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ANNUAL
REPORT

aerospace industries association

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¹Succeeded James R. Kerr, resigned

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MESSAGE TO THE MEMBERSHIP

The splashdown of Apollo 17 near the end of 1972 marked the close of man's most ambitious technological project — placing men on the moon and returning them safely to Earth.

Apollo accomplished that goal with astonishing success. During six missions 12 U. S. men walked on the moon, performed important tasks and returned to Earth. In simple terms the Apollo program, more than any other project in this nation's history, broadened our horizons and stimulated our technological progress. The real significance of Apollo may not be fully assessed for a decade, perhaps for a generation.

On the economic side of the aerospace industry, calendar year 1972 registered both plusses and minuses:

Pluses:

+ The industry's backlog or orders on hand at the end of 1972 was approximately \$27 billion, up \$2 billion over the end of 1971.

+ Employment at the end of 1972 was reported to be 945,000 workers, compared to 924,000 at the end of 1971. This is one indicator that the decline in the aerospace industry during recent years may be levelling out and that a more stable period is ahead, although a slight further decline is predicted for 1973. During 1972, production workers made up 48 per cent of the total employment, scientists and engineers accounted for 17 per cent, technicians 7 per cent, and the remainder were in administrative, clerical and maintenance categories.

+ Industry profits, measured as a percentage of sales after taxes, increased from 1.8 per cent in 1971 to 2.2 per cent in 1972. This is an estimate. After-tax profit figures for all industry are not yet available.

+ Missile sales to the Department of Defense, including research and development funds, increased slightly from \$4.7 billion in 1971 to about \$4.8 billion in 1972.

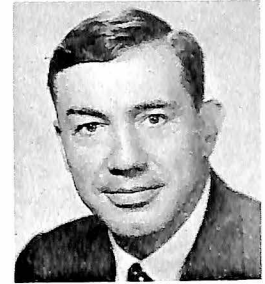
+ Civilian helicopter sales increased sharply from \$69 million in 1971 to \$86 million in 1972, a gain of 25 per cent.

+ Industry non-aerospace sales registered a slight increase from \$2.5 billion in 1971 to \$2.6 billion in 1972. This area represents work by aerospace firms in such fields as urban transportation, pollution control and marine sciences.

+ Overall, aerospace industry sales increased in 1972 to \$22.3 billion, a .7 per cent increase over the figure of \$22.2 billion in 1971.

Minuses:

- Aerospace exports declined for the first time since 1964, from \$4.2 billion in 1971 to \$3.8 billion in 1972. This 8.9 per cent decrease was due largely to a decline in military aerospace exports. In spite of this relatively slight decrease, aerospace exports constituted one of the principal supports for the over-



MR. HARR

all U. S. balance of trade which registered its second consecutive annual deficit since calendar year 1888.

- Military aircraft sales, as reported, decreased to \$7 billion in 1972 from \$7.4 billion in 1971. The reported figures include both procurement and R&D funds.

Outlook for 1973:

● Overall: Sales will remain virtually level or increase slightly, with the expectation that a slight decline in Government procurement will be more than offset by an increase in commercial sales. Commercial aircraft sales are expected to increase from \$4.8 billion in 1972 to about \$5 billion in 1973. Relatively, a strong element in this commercial aircraft sales figure will be the sale of general aviation (non-airline) aircraft.

● Space sales are anticipated to drop slightly from \$3 billion in 1972 to about \$2.9 billion in 1973.

● Non-aerospace sales will remain at about the 1972 level—approximately \$2.5 billion for 1973.

● Employment in the aerospace industry may drop a bit more in 1973, to an annual average level of about 925,000, as compared to 945,000 at the end of 1972.

During 1972 the Aerospace Industries Association membership was increased by two:

- + E-Systems, Incorporated.
- + Hughes Aircraft Company.

The Association has been active in a number of areas of concern to the industry, particularly in financing, procurement and various technical areas. Those activities are outlined in the remainder of this report.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Karl G. Harr, Jr.' with a stylized flourish at the end.

KARL G. HARR, JR.
President

AEROSPACE OPERATIONS SERVICE

The Aerospace Operations Service is concerned with the fields of manufacturing, quality assurance, sub-contract and materiel management, and after-delivery product support. Six committees are augmented by subcommittees and task groups of industry experts.

The Service during 1972 was involved in more than 100 projects to assist in solving problems of the industry.

Composite Tape Laying Machine

The increasing use of composites in aircraft manufacturing demanded that specifications be developed for a numerically controlled composite tape laying machine. Prior to 1972, all composite tape was laid by hand, a time-consuming task. In 1972, a task group prepared and published a performance specification for a numerically controlled composite tape laying machine. The specifications, which were coordinated with the National Machine Tool Builders Association, are available and procurement costs have been reduced substantially.

Increased Machine Tool Reliability

Continuing work in this area, which began in 1971, many member companies started in-house projects recommended by the task group and achieved outstanding increases in machine tool reliability. For example, one member company reduced by 90 per cent the number of hydraulic failures it had previously experienced before a recommended procedure was undertaken.

Electro Chemical and Electric Discharge Machining

Two workshops were held in 1972 on ECM and EDM to increase their use in aerospace manufacturing. This particular type of metal removal is particularly useful in machining odd shapes and holes with long depth to diameter ratios. In many cases, machining times have been reduced to 10 per cent of those of previous methods which employed conventional chip-cutting machinery. Designs previously desired but not available because of the inability of conventional machinery to accomplish the job can now be achieved.

Direct Numerical Control

In the area concerning computer-aided manufacturing, specifications were developed in 1972 to provide performance parameters for direct numerical control. In this mode, the machine is instructed directly from the computer, eliminating the need for an N/C tape and tape reader.

Adaptive Control

In 1972 preparation was started on adaptive control specifications which will drive numerically controlled machinery to the maximum of the controlling parameters of horsepower, torque, spindle deflection or tool tip temperature. Previously, programmers have induced safety factors on each parameter which resulted in a multiple reduction. Results to date indicate machining time savings as much as 40 per cent.

Improved Procurement Quality Assurance

This project, initiated at the request of the Air Force Systems Command, is essentially complete with the report in final preparation, and publication is planned soon. A formal presentation was made to the Air Force Systems Command in August, 1972 and shortly later to the staff of the Directorate of Procurement Policy, USAF. Copies of the briefing were provided to DOD, Army, Navy, and DSA, and assignments have been made in various Air Force organizations for study and implementation.

Quality Resources Study

The object of this study is to update, annually, the previous year's report and serves as a quality management reference for quality costs and manpower staffing. The cost of quality is reported as a percentage of sales, with prevention, detection, and losses then broken down as a percentage of the total cost of quality. Other data reported includes quality manpower by function and of manufacturing direct labor, quality costs of purchased material, and quality engineering manpower allocation by function. By using the same base comparisons, data from each succeeding year indicates trends and changes as each company completes the survey as well as industry averages when compared at the total level.

QASAR Symposiums

AIA and General Aviation Manufacturing Association participated in FAA's new surveillance program, "Quality Assurance Systems Review (QASAR)." Some 500 commercial aircraft manufacturers and their suppliers attended. Plans have been initiated for annual sessions to provide industry with an update of FAA's surveillance plans and to



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CHUCK P. KISH
Martin Marietta Corporation
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JOHN C. McKERCHER
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 Committee



WILLIAM H. HOEING
Lockheed Aircraft Corporation
 Chairman, Service
 Publications Committee



GAYLORD ANDERSON
Northrop Corporation
 Chairman, Product Support
 Committee



JOHN R. KELLIHER
United Aircraft Corporation
 Chairman, Spare Parts
 Committee

provide a forum for developing a better understanding between industry and FAA.

Review of Government Specifications

AIA reviewed 10 military specifications and standards concerning quality assurance matters in 1972 that were either new documents or proposed revisions to existing ones. The field ranged from nondestructive testing and clean rooms to the gaging of screw threads.

Contractor Field Service Support

Some measure of success has been achieved in amending the conversion efforts which the Navy initiated more than a year ago through the expansion of the in-house capability of its Naval Aviation Engineering Service Unit by converting contractor field service personnel and tasks to Civil Service. Although this conversion program had been temporarily halted early in 1972, it was resumed in May. It was estimated that AIA member companies will have lost 77 per cent of their field service tasks to this conversion program through Fiscal Year 1973.

An AIA panel of company chief executive officers subsequently met with the Assistant Secretary of the Navy for Installations and Logistics to discuss the principal industry views and concerns. In response, they were informed that although budgetary constraints dictated the continuation of this conversion program through Fiscal Year 1973, the rate of

conversion would be reduced considerably. A compilation of the total number of tasks affected indicates a reduction in the conversion efforts of approximately 55 per cent.

Government Competition Publications

Technical and cost guidelines for determining whether publications preparation will be accomplished by the government or by contractor organizations are the objectives of an AIA *ad hoc* panel study initiated late in 1972.

This action was taken as the result of mounting competition of government in the preparation of publications for both production and out-of-production hardware programs. This trend, which is common to all of the military services, may result in a serious reduction in industrial publications support of military hardware programs and will have a detrimental impact on the maintenance integrity of the aircraft weapon systems and equipment being manufactured.

Weapons Systems Product Support

DOD's endorsement of AIA's recommendations in 1971, providing more maintenance and support from constrained budget dollars, has resulted in two active Navy projects. One was to determine the proper balance between contractor and organic services in supporting new systems while design stability was maturing. An AIA/Navy report on the findings is scheduled for release in 1973. The second project involved the Navy's adoption of techniques used by commercial air-

lines to reduce maintenance costs and to increase aircraft availability. Currently, they are applying these techniques on two programs utilizing aircraft manufactured by one of the AIA member companies.

DOD Consolidation of Provisioning Documentation

Early in 1972, AIA spearheaded a CODSIA effort with the DOD directed toward consolidating and reducing the proliferation of various provisioning documents and specifications used by the military services with a goal of developing standard documentation for the selection and ordering of spare parts.

The first joint phase of this project, which involved the development of a list of data elements for provisioning that will be common to all military services, was completed, and joint efforts scheduled for 1973 will include the development of a uniform provisioning format as well as manual and mechanical preparation instructions and the preparation of a new DOD instruction to replace the current DOD Inst. 4151.7.

