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TO THE MEMBERSHIP



KARL G. HARR, JR.

1968, the 10th year of the Space Age, saw the achievement of a new level of technological and managerial maturity of the aerospace industry that brought with it proven capabilities to meet man's newest and most ancient challenges.

The Apollo 8 mission, which placed man in orbit around the moon, provided dramatic evidence of industry's technological maturity.

During this same year, the techniques of technology and management developed for major defense, space and civil aircraft programs were increasingly applied to such diverse socioeconomic areas as urban congestion, air and water pollution control, crime detection and control, management of natural resources, teaching innovations, hospital design and operation, and training and employing disadvantaged persons.

This comprehensive application of aerospace industry techniques now promises to become increasingly apparent as both the mechanics of technology transfer and the capability of government to utilize the technology proceed.

The industry also moved forward significantly with its primary tasks of designing, developing and producing the systems for national defense, broad projects in the unmanned area of space exploration, and major civil aircraft programs.

A major thrust of the Association's

efforts during 1968 was to assist in removing constraints to the growth of air commerce. This problem, which largely involves airport and airways congestion, is still very much with us and will continue to be a major effort in 1969. The promised growth of air travel, with its many benefits to the economy as a whole, depends upon prompt programs to modernize existing airports, build new facilities and sharply increase the efficiency of the airways system.

AIA also continued its dialogue, principally with the Department of Defense and the National Aeronautics and Space Administration, to further improve the procurement process. Noteworthy in this regard was an AIA study analyzing the weapons systems acquisition process (see Page 30), which is proving extremely useful to both the government and industry.

Statistical measurement of the industry's accomplishments in 1968 showed gains in virtually every major category.

- Sales reached a record \$30.1 billion, an increase of 10.5 percent over 1967. A major portion of this increase was attributable to a substantial growth in sales of turbine-powered commercial transports. These sales amounted to \$3.73 billion representing, for purposes of illustration, an increase of 211 percent over 1965.

- Production of utility and executive

aircraft reached 13,698 units having a shipment value of \$426 million. Civil helicopter production increased to 528 units, valued at \$59 million.

- Sales to the Department of Defense in 1968 reached \$16.9 billion, an increase of nearly 7 percent over 1967.

- Nonmilitary space sales declined 3.7 percent in 1968 to \$4.047 billion.

- Backlog at the end of the third quarter of 1968 amounted to \$31.2 billion, a gain of \$2.6 billion over 1967, and primarily due to orders for commercial transports.

- Average employment in the industry during the year was 1.4 million workers. The aerospace industry continues to be the nation's largest manufacturing employer.

Exports during 1968 reached nearly \$3 billion, 32 percent higher than 1967. Commercial exports realized an impressive 63 percent increase over 1967, a reflection of the sharp rise in the export of turbine-powered transport aircraft.

The aerospace contribution in 1968 to the balance of trade was more than twice the actual trade balance. Without these exports, the trade balance would have shown a deficit of \$1.5 billion.

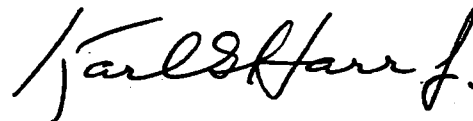
At the Fall Meeting of the Board of Governors, V. J. Adduci was promoted to senior vice president; Samuel L. Wright was named vice president and secretary-treasurer; C. Ronald Lowry was named

vice president, and George F. Copsey was appointed assistant treasurer.

The year 1969 will mark the 50th anniversary of the Aerospace Industries Association. AIA was formed in 1919 as the Aeronautical Chamber of Commerce. In 1945 the name was changed to the Aircraft Industries Association; the present name was adopted in 1959 to reflect the industry's heavy involvement in missiles and space exploration.

As we look back over these past 50 years we see an industry which has grown from a small, highly dedicated group of people involved in designing and producing what was largely regarded as a mechanical curiosity — the airplane — to one possessing the greatest technological capability in the Free World. As that industry moves with the times to apply such capability to an ever widening range of national needs the astonishing progress of the past 50 years promises to be exceeded by an even more challenging future.

Respectfully submitted,



Karl G. Harr, Jr.
President



AEROSPACE OPERATIONS SERVICE

The Aerospace Operations Service functions in widely diversified areas encompassing manufacturing, material management, product support, quality assurance, service publications and spare parts. Operating through six committees, supervising numerous task groups, the Service endeavors to anticipate and avoid, or solve industry and/or government problems.

The Aerospace Operations Service during 1968 was involved in activities pertaining to the production, purchasing, subcontracting and quality of aerospace products and to contractor services supporting their customers in the use of the equipment. Much of this effort involves forward planning to facilitate production and to optimize the operational availability and maintenance of aerospace products.

In practically every area of Aerospace Operations Service activity projects are initiated to push the state of the art. Examples include:

- Studies to increase computerization of quality assurance procedures.
- Data exchange of product performance between aircraft manufacturers and airlines.
- Environmental pollution control in manufacturing processes.
- Contracting techniques for contractor maintenance of military equipment.

Many projects are initiated to anticipate and avoid foreseeable problems such as surveys of probable future bottlenecks in procurement or manufacture of end articles, spare parts and support and training equipment, and, when the surveys so indicate, to take or recommend action to avoid such problems.

Other projects are based upon the desirability of standardizing aerospace requirements to assist those who design and manufacture for this industry. Examples: the development of specifications/standards for vendor packaging, and National Aerospace Standards for production machinery, cutting tools and equipment peculiar to the needs of this industry. Such projects result in earlier availability of equipment tailored to aerospace needs.

Spare Parts Provisioning

Various review efforts were conducted in 1968 with the DoD and the military services directed toward improving the methods for selecting and ordering spare parts.

Among the results was a new DoD specification reflecting the joint efforts of a government/industry task group which prescribed procedures for phased provisioning of initial support items.

Implementation of this specification will provide economies through the early procurement of specific long lead time in quantity lots and their deferred machining and processing until the actual needs for the parts are confirmed through operational usage.

A joint review effort with the Air Force

concerned the refinement of standard provisioning contractual clauses which are used by Air Force resident provisioning teams established at contractors' facilities. The objective of these teams is to streamline provisioning in order that adequate, timely and economical initial support will be provided by the operational requirement date. Almost all of the recommendations developed through joint efforts have been accepted with the exception of certain unresolved differences pertaining to an Air Force requirement for liquidated damages.

A study is underway to determine the impact of provisioning data standardization on both industry and government. The task of this group will be to consider the types of data needed within the next several years and the most effective means of handling it, such as by data processing cards, magnetic tape, or other approaches. Preliminary review indicates that the standardization of elements of data rather than overall provisioning documents is the most feasible approach. For example, cost reductions for standardized data elements were estimated at 18 percent if two of the military services are involved with the purchase of the same equipment. Additional reduction is possible if the three services purchase the same equipment. When this study is completed in 1969 the findings will be presented to government representatives.

Integrated Logistic Support

Future improvement in the logistic support of aerospace systems and equipment may be attributed to several actions which AIA and the government completed in 1968. They include:

- Methods of assuring an earlier and more definitive recognition of logistic requirements.
- Means of costing and evaluating support requirements to permit logistic trade-offs with design.
- New logistic planning guides for the program/contract managers.
- Standardization of inter-service logistic policy and methods of policy application for multi-service procurements.

The release of the "Integrated Logistics Support Planning Guide" for DoD systems and equipment has made available to both government and industry program or project managers a means for achieving the desired balance between the operational, design, economic and logistic factors. The guide identifies all logistic support planning functions or potential requirements and the analytical time phased processes to assure coordi-



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nated consideration of multiple logistic support alternatives and trade-offs prior to and during the design decision-making phases and throughout the acquisition period.

Spare Parts Phaseout Procurement

AIA presented recommendations to the DoD calling for final review action by the government to insure the procurement of quantities of selected critical spare parts prior to the end of production while the contractor still has intact his work force and tool setup. A DoD Instruction on Spares Phaseout Procurement is being developed from the AIA documents and a final draft DoD document should be available for review by a joint government/industry task group in 1969.

Contract Repair Performance Improvement

Impediments to prompt repair and overhaul of military equipment prompted an AIA study during 1968 to determine ways of improving contractor performance because of the large volume of this type of work. Recommendations for improving administration, contracting, funding and communications between the contractor and the government were submitted to DoD. Implementation of these recommendations should significantly reduce the repair time cycle and return the items to inventory earlier. Currently an industry task group is following up further implementation of these recommendations with representatives from the military services.

Manual Specification Reviews

AIA recommendations were provided in 1968 on ten specifications proposed for the DoD Technical Manual Specifications and Standards (TMSS) program. This is a continuing effort to reduce redundant procedures and conflicting requirements of the military services.

Among the draft specifications reviewed were the general style and format requirements for all technical manuals; minimum requirements for commercial equipment manuals, and the preparation of manuals for calibration procedures.

The recommendations called attention to restrictive requirements which, if implemented, would increase manual costs unnecessarily. Suggestions for improvements, and clarification of requirements were also provided to the military services for a series of proposed and revised specifications.

Affected were manuals for aircraft engine maintenance and overhaul instructions; repair parts and special tools list

requirements, and instructions for performing equipment validation and verification. Included in these review efforts were recommendations for updating and improving the specifications for flight manuals to provide a pattern for revising the future flight manuals of the military services.

