturing Committee joined with the Electronic Industries Association (EIA) and NSIA manufacturing committees to hold a first Joint Industry/Government Manufacturing Conference in Arlington, Virginia, on April 12-14, 1988. The theme was "Manufacturing Policy: A Need For Uniformity."

The program included several prominent industry and government speakers. Among the subjects they addressed were DoD Manufacturing Initiatives, Manufacturing Research and Development, Perspectives on the Industrial Modernization Incentives Program, DoD Industrial

Base Readiness, Subcontractors Integration into the Manufacturing Industry Base, and a Trade Publications Perspective on Defense Industry Manufacturing.

Keynote speaker was Tom Murrin, recently retired President of the Energy and Advanced Technology Group, Westinghouse. Luncheon speaker, Dr. John D. White, Jr., Georgia Tech, discussed the importance of the DoD manufacturing initiative on a need for uniformity.

Also in 1988 the AIA Manufacturing Committee, through its Packaging, Handling, and Engineering Manufacturing Technology Advisory Group, sponsored a conference on "Material Handling in the Modern Factory."

Held in Seattle, Washington, on September 28, 1988, the program addressed such subjects as the Future and Equipment of Material Handling in the Modern Factory, Justification for Modern Handling Systems, Just-In-Time Inventory Control Systems and Integration, and the new Boeing Sheet Metal Center.

### AIA Efforts to Enhance Subcontracting with Small Disadvantaged Business

About ten years ago Congress became concerned about the lack of DoD contracting and industry subcontracting with Small Disadvantaged Business (SDB). Public Law 95-507 was enacted,

requiring subcontracting plans in all prime contracts over \$500,000 and establishing goals for awards to Small and Small Disadvantaged Businesses.

Dissatisfied with the amount of SDB awards, Congress legislated a new requirement as part of the FY '87 DoD Authorization Act. It required DoD to set a goal of five percent of total obligations for contracts and subcontracts to be awarded to SDBs and black colleges. Subcontract awards to SDBs are currently about two percent.

To provide incentives for industry to improve its performance, the 100th Congress amended the Small Business Act so that now each contract requiring a subcontract plan "shall contain a clause for the payment of liquidated damages upon a finding that a prime contractor has failed to make a good faith effort" to meet its SDB subcontracting goals.

AIA established a working group of member company representatives, co-chaired by two senior corporate executives, to develop a plan to improve industry's SDB subcontracting. The plan includes a commitment by AIA to 1) arrange quarterly meetings with members of the Congressional Black and Hispanic Caucuses and SDBs interested in subcontracting, 2) fund a survey/study to determine ways to improve industry performance, and 3) set up a data bank of SDB sources.

The ultimate success of the plan depends on CEO commitment

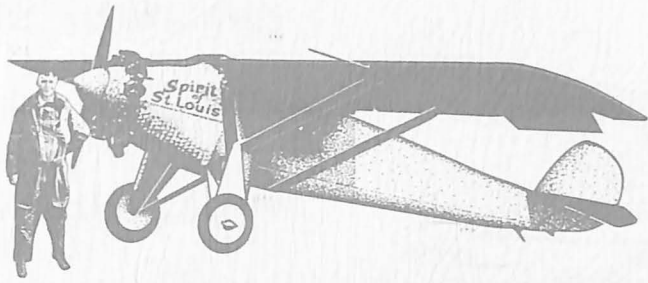
and involvement in implementing an innovative course of action. A new strategy would require company resources, a change in business practices, and a willingness to communicate regularly with Congressional members and their staffs on progress and problems.

Leonard Ross  
General Motors  
Corporation  
Chairman, Spare Parts  
Committee

John J. Ryan  
LTV Aircraft Products  
Group  
Chairman, Manufacturing  
Committee







Charles Lindbergh crossed the Atlantic, New York to Paris, solo, non-stop, in a Ryan NYP monoplane *Spirit of St. Louis*, 33 hrs/39 mins. 1927

### Competition Advocate Working Group Activities

In August 1988 the Competition Advocate Generals of the services met with AIA's Competition Advocate Working Group to review the problems of subcontract reporting.

The underlying problem identified derives from each service wanting different types and formats of competition reporting at the subcontract level. As a result, companies doing business with more than one service are faced with multiple systems for reporting competition, each with different definitions of competition.

During the meeting the Competition Advocate Generals agreed not to place additional subcontract reporting requirements on industry until a real pressing need or benefit could be identified.

The Competition Advocate Generals also realized the importance of cooperation and coordination with the Defense Logistics Agency/Defense Contract Administration Service (DCAS). There have been significant disconnects between their policies and the in-house DoD administration of contracts. The Competition Advocate Generals committed themselves to include DLA/DCAS in their deliberations, policies, and procedures.

### Spare Parts Competition Congressional Briefing

A Government Accounting Office report stating that the Air Force was not complying with the terms

of the Competition in Contracting Act prompted Senator Carl Levin (D-MI) to indicate his intent to hold hearings on spare parts competition in Spring 1988.

AIA prepared a briefing meant to clarify the situation regarding spares breakout and competition for Senator Levin's subcommittee. The Office of the Secretary of Defense (OSD) provided supporting data on the actual status of spare parts breakout.

The briefing presented to Congressional staffers in late January resulted in a favorable reaction and a deferment of hearings in this area.

### CALS Acquisition Group Activities

The CALS (Computer-Aided Acquisition and Logistics Support) Acquisition Task Group of the CALS Industry Steering Group was established in June 1988 to develop a strategy for industry implementation of CALS into contracts.

The group is chaired by an AIA Product Support Committee member and includes representatives from EIA and NSIA. To date, it has developed and prioritized a list of issues in the areas of acquisition management, contracting, data management, and CALS implementation guidance. Work on these issues is proceeding, and industry will provide input to DoD for consideration as it is developed.

### Flight Safety Critical Parts

AIA member companies are deeply concerned over ongoing competitive breakout military procurement activities in the area of flight safety and reliability of purchased parts and components.

The terms used presently to identify "flight safety critical parts" are subject to numerous definitions and interpretations. No DoD standard definition exists. Industry research indicates that a common DoD control document is needed in this area.

AIA has recommended that OSD sponsor a joint DoD/Industry panel to develop a uniform DoD regulation that addresses identification and procurement of "Flight Safety Critical Parts." DoD has deferred their response pending the results of an ongoing Industry/Army review of this matter.

Involved AIA committees will team with counterparts from the American Helicopter Society to bring about a viable resolution of the Flight Safety Parts Program.

### Diminishing Manufacturing Sources

Diminishing Manufacturing Sources (DMS) has long been a concern for both government and industry. As a result of joint discussions, a multi-association effort has been initiated to work the DMS issue.

An ad hoc group is studying DMS from the perspectives of manufacturing, engineering, logistics, material management, contracting, and procurement. A questionnaire

was distributed to participants with analysis of replies expected in December 1988. Industry recommendations on ways to alleviate the DMS situation will be developed.

### Hazardous Materials Warning Study

The Service Publications Committee forwarded the results of the Hazardous Materials Warning Study to DoD in October.

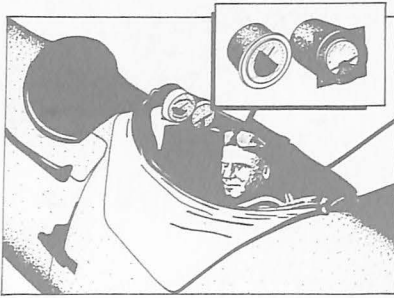
The study addresses better methods to communicate hazardous

Jonathan R. Tilton  
General Electric Company  
Chairman, Service  
Publications Committee

Charles T. Wood  
Martin Marietta  
Chairman, Materiel  
Management Committee







Famed aviator Jimmy Doolittle made first blind-flight takeoff, level flight, and landing, Long Island, NY. 1929

material warnings to maintenance personnel while simultaneously reducing the costs to produce, maintain, and update their technical publications. The warnings presently used are virtually ignored by the user and costly to produce.

The study recommends the use of icon symbols as hazardous material warnings. Tests by the committee show these icons are more effective in transmitting a warning than the existing written warnings. An added benefit is a 15 to 35 percent reduction in printing space and lineage.

Adoption of these recommendations will improve personnel safety and reduce publication costs at the same time.

### Reducing the Cost of Spares Inventory

At a DoD roundtable discussion on LOGISTICS 2010 early in 1988, DoD asked for industry assistance in recommending ways to reduce the DoD spares inventory, then estimated at \$90 billion.

The AIA Spare Parts Committee accepted this challenge and, after a series of meetings with DoD officials, initiated a study on spare parts interchangeability and substitutability.

Recommendations provided to OSD in September 1988 included: DoD establishment of an oversight agency for spares management, centralized DoD data management for spares, a DoD Master Repairable Items List, improved contractor feedback on competition/breakout initiatives, and various other

management and technical suggestions.

DoD response is pending.

### Information Technology

The new Information Technology Committee (ITC) held its formative meeting in March 1988. At the top of the agenda was the development of topics consistent with the committee's charter.

The topics of primary concern are 1) exchange standards which would encompass electronic data interchange and Product Data Exchange Specifications (PDES), 2) telecommunications work dealing with Federal Communications Commission issues, 3) new Technical and Office Data Protocols (TOPS) to standardize computer networking within the office and an engineering environment, 4) security and special access standards, and 5) software development to provide computer-aided tools for systems engineering and Material Requirements Planning (MRP). Also reviewed were issues relating to enhanced interface between government, industry, and the suppliers of hardware and software.

Working subcommittees were established to address each issue with an ITC executive board member designated to oversee the activity of each subcommittee. These subcommittees held their initial meetings and established panels and specific projects to address the key concerns in their area of responsibility.

The Information Exchange Subcommittee will encompass development of the ANSI X12 uniform electronic interchange standard to be employed by DoD, electronic mail, and CALS Product Data Exchange Specifications (PDES).

The Telecommunications Subcommittee established panels covering Aerospace Network Operations and Management, Internetworking, and Video Teleconferencing.

The Software Development Subcommittee established three activity sectors covering Software Development Methodologies, Metrics Development, and Current and Future Assessment of Hardware Platforms and Software Tools.

A fourth subcommittee to address problems relating to automation management, processing, and data storage is under consideration. Initial steps have also been taken to provide a new government/industry liaison activity.

### Electronic Mail Network

An initial project of the Information Technology Committee was the establishment of an electronic mail network.

When completed the network will provide for the exchange of notes, messages, and final and revisable documents plus directories to support the exchange. Data received will be stored electronically for later retrieval or it can be printed in hard copy if required.

The implementation of the project will initially connect the committee's executive board and ultimately the Information Technology Committee and full AIA membership. An E-Mail survey to determine appropriate internetworking capabilities among the member companies is currently underway.

Stan Siegel  
Vice President  
Operations, AIA





## Aerospace Procurement Service

*The Aerospace Procurement Service is the focal point for all procurement and procurement-related issues, including patents and data rights. It provides substantive comments on proposed legislative and regulatory changes and initiates actions for improving the procurement process.*

### IR&D

The Procurement and Finance Council continued working with AIA's Technical Council to ensure that senior DoD and service officials understand the importance and benefits of Independent Research and Development (IR&D) to U.S. national security.