Anticipated benefits to be derived from these consolidation and standardization efforts will include improved data processing and exchange procedures which are expected to provide economies to industry, especially when more than one military customer is involved.

Integrated Logistics Support

AIA since 1970 has been represented on the DOD/Industry Integrated Logistics Support Advisory Committee and has provided recommendations concerning various studies involving techniques for determining and demonstrating the value of applying logistics support concepts to the early development of weapon systems.

During 1972, an AIA task group conducted a review of the current ILS Planning Guide in terms of its compatibility with the latest directives on systems acquisition and integrated logistics support and its interface with policies and procedures related to systems engineering, configuration management and standardization. Recommendations resulting from this review were presented to the Advisory Committee during October 1972.

Subsequently, AIA was advised that 90 per cent of them would be incorporated in the formal issue of the ILS Planning Guide scheduled for release in 1973. Acceptance of these recommendations will assist the user to implement ILS effectively and economically as a principal design parameter for new DOD systems/equipment and modification programs.

Technical Manual Specification Reviews

AIA recommendations in 1972 were provided for four specifications proposed for the DOD Technical Manual Specifications Standardization program. This is a continuing government effort in which AIA has been involved for a number of years and is directed toward reducing procedures and conflicting requirements of the military services.

The reviewed specifications pertained to flight crew checklists; organizational maintenance instructions for aircraft, missiles and ground communications electronics equipment; symbolic integrated maintenance instructions for installation, operation, maintenance and repair of systems or equipment; and the preparation of cross servicing guides for NATO member nations for handling, servicing, and operating fixed and rotary-wing aircraft.

Air Transport Association Liaison

AIA members have joined with their counterparts in the Society of British Aerospace Companies and the French Union Syndicale des Industries Aeronautiques et Spatiales in coordinating specification improvements with the Air Transport Association. These efforts are directed toward achieving more efficient implementation of airline requirements for manufacturers' supply information, data processing and technical data publications.

Another concerned the development of several proposals for substantial cost reductions in the preparation of technical manual revisions. One such approach involved the compacting of text material. Investigation had shown that by eliminating the blank spaces between paragraphs on each page, a 35 per cent reduction in text space could be achieved.

Taking the whole manual, including non-compactable illustrations, a 25 per cent reduction in page volume was possible without affecting the readability of the text. Applying this approach to an average aircraft maintenance manual which typically consists of more than 19,000 pages, substantial savings can be produced. Based on these test results, AIA is currently preparing a proposal for compaction of text in all manuals which will be submitted early in 1973.

World Airlines Technical Operations Glossary

AIA continued its joint efforts with the Association Internationale des Constructeurs de Materiel, the Air Transport Association and the International Air Transport Association in preparing a revision of the World Airlines Technical Operations Glossary. The purpose of this glossary is to foster improved world-wide inter-industry communications through the use of common definitions of terms which are relevant to airline operations and manufacturers' engineering and product support functions.

The third edition of this glossary, incorporating a number of improvements recommended by AIA, was distributed world-wide during August 1972. In revising this glossary, efforts were made wherever possible to achieve consistency with the ATA specifications for service publications and supply data. Approximately 85 per cent of these definitions have now been standardized with those in the specifications.

Government/Industry Microform Workshop

The increasing trend on the part of both military and commercial aircraft customers to use various microforms, such as

microfilm and microfiche, as replacements for or supplements to the traditional printed page form of technical data, prompted the organization of a Government/Industry Microform Workshop. The objective was to find out what various developments are taking place in the military services, what the future looks like, and what the aerospace industry should do to comply with these microform approaches.

In the future industry may be required to supply magnetic tapes rather than hard copy or microform to the various

military services. They, in turn, would reduce the material to a microform system best fitted to their particular needs. It was agreed that a number of innovations and developments in the preparation and use of microforms had also created problems for industry which must be solved before the potential for publications of this type can be realized. An AIA *ad hoc* panel has been established to work closely with the military services and with commercial airlines to solve these problems.

AEROSPACE PROCUREMENT SERVICE

The Aerospace Procurement Service acts in support of the business management activities of member companies, particularly in the fields of contract administration, finance, accounting, procurement law, patents, industrial relations and industrial security. One council and three committees of senior company executives provide the expertise to initiate actions seeking the resolution of problems of mutual concern to government and industry in these fields as well as to develop and present the views of the aerospace industry on government actions impacting the supported and related activities.

The Aerospace Procurement Service in 1972 continued efforts to obtain sound, economic and equitable government procurement policies, practices and procedures governing or effecting the business management activities of the aerospace industry.

Access to Records

During 1972, Department of Defense increased demands for access to internal contractor records and information which customarily had been considered company proprietary and not necessary to government audit. At the direction of AIA's Board of Governors, a special survey was made of member companies concerning this matter and a study prepared, presented and discussed with high level DOD officials. The study and discussions pointed out the over-reaching aspects of these demands for access to records, and their adverse impact on, as well as improper invasion of, management's prerogatives. As the year ended, AIA's study and comments were still under consideration.

Proprietary Information

The trend toward "opening-up" government activities and records to public view has given rise to problems in connection with the protection of proprietary information filed by persons and firms with federal agencies, either voluntarily or under some statutory requirement.

Several federal agencies' proposed regulations could have placed in jeopardy proprietary information or data of the type normally protected under the Freedom of Information Act. In each case AIA submitted comments and recommendations seeking to protect proprietary information, many of which were accepted and implemented.

Technical Data

AIA continued to evaluate the impact of extensive and substantive changes to DOD policy and practices treating with technical data which appeared in Revision 11 to the Armed Services Procurement Regulation (ASPR). The issued regulations did not reflect the acceptance of Council of Defense and Space Industry Association comments and suggestions transmitted to the DOD. For example, the ASPR now contains coverage not only as to the rights acquired by the government to use technical data delivered under a contract, but also requirements for the amount or type of technical data to be delivered. This is a sharp reversal of DOD policy.

During the 1950-60 era, the DOD through a massive effort eliminated technical data requirements from ASPR. Another example of a significant change in DOD past practice, is the requirement for contractors to indicate on technical data the portion in which the government acquires only a limited right to use. This also is a reversion to practices of the 1950-60 period which had been discarded. The reactivation of these practices may add significantly to contract costs.

Balancing the foregoing, are new regulations which provide for both the deferred ordering and deferred delivery of technical data. This may prove mutually beneficial in reducing quantity of technical data delivered under DOD contracts.

Industry experiences under the revised regulations are not sufficient to fully evaluate their impact. However, such experience is being observed and appropriate actions will be taken.

Patents

The President's 1972 Message on Science and Technology and the revision to the President's 1971 Patent Policy Statement each directed affirmative action to utilize the incentives



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 Chairman, Patent Committee

of the U.S. patent system as to inventions made under government contracts.

Accordingly, during 1972, many federal agencies undertook the revision of their procurement regulations, to effectuate this purpose. Thus, the National Aeronautics and Space Administration, the General Services Administration, the Departments of Defense, Transportation (DOT) and Interior, Office of Saline Water, as well as the Environmental Protection Agency, issued or proposed revisions to their procurement regulations as to the disposition of rights to inventions under their contracts and the licensing, including exclusive licensing of Government-owned patents.

AIA, acting with CODSIA, presented industry views and suggestions as to the proposed regulations. The principle thrusts of CODSIA's comments were that normally the contractor would retain the title to an invention made under a government contract, with a royalty-free license issued to the government for governmental purposes.

It was urged that this provides the optimum opportunity for such an invention to be brought into commercial use, and, thus, to the public's benefit. As to the licensing of government-owned patents, it was CODSIA's view that the government should not be in the business of patent licensing and that where the government acquires a patent, it should be subject to a general royalty-free license to all or dedicated to the public. Moreover, exclusive licensing could lead to discrimination and, in any event, the non-exclusive license retained by a contractor should not be extinguished to satisfy an exclusive license.

By the close of 1972, NASA, DOT, EPA and OSW had issued new regulations, which reflect an acceptance of some CODSIA views and suggestions. GSA's revised regulations are expected to be issued in 1973.

Commission on Government Procurement

In 1971, the Procurement and Finance Council prepared and transmitted to the Commission ten studies on significant procurement topics, and collaborated with other Councils, Committees and CODSIA in the development and presentation of seven other studies. Additionally, the Patent Committee

transmitted two studies dealing with patents and technical data.

During 1972 AIA activities with the Commission consisted principally in responding to requests for additional information or elaboration as to these studies.

Economic Stabilization Program

The principal role of the AIA under the Economic Stabilization Program in 1972 was to maintain communications with the staffs of the Price Commission and the Pay Board as well as with the officials of affected federal agencies whereby they were advised of the impact of the program on our industry. Additionally, federal regulations and publications were monitored and advisory bulletins issued on regulations believed to be of significance to member companies.

Product Liability

AIA continued, in 1972, efforts to assure the prompt and equitable settlement of the claims of air passengers and the public for damages arising from aircraft accidents which might occur in domestic and international air transportation.

As to the international field, liaison was maintained with federal agencies, the Air Transport Association and the Society of British Aerospace Companies in connection with the development of a Supplemental Compensation plan under the Warsaw Convention, as amended by the Guatemala Protocol.

Under the amended Warsaw Convention, airlines would be liable, without fault, for up to \$100,000 in damages and the Supplemental Plan would provide for a recovery in excess of that amount. AIA, in addition to proposing a Supplemental Compensation Plan, has also continued to press for the appropriate inclusion of aircraft manufacturers and their suppliers in the amended Warsaw Convention. Pending the resolution of the amendment to the Warsaw Convention, further efforts in the domestic area are being held in abeyance.

Warranties and Consequential Damage

Efforts continued to assist the Department of Defense in establishing appropriate policies and contract clauses covering

liability of contractors for damages arising from defective products.

The general principle that contractors and subcontractors remain liable for correction of defects or comparable consideration and that the government act as self-insurer with respect to other damages resulting from such defects was recognized by Defense Procurement Circular No. 86 in February, 1971.