Calibration and Standards

Two draft revisions of the military specification "Calibration Program Requirements" were reviewed during 1968. AIA proposed new requirements which industry found would add significantly to the cost, but would not provide an increase in quality. Continuing dialogue with OASD representatives indicates the acceptance of many of the AIA recommendations.

NASA Quality Program Requirements

Improvements, accompanied by justifying reasons, have been recommended for NASA's proposed draft of "Quality Program Requirements." The recommendations have been augmented by meetings in which NASA and AIA personnel have studied the problems and alternative solutions.

The development of the proposed draft was prefaced by studies of the current NASA Quality Program which included visits to NASA installations and to the various program offices. The general policy and objectives were developed during this study period.

Handbook Procurement

AIA completed a study concerning the amount of technical manual effort being subcontracted by industry to independent technical writing firms. Responses from 40 member companies were compiled into a report which was presented to DoD, and well received. In summary, the report indicated that many member companies regularly subcontract some publications work to independent firms. Included was considerable substantiation of the impracticality of competitively procuring complete technical manuals separately from equipment contracts, although selected tasks such as typing, illustrating and printing generally lend themselves to successful contracting.

The tasks that are subcontracted usually require a greater degree of coordination and supervision than the work done by the prime and accessory manufacturers' employees.

Field Service Representation

AIA has maintained continuous liaison

with the OASD and the military services concerning changes in government policy and procedures as they affect the field service/contract technical representatives. The increasingly restrictive government policy, although still permitting contractor field support, has increased the difficulties involved.

The industry position is aimed at reversing the present trend toward elimination of the direct communications line between the contractor and the field, and permitting company management flexibility in assigning field service representatives.

From a product support and design improvement standpoint it is considered necessary to continue the proven use of contractor technical representatives where aerospace products are being used or maintained. The current trend toward the alternative of replacing contractor employees with civil service technicians does not improve the service nor result in economy. Similarly, the difficulties in obtaining permission for company service representatives charged to overhead to be sent to the field hamper the contractors in providing service.

Air Transport Association Liaison

AIA and the Air Transport Association in 1968 continued joint review efforts in the service publications and spare parts areas. AIA task groups proposed changes to the ATA specifications for aircraft service and supply data, directed toward the rewording of test procedure instructions, the rearrangement of illustrated parts catalogs and the establishment of standard rules governing recommended quantities of supply items.

ATA's acceptance of a number of these recommended changes has been indicated which, when implemented, should facilitate the processing of spare parts and technical data transactions between the manufacturers and the airlines.

Performance Data Exchange

AIA in 1968 proposed to the Air Transport Association a concept of exchange of product performance data between individual aircraft manufacturers, their various airline customers, and the applicable suppliers of components and equipment.

The applications for this data include, but are not limited to spares inventory management, warranty adjustment, maintenance support, correction of deficiencies, provisioning, product improvement, support effectiveness evalua-

tion, support costing, maintainability and reliability analysis, and new product development.

It has been generally accepted that data exchange as practiced currently varies widely in scope, timing, format and definitions. Its effective use has been hampered by delays in reporting or acquisition and the non-standard methods of accumulation, distribution, retention and recall.

The International Air Transport Association and the Society of British Aerospace Companies will participate with AIA and ATA in developing the product performance data exchange concept into an international program.

Environmental Pollution Control

AIA continued in 1968 the study of pollution control. The original effort involved the problems concerned with complying with Los Angeles Rule No. 66 on Air Pollution Control. The recent effort has been expanded to cover both water and air pollution and encompasses any area where a member company's plant may be located. When a member company solves a pollution problem, the solution is provided to all member companies through AIA and it will be available to all others who wish to use it.

Employing the Unemployable

In addition to comprehensive and vigorous programs by AIA member companies to train and employ the hard-core unemployable and underemployed, various member companies have enlarged their in-house effort by encouraging the broad base of subcontractors to hire the hard-core. This concerted effort, implemented in each concerned company's unique fashion, has in effect reached over 40,000 suppliers. Letters to the subcontractors have advised them that with all other factors equal, such as price, delivery date and quality, the firm hiring the hard core jobless will be given special attention.

Profile Milling Survey

The results of the fourth Profile Milling Survey on Capacity versus Requirements were issued in 1968. As a result of these studies over the last four years, the machine tool industry and the aerospace industry recognized that a shortage of capacity existed. At the time of the first study, the shortage of capacity was extremely critical. Recognizing this problem, the machine tool industry substantially increased its capacity to build new machines and the aerospace industry

quadrupled the annual purchase of machine tools. Future aircraft deliveries should not be delayed due to a shortage of profile milling capacity.

Equal Employment Opportunity

AIA has been working with the DoD and the Department of Labor during the last two years concerning the Certification of Non-Segregated Facilities on the part of the subcontractors. As originally proposed, each prime contractor would have been required to obtain a certificate from every subcontractor on each "Request For Bid." It was conservatively estimated that this would have required several million paper transactions for the large aerospace firms. As finally issued in 1968, the primes are now only required to have on file an annual certification for those with whom they have a subcontract. This has saved the industry a substantial sum in reducing paperwork.

Forging Survey

The second annual AIA Survey of Forging Requirements of the Aerospace Industry and Forging Capability of the Forging Industry was issued in 1968. The survey indicates that there are no critical problems in the forging industry's ability to fill requirements in the next five years. Titanium forging requirements will almost double by 1972 but the capability to meet the demand is predicted. Between the first and second survey, the aerospace industry has itemized the long lead time items most critical to the role of aircraft and in some cases have been able to arrange material procurement in advance. The major benefit of the two surveys has been in coordinating and serving as a communications link between the aerospace manufacturers and the forging suppliers, which has allowed both parties to work out many of their mutual problems and to shorten procurement lead time.



AEROSPACE PROCUREMENT SERVICE

The Aerospace Procurement Service supports the functions of finance, accounting, contract administration, legal activities pertaining to procurement, patents, industrial relations, industrial security, government reports and manpower utilization. Five principal committees provide a medium for conducting evaluations and resolving problems of mutual concern to government and industry.

The Aerospace Procurement Service in 1968 continued its activities in connection with proposed additions and revisions to government policies and procedures in areas relating to the business activities of member companies.

Patent and Data Regulations

The Armed Services Procurement Regulation policy and procedures for selecting the appropriate patent rights clause for particular types of contracts were revised in 1968, and reflect certain suggestions previously proposed by AIA. Several important decisions of the U. S. Court of Claims interpreting the scope and application of the ASPR patent rights clause were studied for potential effect on contractor-owned patents and discussed with cognizant DoD personnel. If necessary, appropriate revisions to ASPR will be proposed to overcome any unintended impact of these decisions.

Proposed revisions to the ASPR sections dealing with rights in technical data received from the DoD, were evaluated and comments submitted. Although the DoD has not as yet acted on these matters, informal follow-ups indicate a favorable reception.

Patent Law Revision

Congress continued to consider proposed legislation which would revise the United States Patent Statutes to modernize and improve the Patent System and to facilitate participation in a worldwide patent system. Such proposed legislation has been reviewed and AIA comments and suggestions were submitted to appropriate Congressional committees.

Proposed Patent Cooperation Treaty

A revised draft of a Patent Cooperation Treaty which would establish a worldwide patent system was released during 1968. The draft treaty was evaluated and comments, including suggested changes, were transmitted to cognizant government officials for consideration prior to their participation in an international conference of patent experts.

Overhead Cost Study

A CODSIA study of overhead cost, primarily supported by AIA companies, provided comprehensive data to a DoD Study Group. Responses from companies representing about \$10 billion in defense sales demonstrated that overhead is being effectively controlled and that growth in such costs is primarily the result of government imposed requirements, such as contractually required reporting and management systems, and the rising costs

of employee fringe benefits, largely brought about by law.

Work Breakdown Structures

A military standard published in 1968 prescribed the structuring of work breakdowns for major contractual programs of the DoD. This culminated effort began in 1967 and AIA participated fully through CODSIA. All significant recommendations of CODSIA were accepted by the DoD and the document will be of mutual benefit to member companies and the government. This standard supports management systems such as cost information reporting, contract fund status reporting and additional systems under development.

DoD/ Incentive Contracting Guide

AIA, through CODSIA, has been active in reviewing a proposed DoD/NASA Incentive Contracting Guide as chapters were drafted by DoD and NASA representatives. The joint DoD/NASA Guide, when issued, will supersede the existing separate DoD and NASA Incentive Contracting Guides. This concurrent effort, initiated at the request of DoD and NASA, permitted submission of industry suggestions and recommendations "before the fact" and provided for thorough discussions of each industry recommendation with government representatives.

As a result of industry and DoD/NASA discussions, indications are that perhaps 90 percent of the industry suggestions will be accommodated. Those which could not be accommodated primarily required changes or additions to the ASPR. It is expected that a revised draft of the guide will be ready for further review in 1969.

A by-product of the industry review of the joint guidelines has been identification of a number of needed ASPR changes, including the need for a separate section within ASPR for incentive contract clauses. Plans are underway to prepare recommended ASPR changes in this area for submission, through CODSIA, to DoD and NASA.