Senior industry executives met with Secretaries Frank C. Carlucci, William Taft, Robert Costello, and others. A favorable development was Secretary Carlucci's November 15 announcement that he was proposing an additional \$300 million for IR&D in the FY '90 DoD budget.

### Pension Funding

For the past several years the government has been concerned that several contractor pension plans are at the Full Funding Limitation (FFL), that is, asset values equal or exceed actuarial liabilities. Contributions to pension plans that exceed the FFL are not deductible for tax purposes. An excess contribution, if made, is treated as a prepayment applicable to future periods.

Defense Contract Audit Agency (DCAA) guidance defined the FFL as occurring when assets exceed the lesser of either 150 percent of current liabilities or accrued liabilities. DCAA states, however, that no pension expense can be charged to current contracts when assets exceed 150 percent of current liabilities but do not exceed accrued liabilities.

Furthermore, when a contractor comes out of a FFL position, it cannot charge lost expense dollars because of the constraints of Cost Accounting Standard (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. This approach was subsequently rejected by the Deputy Assistant Secretary of Defense for Procurement. Currently, any revision of CAS to take care of this problem must await reestablishment of the CAS Board which is provided for in the Office of Federal Procurement Policy (OFPP) legislation.

### OFPP Reauthorization

OFPP was permanently reauthorized after more than one and a half years of ups and downs in the level of Congressional support. AIA first testified before the House Government Operations Committee and supported reauthorization in June 1987 and later repeated its support before the Senate Governmental Affairs Committee. The reauthorization bill also provides for a five-member CAS Board, a four-member Federal Acquisition Regulatory Council, and includes a Procurement Integrity Section which requires certification by both contractors and contracting officers.

### DoD/Industry Relations

Section 808 of the FY '89 DoD Authorization Bill requires that the Secretary of Defense establish an advisory panel to study and make recommendations on ways of enhancing cooperation between DoD and industry on matters of mutual interest.

These include 1) procedures governing debarment and suspension, 2) the role of self-governing oversight programs, 3) expanded use of alternative dispute resolution procedures, and 4) the desirability of establishing a permanent advisory panel on government/industry relations. The panel will include a balance of persons from government, private industry, and academia. AIA submitted several names of prospective industry members for this panel.

### Air Travel Compensation Act

In 1985 AIA arranged with the Rand Corporation to study the compensation paid to the survivors of air crash victims for the 12-year period 1970 to 1982. The study's purpose was to determine how long it takes for settlements and how much is lost through litigation costs.

AIA believes that survivors could be paid more quickly and without incurring litigation costs if legislation were enacted to establish a fund for survivor compensation if an air crash occurs.

The findings of the final report, issued October 28, 1988, are controversial and seem to close the door on any hope of a legislative effort to provide a fund. The investigators concluded that the average of \$363,000 paid to survivors of air crashes was less than half the actual economic loss experienced. This will become ammunition for those who favor

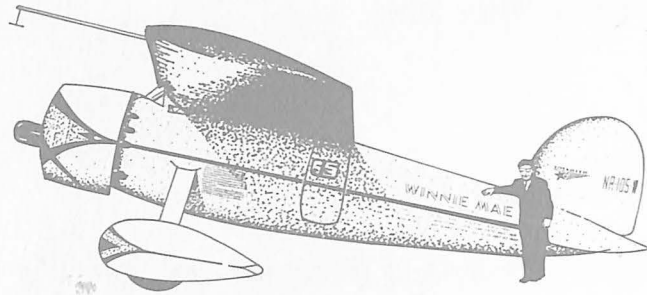
Dale Babione  
The Boeing Company  
Chairman, Executive  
Group, Procurement and  
Finance Council

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





World flight by aviation trailblazer Wiley Post in *Winnie Mae*, a Lockheed 5C Vega, was achieved in record 8 days/16 hrs. 1931



liberalization of international treaties and state laws that limit awards and will also be used in litigation to press for higher awards. At the same time, plaintiff lawyers who have gotten higher awards feel that the report will be used as an argument to limit awards.

#### Foreign Selling Costs

In 1979 the Carter Administration, as part of its policy to discourage sales of U.S. defense products overseas, revised DoD regulations to make foreign selling costs unallowable. Subsequently, DoD decided that expenses related to showing U.S. defense products at international and domestic trade shows were advertising costs and, thus, unallowable.

AIA has argued for the past several years that these changes are inconsistent with normal business practices and sound accounting principles and place the U.S. defense industry at a disadvantage with foreign competitors.

The FY '89 Defense Authorization and Appropriations Acts (Sec. 826 of P.L. 100-456 and Sec. 8105 of P.L. 100-463) instructed DoD to prescribe regulations allowing these foreign selling expenses, though with some limitations. The legislation required DoD to issue final regulations by December 28, 1988. The new rules apply in the contractor's first fiscal year that begins on or after the date the final regulations were published. AIA submitted regulatory language to the Defense Acquisition

Regulatory Council (DARC) early in November.

#### Certificate of Contractor Integrity/ Profit Reduction Clause

Following the disclosure of the "Ill Wind" investigation in mid-June 1988, DoD published a requirement that the 16 companies "tainted" by the investigation had to sign a Certificate of Contractor Business Integrity before receiving any new awards and also accept a Profit Recapture Clause as part of their contracts.

The certificate was so broad that it could be read to encompass almost any communication between any contract employees and any government officials at any level and at any time before or during the solicitation process. The Profit Recapture Clause would have permitted the government to reduce the contract price by the amount of profit negotiated or by 10 percent of the contract price upon a finding by the contracting officer that the contract had been obtained through "tainted" means.

These provisions became effective immediately upon publication in July. AIA took the lead in developing detailed Council of Defense and Space Industry Associations (CODSIA) comments which led to a revised and less onerous regulation in mid-September.

#### Drug-Free Work Force

On September 28, 1988, DoD issued an interim rule, effective October 31, 1988, requiring contractors to institute and maintain programs for achieving a drug-free work force.

The rule addressed random drug testing and contained a clause applicable to contracts involving access to classified information and any other contracts the contracting officer determines are necessary either for reasons of national security or to "protect the health or safety of those using or affected by the product of or the performance of the contract except for commercial or commercial-type products."

#### MRP

The FY '89 Defense Authorization Bill, after extensive activity by AIA and other associations, included much less onerous provisions concerning Material Requirements Planning (MRP) than had been promoted by Representative John Kasich (R-OH) in the House Armed Services Readiness Subcommittee.

The Kasich bill would have legislated the ten key elements and required certification by contractors that their MRP Systems were in full compliance. Basically, the provision in the authorization bill requires DoD to issue appropriate regulations and to determine the need for certification.

#### Rights in Technical Data

AIA continued its leadership throughout 1988 on this issue and

made some progress in achieving a regulation that balances the interests of the government and contractors.

In the four years since P.L. 98-525 was enacted, DoD has endeavored, through several iterations of proposed and interim regulations, to implement a cohesive

Kenneth J. Brown  
The Boeing Company  
Chairman, Legal  
Committee

Alan Chvotkin  
Sundstrand Corporation  
Chairman, Procurement  
Techniques Committee





Amelia Earhart, flying a Lockheed 5B Vega, was the first woman to make a non-stop, solo flight across the Atlantic; she flew the same Vega solo, non-stop, Los Angeles to Newark, the first transcontinental flight by a woman. 1932



and purportedly even-handed policy on rights in technical data. Each effort was seriously flawed and Congress several times amended the statute to clarify its intent.

Congress provided its latest guidance in the FY '88 DoD Authorization Act (Public Law 100-180), causing DoD to completely rewrite the policy and issue an interim regulation on April 1. A June 2 CODSIA letter expressed industry's concern that the interim regulation still failed to approach the balancing of interests mandated by Congress and failed to implement the President's Executive Order (April 1987) on facilitating the commercialization of technology.

On September 26 the Chairman of the DARC briefed representatives of industry associations on a proposed final regulation. While some industry objectives appeared to be equitably resolved, it was clear that a number of issues had not been addressed.

A September 30 CODSIA letter recommended that a second interim regulation be issued for public comment. This suggestion coincided with a September 26 Office of Management and Budget letter to DoD advising that the April 1 interim regulation was published without reference to the requirements of the Paperwork Reduction Act and was, therefore, not enforceable as an information collection requirement.

DoD issued the latest interim regulation on October 28. A

November 28 CODSIA letter called the revised regulation an improvement but expressed continuing concern that it still fell short of complying with Congress' direction. The regulation does not adequately assure that contractors' rights in technical data developed at private expense are protected, nor does it provide sufficient guidance to achieve the commercialization objectives of the Executive Order.

CODSIA recommended that a joint government/industry group be established to develop final regulations on rights in technical data and computer software.

#### **Contractor Risk Assessment Guide (CRAG)**

Secretary 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 to reduce DoD oversight in areas having adequate internal control systems. The areas covered by the voluntary program include labor charging, indirect cost submissions, material management and accounting systems, estimating systems, and purchasing systems.

AIA was instrumental in establishing a joint CODSIA/DoD effort to review and improve the draft CRAG document. CODSIA working groups were formed for each chapter of the CRAG.

Individual company comments were submitted to DoD in mid-June, and copies of these comments were shared with the CODSIA group.

Throughout the summer DoD and CODSIA worked together to improve the guide and examine concerns about the program: the initial draft CRAG was too detailed, too rigid, and contradicted existing regulations in many areas.

These problems were successfully addressed in the final document which was agreed to by DoD and CODSIA in October and issued by DoD in November. However, still unanswered questions include: 1) Will the CRAG program require greater access to contractor data beyond that which is currently required by law or regulation? and 2) How are specific reductions in government audit and oversight to be accomplished?

#### **Financial Impact Study**

The MAC Group report on "The Impact on Defense Industrial Capability of Changes In Procurement and Tax Policy 1984-1987" was completed in February 1988.

The major conclusions were: 1) had recent changes been in effect during performance of the nine programs studied, the return on investment would have been so low that there would have been no financial reason for the companies to bid them and 2) defense firms would require significant additional financing which, for some companies, would exceed their net

worth. AIA took the lead in Phase II to arrange briefings for the media and government policymakers in DoD and in Congress on the findings of the report.

Reaction to the study was generally favorable. The methodology for the study was sound and the conclusions clearly

James J. Cunnane  
General Dynamics  
Corporation  
Chairman, Financial  
Committee

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







The Douglas DC-3 was introduced to commercial service. 1936

supported the initial premise that the cumulative impact of the changes would be a serious decline in industry's ability to meet national security needs. DoD has taken one positive step so far by increasing progress payments from 75 to 80 percent, effective October 1, 1988.

Because of recent changes, such as increased progress payments and further changes in the tax treatment of long-term contracts, we are now in Phase III of the MAC Study effort: updating and reassessing projections made by the study.

**Truth In Negotiations Act (TINA)**  
The FY '88 DoD Authorization Act changed the definition of "cost or pricing data" from "all information that is verifiable" to "all facts." This definition is drawn directly from the Federal Acquisition Regulation (FAR).