However, exceptions, limitations and voids in the Circular precluded full realization of the objective to attain cost effectiveness and fairness.

In October, 1972 proposed revisions incorporating many of industry's more significant recommendations were forwarded by the ASPR Committee for comment. Through CODSIA a response was developed which recommended early publication of those changes representing improvements in the ASPR and which also requested the opportunity to work with the Committee in the development of solutions to the few remaining problems.

Industrial Relations and Security

The impact of the Williams-Steiger Occupational Safety and Health Act on industry resulted in the reactivation of the Occupational Safety and Health Subcommittee. Actions include dissemination of standards interpretation to members; assignment of one member to each subpart of the standards to gather AIA companies' experiences to reveal the effect of the subpart on the industry; placement of members on standards committees and on the Safety Technical Advisory Board of the American National Standards Institute, which is a national consensus standards producing organization; submission of a list of qualified industry people to serve on OSHA standards advisory committees to evaluate criteria for new standards and testifying at OSHA hearings on standards revisions and Office of Management and Budget on record keeping forms.

The Occupational Safety and Health Review Commission published Rules of Procedure governing its proceedings. Comments filed by AIA had a beneficial effect in establishing an equitable procedural climate for employers, while simultaneously streamlining the Commission's processing of cases.

AIA continued annual surveys on various personnel practices and collective bargaining agreements in the industry. Activities also included the continuation of its liaison with the administrators of the Defense Industrial Security Program and, through CODSIA, views and suggestions on 12 proposed changes to the Industrial Security Manual were presented.

Eleven plants and divisions of AIA member companies were the recipients of the 1972 James S. Cogswell Outstanding Industrial Security Achievement Award.

Bureau of Labor Statistics Wage Indexes

The Economic Stabilization Program caused the deferral of substantial wage increases for many employees of aerospace

companies in 1971 and 1972. Under traditional practices of the Bureau of Labor Statistics these increases were not reflected in certain wage indexes published by the BLS resulting in inaccurate and misleading information as to wages paid in this industry.

The final pricing of certain types of aircraft and some components thereof usually includes a provision for price-adjustment geared to these BLS wage indexes. The unusual effect of the ESP without appropriate action by BLS would have brought about a serious inequity, and many companies faced substantial losses in revenue unless data was published indicating wages in the months earned, including any deferred payment of wages.

The BLS agreed to take appropriate action and at year's end a cooperative effort was underway to survey the industry, obtain the requisite data and publish a supplemental series of indexes reflecting the effect of the ESP.

Government Owned Facilities and Property

AIA continued its close liaison with DOD offices concerned with facilities and property policy and implementation. The General Accounting Office in 1972 issued a significant report entitled "Further Improvement Needed in Controls over Government Owned Plant Equipment in Custody of Contractors", to which the DOD took many exceptions. However, AIA has initiated a program to continue an informal information exchange with the General Accounting Office to better inform that agency of industry views and opinions.

AIA surveyed its member companies to ascertain the nature of problems related to the impact of Occupational Safety and Health Act and Environmental Protection Act requirements on government-owned facilities and property in the possession of contractors. It appears that the impact has been minimal. A potential problem of significant magnitude was identified. This problem will arise when the OSHA or the EPA requires changes to government owned property which DOD either cannot or will not provide funds to accomplish.

Contract Financing and Profits

The Department of Defense "new" profit policy, published late in 1972, revises the DOD "weighted guidelines" method used by contracting officers to compute their contract profit objectives prior to negotiating "going-in" profit rates on negotiated contracts.

Under the new policy a contractor's investment and costs will be given equal consideration and weight. Initially, the new policy is to be applied only by mutual agreement between the contracting officer and the contractor on production contracts involving hardware where the costs are \$3 million or more and where engineering costs are 25 per cent or less of proposed in-house costs.

During the years in which the new policy was being developed, AIA worked independently and with CODSIA in

commenting upon drafts of the policy and making suggestions, many of which were accepted.

Because the primary impact of the policy will be on pre-negotiation profit objectives of government negotiators, its impact will be difficult to assess. However, DOD is convinced the aggregate going-in profits should be about the same but that a major redistribution of profits could take place.

DOD plans to evaluate the new policy before extending it to other contracts. During this period AIA will monitor developments and provide suggestions to minimize the possibility of adverse impacts.

Cost Principles

The downward trend in the annual rate of DOD proposed revisions to the ASPR Cost Principles continued in 1972. This trend is based, to some degree, on the stabilization of the Cost Principles. More importantly, however, DOD appears to be waiting for the output of the Cost Accounting Standards Board to determine whether additional changes to the Cost Principles are required.

AIA participated with CODSIA in developing an industry response to a GAO request for views on Section 203, Public Law 91-441, concerning the recovery of Independent Research and Development (IR&D) and Bid and Proposal (B&P) costs, and the related implementation by the DOD.

CODSIA's response advised that although sufficient time had not elapsed to assess fully all of the implications of the law, nevertheless, certain significant trends were developing which required prompt consideration. CODSIA also commented on the repressive effect of the law's requirement for a potential military relationship upon highly innovative R&D; the continued arbitrary reduction of contractor's proposed IR&D and B&P program costs resulting in cost sharing; and the need for improved ways of conducting technical evaluations.

The repressive effect of the statutory "potential relationship" requirement on critical national domestic problems in such fields as pollution, transportation, health, and housing was also discussed. CODSIA strongly recommended that the statute be amended to replace the military relationship test with a requirement for potential relationship to the interests of the government.

Cost Accounting Standards

The Cost Accounting Standards Board was established by the Congress to promulgate cost accounting standards for negotiated defense contracts and subcontracts. Board promulgations have the force and effect of law after 60 calendar days of continuous session of Congress unless rejected by concurrent resolution within that time.

During 1972 AIA continued to participate with CODSIA in periodic discussions with the staff of the Cost Accounting Standards Board and in commenting both formally and informally on material under development.

The Department of Defense in May, 1972 published its directive implementing the Board's regulations. Other agencies affected by the law published their directives shortly thereafter. The General Services Administration voluntarily published in July, 1972 regulations, effective November 1, 1972, applying Cost Accounting Standards to negotiated nondefense contracts.

In Congressional hearings preceding the law's enactment it was established that promulgated standards would set forth accounting "criteria", not rigid rules. A recently issued standard, "Allocation of Home Offices Expenses" is contrary to this intent of the law. Accordingly, this precedent may be of sufficient significance to warrant a request by industry for Congressional intervention.

Should Cost

AIA followed the DOD conduct and use of the "Should Cost" reviews during 1972. Under such reviews, a team from DOD visits a contractor's plant and makes indepth studies to determine what the contractor's costs should be under specific contracts—usually of a follow-on production nature. These findings are then used in negotiating the contract prices.

AIA collected and summarized the experiences of member companies having at least one Should Cost review. The summarized results were discussed with the DOD "Should Cost Coordinating Committee" in a manner precluding the identity of any company. Basically, AIA considers the use of the techniques proper in principle, but that it should be used selectively and in an economic and objective manner.

NASA Acquisition Study

AIA in 1971 at NASA's request and on behalf of the aerospace industry reviewed and submitted recommendations on a draft procedure simplifying Request For Proposals by reducing documentation requirements and proposal preparation costs. These efforts continued during 1972 as well as a review and submittal of recommendations on proposed NASA actions to implement certain findings of its "Management Study of Acquisition Process."

Responsive to a NASA request, AIA, through a group of senior management members from a cross-section of AIA councils and committees, completed its work on NASA's proposed Work Breakdown Structure Handbook. At year end the draft was under final review by NASA.

AIA studies and presentations to government agencies, have pointed out that many valid requirements are specified for response too early in the acquisition process, causing premature submittal of elaborate functional and program plans, synthetic information and duplication of efforts when redone at the proper time.

NASA, in its acquisition study, recognized that RFP procedures could be simplified and industry, as well as government, costs reduced by deferring a number of functional and program

plans heretofore required to be furnished with the proposal. NASA concluded that such plans could be deferred until contract negotiation with the successful offeror or offerors as long as cost and manpower estimates of the ultimate requirements were submitted with the initial proposal.

Following the theme of simplifying RFPs, AIA worked with NASA on the revisions of Procurement Regulation Directives for integration of quality and reliability requirements and system safety requirements. As a result, NASA's PRDs were issued during 1972 requiring that a summary, in contrast to a detailed plan, was to be furnished at the time of proposal submission.

At the close of 1972, review of a NASA proposed draft handbook for "Preparation of Statements of Work" was initiated.

DOD/NASA Incentive Contracting Guide

Several years ago AIA, through CODSIA, participated in reviewing and commenting on the 1969 DOD/NASA Incentive Contracting Guide. In this effort industry's suggestions and recommendations were made "before the fact" and discussed with government representatives. Many CODSIA recommendations were accepted by DOD and NASA and included in the Guide.

Recent governmental studies have been critical of the government's use of incentives in a significant number of contracts. As a result, the DOD Procurement Management Directorate has undertaken necessary action to effect improvements in the use of incentive contracts, and to revise the Guide with the following objectives in mind:

- Update present Guide material.
- Broaden coverage to encompass Cost Plus Award Fee Contracts.
- Revise and enlarge present coverage concerning extra-contractual influences in Government contracting, mul-

iple incentives, exceptional methods of structuring, contract administration and contract change as related to incentive contracting.

The DOD has requested CODSIA to assist in this revision. In order to establish a more knowledgeable base for this task, CODSIA has prepared and transmitted to industry for completion, a questionnaire on experiences under incentive contracting.

Systems, Records and Reports

AIA participated with CODSIA in commenting on proposed ASPR policies and contractual provisions for the "Cost/Schedule Control Systems"; the "Cost Performance Report," and a proposed combined "Cost Information Report" and "Procurement Information Report" to be known as the "Contractor Cost Data Report." Hopefully, as a result of meetings with DOD the "Contractor Cost Data Report," when issued, will be much less burdensome than as proposed. (AIA also met with NASA representatives to express views regarding a related NASA requirement known as "Procedures for Reporting of Correlated Cost and Performance Data.")

AIA also provided informal comments on a proposed revision to Circular A40, the fundamental Office of Management and Budget directive controlling federal reporting. When issued, the new directive should improve the control over reports required from the private sector.