Terminations

Substantial activity in connection with contract terminations and related matters occurred in 1968. AIA, through CODSIA, was represented at meetings with the DoD Contract Administration Panel (CAP) of the ASPR Committee, which resulted in a CODSIA letter to DoD summarizing previously-stated industry positions regarding unresolved contract termination matters. These matters in-



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Corporation
Chairman, Patent Committee



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RCA
Chairman, Procurement and
Finance Committee

cluded burden applications to termination settlements, settlement of terminated contracts with incentive provisions, partial fee/profit statements of termination clause, cost-plus-fixed-fee subcontracts and profit on settlement expenses.

In addition, AIA participated in formulating a CODSIA paper to DoD which expressed industry concerns about the low or no profit allowance in contract terminations. The paper developed an overview of DoD contract terminations and cancellation policies and practices and succinctly described how unsound termination practices and rules have contributed to the decline in defense contractor profits. A number of remedial actions were recommended for DoD consideration.

Manpower Utilization Analysis Group

The AIA Manpower Utilization Analysis Group continued active during 1968, providing a detailed headcount by function of approximately 260,000 people in the participating member companies.

The MUA program provides for periodic inventory of aerospace industry manpower by functional classifications, whereby management has visibility into areas of major concern such as headcounts by function rather than organization, distribution of functions within the organization, historical base and trends, and other comparative data. Participating companies have found it to be particularly useful in organization planning, budget review, manpower monitoring and assessment of plans.

The MUA group plans to conduct a membership campaign to achieve a broader industry base for the manpower surveys. A special subcommittee is developing a plan to explain more effectively the MUA program to potential members. Studies are also under way to undertake in-depth surveys of selected aspects of the program and review definitions in order to provide for uniformity of interpretation and consistency of classification within participating companies.

Government Property

The matter of appropriate controls and administration of government-owned property in the possession of defense contractors received top-level attention in 1968.

As a result of Congressional hearings and attendant General Accounting Office studies, criticisms appeared concerning the lack of adequate controls and effective utilization of government-owned

property. AIA issued a statement which set forth industry's views and, in particular, the reasons for and benefits that accrue to the government through the furnishing of plant equipment.

AIA, through CODSIA, furnished comments on proposed ASPR language which would provide that, in the event a contractor fails to maintain an approved property control system, any loss or damage not satisfactorily accounted for would be presumed to have resulted from such failure. As a result of CODSIA's comments, additional information is being collected for presentation to the ASPR Committee prior to issuance of these regulations.

Cost/Schedule Control System Criteria

Efforts begun in 1966 through CODSIA continued during 1968, with the objective of developing a cost/schedule control system mutually satisfactory to DoD and industry. The general approach has been substantially agreed upon, i.e., government requirements will be held to a minimum and flexibility will be provided for contractor management so that motivation and innovation will not be inhibited.

There are many different views as to what should be specifically prescribed and what should be flexible and the degree of flexibility. Many draft documents have been commented upon and many joint DoD/industry sessions have been held with substantial issues remaining. AIA member companies have recognized the importance of working with DoD to develop a practicable, workable system and their experts in management systems have contributed substantially. AIA participation with CODSIA will continue in 1969 to the end that any sound management system for this purpose can comply with the requirements of the implementing documents.

NASA Property Financial Reporting Handbook

AIA worked jointly with NASA in the development of reporting forms and instructions for prescribing requirements for NASA contractors and subcontractors with respect to real and personal property; special test equipment and materials inventories; and space hardware relating primarily to equipment and components fabricated for use in NASA's programs. Several drafts of proposed language and forms were reviewed and, as a result of AIA recommendations, several revisions were made in the language to alleviate problems concerning these reports. The instructions and reports have

been approved by the Bureau of the Budget and are now in use.

Security Manual Changes

The Office of Industrial Security submits to industry any proposed changes to the Industrial Security Manual. AIA, through CODSIA, reviewed and commented on three proposed changes covering representatives of a foreign interest, termination of clearance of immigrant aliens assigned abroad and administrative termination of clearances. Comments on the proposed changes were directed toward effective security with workable requirements at less cost.

Office of Federal Contract Compliance Regulations

The Office of Federal Contract Compliance (OFCC) proposed regulations to implement Executive Order 11246 to provide for the promotion and assurance of equal opportunity for all persons without regard to race, creed, color, or national origin. Constructive comments to make the regulations more workable were submitted by AIA. Permanent regulations, issued within a few weeks, differed little from the proposed regulations but did reflect two changes important to industry.

Occupational Health and Safety

Companion bills were introduced in Congress during 1968 with the stated objectives of assuring safe and healthful working conditions for working men and women. AIA questioned whether this legislation would gain its objectives, and a statement supporting some provisions and suggesting revisions to others was prepared and transmitted to the Senate Subcommittee on Labor. Congress did not act on the bills.

Age Discrimination Record Keeping Regulations

The record keeping regulations under the Age Discrimination Employment Act of 1967 proposed by the Department of Labor were reviewed and comments submitted in 1968. While the proposed regulations created no new record forms, AIA comments questioned several provisions. Permanent regulations were not issued during the year.

Walsh-Healey Safety Standards

The Department of Labor's proposed revision of Walsh-Healey safety and health standards presented a forward step in accomplishing the long-standing objective of uniform performance, rather than specification, safety and health standards. AIA submitted comments and rec-

ommended changes to provide needed clarification and to make the standards more workable. The effective date of the new standards was delayed to allow the Secretary of Labor time to study the proposal.

LMI Profit Study

Early in the year the results of a comprehensive study on defense industry profits in the form of a report by the Logistics Management Institute (LMI) was released for comment. The report revealed a substantial downward trend and profits much below those realized by industry as a whole.

AIA's position in the matter was accepted by participating CODSIA associations and presented to DoD. CODSIA's comments indicated that the trend of defense earnings had reached dangerous proportions and recommended corrective measures.

The DoD is making further studies and investigations, but has not reached final determinations as to whether further action is required and, if so, what form it should take. One possibility studied by DoD and LMI involved modification of the ASPR provisions covering the negotiation of anticipated profit under weighted guidelines to recognize capital allocated to contract performance. However, factors developed by LMI and being used for test purposes in the study would retain average "going-in" negotiated profits at current levels. The LMI approach would, in effect, penalize the efficient management of capital and detract from the motivations sought. The development of further recommendations as to what should be done has been initiated within AIA and these matters will be the subject of much study and activity in 1969.

Contract Cost Principles

Proposed revisions to the cost principles of the Armed Services Procurement Regulation were studied in 1968. Fifteen proposed revisions were received for review and comment. Of great concern to industry is the "piecemeal" conversion of the cost principles to rigid rules for cost disallowances resulting in a gradual dissolution of the basic principle of the ASPR that a contractor's reasonable and allocable incurred costs should be reimbursed. AIA will continue to exert every effort to obtain equitable cost principles.

The more important revisions were those relating to bid and proposal costs (B&P) and independent research and development (IR&D) costs. These proposed

revisions to B&P and IR&D cost principles represent the culmination of more than five years of informal but intensive discussions between DoD and industry on this subject.

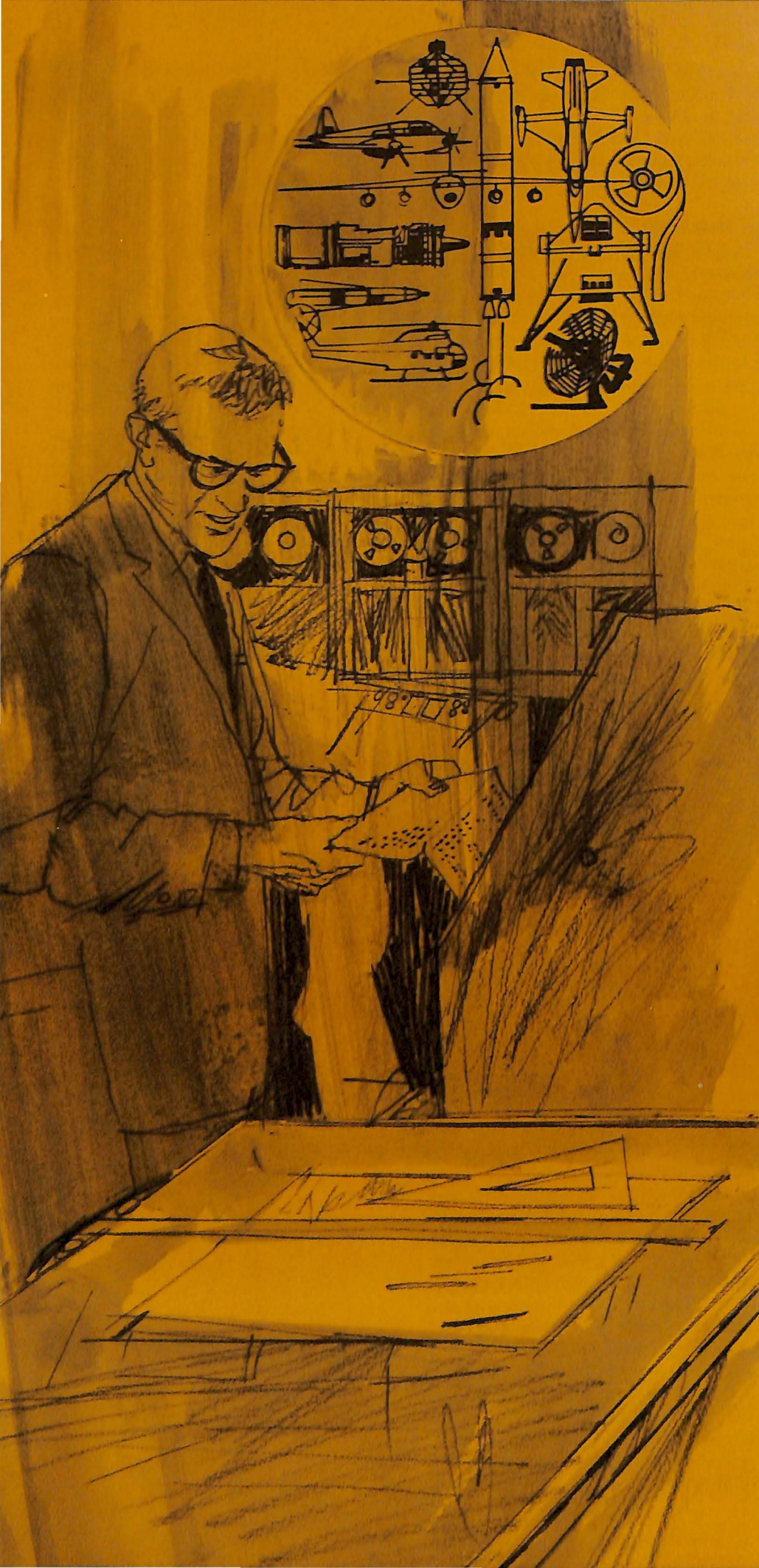
AIA participated through CODSIA in the preparation and presentation to the DoD of substantive comments on and suggested changes to the proposed revisions. The main thrusts of the CODSIA paper were to enumerate the direct benefits of IR&D to the government and the necessity for encouraging IR&D to provide the technological superiority needed for military systems, as well as that contractors must perform IR&D to improve technical competence and the ability to compete.