The House-Senate conference report clearly stated that Congress intended only to codify the definition of cost or pricing data as it has existed in regulations and been reinforced by board and court decisions over the last 25 years. This was implemented by Federal Acquisition Circular (FAC) 84-35, published on April 1, 1988.

Two other regulatory changes have the potential to introduce significant changes in the administration of TINA. The Navy proposed a rule which limits the cost or pricing data required when there is adequate price competition. AIA supported the Navy policy and requested that it be implemented

throughout the government via incorporation into the FAR.

Subsequently, the DAR Council published a proposed DFARS change. AIA supported the proposed change even though it is less ambitious than the Navy proposal. Unfortunately, the DoD Inspector General's office opposes the changes and criticizes what it calls "increasingly liberal interpretations" of adequate price competition.

#### Unauthorized Clauses

AIA continued its efforts to combat the proliferation of unauthorized regulations and contract clauses. The Association believes there is an urgent need to focus on ways 1) to ensure adherence to the FAR/DFARS rules on promulgating regulations and on controlling deviations and 2) to strengthen the Office of the Secretary of Defense (OSD) leadership in this area.

AIA is playing a lead role in the CODSIA task group established to monitor DoD compliance with the procedures governing promulgation of policies and regulations. Chief concerns of the group include: unauthorized non-standard policies and regulations, failure to publish for public comment, and lower-tier policies and regulations which contradict or duplicate higher-level policy and regulations.

The task group has proposed various solutions, including requiring the military services and their lower organizational levels to obtain OSD approval before promulgation of contract policy or special contract clauses. While

Under Secretary Costello rejected AIA's recommendations for major changes in this area, he encouraged the DAR Council and the military services to work with us to balance the needs for flexibility and uniformity in the system.

#### Estimating Systems

During 1988 the DAR Council approved regulations in the DFARS estimating systems that: 1) require businesses which submit certified cost or pricing data to DoD to establish and maintain adequate estimating systems, 2) require certain large businesses to disclose their estimating system in writing, and 3) provide guidelines concerning characteristics of adequate estimating systems.

A series of meetings between AIA representatives and the DAR Council resulted in several improvements in the regulation. AIA was successful in removing the access-to-records provisions from the estimating systems clause and in revising the estimating systems criteria. AIA's Procurement Techniques Committee is monitoring implementation of the new regulations and working to ensure that the estimating systems criteria in CRAG are consistent with the regulations.

**Commercial Procurement Practices**  
AIA supports changes to the defense acquisition system that will enable DoD to buy more commercial products and non-developmental items. AIA/CODSIA representatives are working with the DAR

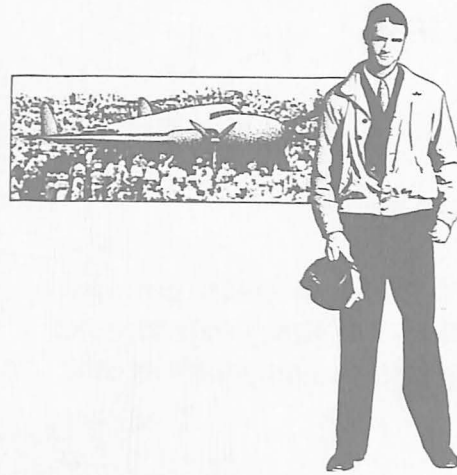
Robert W. Keller  
TRW Inc.  
Chairman, Intellectual  
Property Committee

David Koonce  
Martin Marietta  
Corporation  
Chairman, Economic  
Advisory Committee





Howard Hughes and crew flew around the world in a Lockheed 14 in 3 days/19 hrs/8 mins. 1938



Council staff to establish a DAR case which would eliminate inappropriate requirements for cost or pricing data in commercial procurements.

### Facilities & Property

The Facilities and Property Committee is unique in that it has direct "government counterparts" (DoD, DOE, NASA) in the property arena. The committee also interacts with the legislative branch by furnishing information and industry viewpoints on proposed legislation.

During 1988 the definition of special test equipment was rewritten in the FAR so that commercial components can now be charged as a portion of the special test equipment. The DAR Council also approved a proposal by the committee to redefine inventory in the FAR. Additionally, the FAR now limits the collection of utilization data on plant equipment to items over \$5,000.

A main committee goal for 1989 is strengthening the communications bridge between NASA, DoD, DOE, and the industry.

### AIA Legal Committee

Created just two years ago, the Legal Committee is still in a formative stage. Besides providing advice and counsel on specific legal matters for the Procurement and Finance Council, the committee serves as an authoritative resource on legal issues.

Committee projects and topics during 1988 included suspension and debarment, alternative dispute

resolution, access to records, voluntary disclosure, *qui tam* litigation, statutory subcontracting goals and liquidated damages, allowability and recovery of environmental costs, data rights, CRAG, indemnification, whistleblower statutes and employee rights, the Government Contractor Defense, and the continuing criminalization of the procurement process as evidenced by the "Ill Wind" investigation and its resulting "Competitive Information Certificate" and "Profit Reduction for Illegal or Improper Activity" clause.

### Tax Matters

The tax treatment for long-term contracts continued as a major concern of the Tax Matters Committee in 1988. Tax reform in 1986 eliminated 40 percent of the benefit of the Completed Contract Method (CCM); one-half of the remaining 60 percent was eliminated in 1987; two-thirds of the last 30 percent was removed in the 1988 Technical Corrections Bill.

The AIA Tax Matters Committee worked hard to head off this repeal until a new and fairer method of tax treatment could be put into place since CCM would be replaced by a Percentage of Completion Method of accounting (PCM).

Under PCM contractors pay taxes on the basis of costs incurred rather than revenues realized. The "Revenue Realization Method" (RRM) was developed as an alternative to CCM, but too late

to save what was left (30 percent) of CCM.

Contractors with long-term contracts will now have to account for 90 percent of their revenues under PCM, effective on contracts entered into on or after June 21, 1988. However, consideration of a fairer system of taxation was left open.

The Conference Committee on the Technical Corrections bill directed the Department of Treasury to conduct a six-month study of RRM and improvements to PCM. The PCM, in effect, requires payments of taxes in advance and accounts for a significant portion of the cash-flow shortage projected by the MAC Study.

Dick Wangenheim  
Martin Marietta  
Chairman, Facilities and  
Property Committee

LeRoy J. Haugh  
Vice President  
Procurement &  
Finance, AIA





### Aerospace Research Center

*The 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.*

#### Internationalization

"The Aerospace Industry and the Trend Toward Internationalization," a study developed as a joint project with AIA's International Council (IC), was written and researched by the Research Center.

Published in March, the study was widely distributed to Congress, federal agencies, academia, the media, and the public. It was well received as the first, comprehensive view of the globalization of the aerospace marketplace. Interest aroused by the report led to an AIA presentation before the Republican Platform Committee in August 1988. The report's conclusions may be a focus of Congressional hearings on the internationalization of aerospace early in 1989.

In April the International Council initiated a public and industry education program based on the study. Their intention was to broaden understanding about the dimensions of change in the industry and the resulting implications for public policy.

The Research Center assisted this effort by developing a generic speech and vu-graphs to use in presenting the study concepts to diverse audiences. Accompanying fact sheets on the subjects of education, trends, issues in defense trade, and aerospace employment were developed as supplementary background.

A strategy paper drafted by the Research Center, with guidance from the Strategic Planning Committee of the IC, addressed

industry marketing issues raised in the Internationalization Study. *U.S. Aerospace Industry: Competitive Strategy for the Global Marketplace* includes key recommendations for use in briefing Congressional members and staff and new Administration appointees.

#### Civil Aviation Competitiveness

In 1988 Research Center staff began developing a paper focusing on issues vital to the continuing success of the U.S. civil aerospace manufacturing industry. The Center is working on the project with AIA's Office of Civil Aviation and the Aviation Division of AIA's Aerospace Technical Council.

While industry's sales, backlog, and exports reflect a strong market position, various market, financial, technical, and policy issues will strongly influence the industry's position a decade and more from now.

Issues being addressed in the paper are: 1) the sufficiency of federal regulatory system policy and resources to support U.S. leadership in the international market environment, 2) the potential impact of market and cost pressures on the industry's technological position vis-a-vis foreign competitors, 3) the effect of airway and airport congestion on air travel and U.S. aircraft manufacturers, and 4) whether or not there will be an adequate number of technologically competent people at all levels of

the work force — craftsmen and technicians as well as scientists and engineers.

The paper will be used by AIA staff in briefing Congress and the new Administration, preparing testimony and position papers, and informing the media and the public about industry concerns.

#### Aerospace/National Issues

The Association continued to use an issues summary piece prepared by the Research Center to brief Presidential candidates' staff and others in government on the industry's current status and prospects.

*Campaign '88 — An Aerospace Perspective* presented industry views on world market competitiveness, the financial health of the defense industry, research and technology development, and space policy.

#### Perspective on Air System Congestion and Aerospace Market Share

Information briefs providing background on various aerospace trends and issues are published by the Research Center in a series titled *Facts & Perspective*.

The February 1988 issue looked at air system congestion, the search for solutions, and concerns over the surplus of user tax funds in the Airport and Airway Trust Fund. One conclusion was that solutions that limit the growth of air transportation also affect economic growth.

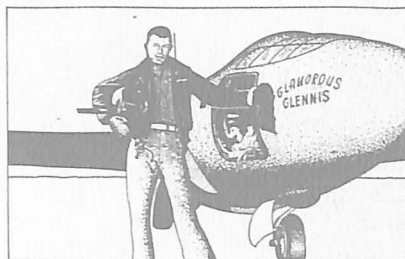
A June 1988 *Facts & Perspective* examined U.S. aerospace market share. Data showed that in the 1980s the U.S. industry recovered some of the market share it lost to European competitors during the 1970s. The increase was largely due to U.S. military spending, however.

Virginia Lopez  
Director  
Research Center, AIA





Captain "Chuck" Yeager, USAF, in "Glamorous Glennis," a rocket-powered Bell XS-1 research aircraft, became the first to fly faster than the speed of sound. 1947



The U.S. continues to hold the largest share of free-world aerospace production, yet market share remains significantly below its peak levels as competition from abroad increases. And while the United States is dominant in airframe production as a whole, it does not dominate in each component of that business, for example, the commuter transport market.

#### **Facts & Figures**

The Research Center completed the 36th edition of the industry's statistical handbook, *Aerospace Facts & Figures*, in 1988.

*Facts & Figures* provides more than 130 tables on a range of industry data including sales, production, Research and Development (R&D), trade, capital expenditures, and profitability. The theme of the handbook this year is *Key Technologies — Legacy for the 21st Century*. It ties in with an important focus of the Association: keeping the industry competitive through cooperation amongst government/industry/academia on high potential technologies.

#### **Yearend Review and Forecast**

Research Center staff reviewed data on industry activity during the first three quarters of 1988 and prepared yearend estimates of sales, shipments, backlog, trade, capital expenditures, and employment.

Projections for 1989 were made as well for release to representatives of the media, Capitol Hill, federal agencies, and industry analysts at an annual luncheon sponsored by

AIA and the Aviation/Space Writers Association.