DOD has continued to implement the Military Standard Contract Administration Procedures program. As a result of meetings with DOD, industry was afforded the opportunity of commenting on several proposed ASPR changes related to MILSCAP, although DOD also continued to make other changes without obtaining industry views. Because of the impact of this system and related DOD "internal" logistical systems requirements will have on contractors, developments will be monitored and appropriate action initiated.

AEROSPACE RESEARCH CENTER

The Aerospace Research Center conducts research, analyses and advanced studies designed to bring perspective and understanding to the issues, problems and policies which affect the aerospace industry and, due to its broad involvement in our society, affect the nation itself.

The Center during 1972 provided a focal point within the Association from which the aerospace industry was able to:

- Conduct applied research and advanced studies of a nature that will be of long-range benefit to the aerospace industry of the United States;
- Produce papers that clarify the various key issues in regard to both the industry's capabilities and its major problems; and
- Promote improvements in all aspects of industry/government relationships as well as to enhance industry potential in commercial endeavors.

Removed from day to day operational matters, the professional, interdisciplinary research staff examines each issue from an analytical perspective, with the depth of study necessary to derive clear understanding and useful conclusions and recommendations. The judgment, knowledge, and experience available within the industry, as well as from authorities prominent in government, academic, and other professional communities, can be brought to bear through the Center's research programs.

In 1972, the Center's principal efforts were directed toward the analysis of national and international technological trends. For the first time in history, the President, on March 16, 1972, delivered a message to Congress on the burgeoning importance of science and technology to national progress. The President stressed that ". . . the impact of new technology can do much to enrich the quality of our lives. The forces which threaten that quality will be growing at a dramatic pace in the years ahead. One of the great questions of our time is whether our capacity to deal with these forces will grow at a similar rate.

The answer to that question lies in our scientific and technological progress."

The Center therefore concentrated its effort in 1972 on the perspective, importance, and potential of the Presidential message and other technological events, and toward analyzing concepts for meaningful industry participation.

The key questions of whether the Nation's capabilities in technology will achieve their promise and how they will be mobilized were addressed through several research efforts. In one Center study, the Presidential message was analyzed and recommendations were made regarding the three basic economic policy problems identified by the President - international trade, productivity, and employment.

Another study reported on how the United States is facing strong challenges to its world technological leadership and its posture in international trade. It was found that in most of the nations studied, the governments are supporting R&D programs which are growing annually in funding and scope. By contrast, the growth rate of U.S. government-financed R&D is almost stagnant.

At year's end, the Center was exploring many of these technological questions in greater depth. Studies in R&D resource allocation and incentives for private R&D investment are currently under investigation.

In addition, the Center supported other elements of AIA in 1972 through research on present transport aircraft financing problems and transportation policy, and was in the process of investigating the consequences of monopsony in government procurement.

AEROSPACE TECHNICAL COUNCIL

The Aerospace Technical Council is the industry's top level technical advisory body through which broad technical and management problems affecting both government and industry are reviewed and solutions sought.

The Council continued during 1972 to function as a channel of communications with senior technical management officials in the government, providing an industry viewpoint and perspective.

Discussions with government officials covered such subjects as cost sharing, restraints on the utilization of industry in the nation's technology program, Independent Research and Development and Bid and Proposal (IR&D/B&P), major system source selection, productivity and design to a price concept, federal procurement principles, reliability and maintainability on new defense programs, current implementation of new Department of Defense policy for major system acquisition, and the major system acquisition policies of the Department of Transportation.

The Council also streamlined its organization to achieve efficient utilization of association resources by limiting the membership of the National Aerospace Standards Committee to one representative from each member company, the Ad Hoc Aircraft Noise Policy Group and combining its function with that of the Aircraft Noise and Emission Control Committee established last year.

The Council concentrated on three principal project activities for which ad hoc groups were used. One group was involved in the continuing effort with the DOD on the subject of IR&D/B&P. The second group addressed the question of the aerospace industry's and AIA's involvement in international standardization. The third group participated in a joint effort with AIA's Aerospace Research Center in developing a report concerned with how to reduce or eliminate the restraints on the utilization of industrial technological talent. The Council also participated in the AIA project to identify the industry's position on metrification, and through its Executive Committee and two divisions set policy for its nine technical working committees, and exercised management review and control of the many technical project activities of those committees.

Independent Research and Development

An AIA study was completed during 1972 which highlighted the severe restraints imposed on industry's IR&D efforts by both public law and by DOD implementing policies. The study pinpointed the source of these restraints and their detrimental effect on industry, and made several recommen-

dations aimed at both an immediate reduction of the impact of such restraints and their eventual elimination.

AIA testimony before Congress and continuous discussions with DOD management including the DOD IR&D Policy Council urged that there should be an amendment to IR&D legislation, in support of the national emphasis on technology, to remove the provisions which restrict the recovery of reasonable and allocable IR&D costs.

Other recommendations pointed out the need for a change in DOD policy to formally encourage IR&D as an essential and normal cost of doing business and to modify the DOD implementing procedures which currently add to the public law restraints. In briefings to the DOD IR&D Policy Council, specific recommendations have been made to improve and make more effective the DOD technical evaluation and assessment of industry IR&D programs.

It has been emphasized that there are already strong and natural constraints on industry which serve to regulate the right kinds and right amount of IR&D, without need for excessive regulation which can result in loss of innovation, less technical progress, reduction in competition, trend to an arsenal concept, and a deterioration of the U.S. competitive position in the world.

DOD officials have indicated that increased emphasis will be placed on on-site technical evaluations and the results of the evaluations will be used in advance agreement negotiations.

Major Systems Acquisition Policy

As a follow-on to the four phase AIA study of the previous three years into DOD weapon systems development and the separate effort during 1971 to document the industry position on prototyping, the Council has followed closely the evolving implementation of DOD acquisition policy established by former Deputy Secretary of Defense David Packard.

Representatives of the Council have discussed this subject on several occasions with DOD officials including Mr. Packard and have also briefed DOT officials on the industry position relative to recently published DOT policy directives.

A Council objective is to assure that current DOD system acquisition approaches such as "fly-before-you-buy," "weapon-system-simplification," "improved-reliability-and maintainability," "design-to-a-price," etc., are implemented in a way



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complementary to the policy of "continuous trade-offs" introduced by DOD Directive 5000.1.

This Directive requires that trade-offs be made throughout the system life cycle as continuous reassessments of needs, requirements, technology, schedule, cost, and performance reveal the necessity for realignments made necessary by new information, unexpected uncertainties, and newer test results.

Acquisition Management Systems Control Program

During the year, a test project was initiated by the DOD with the objective of improving the effectiveness and efficiency of the DOD Management Systems Control Program. The project is capitalizing on recommendations of the AIA report published last year "Management Systems in Future Government Procurement," and is intended to improve the DOD Acquisition Management Systems List (AMSL) which evolved from an early AIA effort and the more recent CODSIA Management Control Systems project.

Under this test program, documents prescribing management tasks for contractual application have been grouped into eight generic categories similar to the generic management system categories recommended by the AIA report. The test program also groups data requirement documents into the same categories and relates them to the management tasks which generate the data requirement.

A significant issue to be resolved within the DOD concerns the integration of management control policies for management requirements and data requirements. The test program has been applied on some Air Force contracts with the intent that close monitoring and evaluation of results will help to refine, consolidate, reduce, and standardize the number of contractual management tasks and associated data requirements.

AIA is following this test program closely and will participate as appropriate in the coming year in its evaluation.

Value Engineering

There has been concern expressed for several years that neither industry nor the government has been receiving the full "value" from Value Engineering.

To investigate this concern, AIA member companies were requested to describe specific problems as well as successes encountered while attempting to achieve savings from value engineering proposals. An analysis was made of these problems and successes and of government value engineering policies to identify the root causes of the problems. The task group involved in this project has prepared constructive recommendations for actions by both government and industry which would make possible increased "value" from value engineering performed by the industry for the DOD, NASA, and DOT.

The study found that the most significant cause of value engineering problems is insufficient motivation provided to government contracting and program offices. Mutual government/industry motivation is the apparent key to successful

value engineering programs, and value engineering successes seem to occur on programs that are contractually well defined, have a substantial cost base, and where mutual motivation exists for contract changes which reduce cost and/or risk.

The several recommendations of the AIA report are concerned with improving the incentive and motivation for value engineering accomplishment. These recommendations will be formally presented to the government early in 1973.

Defense Systems Engineering

The development of systems engineering policy was followed closely in many informal discussions with DOD representatives. During the year, an internal task group within DOD studied the need for a contractually applicable standard and a guide or manual, in addition to the documentation of policy in a top level directive compatible with new major system acquisition policy expressed in Directive 5000.1.

At year's end, it appeared that the top level policy document would be one of those in the 5000 series and would encompass program management of the development process, with a proposed title "Development of Major Defense Systems."

The need has been recognized for a more clear cut distinction between system engineering effort by the government and system engineering effort by the contractor. Although the policy directive will be broad, the question of how to handle in the future the mass of sub-tier standards, manuals, etc., which have been imposed on contracts, has been receiving serious consideration.

Industry inputs to the DOD effort have been made informally in 1972 during the formative stages of the new policy directive. Basic to the industry inputs has been the position that contractual requirements for system engineering should be well tailored to meet program objectives, with the intent of making full use of contractor internal procedures and management information systems; also that engineering specialties such as reliability and maintainability should be integrated into a consolidated effort to optimize the system configuration to satisfy all user requirements.

It is anticipated that more formal industry coordination will be possible during 1973 when draft directives, standards, or manuals become available.

Configuration Management

During the year, a DOD joint agency configuration management regulation became available for industry review in draft format. Its preparation had been initiated in 1971 to prescribe uniform policy and guidance for the military services and defense agencies in place of the existing and DOD component policy directives on configuration management.

AIA comments were critical of the document in that it did not satisfactorily respond to the emphasis and guidance of Directive 5000.1 regarding avoidance of premature detailed operational support considerations, utilization of contractor

data, a reduction in the number of implementing documents, and the consolidation of necessary procedural guidance.