During the year, Congress extended the Defense Production Act which included provisions requiring the Comptroller General to undertake a study of the feasibility of uniform cost accounting standards that would be applicable to defense contracts. The GAO is coordinating its study of the subject with various professional and industry associations, including CODSIA. AIA is actively participating in this project.

In 1968, the General Accounting Office completed an industry-wide study of "Government Contractor's Independent Research and Development Programs." A draft of this study was transmitted to CODSIA for review and AIA participated in the development of CODSIA's comments. The draft study is scheduled for publication and release in 1969.

AEROSPACE TECHNICAL COUNCIL

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



The Aerospace Technical Council in 1968 continued a vigorous program to resolve mutual government/industry problems. The Council's three divisions and thirteen working committees have been engaged in many activities related to government policies, procedures, and actions which broadly affect the technical side of the industry.

Effective channels of communication have been maintained between the Council and senior technical management officials in government. The objectives of this communication have been to exchange views on problem areas which have significant impact on the aerospace industry. Productive dialogue between these groups covered such subjects as risk and uncertainty involved in weapon systems development, effective use of the nation's technical resources, management systems control, systems engineering requirements, use of fixed price contracts for research and development, and research and development needs in a competitive business environment.

Management Control Systems

AIA continued during 1968 to support the DoD-CODSIA Advisory Committee for Management Systems Control effort to stem the increasing number of divergent and incompatible management control systems being contractually imposed by the military services. This problem was originally identified by the Aerospace Technical Council in 1965, and the resolution of this problem began with the presentation to top DoD management of the AIA Systems Management Advisory Group (SMAG) Report in May 1966. Following that presentation, where the problem was recognized as a mutual problem and not an issue, the DoD-CODSIA Advisory Committee was established to develop a system for controlling the proliferation.

The project is divided into three phases. Phase I was completed in early 1967 with the publication of a Master Plan for the Phase II and III efforts. Phase II was completed in June 1968 with the publication of DoD Instructions 7000.6, "Development of Management Control Systems for Use in the Acquisition Process," and 7000.7, "Selection and Application of Management Control Systems in the Acquisition Process." These Instructions established the policy and requirements for the military services to follow in the management of new or revised management control systems documents and in the selection and application of those documents in contracts. The Phase II effort also included several meaningful need/use analyses which tested the requirements of the two Instructions before they were finalized and offered recommendations regarding a significant number of individual management control systems documents in the current inventory.

During Phase III, which is now underway, the two DoD Instructions will be implemented, and all of the approximately 1,240 management control systems documents contained in the inventory—the Management Control Systems List (MCSL)—will be subjected to the requirements of DoD Instruction 7000.6 and will either be cancelled, revised or accepted. The revised and accepted documents will form the Authorized Management Control Systems List (AMCSL), and the MCSL is scheduled to be cancelled by mid-1970. AIA will continue to support this very important project until the original objectives are accomplished.

Systems Engineering/Technical Performance Measurement

Continuing the systems engineering effort begun in 1967, the Council has made recommendations to DoD for a systems engineering requirements document which would have uniform DoD applicability and specify "what" is required by the contractor in the way of systems engineering rather than the detailed "how to" procedures. The Air Force in early 1968 proposed a specification intended to fulfill this purpose, but a CODSIA review found that it did not meet the objectives in many respects and contained unrealistic government requirements for technical performance measurement and accountability by the contractor.

When DoD began the development of a DoD (tri-service) Systems Engineering Standard late in 1968, a major industry effort was devoted to providing comments to be used as a basis for preparation of the new document. The impact of this requirements document upon industry will be highly significant. The thrust of industry recommendations has been concerned with recognition of the contractors' internal systems engineering procedures as long as they meet established criteria for a systems engineering process which properly integrates the system design and provides the visibility needed by government for management of the system procurement. In addition to criteria for the systems engineering process, the document is expected to cover integration of the many separate management plans required of the contractor, provide for appropriate design reviews, and require technical performance measurement only to the extent that it is practical and realistic.

Technical performance measurement as a contractual requirement stems from DoD Directive 7000.2 which also speci-

fies the requirement for an interrelation with cost and schedule performance measurement. The expressed requirement for technical performance measurement has created widespread concern within industry, and the Council has emphasized in its interfaces with DoD that such a requirement must be realistically applied and techniques for accomplishing such a requirement have yet to be developed to any great depth.

Computer Aided Design

The DoD has recognized that the application of computers to the design, production, and testing of defense systems offers many advantages in certain instances and has initiated a special program to accelerate the application of computers. For this purpose, the Council has established a Computer Aided Design (CAD) *ad hoc* group to work with the DoD program office. This group is providing suggestions and recommendations for actions by the DoD to accomplish its goal of speeding up the CAD process. The objective of the group is to support the DoD in this aim, yet to assure that there is not undue restraint upon the imagination of those in industry seeking to improve these relatively new methods.

Data Management

The Council in 1968 provided assistance to the DoD in the formulation of improved government policies and requirements for technical data. Emphasis has been on defining essential data requirements of the military services and techniques for obtaining such data in the most cost effective way. A major effort involved assisting the Air Force in the development of a new regulation, manual, and standard covering the procurement data package and the requirements on the contractor to provide the data package to the government.

In a review of the DoD Instruction covering policies for technical data management, industry recommendations were made which resulted in improvements in the approach to the management of data. These improvements include use of "judgment factors" necessary to the selection and application of "only essential" data on contract, deferred delivery of certain data, defining of all contractual data requirements on a separate Department of Defense data requirements form, more realistic treatment of the procurement data package and guarantees or certifications regarding

its adequacy for use in competitive procurement.

Configuration Management

A major Council effort was started in 1967 to assist DoD in the preparation of a total package of documents to define a configuration management system for DoD-wide applicability. These documents range from a DoD Directive and Instruction to the detailed tri-service standards and specifications covering every element of configuration management. Several industry task groups worked closely with counterpart DoD task groups and provided comments and suggestions.

The project was completed in 1968, and the family of DoD documents was published late in the year. The management system, which these documents define, provides for the uniform application of configuration management requirements by all three military services. It should eliminate the previous proliferation of requirements and avoid the added costs and schedule stretchouts attributed to the individual services' configuration management requirements. The new system embraces the concept of progressive baselining and of configuration identification, control, and accounting and has recognized and provided for numerous implementation situations.

Turbojet and Turbofan Engine Requirements

The second year of an effort requested by the Air Force and Navy to repackage the three engine requirements specifications into a single document has resulted in completion of the task. The objectives of this effort were to clarify, simplify and update its content based on today's and forecasted needs. A means of demonstrating or verifying each requirement has been proposed and will be presented to the services early in 1969.

In addition to providing a simplified document to set forth engine requirements, this effort has resulted in remolding of Air Force and Navy philosophy and policy in the development and testing of engines. This change should result in shorter, less expensive development programs without any degradation of product quality than would have been possible under previous service concepts.

Aircraft Exhaust Emissions

Following last year's AIA Transport

Aircraft Council status report on air pollution, the Aerospace Technical Council initiated a formal project to develop a comprehensive report to furnish the Department of Health, Education, and Welfare with authoritative information to complement its report to Congress as required by the "Air Quality Act of 1967." The project group, with participation of the Air Transport Association, spent approximately five months in developing a report that covered the contribution of aircraft operations to the national air pollution problem, the state of the art in reduction of pollutants in aircraft engine exhaust, and the prospect of future improvements.