#### **Employment Survey**

The Research Center released its annual survey of employment in the aerospace industry in May 1988 and forecast a slight decline in employment by yearend 1988. Later, for the Yearend Review and Forecast, still further employment declines in 1989 total employment were projected.

#### **Data Issues**

Research Center staff continued to assist AIA member companies in working with the Bureau of Labor Statistics (BLS) to collect and publish data on Lump Sum Wage Payments.

BLS will publish dual hourly earnings series for SIC 3761 (Guided Missiles and Space Vehicles) and SIC 3721 (Aircraft) from October 1983 forward. Publication of the hourly earnings series for SIC 3761, temporarily suspended, resumed in July 1988.

#### **Survey Assistance**

The Research Center provided ongoing assistance to AIA data and information gathering and analysis efforts.

Research support was given in several areas: company-perceived impediments to a viable industrial base, FAA regulations concerning foreign repair stations, rights in technical data, DCAA overhead audit delays on cost and fixed-price incentive contracts, aerospace company views on services provided

by the Department of Commerce, the cost impact of proposed Special Tooling Clause (FAR 52.245-17), and a review of Diminishing Manufacturing Resources.

Staff also helped develop several surveys anticipated by the new Information Technology Committee.

#### **Statistical and Information Services**

Interim reports of industry data are released throughout the year in more than two dozen statistical series addressing general industry activity: employment, aircraft production, foreign trade, DoD and NASA contracts, obligations, and outlays.

Staff also provide "backgrounders" — short data and analysis papers — for AIA staff as requested. In 1988 topics included aviation safety statistics, the impact of the proposed FY '89 DoD budget on aerospace, trends in U.S. defense trade, the relationship between aerospace R&D funding and trade performance, and industry R&D patterns.

The Research Center handles daily information queries from staff, AIA members, government, media, and the public on a range of topics.





# Association Activities 1988

## Aerospace Technical Council

*The Aerospace Technical Council focuses on the complexities of system development, program management problems, and initiatives to advance aerospace technologies.*

### Key Technologies for the 1990s

The Aerospace Technical Council's (ATCouncil) "Key Technologies for the 1990s" program has continued to gain momentum in 1988.

A major milestone was the establishment of the Aerospace Technology Policy Forum composed of high-level policy makers from industry, government, and the university technical community. Chaired by AIA President Don Fuqua, the Forum oversees the key technology roadmap efforts and also provides policy guidance to cooperative technology development initiatives.

Industry roadmaps for Advanced Composites and Rocket Propulsion were briefed to the forum in mid-July. At a second forum meeting in mid-October, the Software Development and Artificial Intelligence roadmaps were presented.

Work on national technology development plans for each technology was begun, and the Key Technologies Steering Group started work on a "roadmap of roadmaps" to integrate the ongoing program.

Recognizing the need for a permanent management structure to support the Tech 90s program, the ATCouncil developed a proposal for a foundation that would administer the program on a day-to-day basis. At its October meeting, AIA's Board of Governors (BOG) unanimously adopted a resolution approving continued implementation of the Tech 90s

program and authorizing the management concept proposed by the ATCouncil.

### Independent Research and Development

The threat of cuts to Independent Research and Development (IR&D) by the Department of Defense once again brought this issue to the forefront in 1988.

At the request of AIA's Executive Committee, the ATCouncil developed a draft position paper which it presented at the Fall BOG meeting. Throughout the year AIA held meetings with Defense Secretary Frank Carlucci and other DoD officials to explain the importance of IR&D to the industry.

A powerful addition to these IR&D education efforts was the linkage between IR&D and Key Technologies. An ATCouncil survey found that 40 percent of industry's technology efforts are related to Key Technologies and that these efforts are supported almost equally by IR&D and contract R&D funds.

### Space Studies

In early 1988 the AIA Space Committee distributed its document *Selected Papers on Space Topics* to Congress and other government agencies. The papers addressed such issues as Privatization of Selected National Commission on Space Recommendations, U.S. leadership in space, and "Why Space Station?"

The Space Committee now has initiated a study on the producibility, affordability, and supportability of space systems.

### Acquisition Issues

Acquisition streamlining moved closer to implementation in 1988 with the publication of changes to the Federal Acquisition Regulations (FAR) and the Defense Supplement (DFARS). Industry strongly supported these changes as a way to "flow down" policy to the government contracting community.

The Technical Management Committee continued to take aggressive action on counter-productive DoD requirements.

The Council of Defense and Space Industry Associations (CODSIA) developed a list of 50 DoD documents which should be given top priority for revision or cancellation. In addition, CODSIA highlighted 78 quality standards which are being given a special review. It has been estimated that DoD could save from \$14 to \$20 billion per year if its procuring agencies would not impose how-to-manage requirements on contractors.

The Defense Science Board and Congress recommended that, whenever practical, DoD should acquire commercial products or existing, "non-developmental items" (NDI) in place of new items

Robert L. Cattoi  
Rockwell International  
Corporation  
Chairman, Aerospace  
Technical Council

Walter S. Cebulak  
Aluminum Company  
of America  
Chairman, Technical  
Specifications Division

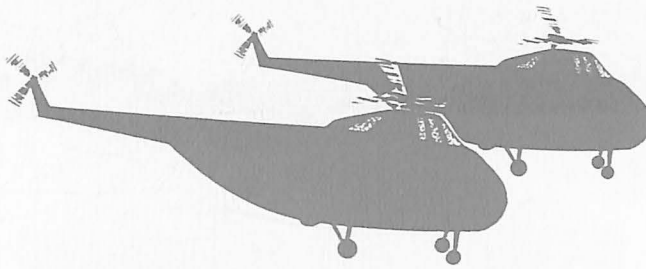


Lawrence R. Cecchini  
E-Systems, Inc.  
Chairman, Electronic  
Systems Committee

Phillip C. Ebbers  
IBM Corporation  
Chairman, Technical  
Management Committee







Two Sikorsky S-55 helicopters completed the first West-East trans-Atlantic helicopter crossing, breaking the non-stop distance record for rotary wing aircraft. 1952

uniquely developed or manufactured to government specification.

The Technical Management Committee began a paper enumerating the problems with the orderly implementation of NDI procurement which should be forwarded to the government shortly.

### Value Engineering

Industry forwarded a proposal in November to the Defense Acquisition Regulatory Council suggesting a modification of a FAR clause on Value Engineering (FAR 52-248.1). The change would allow payment of value engineering incentives for operation and support cost savings — when implementation does not require a change to the contract.

Currently, contractors can only share in “collateral savings,” such as operation and support savings, when a change to the instant contract is accomplished. Contractors, therefore, have no incentive to submit value engineering change proposals when no change to the contract is required.

### Standardization Issues

Key tasks were accomplished this year as part of the ATCouncil’s strategy to implement the Board of Governors’ policy of AIA leadership in standardization.

At its Spring meeting the Council approved ten basic criteria defining the types of standards

activities the aerospace industry will support. These criteria, which have been communicated to standards developing organizations both inside AIA and outside, are useful tools for AIA companies in managing the commitment of their standardization resources.

To educate management in industry and government about the benefits of aerospace standardization, AIA in 1988 published two “case studies” documenting specific instances of standardization efforts which had resulted in measurable payoffs.

One describes how DoD realized more than \$6 million in savings after working with AIA to develop standards for three simple, but widely used parts. In the second study, an AIA member company realized more than \$1.3 million in initial savings through a company-wide item reduction project.

The National Aerospace Standards Committee (NASC) continued its work on AIA’s body of more than 2,800 National Aerospace Standards (NAS).

During 1988 the NASC published 57 new or revised standards on such items as couplings, gauges, O-rings, and numerous types of aerospace fasteners. These standards support competitive sourcing by insuring

functional interchangeability among various manufacturers’ products.

AIA member companies and DoD have expressed a growing need for AIA standards in a format accessible by computer and CAD/CAM systems. Efforts are underway to convert AIA’s National Aerospace Standards to electronic format. AIA sponsored a workshop in September which generated a two-phase plan for the effort.

Action continued on implementing DoD’s policy to make greater use of voluntary standards in lieu of developing or maintaining Mil-Specs.

Jose R. Elfalan  
The Boeing Company  
Chairman, International  
Standardization Advisory  
Group

Allen C. Haggerty  
McDonnell Douglas  
Corporation  
Chairman, Rotorcraft  
Committee



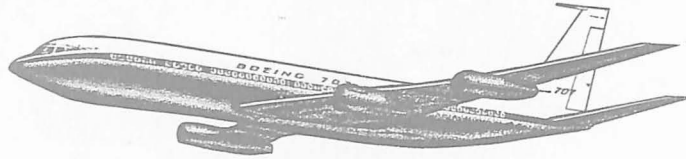
Martin Krupitsky  
Lockheed Corporation  
Chairman, Transport  
Committee

Michael D. Page  
Northrop Corporation  
Chairman, National  
Aerospace Standards  
Committee





Four years after the maiden flight of the first 707 in 1954, Pan American inaugurated regular daily jet transport service between New York and Paris using Boeing 707s. 1958



In July Under Secretary of Defense Robert Costello invited Don Fuqua and the heads of nine other major standards organizations to a meeting to discuss implementation of DoD's policy. AIA's recommendations were geared toward managing implementation in a way that would not have a negative impact on the procurement process.

**Metric Transition**

The Omnibus Trade Bill, signed into law August 1988, included a provision designating the metric system as the "preferred system" of weights and measures for the U.S.

The act requires that by "a date certain and to the extent economically feasible by the end of the fiscal year 1992," each federal agency would be using the metric system for all of its procurement, grants, and other business-related activities.

DoD's requirement for metric design on the Strategic Defense Initiative (SDI) and NASA's reconsideration of going metric on the Space Station may indicate an increased emphasis by government on the use of metric units in acquisition.

Responding to DoD's request for accelerated development of metric standards to support current and future metric programs, AIA's National Aerospace Standards Committee has undertaken a program to develop some 300 new metric airframe standards. These will be in addition to the 175 metric

standards already developed and published by NASC. The committee targets 1990 for completion of the program.

**International Standardization**

ISO/TC 20, the international committee for aerospace standardization, held its 29th plenary meeting in Madrid in April. AIA provides the secretariat and chairman for the technical committee.

The session brought together representatives of fourteen major aircraft producing nations to address standardization management issues ranging from qualification/certification to development of standards for space applications.

As part of the European Community's (EC) efforts to develop a single internal market by 1992, the EC nations are moving aggressively to harmonize their standards, testing, and certification requirements. The United States is concerned that harmonized European standards might hinder market access for U.S. products.

The Aerospace Technical Council recognized the need for improved visibility and lines of communication with the Europeans in this area. It initiated action to study the European Community's standardization policies and potential impact on U.S. aerospace business and, after analyzing the situation, will develop a recommended AIA strategy.

Harold L. Richardson, Jr.    John M. Swihart  
*Lockheed Corporation*    *The Boeing Company*  
 Chairman, Aerospace    Chairman, Aviation  
 Sector Committee    Division



Ronald T. Torgerson    Edmund M. Walcavage  
*General Dynamics*    *Allied-Signal, Inc.*  
 Corporation    Chairman, Propulsion  
 Chairman, Materials &    Committee  
 Structures Committee







### DoD Software Development Standards

After extensive industry activity, Revision A to DoD-STD-2167, Defense System Software Development, was released in February. It incorporates many of the recommendations made by AIA.