The document contained much material considered redundant to the set of tri-Service configuration management standards and specifications, and did not adequately cover the subject of tailoring the configuration management requirement to each specific program.

AIA comments also addressed the need for a separate policy document on configuration management in consideration of the policy document in preparation on defense system engineering, pointing out that the answer to that issue depended upon the ultimate scope decided upon for the system engineering document.

Reliability and Maintainability

Improved systems reliability and maintainability to provide systems capable of being supported in their operational environment with less expenditure of resources continued to receive special attention by the DOD during 1972.

An AIA project to study ways for the DOD to achieve this goal was completed early in the year and recommendations were discussed with DOD representatives. Among the many suggestions emphasized by industry were the need to eliminate the "cost auctions" and other procurement practices which drive reliability analyses, tests, and reliability design features out of proposals; the need for realistic requirements; design simplicity; improved contractual involvement of industry with the Services into the operational environment; and recognition that development money is necessary to save operational costs.

Related to the DOD requirement to improve system support requirements and operational effectiveness, AIA also urged that the many separate requirements for the engineering "ilities," including human engineering, be appropriately integrated into the overall systems engineering effort, with trade-offs determining the appropriate emphasis on each.

AIA's comments on the tri-Service Human Engineering Standard were presented to the DOD and were met with general acceptance. Projects were initiated to review draft revisions of the maintainability program standard and the maintainability evaluation and demonstration standard.

Airworthiness Standards

Council representatives continued to work closely with the Federal Aviation Administration to develop new and updated airworthiness standards. Numerous formal comments on FAA notices of proposed changes to the airworthiness rules were submitted to FAA as were AIA comments on draft advisory circulars proposing acceptable means of showing compliance with the aircraft certification rules.

Technical analyses and positions were presented at government/industry meetings on cockpit vision requirements for transport aircraft, the use of dichlorvos vapor (DDVP) as an aircraft disinsectant, securing of aircraft ventral door inflight,

passenger safety in turbulence encounters, flight attendants safety and others.

Safety Measures for Aircraft Fuel Systems

Council representatives continued their support of the FAA's Advisory Committee on Fuel Systems Fire Safety. The objective of the Committee, composed of representatives of FAA, AIA, airline operators, flight engineers and pilot associations, and the Air Force, is to foster and encourage the development and testing means for achieving protection against fuel system fires and explosions. The FAA advised that after four years of activity the committee's assigned goals had been reached and future activities would be carried out on an informal basis.

Committee activities have continued on an informal basis with AIA supporting the objective of reducing aircraft fuel fire hazards by all practical means including design features, operational procedures and fuel selection, processing and handling.

International Airworthiness Requirements

The Association of European Aerospace Constructors, consisting of aerospace manufacturers of France, Germany, Netherlands, United Kingdom, Italy, Sweden and Belgium, continued their efforts to develop a joint airworthiness code for transport aircraft. AIA has been monitoring this effort and has been invited to review and comment on the draft code in 1973. Such a common code should ease aircraft import and export problems in Europe.

The FAA has undertaken a concerted effort to update the bilateral airworthiness agreements with a number of foreign countries. Council representatives were afforded an opportunity to review and comment on the proposed revisions to existing agreements. It is expected that a number of revised bilateral agreements will be signed in 1973.

Aircraft Noise and Emission Control

In November 1971, Council representatives responded to an FAA notice of proposed rule making to amend the aircraft noise standards. The AIA reply opposed a provision in the notice that would apply temperature and altitude accountability to the noise certification requirements.

This provision was objected to on the grounds that it would require extensive additional testing without significant noise reduction accruing to airport neighbors. Early in 1972, AIA supplemented its earlier comments on the FAA proposal and showed the range/payload penalties for typical wide bodied jets that would result from a full temperature and altitude accountability requirement in the certification rules. At year end, FAA had not adopted or rejected the notice proposal.

FAA earlier advised that consideration was being given to lowering the acceptable aircraft noise standards by 10 EPNdB and asked for AIA views on the matter. Council representa-

tives advised that a preliminary assessment indicated a 10 EPNdB would be a desirable goal for the next generation of aircraft but industry did not have the technology today to accomplish the goal. AIA offered industry assistance in determining the noise levels reduction that might be possible for aircraft in current production and realistic date for the change in the requirement to become effective.

Council representatives were engaged at year's end in developing AIA comments on aircraft engine emission standards proposed by the Environmental Protection Agency in December 1972.

Cost Savings Through Standards

The importance of usable technical standards is reflected by recently released DOD statement on cost savings by use of standard:

- Part - \$1,300 to \$31,000
- Sub-assembly - \$381,000
- Major-assembly - one million dollars

This significant cost saving can be achieved only if broadly accepted standards are available and are kept up-to-date with the rapidly changing technology. Council committees have assisted the government in 1972 in the coordination of hundreds of proposed new and revised Industry and Military specifications and standards.

Considering that the DOD index of specifications and standards lists over 40,000 active documents, all applicable for contractual application, the need for purging unrealistic and limiting requirements and correcting these documents so that they can be used in lieu of unique contractual technical requirements takes on a different perspective, as a valuable tool for cost savings.

New Material and Process Development

The development of new weapons systems has created a need for new materials and advanced processing techniques, and a demand for both new specifications and revisions to existing specifications, including the best technical knowledge and principles available. This occurs at a time when the economic conditions of the aerospace industry call for greater cost effectiveness in the task of generating proper specifications in a timely manner.

The present specification systems contains a degree of redundancy in that documents may be generated on similar materials or processes by one or more issuing groups, requiring multiple representation and response from both Industry and the government.

DOD is giving favorable consideration to an AIA recommendation that a study be authorized to review the problems and economic impact of the present methods of developing and coordinating aerospace materials and process specifications.

The study could point the way to a more rational procedure in the mechanism of writing, reviewing and standardizing

materials and process specifications. New approaches to preparing specifications should be examined, so as to benefit from improved scientific and technological understanding and knowledge.

Environmental Test and Limits

An AIA proposal for environmental test, test limits, and design requirements led to formation of a DOD-industry task group. The group completed agreements on improved and expanded tri-Service Test Methods Standard (MIL-STD-810). However, standard environmental requirements for all military services could not be resolved and these will be issued first as a USAF-only requirement. AIA will continue to recommend further tri-Service-Industry effort to achieve a tri-Service standard.

Electronic Systems

A major factor in rapidly changing aerospace electronic systems is technological growth of microcircuits, and their application as hybrids and medium and large scale integrated circuits.

The specification tree for first generation microcircuit devices is nearing completion as a direct result of military and AIA pursuit of this objective. A most significant development has been DOD-NASA agreement to issue NASA Complementary Metal Oxide Semiconductor (CMOS) Microcircuit Specifications in the military series with full DOD-industry coordination.

AIA continues to be the catalyst for development of new military documents including individual microcircuit specifications, characterization and testing of hybrid microcircuits, uncased semiconductor chips, metal oxide semiconductor circuits (MOS), and large scale integrated circuits (LSI).

The updating of 17 of the 69 electronic system design baseline standards was completed and several proposed new standards were reviewed during 1972. Orderly revision of the remaining 52 design standards is scheduled over the next 18 months to keep them dynamic and usable with a minimum of expense for developing and justifying deviations.

Standardization Management

Industry and DOD representatives met twice in 1972 to discuss overall management schemes for enhancing defense standardization as a tool for controlling cost of military systems. These discussions were in consonance with a growing desire of the military and Congress that design to cost be considered equally as important as performance and schedule parameters.

The industry efforts to achieve integrated government-industry standardization have not been fully successful, but nevertheless considerable progress has been made. For example, Assistant Secretary of Defense (I&L) memorandum to Director of Defense, Research, and Engineering commended the Defense

Supply Agency (DSA) approach to strengthening its relationship to Industry in standardization efforts by directing the following:

- "Industry and professional associations performing standardization in each FSC are to be identified.
- "Each Program Analysis is to include a discussion of the relationship between DOD and industry standardization work with the objective of identifying those industry projects that will satisfy DOD requirements.
- "Each Program Analysis is to identify the coordination actions which have been taken to provide for an integrated DOD/industry standardization program.
- "Make these policies work through communication with industry groups such as the AIA."

Other standardization management accomplishments include the introduction of military standards which are intended to cover standardization management in weapon system contract, the release of MIL-STD-1515 as a base for Government-Industry standardization of aerospace hardware in manner similar to MIL-STD-454 program for electronic design standards, and plans for conversion of appropriate company standards to National Aerospace Standards.

National Aerospace Standards

National Aerospace Standards are a series of voluntary industry documents covering a wide variety of aerospace requirements not included in current government, national or industry documents. The series consists of over 1,200 standards and specifications defining mechanical and electrical hardware, structural fasteners, large numerical controlled machine tools, cargo pallets and airport planning.

Current projects cover development of standards for an aluminum coating, blind fasteners, and composite tape machine. During 1972 approximately 15 new standards and 90 revisions to existing standards were published.

Material and Process Specifications

The review of government material and process specifications provides government agencies preparing these documents with current user experience and advice, and results in acceptable and usable documents of minimum cost.

Approximately 50 specification documents were reviewed in 1972 covering such materials and processes as aluminum alloys, titanium alloys, sealing compounds, finishes and cratings, structural core materials, adhesives, brazing, welding, shot peening, and heat treating processes. Audit of published documents indicates a high degree of acceptance of the industry recommendations.

Structural Design Criteria

Industry specialists have worked with military service representatives to develop structural design and test criteria to

improve the structural integrity and service life of military aircraft and to develop an Engineering Design Handbook for Rotorcraft. Programs have been initiated to develop mechanical properties data on specific materials and to establish industry requirements for fracture mechanics data and testing procedures.

Metric Conversion

In order to develop an aerospace industry position on metric conversion, a survey of AIA members was conducted in 1972. Data was received from 71 per cent of the members which led to the conclusion that the U.S. should convert to the metric system, and the government should play an active role in managing and coordinating the conversion. However, conversion on the part of private industry should be voluntary and not mandatory.