It is the position of industry that realistic evaluation of the minor contribution of aircraft engine exhaust to total air pollution, particularly in view of the voluntary effort of industry to reduce the visible smoke of jet engines, will lead to the conclusion that a federally funded and administered program of control will be unnecessary.

Liquid and Solid Rocket Design

AIA continues to provide member company views on rocket and rocket propellant specifications and requirements, and to maintain DoD/NASA/Industry interface in this technology area. In the area of liquid rocket design, numerous specifications were reviewed during the year and comments coordinated with the appropriate government offices.

In recent policy level discussions between the Council's representatives and the Air Force Rocket Propulsion Laboratory regarding specifications for solid propellant rocket motors, the representatives were asked to study the problem of cost of large solid boosters. A preliminary study is under way to determine the feasibility of developing a plan to produce large boosters at a target cost of 25 percent of launch cost which would represent a substantial savings over today's costs. Initially the review will focus on "relaxation of controls" and "disengagement" by the Air Force, and it is expected that the preliminary study will be completed and recommendations will be made early next year.

Microelectronics

Continuing communication and liaison efforts by the Council have succeeded in obtaining a timely DoD statement on policies for the use of microelectronics in military systems. The Council also provided support to DoD in 1967 and

1968 in developing these five micro-electronic standards:

- Terms and Definitions
- Test Methods and Procedures
- Parameters to be Controlled
- Device Data Handbook
- Packaging

The Electronic Industries Association (EIA), in order to eliminate duplication of effort between AIA and EIA, is preparing a general specification and standards for selected families of microcircuits, utilizing, by reference, the DoD general standards. AIA is providing active liaison support of these tasks and their acceptance by DoD. These proposed general and detailed specifications will complete the microelectronic tree and implement by reference the five DoD standards. These hardware specifications will provide improved control of the procurement of items being used in several military systems by a number of systems manufacturers and procured in each case from multiple sources. It is estimated that release of these specifications will reduce the number of detailed specifications to be maintained from 2,000 to about 40, which will represent a significant dollar saving over the projected 11-year useful life for design and support purposes. These documents also have good potential value in improving reliability, quality and cost.

Electronic Design Uniformity

The joint government/industry group, formed in 1964, to bring up-to-date and unify electronic design requirements of the military services, has successfully completed its initial tasks during 1968. Their objectives were to eliminate peculiar electronic design practices in favor of standard practices for various classes of electronic equipment (missiles, aircraft, etc.) except in those instances where a peculiar environment requires special treatment which is not acceptable as a standard practice.

The results of this joint government/industry effort have been very encouraging and have already produced cost benefits. For example, "Standard General Requirements for Electronic Equipment" now contains the 63 design practice standards developed by this program, and it is estimated that their implementation in lieu of the over 500 separate service requirements which they supersede accrued over \$21 million cost avoidance by the end of 1968 and that \$33 million cost avoidance will accrue by 1970.

In order for these standards to remain useful, they must be kept viable by



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Requirements Division



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General Motors Corporation
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Corporation
Chairman, Aerospace
Technical Council



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Martin Marietta Corporation
Chairman, Technical Contract
Requirements Committee



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Chairman, Environmental
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Chairman, Small Aircraft
Airworthiness Requirements
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Chairman, Electronic Systems
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F. C. ROWLEY
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Chairman, Flight Testing
Committee



K. J. KEELAGHAN
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Committee



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Committee



P. A. LITTLE
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Corporation
Chairman, National
Aerospace Standards
Committee



N. S. MEFFORD
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Chairman, Maintainability
Committee



A. A. DUPONT
The Garrett Corporation
Chairman, Air-Breathing
Propulsion Committee



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Committee

periodic government/industry action to update them. Because this program was so successful, a new two-year plan has been approved to utilize the same joint government/industry group for updating the 63 approved design practices and develop 11 new standards by September 1970. These new standards will include microelectronics, high-reliability soldering, environmental requirements, corrosion protection and dissimilar metals.

Structural Design Criteria and Materials

Industry specialists during 1968 reviewed and submitted comments on numerous structural design criteria and materials documents. Continuous liaison with the various military service groups and NASA provides a communication media with the objectives of determining more efficient criteria for design and development of more effective standards and specifications.

A specific example of a design study is on aircraft gust criteria. Some concern has been expressed with the adequacy of the current criteria. In this regard, higher gust velocities have been proposed and are being evaluated in terms of increased weight of the structure. Consideration is being given to the possibility that the problems encountered during flight in turbulent air are due to loss of control. If this is the case, the increased structural strength resulting from the design to higher gust velocities might result in an unwarranted weight penalty.

One phase of this study is concerned with the development of gust design procedures based on power spectral techniques using a continuous turbulence concept. This approach is being imposed by specification on new Air Force aircraft programs. Industry acceptance of the continuous turbulence approach is one of caution, and discreet gust analysis is being used as a back-up procedure until more experience and confidence is gained.

Another area of concern by industry is the design monographs and handbooks specifying methods of analysis that are imposed on contracts. Industry liaison with government laboratories has stressed the need for "requirements" and not detailed "how-to" procedures.

Flight Test Crew Qualification

The Council has worked extensively with the Air Force to develop mutually acceptable regulations and requirements pertinent to the qualification of con-

tractor flight test crews and to the conduct of flights with bailed aircraft.

Some of the changes proposed by the Air Force would tend to restrict the contractor's ability to schedule and conduct his flight test operations in an orderly and efficient manner. Industry has proposed that the contractor be charged with full responsibility for the conduct of the flight test program in accordance with contract requirements. This is in keeping with current policies on disengagement and with current contracting procedures. It is felt that the industry position can provide for well qualified flight crews and proper use of government-owned material with a lower management cost than existing or proposed requirements.

Standardization Management

A major standardization management study was completed in 1968 by the Council's Standardization Management Policy Group, and the conclusions and recommendations were presented to DoD. The objective of the study was to develop a complete program which would improve industry communication and cooperation with government standardization agencies, avoid duplication within industry, maximize acceptance of industry standards in a preferred status, and improve interface with all standardization organizations.

The three basic recommendations resulting from the study were that DoD should establish:

- A joint military and industry standardization management advisory committee within DoD;
- An improved program of communicating information on standard items;
- A policy to accept industry standards, which do not duplicate military standards.

To improve the interface with other industry standardization organizations and avoid duplication, several efforts were initiated. For example, seven hundred active projects of the SAE Aerospace Council were reviewed and recommendations submitted. On international standardization, AIA interface with International Standards Organization, International Civil Aviation Organization, and United States of America Standards Institute are in a formative stage, and action on these tasks will be accelerated during 1969.

In addition to developing better methods for the management of standards, the Council's activities have included review, analysis and recommendations on proposed and published

requirements for specific standardization activities by the individual services and OSD.

National Aerospace Standards

The National Aerospace Standards (NAS) are a series of industry specifications, parts standards, design standards and standard practices, developed to meet the demands of high performance, reliability and economical operation for use in aerospace products and systems. Nearly 1,200 NAS documents have been published in the 27-year existence of the series, with approximately 800 now in an active status.

NAS documents cover a wide variety of aerospace disciplines, from airport planning and machine tools, to aerospace hardware and electrical items. During 1968, new standards have been published on airport planning, cost savings due to standardization, packaging standards and fastening devices including fasteners incorporating the new "tri-wing" recess head. In addition, a vigorous program of maintenance of existing standards is carried out to keep the series current.

Metric System Study

With Britain converting their measuring system to metric units, the United States remains as one of the few major industrial nations still using the English system. Realizing that the current world trend to the International System of Units, or "SI" system, may have far-reaching effects on U.S. world trade, Congress authorized the Secretary of Commerce to study the effect of increased use of the metric system in the U.S. In carrying out the three-year study program, the Secretary is charged to appraise the advantages and disadvantages to the U.S. in international trade and commerce of the increased use of the metric system, and to recommend specific means of meeting practical difficulties and costs of conversion for those industries affected.

The language of the Act assures the appropriate participation of industry representatives in the planning and conduct of the study program. The Council has named an industry representative who will act as the AIA point of contact to the Department of Commerce's National Bureau of Standards.

Crashworthiness and Passenger Evacuation

Beginning in 1967, the Council initiated an intensive research effort to find ways to increase passenger survivability

following accidents involving large air carrier type aircraft. The effort had as its objective the increase of passenger survivability through improvements in interior materials, fire suppression and smoke and fume protection systems, emergency lighting and evacuation systems.

In mid-1968, the Council's *ad hoc* group briefed the FAA on the results of the program and provided a comprehensive report documenting test results, conclusions and recommended changes to the present airworthiness rules. It is expected that the FAA will accept, in substance, the AIA recommendations to upgrade the airworthiness requirement for transport category aircraft and issue a Notice of Proposed Rule Making incorporating these recommendations in 1969.

V/STOL Airworthiness Rules

As a follow-on to the V/STOL Project Group's intensive effort in developing proposed airworthiness standards for V/STOL aircraft, submitted to the FAA in 1967, the group provided industry positions on the tentative standards at the Government/Industry V/STOL Standards Meeting in April 1968. The FAA published these tentative airworthiness standards in mid-1968, and they are being reviewed by the Council with technical comments and recommendations to be provided FAA in 1969.