In April a new version of DoD-STD-2168, DoD Software Quality Program, was released. Generally, all of industry's comments were incorporated. The results of both industry endeavors were, on the whole, positive.

### Aviation Matters

In early June the Federal Aviation Administration (FAA) held a widely publicized workshop on aging aircraft which focused on concerns about the continued airworthiness of the aging fleet. The industry position is that properly maintained older airplanes pose no safety problems.

At the workshop AIA and the Air Transport Association (ATA) volunteered to lead an aggressive multiphase effort addressing the key concerns of design, maintenance, inspection, R&D, non-destructive inspection, and human factors. An AIA, ATA, and FAA steering group was formed.

In 1988 the Aerospace Industries Association received the "Innovator Award" from the Paralyzed Veterans of America in recognition of the contributions of the AIA Transport Committee to the field of aircraft access for the elderly and disabled.

The award, presented at the fifth "Access to the Skies" conference, cites AIA's "Carriage of Handicapped Persons" report. This document outlines minimum accessibility features for wide-bodied aircraft.

The Department of Transportation is in the process of publishing a rule on handicapped access to air travel; it is expected that the AIA report will be accepted as advisory material on how to implement the requirements.

The Aviation Division committees gave high priority in 1988 to the harmonization of airworthiness certification requirements between the U.S. and Europe.

At the fifth FAA and European Joint Airworthiness Requirements Authorities meeting in San Antonio, Texas, AIA encouraged further cooperation between U.S. and European airworthiness authorities. The Transport Committee, in coordination with the European Association of Aerospace Manufacturers, proposed that the authorities start the harmonization process by developing a single, joint-flight test acceptable to all nations.

The FAA has supported industry's position. Though industry favors harmonization of certification requirements, changes must first be economically sound and entail no decrease in safety.

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

Michael I. Yarymovych  
Rockwell International  
Corporation  
Chairman, Space  
Committee



C. Ronald Lowry  
Vice President  
Research and  
Technology, AIA





# Association Activities 1988

## Human Resources Council

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

### Environmental Concerns/Initiatives

A number of hazardous materials used within the aerospace industry are essential to obtain the required high performance and reliability of aerospace products — products designed to operate in every known environment.

Enforcement of many present and proposed environmental laws and regulations, however, are certain to restrict aerospace manufacturing processes adversely. Unfortunately, it takes years of laboratory development and field testing for less environmentally sensitive substitute materials and technically feasible alternative processes to be approved for use.

Clearly, aerospace must do its part to improve the environment. Established in July 1988, the AIA Environmental Affairs Committee, focuses on issues and proposed environmental initiatives, such as air quality and hazardous waste reduction, which significantly and uniquely affect aerospace manufacturing operations and process technology. Through this committee AIA intends to maintain a positive position by suggesting technically feasible alternatives and stressing a balanced approach which considers beneficial use, economics, and public health.

### Air Quality

• *Clean Air Act.* AIA has been working to reconcile the Environmental Protection Agency's

(EPA) position on forced reductions in volatile organic compound (VOC) emissions with customers' requirements for high quality, reliable products.

AIA is attempting to get EPA to develop a Control Techniques Guideline (CTG) which would fit the aerospace industry and provide guidance to local agencies developing aerospace-specific rules. The CTG would bring some consistency to local regulations and provide a basis for some long-range aerospace facility and technology planning.

• *Ozone Depletion.* EPA's consideration to ban use of chlorofluorocarbons (CFCs) conflicts with many military specifications. CFCs may deplete the earth's ozone layer; however, contractors are required to use CFCs, sometimes for as long as 15 years, in support of specific products.

Because CFCs leave no residue and are safe for the worker, they are necessary for many fire protection, component cleaning, and manufacturing processes. Since no acceptable substitute is currently available, an outright ban could severely restrict some aerospace manufacturing capabilities.

• *Air Toxics.* The misapplication of current risk-assessment results, as well as inadequate collection and evaluation of health data, is leading local

agencies and EPA to propose such severe restrictions on a broad list of chemicals that their use could effectively be eliminated. Many, like chrome, are critical to the aerospace industry.

Aerospace has been requesting state agencies and EPA to review the original health data associated with chromium in view of recent scientific findings which indicate that the actual health risk from low-level exposure to chrome may have been overstated.

### Hazardous Waste Reduction

It has grown tougher and costlier for businesses to dispose of used chemicals. Industry and government officials have concluded, therefore, that the best way to deal with toxic waste is to produce less of it either by changing production methods or recycling.

One legislative proposal of the 100th Congress that failed to pass would have 1) authorized EPA to establish measurable goals and 2) required industry to implement hazardous waste source reduction techniques to reduce the generation of hazardous waste from a broad list of chemicals.

Industry opposed this legislation, arguing that it would have put EPA in the position of determining what industry processes needed to be changed or eliminated in order to meet EPA's goals of waste reduction.

### Composites

A major issue facing many of our members is the health and safety of employees working with composite materials. A quantum leap in both employee and public concern with composites appears to have outstripped known scientific data on the health effects of composite manufacture.

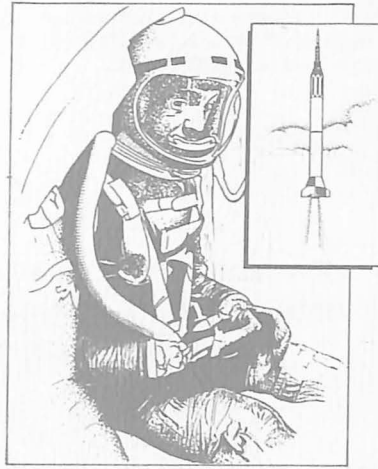
Sam Dolfi  
General Electric Company  
Chairman, Human  
Resources Council

Joseph H. Copeland  
McDonnell Douglas  
Corporation  
Chairman, Environmental  
Affairs Committee





Astronaut Alan B. Shepard became the first American in space during a 15-minute suborbital ballistic flight in the Mercury Spacecraft, *Freedom 7*. The spacecraft with Shepard inside splashed down in the Atlantic Ocean and was retrieved by helicopter. 1961



Recognizing this gap, AIA members continue to emphasize long-standing programs to protect their composite workers. Required use of personal protective apparel, confining composite materials to the workplace, stressing personal hygiene, recognizing the individual "sensitivity" factor, and emphasizing management and worker responsibility to "follow the rules" of safe and healthy work practices are tantamount:

AIA's Human Resources Council has begun a new program to overcome some of the "unknowns" of composite manufacture and help clear up many of the unfounded assumptions that result in public concern, worker complaints, and possible litigation.

The following plans are underway:

- Interact with appropriate federal agencies, for example, OSHA/NIOSH (Occupational Safety and Health Administration/National Institute for Occupational Safety and Health) and third-party medical experts to determine if current regulations on exposure levels are adequate.
- Through AIA's Occupational Safety and Health Committee, continue to share member company information on "Best Practices" safety programs and current or proposed research efforts.
- Widen the playing field. Many other industries are involved in composite manufacturing. In working with SACMA, the

Suppliers of Advanced Composite Materials Association, AIA intends to broaden concern to other industries, motivate an industry-wide research program, identify unique aerospace applications, and develop a state-of-the-art position paper that will help resolve many of the safety and health concerns associated with composite manufacture.

- Assess need for further research and develop a process for cooperative research efforts.
- Develop a strategy for informing various Congressional committees of these activities and provide information to appropriate member companies to share with employees and union officials.

#### Legislative Issues

The Human Resources Council, working closely with AIA's Office of Legislative Affairs, helped defeat the High-Risk Occupational Disease Notification and Prevention Act.

This act would have established a second OSHA-type of agency under the Department of Health and Human Services plus employers would have been required to notify current and past employees of exposure to toxic substances in the workplace. This requirement is already in effect, however, under comprehensive federal right-to-know mechanisms.

Unfortunately, efforts to defeat plant closing and mass lay-off notification legislation were unsuccessful with the passage of the

"Worker Adjustment and Retraining Notification Act" (WARN) on August 4, 1988.

Other labor-management issues AIA opposed failed to make it through the 100th Congress: parental leave, mandated health benefits, compulsory unionism, comparable worth, and raising the minimum wage are issues expected to be high on the labor agenda of the 101st Congress.

#### Industrial Security

AIA continued to concentrate on industrial security activities with the highest cost-effective return to member companies. Maintaining liaison with DoD, we also began expanding relationships with other government agencies with security policy responsibility, including the CIA, National Security Agency, the Departments of Energy, State, and Commerce, the National Security Council, the Office of Management and Budget, the FBI, and various interagency committees.

Three activities of special note are:

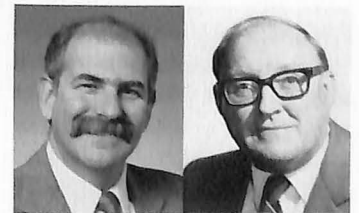
- *National Industrial Security Program (NISP)*. For defense savings on a major scale, AIA has proposed working with government to develop and implement a single, integrated National Industrial Security Program to replace the myriad of conflicting and redundant security programs in effect today.

This program would establish cost-effective, results-oriented

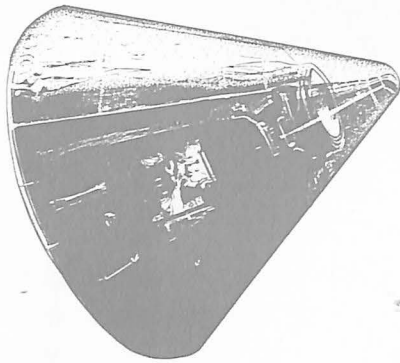
security to protect against known threats and have as its base minimum, uniform security requirements applied across multi-agency programs. Contractor compliance would be measured against performance to standards rather than detailed instructions.

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

Richard J. Slezak  
Lockheed Corporation  
Chairman, Compensation  
Practices Committee







Apollo 11 Command Module *Columbia* was the living quarters for the 3-man crew in NASA's first manned lunar mission. 1969

This single program concept has been discussed with key executives in industry, other associations, and several government agencies and has received wide support. Even if not adopted in total, indications are DoD may soon implement some of its concepts.

• **Automated Clearance Processing.** As a result of a recently completed joint AIA/DoD study, contractors can now mail clearance paper work electronically to DoD with electronic return of "consent to brief." The PSQ Electronic Transmission Program is now available to all 13,000 DoD-cleared contractors.

The cost savings in reduced "dead time" from employee hire-in to clearance granting is substantial. DoD estimates this system, coupled with granting initial clearances on an "interim" basis, will save government and industry \$500 million annually in regained production time.

• **International Treaty/Agreement Impact on Industrial Security.** How security relating to INF, START, and other treaties and agreements is developed and imposed can have a substantial financial impact on AIA members. Responding to a DoD/ State Department request, a member company estimated its preparation cost for one Soviet inspection under the INF Treaty at approximately \$16 million.