The use of federal procurement will stimulate and accelerate national conversion in both the public and private sectors. There should be an established plan for conversion with a fixed target date as a goal. The cost of conversion to private industry should generally be treated as a normal cost of doing business, to be included in the prices of products and services sold to customers.

Basically, these conclusions indicated general agreement on the part of the aerospace industry with the recommendations of the Secretary of Commerce in his 1971 report on the U.S. Metric Study, and with subsequent proposed legislation.

The survey resulted in an AIA Statement on Metric Conversion which will be used as a basis of AIA views on legislation expected to be proposed in the 93rd Congress.

International Standardization

A study of the role of the aerospace industry in international standardization activities indicated that the industry's participation has been limited, not providing an opportunity to have a significant role in determining the standardization activity, or a strong voice in its outcome.

The current trend towards universal use of the metric system assures that future international standards will be developed in the metric system, and that current U.S. standards, based on a non-metric system, will not receive international acceptance.

The study concluded that AIA should provide an appropriate mechanism through which the interests of the aerospace industry in international standardization should be represented, and recommended appropriate steps be taken to align AIA organizationally with the International Organization for Standardization (ISO) and its U.S. member, the American National Standards Institute (ANSI). At the proper time, the aerospace industry should take an active role in developing metric standards embodying the latest U.S. technology, and introduce these into ISO channels.

Flight Test Requirements

The performance of many contracts requires that contractors maintain and operate government owned aircraft. Generally speaking the government assumes the flight and ground risk for these operations, and must assume that all operations are conducted in a manner in the best interest of the government.

The present method of controlling contractors' flight testing operations by means of a service regulation leaves much to be desired since it provides neither the contractor nor the government the degree of protection that would be available if those requirements were covered by the contract. An industry position on this matter has been prepared for presentation to DOD.

AIA is also concerned by a trend within the government to have all flight testing conducted by military personnel. Such a change would substantially dilute the contractor's authority and control over his test programs without relieving him of any responsibility for the performance under his contract. During 1972 this trend has become more apparent in the case of those contracts involving the use of Air Force aircraft.

The AIA Flight Safety Program, which is a statistical reporting system of aircraft accidents and incidents, has been expanded to develop recommended practices and procedures for the conduct of contractor flight test programs. It is the goal of this Program to develop criteria to be issued as an industry standard which can be adopted by the military to govern contractor operation of government owned aircraft. Such a standard will provide the needed assurance for the government and will afford the contractor the necessary flexibility to efficiently perform under the terms of the contract.

Propulsion Systems

A review of the situation which resulted in the proliferation of service propulsion system requirements provided the basis for an AIA report to the DOD. This report pointed out the benefits to both the government and the contractor of having fully coordinated DOD requirements. DOD has responded favorably to this report and AIA will provide assistance to the military services during 1973 to consolidate and coordinate their technical requirements for propulsion systems.

A recently issued design standard for aircraft gas turbines is being studied. This document is a source of concern to the industry since it severely restricts the technological freedom of the designer; is not compatible with the current DOD policy of "design to price," and in general would not provide state-of-the-art development. It is planned that this matter will be brought to the attention of the appropriate DOD officials in 1973.

At the request of DOD a review has been undertaken of a study report on "Methods of Acquiring and Maintaining Aircraft Engines." This report is a comprehensive compilation of the present method of acquiring and supporting aircraft propulsion systems and is intended to aid in determining means of reducing life cycle program costs. This study could have significant impact on DOD procurement and support policies and practices.

Currently an AIA study is being made of those elements in a gas turbine propulsion system which will now be required in rocket propulsion systems programmed for reuse, such as the Space Shuttle.

INTERNATIONAL SERVICE

The International Service is a guidance and coordination point for the exporting segment of the aerospace industry. Operating through the International Committee, its primary activity is the development of a platform for the exchange of views between industry and government agencies, to assist in creating, within the national interest, the optimum environment for increasing aerospace exports.

ARTHUR J. BURROWS
Avco Corporation
Chairman, International
Committee



The Executive Branch of the U.S. Government in 1972 reappraised the national economic objectives of international trade. Significant among the subjects reviewed were aerospace exports which have high visibility as a major contribution to the nation's trade balance. The favorable aerospace trade balance during 1972 declined only slightly from 1971.

AIA International Service and International Committee contributed to several key studies conducted by the government in 1972 which focused on the international competitive capability of the U.S. aerospace industry. Among important basic issues examined were product financing and international exchange of technology which have a direct bearing on the near-term capability to export aerospace products. Issues affecting the industry's ability to sell internationally included the problems of off-set procurement and anti-trust limitations to international sales. These and related problems raised in 1972 must be resolved, at least in part, by government policy to continue a successful aerospace export program.

Interesting new developments in potential aerospace sales in China, Russia and Eastern Europe came in 1972. Even though these "restricted area sales" involve commercial aerospace products, National Disclosure Policy and Department of Defense attitudes remain primarily unresolved. Following the AIA International Committee recommendation, an intra-agency meeting was held to review the sale of sensitive components to "restricted areas."

Total U.S.-manufactured aerospace exports amounted to \$3.8 billion in 1972, a 8.9 per cent decrease from the 1971 all-time high of \$4.2 billion.

Export Financing

The industry's products, when eligible from a national security position, gained an effective response from U.S. financial institutions for export financing during 1972. In cooperation with progressive commercial banks, the Export-Import Bank continued to do an impressive job of leadership in arranging export financing for U.S.-manufactured jet transport aircraft. AIA and individual member companies provided

substantial aerospace statistical information at the request of the Export-Import Bank.

In Fiscal Year 1972, commercial banks responded favorably to the DOD guarantee private credit program by supplying \$220 million, or 40 per cent of all foreign military sales. This compared with only \$55 million of private financing in fiscal year 1971 or 7 per cent of the total foreign military sales credit program. This method of export financing provides additional availability of credit funding, while freeing government financial resources for other programs. The International Committee's continuing program involving participation by commercial bankers at national meeting symposia has been one of the key factors in developing this phase of export credit financing.

International Legislation

Cooperating with other trade groups, the AIA International Committee sponsored periodic meetings in 1972 for the purpose of analyzing and reviewing specific bills and legislative actions directly affecting the international trade of aerospace products. Burke-Hartke, the Equal Export Opportunity Act, the Military Sales Act, and a number of the trade bills were discussed and reported to the membership. There also was an influx of internationally oriented bills indirectly affecting the industry's ability to conduct its international business.

Foreign Aerospace Competition

Focusing on the problems of the European Economic Community concerning aircraft production and export sales, the Commission of the European Communities published, July 19, 1972, A Policy of the Community for the Promotion of Industry and Technology in the Aeronautical Sector. Known as the Spinelli Plan, this report clearly states that European manufacturing consolidation, backed by substantial government financing, will be the required course of action to follow in competing with U.S. aerospace firms. The AIA International Service provided industry with information on the major foreign aerospace competitive development.

Export Control Legislation

One major problem facing the international sales of aerospace products is the Government's policy of controlling high technology exports. In August the Congress passed the Equal Export Opportunity Act which extended and amended the Export Administration Act of 1969. The new law provided the Secretary of Commerce with five new progressive administrative measures under which current export controls can be liberalized in the interest of expanding exports. This new measure was supported by the AIA International Committee. The Department of Commerce requested AIA's cooperation in implementing specific phases of the decontrol process of commercial aerospace products.

Major efforts and recommendations were made by the International Committee to obtain a more liberal policy for the procedures and regulations controlling the export of military aerospace products.

International Cooperation in Space R&D

In 1972 U.S. and foreign government policies and guidelines relative to international cooperation in space R&D on aerospace products were explored. U.S. officials and foreign executives

participated in the national meetings of the International Committee and discussed European-U.S. plans and possible arrangements for the post-Apollo and application satellite programs. New development in Europe concerning the activation of Eurosat also were evaluated during the year.

In 1972, the AIA International Committee reviewed the DOD proposed concept of international cooperative R&D and interdependence, a significant program designed to achieve maximum R&D at reduced costs.

FAA - International Aerospace Leadership

Recognizing the importance of continuing the economic and security contributions of the aerospace industry, the Federal Aviation Administration in 1972 began a series of briefings in cooperation with AIA and other associations. These briefings, covering major world geographical regions, provided an analysis of the International Civil Aviation Organization air navigation re-equipment plans on a country-by-country basis.

AIA International Service participated in the panel program on International Aviation Affairs on the FAA National Planning Review Conference held in Washington D. C. This provided AIA an opportunity to make specific recommendations concerning various problems facing U.S. aerospace exporters.

OFFICE OF PUBLIC AFFAIRS

The mission of the Office of Public Affairs is to inform the public about the goals and accomplishments of the aerospace industry in support of national security, space exploration, civil aviation, commerce, international trade and other national goals of importance to the nation and its citizens.

During 1972 the AIA Office of Public Affairs continued to focus its output of information on subjects of major interest to the industry as a whole. Primary areas of emphasis were aerospace contributions to a better life for mankind and to the national balance of trade.

Studies and Reports

The series of 20 studies and supporting pocket summaries covering various aspects of the Government procurement process was completed at the end of 1971, but outside interest in these studies, which were made in support of the work being done by the Commission on Government Procurement, continued well into 1972. The Commission was due to submit its report by the end of 1972. Comment and other actions generated by the report will be an important item of business for AIA in 1973.

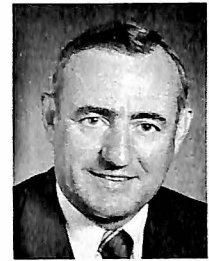
The Aerospace Research Center conducted several studies that were useful internally, including two that were published and distributed throughout Government, to news media and to a wide variety of educators and other opinion leaders. These studies were entitled "International R & D Trends and Policies: An Analysis of Implications for the U.S." and "The National Technology Program—Utilization of Industry."

Other Publications

Aerospace Magazine: Continuing the pattern of 1971, the magazine was published quarterly during 1972. The April issue was unusual on two counts. First, it was themed around the space shuttle and the benefits of the space program. Second, it carried a postcard readership survey. The survey brought in an unusually high number of responses and a gratifying number of specific comments which, almost without exception, were laudatory. The greatest number of favorable comments came from the teaching profession.