Supersonic Transport Airworthiness Requirements

Since the beginning of the development of tentative airworthiness standards for supersonic transport aircraft in 1960, AIA has been a major contributor to this FAA project. Continuing its support in 1968, AIA representatives participated in numerous technical meetings considering the effects of current and proposed revisions to the tentative airworthiness standards on the design of the aircraft. At the request of FAA, the AIA Supersonic Transport Project Group, in conjunction with the Air Transport Association, reviewed and submitted comments and recommendations on 60 government-proposed tentative standards for the annual government/industry meeting held in October 1968. Following the procedures of past years, FAA published a revision to the Tentative Standards for Supersonic Transport Aircraft in December 1968.

Noise Abatement

The Council's special *ad hoc* group,

which was appointed in 1966 to serve as the AIA focal point for all activity associated with the disturbance due to aircraft noise in the vicinity of airports, has completed its second year of activity. Its efforts were focused in two areas: noise certification of new aircraft, and an operations research program to model an air transportation system.

Through its working group, the Council has maintained a continuous dialogue with the FAA in its effort to develop realistic noise criteria for the noise certification of aircraft as required by a law which became effective in July 1968. The importance of this work cannot be overemphasized since criteria developed without consideration for aerodynamic design and airline economics could act to affect seriously the future of the air transport industry.

The first phase of a two-phase operations research program which was initiated last year as a joint AIA/Air Transport Association effort, has been successfully completed. The contractor developed a computer programmed mathematical model of a limited air transport system which would be capable of evaluating on an economic basis the various trade-offs involved in all approaches to reduction of the disturbance due to aircraft noise. The model is capable of expansion to simulate the U. S. air transport system in 1985.

In addition to the initial phase, a supplemental phase has been conducted to refine the model and to develop a systematic scheme for selection of a statistically valid sample of the whole U. S. air transport system for use in the second phase. The results of the efforts conducted thus far are under review before proceeding with the second phase which will examine the entire U. S. system through 1985.

International Airworthiness Requirements

Progress has been made in a Council project to attain more uniformity between U. S. airworthiness standards and the standards of other countries. While many countries have standards very similar to the U. S., or have no standards and accept U. S. certification, a few countries have significantly different codes primarily based on the United Kingdom Code. As provided in bilateral agreements, countries with different standards apply special certification requirements causing a burden to manufacturers exporting aircraft to those countries.

In February 1968, the Council, in cooperation with the AIA International Service, met with FAA representatives, and a plan of action was developed to attain greater uniformity of U. S. and foreign countries airworthiness standards. It was agreed to first consider the lack of uniformity in the U. S. and United Kingdom codes. The AIA then met with the FAA and the United Kingdom organizations, and it was agreed that a comparative study of airworthiness standards should be made. The FAA completed this study in late 1968. Following an industry review, AIA and FAA will meet in 1969 in preparation for a joint government/industry meeting in London, England. Representatives to the London meeting will include the AIA, FAA, Air Registration Board and the Society of British Aerospace Companies.

Safety Measures for Aircraft Fuel Systems

The Department of Transportation has established an Advisory Committee on Fuel System Fire Safety with representatives from the AIA, Air Transport Association, Airline Pilots Association, Air Force and the FAA. This committee will serve in an advisory capacity to the FAA and will act as a coordinating medium with all segments of industry to collect information on fuel system hazards and methods of protection, and evaluate specific systems and means of achieving improved protection. Meetings to date have produced a wide interchange of test data and experience in the common interest of producing increased aircraft safety.

Airworthiness Standards

The AIA continued its close working relationship with the FAA during 1968 on airworthiness standards. In addition to maintaining effective channels of communication with FAA personnel engaged in aircraft airworthiness regulatory activities, Council representatives reviewed and prepared formal comments on many FAA proposals to change the airworthiness rules affecting all categories of aircraft.

One major project was completed in November 1968 with the submittal of comments and recommendations in response to the government's notice of proposed rule making containing 97 proposed changes to the transport category airworthiness rules. Industry comments are presently being reviewed by the FAA for incorporation into the final rule making action.

INTERNATIONAL SERVICE



ROBERT G. McCUNE
*Lockheed Aircraft
Corporation*
Chairman, International
Committee



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.

The International Service was actively engaged in many areas during 1968 to improve the climate for the export of industry products.

Exports amounted to nearly \$3 billion, 32 percent higher than 1967. Significantly, commercial aerospace exports realized an impressive 64 percent increase over 1967, reflecting the increased export of U.S. jet transport aircraft. By May 1968, the free world's commercial airfleet numbered 6,500 aircraft of which 76 percent were U.S.-built. Over the past decade, U.S.-built aircraft have accounted for 83 percent of the 3,176 jet aircraft ordered by the free world's airlines. Aerospace imports were valued at \$360 million during the year.

National Trade Policy

The nation's long-term progressive international trade policies were repeatedly challenged by various Congressional moves to impose import quotas on several commodities. If such moves should be successful, in view of U.S. leadership in the culmination of the Kennedy-Round Tariff negotiations, retaliation will likely develop in important overseas aerospace market areas.

The AIA International Committee's Trade Policy Task Force developed recommendations concerning the specific categories of aerospace products and presented them to the U.S. Trade Information Committee. These AIA recommendations are now under consideration as trade policy guidelines.

AIA President Karl G. Harr, Jr. and International Committee Chairman Rob-

ert G. McCune appeared before the House Ways and Means Committee during the hearings on the Trade Expansion Act of 1968. The industry's positive support of liberal and realistic policy concerning international trade was outlined with emphasis placed upon free foreign market access for U.S.-manufactured aerospace products.

International Finance

The problem of export financing of large jet transports continued to grow in 1968 because of a reassessment of the seat-mile requirements of foreign airlines and the direct effect of inflation in the U.S. on export prices over the next ten years. An independent feasibility study developed for the Bankers' Association for Foreign Trade predicted a need for financing \$13 billion in jet transport export sales for the period 1968-1977. The Commerce Department's export strategy study revised the next decade figure to expected potential sales between and \$18 and \$21 billion.

The Private Export Financing Corporation (PEFCO), supported by the Bankers' Association for Foreign Trade, is viewed by the industry as part of the answer. PEFCO is a proposed corporation of approximately 50 U.S. banks which have substantial reserves that could be pooled to support exports. This rather complex and progressive arrangement is under review by several government agencies, the sponsoring commercial financial institutions and the International Committee's Heavy Transport Finance Task Force, so that participating banks can be kept abreast of this industry's export financing program at periodic intervals.

The Export Import Bank during 1968 continued its support of the industry's export sales by financing 274 aircraft to 39 market areas amounting to a contract value of \$724,465,000.

Military Export Finance

AIA, in cooperation with the DoD, has performed a specialized information function in support of the U.S. foreign military sales program through national symposia and the distribution of aerospace export finance data and requirements to selected commercial bankers.

DoD is concerned whether the \$296 million for loans and guarantees of the 1969 Foreign Military Sales Act will stretch across the full spectrum of foreign military sales requirements where extensions of credit are necessary, particularly in view of 1970 fiscal require-

ments which reflect the need for \$100 million in private sector financing. Therefore, the participation of the private banking community in specific phases of the nation's international defense program, are important long-term factors supporting both economic and national security objectives.

Export Licensing Controls

The pattern of productive, informative dialogue was continued between AIA and the Department of State in 1968 concerning prospective changes in the export control regulations covering military aerospace products exported to third, fourth and subsequent countries.

The Director of the Office of Munitions Control, Department of State, gave AIA a complete review of the changes to the International Traffic in Arms Regulations since the last printing in 1966. AIA recommendations to those revisions were adopted.

The Munitions Control Task Force during late 1968 developed a questionnaire, for accomplishment by industry, concerning all aspects of the export license regulations and procedures in preparation for AIA recommendations to be presented to the Department of State in 1969.