Because of AIA's awareness of these security matters, the Association has been asked to represent industry on a government

task group that will develop strategies for implementing START and to participate in the development of an intelligence risk analysis for a US/USSR Science Agreement that will include exchange visits in twelve basic scientific areas.

**Executive Compensation**  
Congressional and administrative agency studies of our industry's compensation levels and pay practices have been highly critical. Often we have been unable to answer criticisms since the data we use is proprietary and the government is forced to rely on publicly available and less reliable survey data.

To resolve this problem, AIA engaged a highly reputable compensation consultant to develop an AIA executive compensation survey. In October Towers, Perrin, Forster and Crosby (TPF&C) completed the first of AIA's annual Executive Compensation surveys. It includes data from 33 major companies involved in substantial manufacturing and high technology. The companies ranged in size from Apollo Computer to General Motors.

The survey was coordinated with a Digital Equipment Company survey which resulted in increased commercial company participation. Criteria for identifying a company as a defense contractor were 1) that more than 40 percent of its 1987 sales were to the government or 2) that it had appeared among the

top 15 on DoD's list of prime contractors in three of the last five years.

The study found many organizational differences within the industry plus variations in job title, job definition, and job scope. These facts were compounded in comparing defense with commercial organizational structures and jobs. Ironically, the industry has been trying for years to convince government auditors of this.

After reviewing the data, TPF&C concluded that executive compensation pay and practices among defense contractors are not significantly different or substantially higher than executive compensation pay and practices at primarily commercial companies.

An executive summary of TPF&C's findings was distributed to all member companies.

The survey will require some additional steps to enhance its credibility:

- Organization and job definitions will be tightened.
- Survey input methods and format will be revised and simplified.
- Increased participation will be on a balanced basis of defense and commercial companies.
- The definition of defense and commercial companies will be reviewed as the number of companies in the survey grows. Companies may be grouped into primarily defense, primarily commercial with significant defense, and primarily commercial with minor defense.

### DCAA Interface

A group of AIA member company compensation managers met on three occasions in 1988 with Defense Contract Audit Agency (DCAA) headquarters and regional compensation audit managers. Their purpose was to discuss ways of lowering the confrontational aspects associated with DCAA's compensation audits.

The major factor leading to this confrontation is the use of proprietary survey data available to contractors but not to DCAA. AIA will host a compensation survey symposium with DCAA early in 1989 to further address this issue.

George M. Tomer  
Lockheed Missiles &  
Space Company  
Chairman, Occupational  
Safety & Health  
Committee

Daniel J. Nauer  
Vice President  
Human Resources, AIA





# Association Activities 1988

## International Council

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

### Omnibus Trade Bill

Congress passed the Omnibus Trade and Competitiveness Act of 1988 as Public Law 100-418. President Reagan signed the act on August 23, 1988.

AIA is monitoring the implementation of several provisions included in the final act and espoused by the Association. Export enhancement through improvement in export control regulations is a major goal.

### International Traffic In Arms Regulations

AIA developed specific recommendations on the International Traffic in Arms Regulations (ITAR) which were submitted to the Office of Munitions Control (OMC), State Department, in July.

The recommendations sought clarification, guidance, or rationale for certain sections, and procedural changes and a draft table of contents were also suggested.

Most of the regulations will be implemented in 1989; however, some actions, such as the export of spare parts, license exemptions, and clarification of certification requirements are being addressed separately on a "fast track" course.

### Commodity Jurisdiction Dispute

Control of export licenses for developmental civil aircraft and components was transferred from Commerce to the State Department in a revision to the ITAR announced in April.

AIA believes these revisions contradict Section 17(c) of the Export Administration Act (EAA) and Congressional intent that all dual-use products and technologies be under the jurisdiction of Commerce.

AIA President Don Fuqua wrote to Secretary of State George Shultz requesting a review of the trade policy raised by the ITAR revisions. We sought a response that would bring regulatory practice in line with Congressional intent, statutory language, and trade policy. Fuqua's letter supported Commerce Secretary William Verity's earlier correspondence to Secretary Shultz regarding the changes. State and Commerce recognize the need to achieve a solution.

### Office of Munitions Control

A current and continuing problem in OMC is the lack of sufficient personnel to handle the increasing number of license applications from American exporters.

Following various actions by AIA on this issue, Don Fuqua met in November with Deputy Secretary of State John Whitehead to urge an immediate upgrade in OMC resources, including the transfer of other governmental personnel to OMC. Administrative and operational changes in progress at OMC could brighten the long-term outlook.

### Association Counterpart Activities

AIA and the Aerospace Industries Association of Canada (AIAC) signed a Memorandum of Understanding on July 26, 1988, at their meeting in Toronto. Besides identifying international industrial problems in common, the two associations agreed to establish working groups on defense industrial arrangements, offsets, and air shows.

In joint meetings with the British, French, and Germans, the Europeans stressed a need for flexible international partnerships where leadership might be either European or American, depending on circumstances.

AIA representatives, in turn, urged the Europeans to explain their aims and objectives as they move toward "internal harmonization" in 1992. The U.S. remains concerned that Europe, in removing its regional trade barriers, does not set up new barriers within these countries which might be detrimental to U.S. export trade.

In the Japanese meetings, emphasis was on joint working groups to address issues such as reverse technology flow, collaborative problems, and open markets.

The Australians emphasized their desire for joint projects with the U.S. aerospace industry, including work shares in Australian equipment purchases.

### European Harmonization in 1992

The European Community (EC) has begun a program of "internal harmonization" that would remove

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



Jerome E. Eiler  
Grumman Corporation  
Vice Chairman,  
International Council  
Chairman, Export  
Controls Committee



Dr. Brenda Forman  
Lockheed Corporation  
Chairman, International  
Space Committee

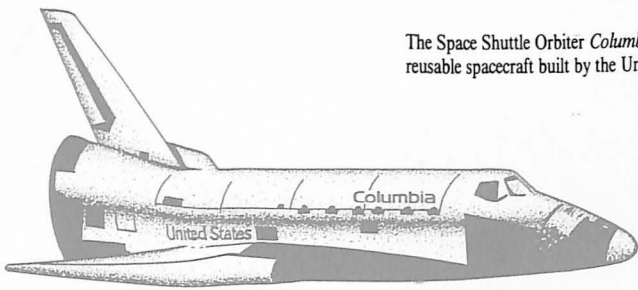


William B. Forti  
General Dynamics  
Corporation  
Chairman, Strategic  
Planning Committee





The Space Shuttle Orbiter *Columbia* was the first reusable spacecraft built by the United States. 1981



internal physical, technical, and fiscal barriers within Europe by 1992.

U.S. firms and investors doing business with Europe are concerned that removing these internal barriers might inadvertently create an "external shield" against foreign imports.

Though the movement toward harmonization receives the most attention at official levels, the European private sector also supports a similar emphasis on Europeanization.

Thus far, AIA has not found that any of the approximately 300 proposed European regulations directly apply to aerospace, but their indirect impact remains to be determined.

#### Internationalization Study

The 1988 AIA study on "The U.S. Aerospace Industry and the Trend Toward Internationalization" was well-received in Congress, the Executive Branch, the Defense establishment, and in other associations, organizations, and academic institutions. More than 5,000 copies were distributed in 1988.

In addition to a successful briefing before the Republican National Committee's Platform Committee, the study is being used at several private and military institutions of higher learning.

The Internationalization Study is intended to be a "living" document and will be refined and updated yearly.

#### Technology Transfer

There are 30 areas in the Omnibus Trade and Competitiveness Act that will require either new regulations or changes to existing ones. Commerce estimates six months or longer to make the changes.

AIA has encouraged the U.S. government to examine carefully any possible controls on international cooperative Research and Development (R&D) projects where a leading edge technology might emerge. Industry might be reluctant to participate in programs that at a later date could be severely restricted.

#### Foreign Availability

U.S. government procedures to assess the foreign availability of products and technologies have not met the 90-day standard set by Commerce.

The Government Accounting Office recommended that Commerce and DoD establish procedures for complete information-sharing and that Commerce amend its foreign availability regulations to bring them in line with the Congressional amendments of 1985.

AIA continued exploring use of "Project Socrates," a government tracking system to improve assessment of foreign availability.

#### Offsets

The Defense Production Act (1984), the Omnibus Trade and Competitiveness Act (1988), the FY '88 Defense Appropriations Bill plus a range of other Congressional bills have all called for examinations of offsets.

In conjunction with its foreign counterpart associations, AIA is reviewing recommendations on offsets for approval by the respective industries.

Raymond Garcia  
Rockwell International  
Corporation  
Chairman, Legislative  
Committee

Rosemary A. Mazon  
Allied Signal Inc.  
Chairman, Finance  
Committee



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

Emery Peter Smith  
Vice President,  
International, AIA





## Association Activities 1988

### Office of Civil Aviation

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

#### **"Operation Snapshot"**

During 1988 the Office of Civil Aviation and AIA's Operations Service monitored the progress of "Operation Snapshot" and ensured the accurate representation of industry views.

The AIA Ad Hoc Committee on Quality Assurance met with FAA Administrator Allan McArtor in January and again in October to discuss the status of the inspection program and FAA intentions for the future. FAA's preliminary findings from Snapshot were to be issued at year's end.

Ultimately, FAA intends to update the Quality Assurance Systems Analysis Review (QASAR) program on the basis of the lessons learned from Snapshot. The Ad Hoc Committee was encouraged by FAA's clear desire to use these lessons to design a more effective and efficient structure within FAA that would enable it to cope with a rapidly changing design and manufacturing environment.

In November the AIA Board of Governors agreed to extend the operation of the Ad Hoc Committee pending the final outcome of Snapshot.

#### **Foreign Repair Stations**

The Office of Civil Aviation, the Aerospace Operations Service, and AIA's Technical Council continued to coordinate Association activities related to FAA regulations on the repair of U.S. registered aircraft in foreign repair stations.

In February a Foreign Repair Stations Questionnaire was distributed to member companies and foreign airline customers. The data from this survey was used in developing a fact sheet which was distributed to members of Congress and the press.

In November FAA published the final rule. AIA supports this action which recognizes the international nature of the industry and U.S. obligations under international agreements.

#### **GATT Agreement**

Through the AIA Ad Hoc Committee on the GATT Agreement on Trade in Civil Aircraft, the Office of Civil Aviation continued advising the U.S. government during discussions about government involvement in the civil aircraft sector with representatives of the European Community and the four Airbus governments (the United Kingdom, France, West Germany, and Spain).

Industry goals in the negotiations included: 1) disclosure of government financial support for civil aircraft programs, including provisions for recovery and recoupment, 2) limitation of subsidies — including grants and low interest or non-recourse loans — to research rather than aircraft development and production, 3) prohibition of inducements attached to the sales of aircraft, and 4) prohibition of political or ministerial influence in civil aircraft or component procurement.

In meetings with U.S. Trade Representative Clayton Yeutter and Secretary of Commerce William Verity in March, AIA emphasized that progress had been made in the area of inducements and recommended that efforts to reach an accord on the issue of subsidies be continued. Unfortunately, there have been no substantial advances since that time, and with the transition to a new U.S. administration, discussions were effectively postponed.