Aerospace Facts and Figures, 1972/73: This authoritative reference book was published during the second quarter of 1972. It was prepared by the AIA Public Affairs staff and distributed commercially by **Aviation Week & Space Technology** magazine, a McGraw-Hill publication. "Aerospace Facts and Figures" is the most complete reference source for

STANLEY M. LITTLE, JR.
The Boeing Company
Chairman, Public
Affairs Council



aerospace industry statistics published in up-dated form each year.

Helicopter Operators and Heliport Directories: AIA again published the two annual directories: "Directory of Helicopter Operators in the United States and Canada," and "Heliports - Helistops in the United States, Canada, Puerto Rico." For the first time AIA was supported in publishing the operators manual by **Rotor and Wing** magazine which devoted much of its summer issue to the full listing, thereby increasing the distribution significantly.

"You Can Get There From Here": A new pamphlet outlining the value of a heliport to a community and presenting a checklist of steps to take in developing a heliport was published in December 1972. The pamphlet was given wide distribution, with emphasis on leaders at the city and state government levels.

Aerospace Perspectives: This new publication, designed to present news and views of the nation's high technology industry, was launched in August. The first issue of this four to six-page publication was on the subject: "The Aerospace Industry: An Economic Profile." The second (October) issue was on "V/STOL: Straight Line Air Travel—and More." The third issue (November) was on "Civil Aviation Research and Development." Each issue is distributed to more than 14,000 addressees.

Short Items: During 1972 AIA developed and distributed eight messages, four written and four in graphic form.

The written subjects were: "Technology at The Crossroads," "Look to Space," "Man Didn't Move Forward by Looking Backward" and "Defense in Perspective."

The graphic subjects were: "Billions at Stake in Aircraft Market," "Trends in Federal Dollar Outlays," "U.S. Balance of Trade, 1964 - 1971" and "Air Travel Has Come of Age."

Other Activities

The AIA Office of Public Affairs continued close liaison with national media representatives in the Washington area, issued a number of news releases, arranged interviews, and developed and distributed a number of information items

(e.g. material covering the Space Shuttle and its role in the future, its inherent importance in serving mankind and its economic value to the U.S.)

Economic Data Service

The AIA Public Affairs program of gathering, analyzing, preparing and distributing industry statistical reports continues to meet with wide acceptance. Thanks to the support of member companies in providing information and to the cooperation of Government departments and agencies this program has done much to establish the Association as a prime source of accurate, timely and complete statistical information about the aerospace industry. Primary documents prepared and distributed include:

- Monthly and quarterly analyses of imports and exports of aerospace industry products.
- Semi-annual aerospace employment surveys.
- General industry economic data.
- The annual aerospace industry review and forecast, presented by Mr. Harr to the Aviation/Space Writers Association in Washington, D. C. in mid-December.
- The Economic Data Service of AIA exercises primary responsibility for gathering and developing the factual material that makes up "Aerospace Facts and Figures"—the unique publication that enjoys wide acceptance throughout government, the news media community and the educational field.

Aerospace Reference Library

The AIA Reference Library continues to be one of the best primary sources of aerospace information for staff members, member companies, AIA councils and committees, government offices, business and educational institutions. The library contains standard aeronautics and astronautics publications and special collection of news clippings, background information, biographies, speeches, annual reports, aviation history, and information about allied associations and organizations.

Activities of President Harr

Mr. Harr has continued to make public presentations of the industry view on such subjects as the economic impact of the aerospace industry, the importance of technological progress, industry problems and foreign competition, risks and profits, weapons systems acquisition, the space program, and the shuttle.

Among the formal audiences addressed in 1972 were the Los Angeles Town Hall, Aero Club of Washington, the Bell Aerospace Management Club in Buffalo, the University of Texas graduate school of business, a special Boston financial audience, National Association of Business Economists in Los Angeles, AWA's annual year end "State of the Industry" presentation to the Wings Club in New York.

These speeches received considerable press coverage in audio, visual and print-media. In addition he continued to meet with media people in Washington and other major cities, participated in a Westinghouse network radio program, a regional TV show on space, and a "state of the industry" radio interview with NBC's Robert Goralsky.

He also presented industry views and comments at the Department of Transportation's Aviation Planning Review Conference, and on the health of the aerospace industry before the President's Aviation Advisory Commission.

Meetings

The Public Affairs Council met twice during the year. One occasion was the annual spring meeting in Washington, D. C., which included a reception for the national press corps. The other occasion was a two-day meeting at Scottsdale, Ariz., early in October. One PAC Executive Committee meeting was held in August in Washington, D. C., in preparation for the fall meeting of the full Council, and another was held early in December, again in Washington, D. C., to consider programs for the new year.

TRAFFIC SERVICE

Traffic Service is responsible for obtaining for the aerospace industry adequate, economical and efficient transportation facilities and service. Within its area of activity, the Service represents the Association before the courts, the transportation regulatory agencies, and boards and associations of carriers.

MAX J. JONES
*Thiokol Chemical Corporation
Chairman, Traffic Committee*



Efforts of Traffic Service during 1972 accomplished results which can be accurately measured in dollars and cents. As a result of the successful completion of cases, members reported cost savings of \$2,788,000. In addition, litigation costs for individual member companies were reduced. Included in the cases handled by AIA in 1972 were ten before the ICC, one federal court case, and nine cases with carrier rate bureaus.

The following is a summary of cases litigated by Traffic Service in 1972:

Civil Action T-4926—U.S. District Court (Kansas)

This was an appeal of the nation's railroads to a three-judge Federal Court from a decision of the Interstate Commerce Commission ruling in favor of AIA. The railroads were attempting to limit their liability to a maximum of \$300,000 per carload for negligent damage to shipments, primarily shipments of aerospace material. The court heard oral argument in which Traffic Service participated and thereafter ruled in favor of AIA and dismissed the railroads' appeal.

Docket No. 8683—Interstate Commerce Commission

The Burlington Northern Railroad cancelled all westbound specific commodity rates on aircraft and parts. The cancellation applied to shipments having a value in excess of \$300,000 per car. Inasmuch as the facilities of The Boeing Company in the Seattle area are local to the Burlington Northern, only Boeing was effected by the cancellation. It was obvious, however, that the carrier was making a test case and, if successful, all other railroads would have followed its lead. Traffic Service filed a strong protest with the I.C.C. The cancellation was suspended. Following oral hearing the I.C.C. ruled in AIA's favor. The effect on Boeing of the cancellation of specific commodity rates on aircraft parts, as applied against shipments moving in 1972, would have increased its transportation bill for that year by \$2,028,000.

Ex Parte No. 263—Interstate Commerce Commission

AIA filed a complaint with the Interstate Commerce Commission alleging that the practice of all railroads, motor carriers and freight forwarders in arbitrarily settling loss and

damage claims at less than full amounts were unlawful and should be enjoined. The Commission agreed and following a hearing, ordered the practice halted. AIA Traffic Committee members advised that the successful conclusion of this case will result in added recoveries to them of \$33,300 annually.

Docket No. 26015—Interstate Commerce Commission

Transcontinental motor carriers increased freight rates on specific shipments by the device of assessing charges on space occupied rather than on the basis of weight. The effect on light loading aerospace shipments was especially detrimental and prejudicial. Accordingly, an AIA protest was filed with the Interstate Commerce Commission. The increases were suspended by the I.C.C. and subsequently cancelled. Traffic Committee members reported that added annual freight charges of \$564,908 were thus avoided.

In addition to the foregoing litigation, Traffic Service has obtained favorable disposition of eight informal cases before carrier boards and bureaus with resulting savings to members totaling \$162,678.

Pending Litigation

Traffic Service is, at this time, a party to seven cases before the Interstate Commerce Commission. The cases are in various stages of litigation. The Service also is participating in two pending cases before the Civil Aeronautics Board and one case before the U. S. Tariff Commission. Traffic Service also will participate in a pending Federal District Court suit in Ft. Worth, Texas, which will challenge the lawfulness of motor carrier freight rates applicable to shipments of aircraft parts.

Government Agencies Coordination

Throughout the year Traffic Service continued to coordinate the traffic and transportation interest of members with government agencies and departments. Principal activity in this area consisted of participation in rulemaking proceedings of the Department of Transportation's Hazardous Materials Regulations Board, the U. S. Bureau of Customs, the Interstate Commerce Commission, and the Civil Aeronautics Board. Close coordination also was accomplished with the traffic

organizations of NASA and the Department of Defense, primarily the Military Traffic Management and Terminal Service and the Air Force Systems Command. To facilitate action in these areas, *ad hoc* task forces of the Traffic Committee were assigned specific responsibility to review pending administrative actions and to prepare recommended position papers.

Because of a resurgence of problems with respect to impediments to the movement of outsize aerospace material, a task force was established with responsibility to identify such impediments, isolate their causes, and design programs for their removal or mitigation. The task force will coordinate its activ-

ity with government agencies (local, federal and state), carriers and carrier associations and such other organizations and individuals who can contribute to the accomplishment of the Committee's objectives.

The activities of the Service are coordinated at periodic meetings of the Traffic Committee. This Committee consists of traffic managers of aerospace companies holding membership in AIA. Traffic Service provides professional representation backed up by the coordinated strength of the industry and thus can obtain results not otherwise attainable by the individual member companies.

TRANSPORT AIRCRAFT COUNCIL

The Transport Aircraft Council coordinates and presents transport aircraft and engine manufacturers' views with respect to commercial air transport matters; it plans and gives direction to AIA actions designed to promote the most effective and efficient potential of civil air transport aircraft.

JACKSON R. MCGOWEN
McDonnell Douglas Corporation
Chairman, Transport
Aircraft Council



During 1972 the Council followed through on programs in support of industry and government activity to preserve the leadership of the United States in commercial air transport development and sales. This program will continue through 1973 with added emphasis in view of the growing competition from the European Economic Community.

The members of the Council together with air carriers and airport management interests will be involved deeply in this effort to effectively meet the challenge which has been clearly stated by the EEC. In order to broaden the sphere of influence of the manufacturing industry in international aviation needs the Council initiated an effort to organize an international association of aerospace manufacturers.