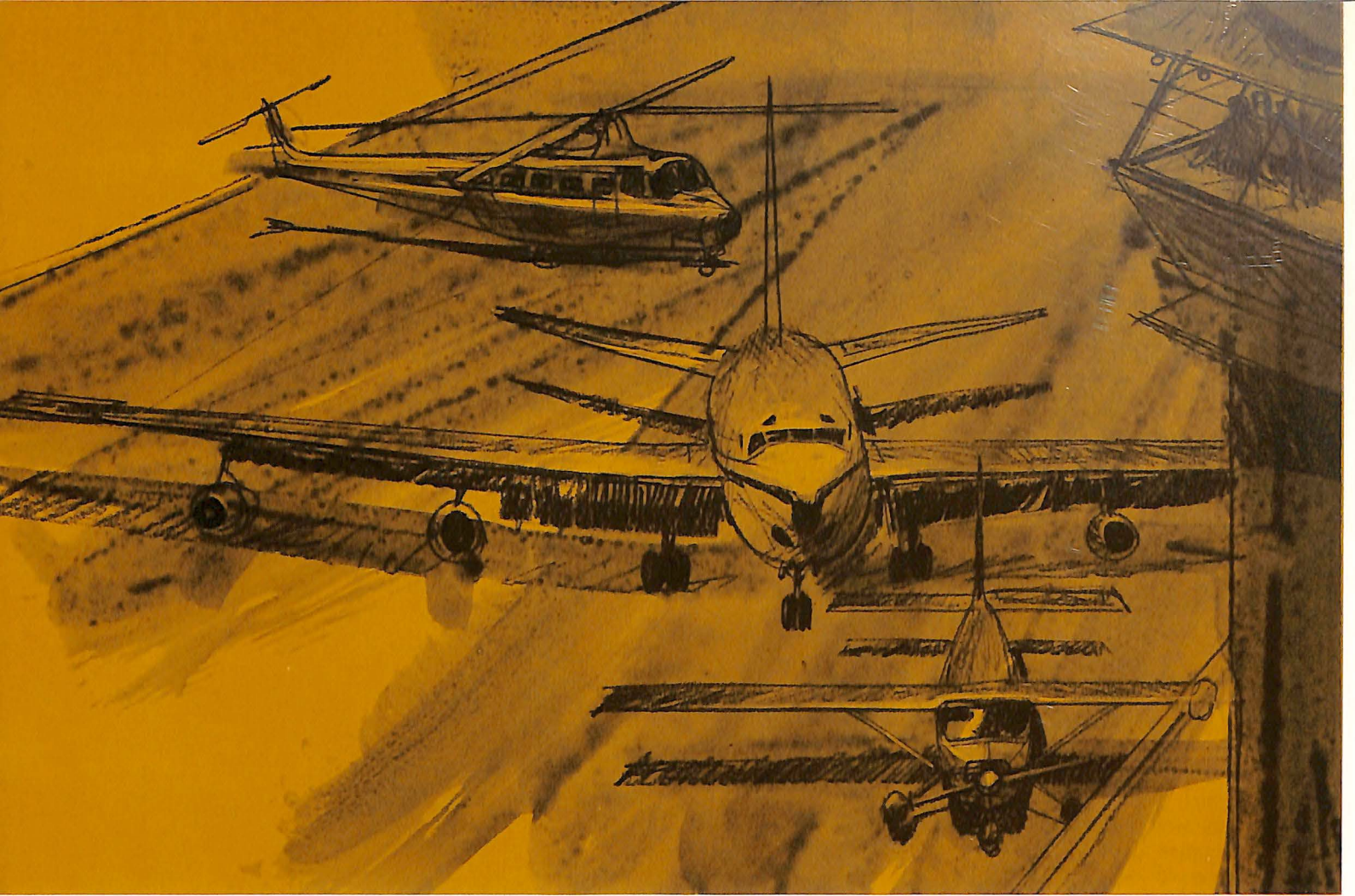
International Trade Promotion

AIA during 1968 sponsored several projects which implemented the international marketing acceptance of the industry's products. These included:

Paris Air Show. Extensive plans and developments were made during the year concerning the show scheduled for May 29 to June 8, 1969. The extent of U. S. government and aerospace industry participation required was discussed and AIA coordinated advice to industry and government concerning the industry's role in the Paris Air Show.

Transport Aircraft in Developing Nations. The utilization of transport aircraft in developing nations was shown during 1968 through a film entitled *The Seven League Step Into Tomorrow*. Using available company-donated film and combining an interesting narrative sound track, the film portrayed the use of the transport aircraft as an effective economic tool for developing nations.

This project was an effective step in a program designed to show the use of modern aircraft as a vital phase of a nation's transportation system.



OFFICE OF AIR COMMERCE



FRANK E. HEDRICK
Beech Aircraft Corporation
Chairman, Air Commerce
Executive Council

The Office of Air Commerce coordinates within AIA those activities concerned with civil aviation. In conjunction with its three member Councils — Transport Aircraft, Utility Airplane and Vertical Lift Aircraft — it provides policy guidance on matters pertaining to the advancement of air commerce on behalf of all segments of the aircraft manufacturing community to foster, advance and promote the growth of air commerce.



TRANSPORT AIRCRAFT COUNCIL



JOHN O. YEASTING
The Boeing Company
Chairman, 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.

In its first full year of operation, the Transport Aircraft Council in 1968 fostered programs of action and appropriate liaison with government, other segments of industry and organizations concerned with civil air transport matters. Machinery was established whereby, through the exchange of technical information, air carrier manufacturing, operating and airport interests could establish short and long term action programs designed to solve growing air commerce constraint problems.

Actions undertaken in 1968 included:

- Development of a National Aerospace Standard for manufacturers' use in describing aircraft (current or in production) physical characteristics in a form needed for airport authority facility planning and design.

- Development of a "Future Aircraft Trends" document that will synthesize parameters of possible future aircraft so that airport designers and operators can better plan for future terminal needs.

- Development of a standard format for the assembly of airport data to include current status, future development programs, funding, demographic information, etc., to assist manufacturer

and operator long range planning.

- Development of realistic runway-taxiway construction and load bearing standards that take into account recent improvements in construction methods and advancement in aircraft landing gear designs.

Of considerable long range significance is the active participation of the Transport Aircraft Council with the Department of Transportation Air Traffic Control Advisory Committee established in mid-1968. Technical data are being provided by Transport Aircraft Council member companies, which will permit the DoT to:

- Define the essential design and performance characteristics required of an air traffic control and airport system capable of meeting future air travel demands safely and economically.

- Assess the potential of current and projected technology in relation to these system characteristics and propose a next generation system.

- Identify research and development programs which should be undertaken in order to ensure the timely introduction of the technology required for the next generation system.

UTILITY AIRPLANE COUNCIL



FRANK E. HEDRICK
Beech Aircraft Corporation
Chairman, Utility Airplane
Council

The Utility Airplane Council works in all areas concerned with general aviation, which include all aviation except that of the military and commercial carriers. The Council works in the fields of public education, special group education, airport development, airspace usage, air taxi and cargo promotion, export activities, and pilot licensing procedures and requirements in promoting understanding conducive to the maximum use of the private and business aircraft.

The Utility Airplane Council in 1968 directed its efforts toward increasing public understanding of the significant role general aviation plays in the nation's economic and social areas.

Air Age Education

Several years ago a program of joint effort directed to young people and their educators in the nation's schools, par-



ticularly those of high school age, to prove the importance of aviation and the impact it will have on their lives, was initiated by the Council.

The first phase of this program was completed in mid-year. Professional lecturers, aided by color slides and stereophonic sound, presented a program designed to fit into the typical high school daily or weekly assembly. The test program in 1967, which reached tens of thousands of young people in several hundred schools in Ohio, Illinois and Indiana, was expanded during the 1967-68 school year to three teams which toured the northeast, west and southwest. Reception was excellent and the overall two year program reached as many as 1.5 million school students.

As effective as this program has been, the Council feels a more concentrated effort on how to actually institute aviation education courses in the schools, and which would also be a multiplier of individual member company efforts, would be more beneficial, and studies to that effect are now underway.

Individual member companies have been following up the Council's joint study efforts and the initial impact of the School Assembly Program, and several now have full time education specialists on their staffs who are responsible for developing and distributing support material for schools.

Economic Impact Study

A major program of the Utility Airplane Council during 1968 was a study to determine the magnitude and the economic impact of general aviation for the 1968-80 time period.

This required a comprehensive examination of existing industry data. The major lack of basic data in both the magnitude and economic impact areas necessitated an extensive research and data development effort, including computer programming approaches. A group of aviation consultants was retained, and a substantial amount of new data has been developed in addition to that contained in previous forecasts.

The study provided information which is now being organized for use in discussions with national and local government bodies and with other elements of the aviation community in their planning for air transportation facilities and to illustrate the economic benefits which accrue from general aviation.

The study was based on the premise that there would be no unnatural restraints to aviation growth. Emphasis was on the urgent need which exists for up-

grading the nation's capability for accommodating air traffic growth. It was concluded, as the result of the study, that there can be sufficient upgrading in the nation's air traffic system and airport facilities as will allow the projected growth.

The first step was analysis of the size of the general aviation activity, as of December 31, 1967, and preparation of a forecast of its size in the terms of number of aircraft, flying hours, aircraft movements and other identifying parameters. The second major step concerned estimating the present and projected extent of the impact of general aviation on the nation's economy.

Extracts of essential findings are being assembled in a "fact book" with supporting commentary and will be distributed by the Council and its members.

International

In conjunction with the International Service of AIA, the Council in 1968 assisted in researching and preparing data on general aviation aircraft in Latin America which was published by the Office of Aviation of the Department of State.

This report, according to the Department of State, "represents an effort to assist and encourage the export programs of United States light aircraft manufacturers by collecting and utilizing the commercial information accessible abroad to U. S. Government officials." This is similar to the assistance provided for the report issued by the Department of State on Africa in early 1968.

The report is available to American exporters of aircraft and of related products to help define market opportunities.

Members of the Council have been exporting aircraft to these markets since the middle 1930's. Overall, exports of general aviation aircraft in the past five years have averaged between 20 and 25 percent of the total production. In 1968, exports returned \$91 million as the general aviation industry's contribution to the balance of payments.

FAA/DoT Cooperation

Rulemaking proposals by the Federal Aviation Administration affecting general aviation are closely monitored by the Council. It regularly attends conferences called by FAA when such matters are discussed informally by the Agency prior to formal rulemaking, or are the subject of a public hearing, as such matters appear to be of concern to general aviation and the basic interest of the UAC members.