In November the West German government announced a plan to privatize Messerschmidt Boelkow Blohm (MBB), the parent of Deutsche Airbus. The plan includes substantial government assumption of foreign exchange risk and liabilities incurred by Deutsche Airbus.

AIA believes this sets an extremely unfortunate precedent. This action can be expected to have an adverse effect on future negotiations.

Bob Robeson  
Vice President  
Civil Aviation, AIA



## Association Activities 1988

### Office of Communications

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

#### The Voice of the Industry

In 1988 AIA's ten issues continued to provide the focal points for the three activity areas of the Communications Office: media relations, member relations, and editorial products. The issues were reviewed and revised in September and approved at the October 1988 Executive Committee meeting.

As a primary spokesman for the industry, AIA President Don Fuqua further accelerated the very active pace he set in 1987. By yearend 1988 he had made 31 speeches and granted 49 news interviews. The cumulative effect of this exposure makes Fuqua increasingly in demand by the news media as the voice of the industry.

More than 100 news representatives were among 350 people who attended AIA's annual Review and Forecast Luncheon in mid-December at which Don Fuqua spoke forcefully on the industry's most pressing issues.

Among press reports was an extensive, straight-forward account in *The Washington Post* of his remarks concerning the much reported procurement investigation by the FBI/Naval Investigative Service/Justice Department. His "yearender" speech also triggered an interview by the *Post* and a lengthy article accurately reporting AIA's views on major industry issues.

#### Media Activities

The procurement investigation dominated much of the Association's media activities in 1988. Don Fuqua was the industry's spokesman, and a June 28 news release outlined the Association's offer to DoD and Congress to establish a CEO task force to "direct their expertise toward correcting problems that may be identified by the investigation."

Besides numerous interviews, Fuqua appeared on CBS Evening News, Good Morning America (ABC), This Week with David Brinkley (ABC), CNN Newsmaker Saturday and Business This Morning (FNN). Fuqua's letter responding to an editorial criticizing the industry's reaction to the investigation was published in *Aviation Week & Space Technology*. He also sent letters to the editors-in-chief of six major newspapers requesting objectivity and fairness on the unsealing of affidavits.

In other areas the MAC Group study on "The Impact on Defense Industrial Capability of Changes in Procurement and Tax Policy, 1984-1987" was released at a press briefing in March 1988. It continues to receive positive media attention as does the joint AIA Research Center/International Council report, "The U.S. Aerospace Industry and the Trend Toward Internationalization," released in April 1988.

The "Key Technologies for the 1990s" program continues to be a topic of interest to the media. In May a press briefing that resulted in positive coverage kicked-off the IMIP Forum on Capitol Hill.

The increasing volume of queries received and articles quoting the Association is hard evidence that AIA has become a primary source to the media when they are working a story involving the aerospace industry.

#### Member Relations

Through its member relations program and Communications Council, the Communications Office aims to establish AIA as a valuable information resource for its member companies. AIA is also tailoring materials to specific audiences within member companies, such as company speechwriters and publications editors. A quick-alert mechanism established in 1988 is a channel to notify members immediately of any fast-breaking information.

The Communications Council supported the AIA Quality Assurance Committee in producing the *Total Quality Management* brochure. A directory of aerospace industry public information contacts at all member company locations is another special project initiated in 1988. After publication Communications will distribute the directory to the media, appropriate government public information offices, and the membership.

The Communications Council met in Washington in May 1988 and in Seattle in October 1988. A separate group — the Washington Public Relations Representatives — held nine breakfast meetings in 1988 to exchange information.

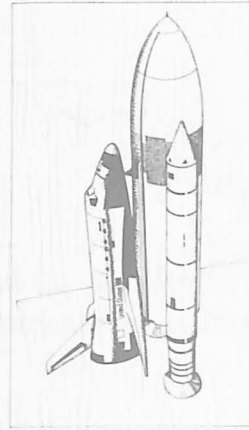
On November 1 a group of corporate contributions managers from member companies met for the first time to discuss common

Julian R. Levine  
TRW Inc.  
Chairman  
Communications Council





The successful launch and return of the Shuttle Orbiter *Discovery* marked America's return to space. 1988



issues; AIA hosted the second annual "Speechwriters Roundtable" on December 13.

The Communications Council formed four task groups to address 1) production of the AIA videos (scheduled to be completed early in 1989), 2) local initiatives, such as the "nuclear free zone" proposals that are cropping up around the country, 3) environmental issues, and 4) the establishment of a communications network with aerospace industry financial analysts.

#### AIA Newsletter

AIA published six issues of the new *AIA Newsletter* in 1988. Indications are that it is meeting the goal of providing information that is new, practical, and substantive — reflecting the advocacy of the Association.

Each issue features an in-depth article on pages 1 and 2 (Focal Point) which, to date, has included topics such as the MAC Study, procurement reform, and the environmental challenge. Don Fuqua's column (Washington Pipeline) has been useful as a forum for addressing such topics as the charges and fallout from the Justice Department investigation and the pros and cons of the Fraud Bill.

The Issues Analysis and Q & A pages in each issue have examined IR&D, consultant registration, ethics certification, and many more areas of AIA involvement and concern. The Around Aerospace and Aerospace Good News departments are a forum for

spreading the word about significant accomplishments of the industry. From the Nation's Capital summarizes pertinent legislation of special interest to the aerospace industry.

Along with being a vehicle for promoting other AIA publications, the *Newsletter* also identifies relevant reports, studies, and videotapes from other organizations, companies, or government offices.

Approximately 15,000 copies of each monthly issue are distributed to AIA members, Congress, government agencies/departments, universities, financial institutions, key executives at member company locations, and the news media. *Newsletter* articles have been reprinted in media and member company publications.

#### Key Speeches

In 1988 the Communications Office published nine *Key Speeches*, containing 21 full speech texts and 23 summaries.

Format, typeface, content, and masthead changes were made to *Key Speeches* to increase "readability." Photographs of speakers are now included, and material that "promotes" the Association, such as listing AIA member companies and AIA publications, is included.

#### AIA Annual Report

The 1987 Annual Report, published in the Winter of 1988, appeared for the first time in a magazine-like

format. It featured a full-color industry highlights section, previously found in the now "retired" *Aerospace* magazine.

AIA's annual report is viewed as a yearbook and year-end report on the industry as well as on AIA activities. Distribution encompasses all of the various publics with which AIA interacts.

#### 70 Years of Service

AIA's 70th Anniversary is September 30, 1989, dating from the incorporation of the Aeronautical Chamber of Commerce (AIA's precursor). However, the birthday will be celebrated throughout calendar year 1989. A 70th Anniversary Reception is planned for Spring at the National Air & Space Museum.

An anniversary seal, designed by IBM, will be used on stationery, media and member kits, envelopes, and wherever else appropriate. All AIA publications will carry historical themes throughout the anniversary year.

#### Interface with Other Associations

The Communications Council continues to find avenues for productive cooperation with sister associations, such as the Electronic Industries Association (EIA). One joint AIA/EIA venture in 1988 was a task group to address and find solutions to the problems generated by the "nuclear free zone" initiatives.

Herbert E. Hetu  
Vice President  
Communications, AIA



# Association Activities 1988

## Office of Legislative Affairs

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

### 1988 Legislative Agenda

- Defense Procurement
- CAS Board
- Minority Business Subcontracting
- Counterfeit and Substandard Fasteners
- Omnibus Trade and Competitiveness Act
- Arms Sales
- Environmental and Health and Safety Issues
- Resource Conservation and Recovery Act
- Aviation Safety and Research Act
- Commercial Space Launch Act

AIA positively influenced several major acquisition reform provisions in the original FY '89 Defense Authorization Act: contractor profit reporting requirements, automated inventory accounting systems, contractor legal fees, and foreign selling costs. Senate attempts to impose a statutory cap on IR&D/B&P and stringent consultant registration requirements through the FY '89 DoD Appropriations Act were also defeated. In the volatile area of criminal "procurement fraud" legislation, the Association endeavored to ensure that operative provisions appropriately defined the targeted crime and that penalties were commensurate with severity.

AIA was instrumental in the reestablishment of an independent CAS Board via the permanent reauthorization of the Office of Federal Procurement Policy. Efforts to dilute a punitive minority business subcontracting measure and, at the

same time, encourage Congressional initiatives 1) to expand the subcontracting base for such businesses and 2) to provide industry with incentives for increasing its use of small and small disadvantaged business were also undertaken.

Counterfeit and substandard fasteners in aerospace products, too, faced Congressional scrutiny. AIA questioned the advisability of legislation to certify fastener manufacturers, arguing that in purchasing from their distributors, companies routinely test fasteners. Certifying manufacturers would not increase assurance for aerospace companies but, rather, would create additional burdens.

AIA focused extensively on such international trade issues as the Omnibus Trade and Competitiveness Act and arms sales in 1988. The need for a strong U.S. foreign policy, the positive trade balance in aerospace, jobs, and the protection of our economic interests underpinned the legislative strategy. Other specific legislation covering sanctions, financing, offsets, co-production, and civil aviation issues was closely monitored to ensure that industry-specific concerns were heard.

AIA member companies are committed to protecting the environment and the health and safety of workers. This message plus educational efforts directed toward amending the Clean Air Act were vigorously pursued in FY '88. Industry strove to create an awareness of its need for regulatory flexibility in order to maintain

control over its unique process technology: industry's ability to produce competitive, safe and reliable products depends on having this control.

AIA worked to refine broadly-worded legislation amending the Resource Conservation and Recovery Act (RCRA) to make it compatible with other environmental legislation. This effort provided a blueprint for amendments to RCRA, scheduled for reauthorization in 1989.

Emphasis on civil aviation and space issues resulted in some successes. AIA convinced Congress to amend proposals to the Aviation Safety and Research Act that actually threatened to decrease, rather than improve, safety. The importance of the space program in expanding U.S. technological leadership and in fostering international cooperation were pivotal arguments for AIA's support of NASA's FY '89 budget request. By framing the issue as a "risk-sharing" arrangement that would ensure a robust U.S. commercial launch infrastructure, AIA overcame the objections of key lawmakers and departments within the Administration, and, as a result, the Commercial Space Launch Act limiting liability for manufacturers became law in 1988.

Election year activity included the publication of "Campaign '88 — An Aerospace Perspective." AIA presentations to the Republican National Committee on the

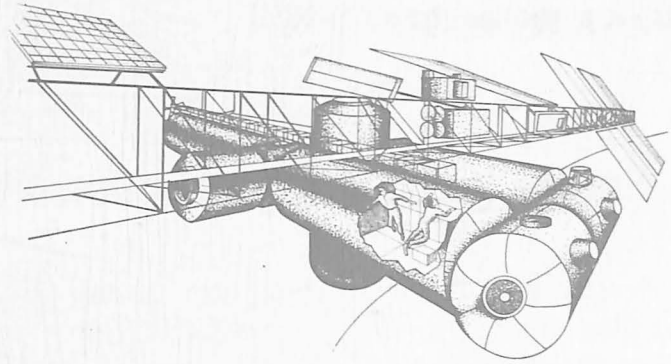
internationalization of the aerospace industry in July 1988 and to the Defense Policy Subcommittee of the Republican Platform Committee in August 1988 stressed greater cooperation between government and industry so that the nation's competitive edge in the aerospace industry would be preserved. As transition teams were assembled and new positions filled, the Office of Legislative Affairs held discussions with key Congressional and Administration officials to define the policies and agendas for the aerospace industry into the 1990s.