During 1972 this effort culminated in the formation of the International Coordinating Council of Aerospace Industries Associations. The members of this organization are the AIA, the Air Industries Association of Canada, the Association Internationale des Constructeurs de Materiel Aerospatiale and the Society of Japanese Aircraft Constructors.

The organization therefore represents the Aircraft Manufacturers Association of 13 countries and, except for the USSR, represents all of those countries currently involved in the construction of commercial transport aircraft. This organization has been recognized by the International Civil Aviation Organization as being qualified for representation at its proceedings. The Council has conducted a survey of ICAO activities and is preparing recommendations as to the extent of ICCAIA participation.

The negotiations with the Air Navigation Commission of the ICAO to adopt the industry developed standard entitled "Airplane Characteristics for Airport Planners" (NAS 3601) have met with some success. The use of this format by ICAO will simplify the problem of manufacturers supplying aircraft data for use in the ICAO program to study aircraft/infrastructure compatibility.

As a further step in international cooperation the Council has sponsored the formation of an International Industry Working Group to expand the effort carried out by the United States Aviation Industry Working Group. The Council provides representation to the Steering Committee for this international group which is carrying out a program to collect airport physical, operating and economic data on a worldwide basis. This will supplement the program to collect, in a standard format, the same data for airports in the continental United States.

The program proposed in 1971 to prepare a general position paper on the user requirements for short haul transportation systems has grown into a cooperative program with the Government. A representative has been assigned to the NASA group which is responsible for developing these requirements. The Council provided representation and assistance to the programs of the Aviation Advisory Commission and during 1973 will prepare a critique and recommendations on the Commission report.

Close cooperation was maintained with the Department of Transportation in the preparation of the working papers for the Cost Allocation Study which was required by the Airport Airways Development Act. Together with the air carriers and airport operators the Council will review the study.

Two publications which were distributed previously related to the trends and growth projections for CTOL and STOL aircraft. These have become an important source for airport planners, communities and operators on an international basis. During 1973 these documents will be reviewed and updated as necessary to insure the most accurate projections that can be made available. On a continuing basis the TAC works with the FAA to develop the program for the annual national aviation system planning review conference.

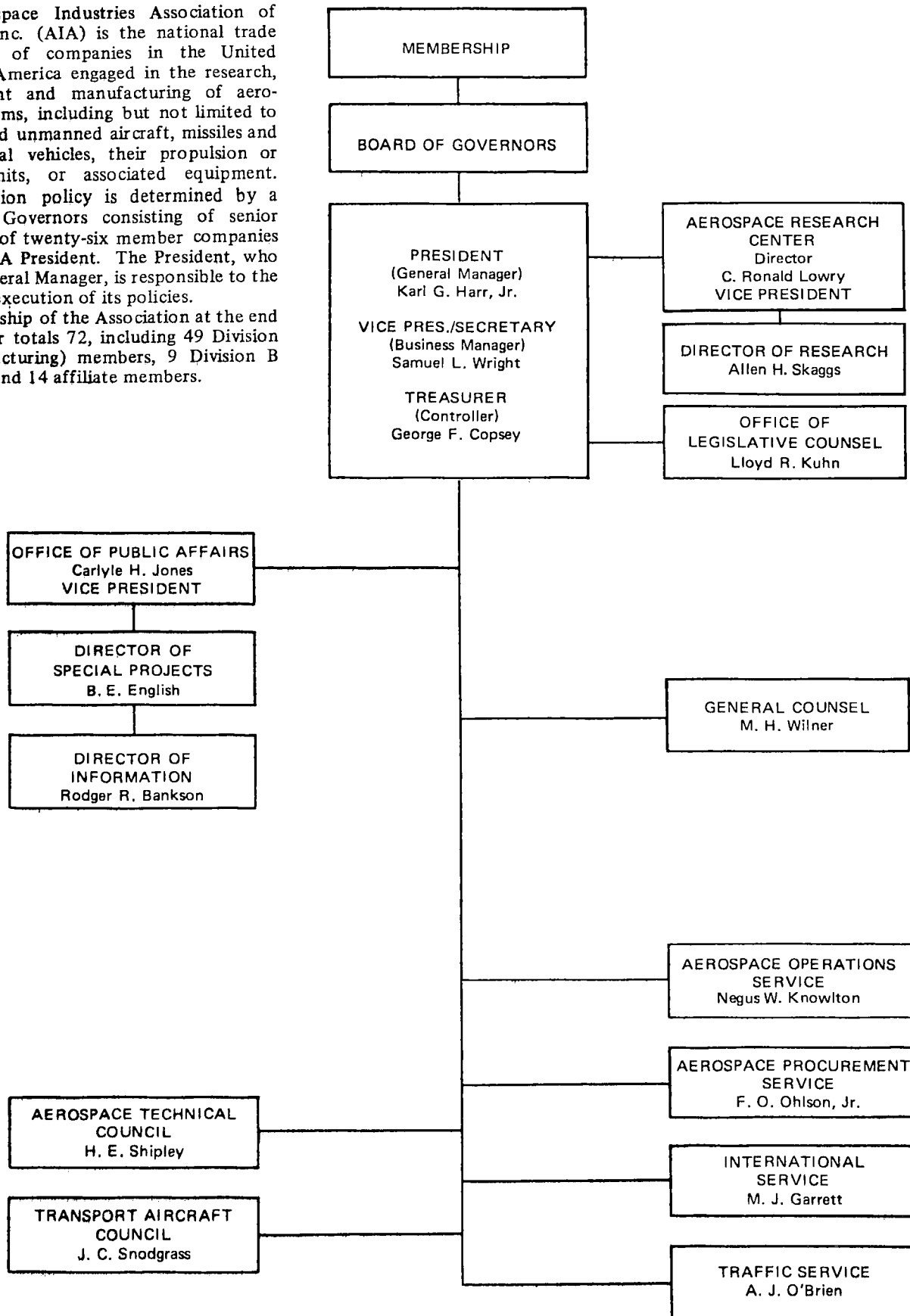
ORGANIZATIONAL CHART

(January 1, 1973)

The Aerospace Industries Association of America, Inc. (AIA) is the national trade association of companies in the United States of America engaged in the research, development and manufacturing of aerospace systems, including but not limited to manned and unmanned aircraft, missiles and astronautical vehicles, their propulsion or control units, or associated equipment.

Association policy is determined by a Board of Governors consisting of senior executives of twenty-six member companies and the AIA President. The President, who is also General Manager, is responsible to the Board for execution of its policies.

Membership of the Association at the end of the year totals 72, including 49 Division A (manufacturing) members, 9 Division B members, and 14 affiliate members.



AIA MEMBERSHIP

MANUFACTURING MEMBERS

AERODEX, INC.
AEROJET-GENERAL CORPORATION
AERONCA, INC.
AMPHENOL SAMS DIVISION
 The Bunker-Ramo Corp.
AVCO CORPORATION
THE BENDIX CORPORATION
THE BOEING COMPANY
CCI CORPORATION
CHANDLER EVANS INC.
 Control Systems Division of Colt Industries
E - SYSTEMS, INC.
THE GARRETT CORPORATION
GENERAL DYNAMICS CORPORATION
GENERAL ELECTRIC COMPANY
 Aerospace Business Group
 Aircraft Engine Business Group
GENERAL MOTORS CORPORATION
 Detroit Diesel Allison Division
THE B. F. GOODRICH COMPANY
 Aerospace & Defense Products
GOODYEAR AEROSPACE CORPORATION
GRUMMAN AEROSPACE CORPORATION
GYRODYNE COMPANY OF AMERICA, INC.
HEATH TECNA CORPORATION
HERCULES INCORPORATED
HONEYWELL INC.
HUGHES AIRCRAFT COMPANY
IBM CORPORATION
 Federal Systems Division
ITT DEFENSE-SPACE GROUP
 ITT Aerospace/Optical Division
 ITT Avionics Division
 ITT Defense Communications Division
KAISER AEROSPACE & ELECTRONICS
CORPORATION
LEAR SIEGLER, INC.
LOCKHEED AIRCRAFT CORPORATION
LTV AEROSPACE CORPORATION
MARTIN MARIETTA CORPORATION
McDONNELL DOUGLAS CORPORATION
MENASCO MANUFACTURING COMPANY
NORTH AMERICAN ROCKWELL CORPORATION
NORTHROP CORPORATION
PHILCO-FORD CORPORATION
PNEUMO DYNAMICS CORPORATION
RAYTHEON COMPANY
 Missile Systems Division
ROHR CORPORATION
THE SINGER COMPANY
 Aerospace and Marine Systems Group

SOLAR, DIVISION OF INTERNATIONAL HARVESTER CO.
SPERRY RAND CORPORATION
SUNDSTRAND AVIATION, DIVISION OF
SUNDSTRAND CORPORATION
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TELEDYNE RYAN AERONAUTICAL
TEXTRON, INC.
 Bell Aerospace Company
 Bell Helicopter Company
 Dalmo Victor Company
 Hydraulic Research and Engineering Corporation
THIOKOL CHEMICAL CORPORATION
TOOL RESEARCH AND ENGINEERING CORPORATION
TRW INC.
UNITED AIRCRAFT CORPORATION
WESTINGHOUSE ELECTRIC CORPORATION
 Aerospace Electrical Division
 Aerospace and Electronic Systems Division
 Astronuclear Laboratory

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PARKER & COMPANY INTERNATIONAL, INC.
MANUFACTURERS AIRCRAFT ASSOCIATION, INC.
BRUKNER, CLAYTON J.
CONDON, CYRIL HYDE
DE SEVERSKY, A.P.
FALES, HERBERT G.

HONORARY LIFE MEMBERS

LOENING, ALBERT P.
LOENING, GROVER

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AVIATION WEEK & SPACE TECHNOLOGY
BRITISH AIRCRAFT CORP. (U.S.A.), INC.
COMMERCE OVERSEAS CORPORATION
EASTERN AIRCRAFT CORP.
INFORMATION HANDLING SERVICES, INC.
LYBRAND, ROSS BROS. & MONTGOMERY
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TRANSAERO, INC.
U.S. AVIATION UNDERWRITERS, INC.
EDWIN C. WALTON



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