Thomas N. Tate  
Vice President  
Legislative Affairs, AIA





The manned Space Station Freedom will provide a long-term base for human exploration of the solar system and greatly expanded opportunities for scientific research in space in the 1990s.



AIA has identified the top ten issues of importance to the aerospace industry for the coming year. Several are carryovers from previous years; however, civil aviation and environmental matters are new to the list. In the positive column for industry, favorable developments in legislation and regulations related to Material Requirements Planning (MRP) resulted in dropping this issue from the 1989 list of ten.

The following is a short explanation of each issue:

### **Government/Industry Relations**

A continuing public education program on defense procurement, especially for the new administration, is essential to prevent unnecessary legislative and regulatory reform measures.

### **Ethics/Self-Governance**

Despite industry's conscientious efforts to restore public confidence through programs such as the Defense Industry Initiatives, a public perception remains that industry is not committed to ethics and self-governance.

### **Financial Health of the Industry**

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

### **Competitiveness in the World Market**

To prosper in the world market, the U.S. must support coordinated and rational national export policies, avoid protectionism, and advocate fair principles of international trade.

### **Aerospace and Defense Industrial Base**

A concerted effort to bolster defense industrial competitiveness, institutionalize Total Quality Management and factory modernization through IMIP, foster concurrent manufacturing with engineering, and expand the participation of small disadvantaged businesses in the subcontract base is essential to the aerospace and defense industrial base.

### **Leadership in Space**

The U.S. must capture the momentum gained by the return to space. U.S. technological leadership must be expanded and international cooperative ventures fostered.

### **IR&D**

Increased investment in IR&D (Independent Research and Development) is essential to industry's ability to develop innovative defense systems and to maintain U.S. technological leadership.

### **Key Technologies for the 1990s**

This bold national program focuses on high-payoff technologies that will bring a new generation of superior aerospace products into the global market by the year 2000.

### **Civil Aviation**

Government involvement in civil aerospace, export controls, product safety, congestion of airspace and ground facilities, and government reorganization are issues affecting the vitality of U.S. civil aviation.

### **Environmental Concerns/Initiatives**

The aerospace industry is committed to protecting the environment and ensuring the occupational safety of its workers. The industry recognizes its responsibilities and will meet them by developing industry consensus positions on legislation and regulations which are practical, logical, and cost-effective.



## AIA...Service to U.S. Aviation, Space, and Defense Since 1919

**1919**

Aeronautical Chamber of Commerce of America (ACCA) founded with charter membership of 100 "to foster, advance, promulgate and promote" aeronautics... and to do every act and thing... necessary for the advancement of American aviation." Early members included Orville Wright and Glenn H. Curtiss and nearly every important aircraft manufacturer.

A predecessor, the Aircraft Manufacturers Association (1917), was the first formal organization of aircraft manufacturers. By facilitating cross-licensing of patents, it cleared the way for production of aircraft to help the U.S. effort in World War I. Later known as the Manufacturers Aircraft Association (MAA), it focused on unification of the air industry, public education, and industry technical concerns.

**1919**

First publication by ACCA of the *Aircraft Year Book*, later to become the *Aerospace Year Book*, and for years, the single source of statistics, information on legislative and government activities in aviation, outstanding aviation records, scientific developments, and data on new aircraft, engines, and accessories.

**1938**

AIA's National Aerospace Standards Committee established to develop technical standards for items designed into aerospace products and used in their fabrication. Since 1938 more than 2,800 National Aerospace Standards (NAS) have been developed, constituting the third largest group of U.S. voluntary standards. Most free world aircraft and aerospace products, including those designed and built outside the United States, incorporate parts and components complying with NAS.

**1940-1945**

The ACCA carried on limited functions during World War II while manufacturers focused on the war effort through East and West Coast Aircraft War Production Councils. In 1944 the industry produced more military planes than had been built by one country in one year in world history and more than had been built in the entire world before 1940.

**1944**

The publication, *Planes*, became the "voice" of the industry, later succeeded by *Aerospace* magazine, and currently, the *AIA Newsletter*. The *Newsletter* reaches an audience of 15,000 in industry, government, academia, the financial community, and the media.

**1945**

The ACCA became the Aircraft Industries Association. It took over many functions of the War Production Councils and reorganized to focus on developing the industry's commercial aviation and related trade and commercial interests. The organization became a trade association for the first time.

**1945**

AIA published *Aviation Facts & Figures* (now *Aerospace Facts & Figures*), the "first comprehensive survey of aviation statistics." *Facts & Figures* is now in its 36th edition.

**1947**

Financial conditions caused by contraction of the industry and a glut of aircraft following World War II led AIA to call for a national air policy to ensure survival of the industry to fulfill its mission in national defense. Its efforts led to establishment of a Congressional Aviation Policy Board and the President's Air Policy Commission. AIA staff developed "Elements of American Air Power," a virtual encyclopedia of information on conditions in the industry.

The Aviation Policy Board and Air Policy Commission recommended a significant expansion in aircraft production... more than tripling the rate of industry output prevailing since VJ-Day. The importance of a healthy, technologically progressive, peacetime aircraft industry — and its relevance to U.S. social and economic welfare and national security — was established.

**1949**

Work of the AIA Export Committee contributed to declassification of military aircraft for sale in the Western Hemisphere and to a more uniform Western defense program.

**1950-1953**

During the Korean War AIA was the central aircraft industry agency seeking a solution to myriad problems connected with mobilization requirements for aircraft production.

From the mid-'50s through the mid-'60s, AIA prepared annual 5- to 10-year forecasts of engineering and manufacturing trends and requirements, reflecting thinking of industry's top technical people.

**1952**

AIA adopted long-range program of cooperation with the National Aviation Education Council to produce instructional materials for schools. Support for education materials development continued into the 1970s when AIA provided housing and support for the nascent National Aerospace Education Association until it became an independent organization in January 1979.



1957

Nineteen AIA member companies, in concert with the USAF Air Materiel Command and the Massachusetts Institute of Technology, developed the Automatically Programmed Tool (APT) system for machining complex aircraft and missile parts. In effect, the program developed the system and specifications for creating the machines of the future and resulted in 80 to 95 percent savings in skilled man-hours. Up to that time, it was the largest cooperative R&D program in the U.S.

In 1961 AIA established the APT Long Range Program to continue the system's development and extend its benefits to other industries. The Illinois Institute of Technology's Research Institute operated the program under contract.

1959

Aircraft Industries Association became Aerospace Industries Association of America to reflect the broader industry product line — missile systems as well as aircraft — and the industry's embryonic involvement in space.

1965

AIA played key role in forming the Council of Defense and Space Industry Associations (CODSIA). CODSIA gave a variety of associations in the defense sector an opportunity to speak with a "single voice," making industry and government communications more efficient.

1970

AIA's Aerospace Research Center established to bring perspective and broader understanding to the issues, problems, and policies affecting the aerospace industry through studies, trend analyses, and position papers.

1973-1979

AIA played major role in supporting and assisting U.S. government negotiators during Tokyo Round of the GATT negotiations. The Civil Aircraft Agreement concluded through the Tokyo Round significantly liberalized and promoted trade in civil aerospace.

1975

AIA assumed the secretariat of ISO/TC 20, the committee responsible for developing international aerospace standards. It instituted programs to harmonize U.S. national standards with those of the rest of the world.

1988

AIA and the Aerospace Industries Association of Canada (AIAC) signed a Memorandum of Understanding (MOU) pledging coordination and cooperation on issues of major importance to both aerospace industries. It was the first time two associations signed an international MOU of the kind.

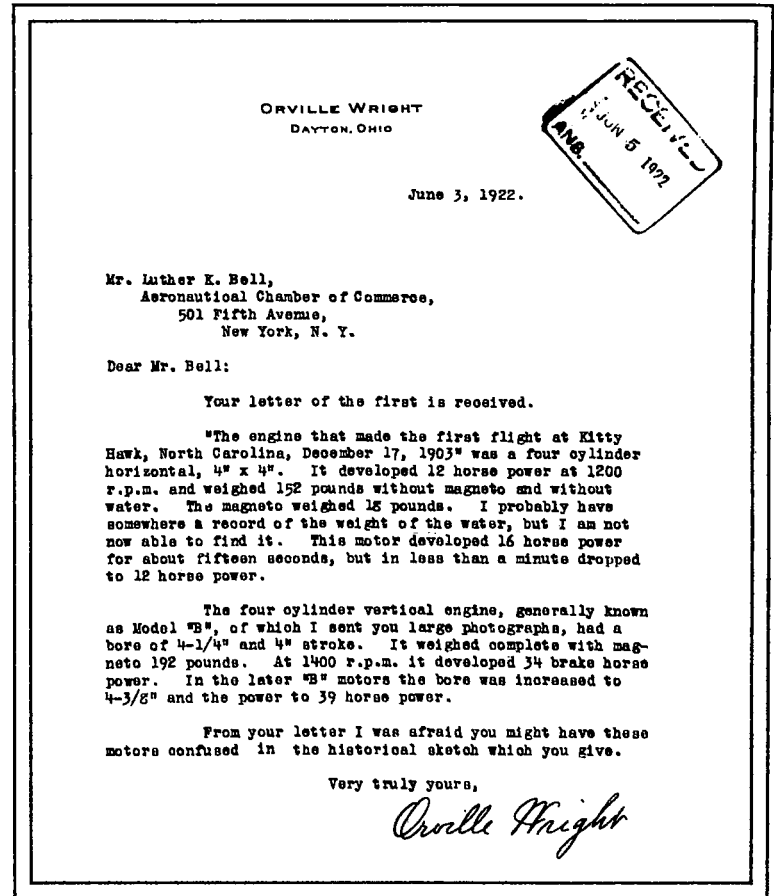
"...one small step..."

1988

AIA embarked on a national technology development program, "Key Technologies for the 1990s." The goal — a model for setting technology priorities that would help keep U.S. aerospace and related industries competitive in coming decades.

1988

An Aerospace Technology Policy Forum involving industry, government, and university leaders was set up as the vehicle for initiating policy changes to facilitate Key Technologies development. AIA announced establishment of an industry-funded National Center for Advanced Technologies to foster the Key Technologies strategy.



# 1989 AIA Board of Governors

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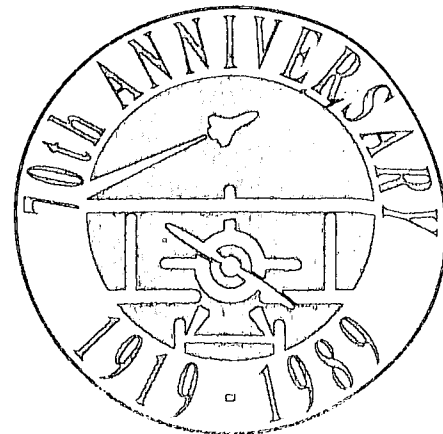
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