During 1968, the Council was involved in a number of matters some of which were the subject of formal comment filed with the FAA rule making docket while others were discussed with FAA officials. These include:

- Periodic pilot flight instrumentation or proficiency checks.
- Requirement for all turbine powered and large pressurized aircraft to operate on instrument flight rules at all times in controlled airspace.
- Amendments concerned with medical exemptions.
- Administration proposal on airport financing and user charges.
- Increase of landing fees at Washington National Airport.
- Amendments to the regulation on agricultural aircraft operations.
- FAA rule amendments emphasizing pilot responsibility to maintain vigilance.
- Air traffic congestion at major hub airports.
- Elimination of Special VFR at 33 airports.
- FAA plans for high density terminal areas.
- Inverted cone high density terminal area traffic control.
- Request from FAA for preliminary recommendations to facilities air traffic management.
- Use of audio visual courses in approved pilot ground schools.
- Change in FCC rules regarding identification of civil aircraft in radio communications.
- Amendments concerning flight equipment and chief instructor experience.
- FAA proposal to change experience requirements for pilot rating.

Council staff also participated in several FAA meetings to present views at the invitation of Secretary of the Department of Transportation, the FAA Administrator and the Assistant Administrator for General Aviation Affairs. Among those were meetings to brief the industry on the status of the progress of broadening and improving the airport/airways system in the face of mounting congestion and available appropriations to equip, operate and maintain the airways navigation and traffic control system. Another meeting dealt with the advance planning conference preliminary to the three-day First National Aviation System Planning Review Conference of the FAA to be conducted in 1969.



VERTICAL LIFT AIRCRAFT COUNCIL



JAMES W. CLYNE
United Aircraft
Corporation
Chairman, Vertical Lift
Aircraft Council

The Vertical Lift Aircraft Council coordinates and presents the vertical lift aircraft industry views on matters affecting these aircraft and in promoting the development and use of V/STOL aircraft in the U.S. and abroad.

The Vertical Lift Aircraft Council in 1968 concentrated its effort in three principal areas: direct operating cost formula; facilities design criteria for urban and suburban VTOL service; and highway safety and rescue service.

Direct Operating Costs

As a result of discussions with the Civil Aeronautics Board, the Department of Transportation and the airlines, VLAC established an action group to prepare and submit a suggested formula for deriving VTOL direct operating costs.

Existing methodology was reviewed, drafts distributed and in November the first revision was distributed to Council members for comment and/or approval.

Approval from the Council was received and the report was released to the Department of Transportation, the Civil Aeronautics Board and the Air Transport Association. This formula will be used to systematize consideration of submissions in the Northeast Corridor investigation. Additional material and data being received by the Council will be incorporated in subsequent revisions during 1969.

V/STOL Certification

Under the aegis of the Aerospace Technical Council, VLAC actively participated in the development of standardized certification procedures for V/STOL aircraft. This action, given impetus by the VLAC report "The Economics of VTOL Systems," culminated in 1968 with issuance of tentative Federal Aviation Regulations on the subject.

Highway Safety and Law Enforcement

The Army's Medical Department, with the cooperation of VLAC member companies, prepared in 1968 a graphic exhibit of the Army's rescue helicopters in Vietnam and the civilian models of these Army helicopters as air ambulances or medicopters patrolling the U. S. highways.

The exhibit, which effectively demonstrates civilian application of the Army Medical Department's use of helicopters, was first displayed at the 1968 American Hospital Association convention and subsequently at other medical and trade association conventions. At the Army's request, copies of the VLAC publication *Death on the Highways—A National Disease* and the *1968 Directory of Hospital Heliports in the United States* were made available for distribution with the exhibit.

At the first Institute of Aircraft Roles in Law Enforcement sponsored by the University of Missouri, AIA made a presentation on police use of helicopters for highway patrol and crime control. As a result of interest initiated by this Institute, attended by law enforcement officers from 13 states, the Law Enforcement Officer's Association was organized. VLAC will serve as industry liaison.

"All Systems Go," defining the role of the ambulance helicopter in the emergency medical system and reporting on current government-financed helicopter highway test programs, was prepared as the keynote speech for the Ambulance Association of America. Copies of the presentation were distributed by the Ambulance Association of America and by the U. S. Public Health Service.

Hospital Heliports

The first two civilian hospital heliports—Washington Hospital Center and D. C. General—were designated as a result of the Helicopter Ambulance Symposium sponsored by the Medical Society of the District of Columbia and the

Washington Hospital Center in April, 1968. Three more area hospital heliports are now planned. Council staff served as industry liaison for the Symposium. Interested VLAC member companies participated and provided helicopters for flight demonstrations for hospital personnel, U. S. Public Health Service officials and the press.

Facilities Planning

In a series of discussions with the airlines and interested state and local authorities, VLAC assisted the Federal Aviation Administration in initiating action by providing nationally accepted design criteria for urban and suburban VTOL facilities.

The FAA sponsored a joint government/industry conference on revision of the FAA's Heliport Design Guide at which industry views were presented on the need for broadening and upgrading current design criteria.

In that presentation emphasis was placed on the requirement for:

- All-weather (instrument) capability for both elevated and ground level vertiports.
- Model zoning ordinances for use by state and local authorities in establishing city center service.
- Development of regulatory procedures to be used in handling terminal traffic.

General agreement on these guide lines was reached, and collection of basic data will be made during 1969.

VLAC Publications

Preparation and distribution of VLAC publications continued during 1968.

The *Vertical Lift Aircraft Designation Chart* covering both production and research/development projects was revised and distributed. Eighty-three production models, ranging in size from one to 72 places are reported. In addition, there are twenty-one flight test, research and development models listed.

The *1968 Directory of Hospital Heliports in the United States* was published and first distributed at the American Hospital Association and the Ambulance Association of America conventions. There were 186 established and 38 proposed landing facilities at U. S. hospitals for the modern aerial ambulance—the medicopter.

The *1968 Directory of Heliports/Heliports in the United States, Canada and Puerto Rico* listing 1,892 helicopter landing facilities, a fivefold increase since 1960, was published.

OFFICE OF PUBLIC AFFAIRS



CHARLES H. WEAVER
*Westinghouse Electric
Corporation*
Chairman, Public Affairs
Council



The Office of Public Affairs serves to further the aerospace industry's objective to inform the educational community, news media, the government and the general public as to activities conducted by the industry in the areas of national security, space exploration, international trade and commerce and civil aviation.

The Office of Public Affairs was organized in January 1968 to replace the Public Relations Service following the creation by the AIA Board of Governors of the Public Affairs Council in 1967.

The new Council is a working group whose purpose is to mobilize the public affairs resources of individual member companies in developing and presenting industry-wide positions on issues as a whole and to assist in the overall communications activity of the industry.

Staff members of the Public Affairs Office serve as executive secretaries of five task groups appointed from Council membership which recommend positions and policies on many issues and prepare programs and projects for their implementation in the areas of international aerospace affairs, procurement environment, space, air commerce and technology applications.

During 1968 the task groups were involved in such diverse subjects as promotion of the role of aviation in developing countries, defense industry profitability, allowability of industry research and development, airport/airways modernization and the establishment of long-range national objectives in space.

Speeches by President Harr

Karl G. Harr, Jr., president of AIA, delivered speeches before various groups during the year presenting positions and ideas on a wide variety of subjects of industry concern and interest. These included:

- Joint Meeting of the American Bar Association and the American Institute of Aeronautics and Astronautics, Washington, D. C., *The New World and Its Natives.*

- Washington Society of Investment Analysts, Washington, D. C., *The Aerospace Industry and the Investment Community.*

- District of Columbia Chapter of Financial Executives, *A Look at Aerospace.*

- Knife and Fork Club, Salt Lake City, Utah, *Tomorrow's Society and the Aerospace Industry*

- Aviation/Space Writers Association, Washington, D. C., *1968 Year End Review and Forecast.*

Reprints of Mr. Harr's speeches were produced and distributed to the news media for background and material for articles.

Mr. Harr also submitted testimony to the U. S. Trade Information Committee regarding the expansion of U. S. exports; the House Ways and Means Committee concerning the Administration's Trade Expansion Act of 1968; and the House Science and Astronautics Subcommittee on Advanced Research and Technology on the future requirements of aeronautical research and development. He also presented the results of the industry's aircraft crashworthiness development program before the Federal Aviation Administration.

Publications

The AIA publications program continued to be a primary method of presenting the industry's accomplishments. Principal publications during 1968 included:

- *Aerospace Magazine.* Issued periodically during the year, this publication continued as a major vehicle for public communications.

- *Aerospace Year Book.* The 46th annual edition of the *Year Book* was issued

during 1968 and distributed throughout the world. A publication for the National Aerospace Education Council, *U. S. Aircraft, Missiles and Spacecraft*, was made up from selected sections of the *Year Book* and sold during the year.

- *Aerospace Facts and Figures.* Published since 1945, *Facts and Figures* is recognized by media, government, financial institutions and industry in general as the authoritative source for aerospace statistics. It is distributed commercially by Aero Publishers, Inc.

- *Annual Report.* In addition to its primary function of informing the membership of AIA, the *Report* was useful to governmental and private organizations.

In addition, AIA published a highly successful booklet entitled *Aerospace Technology: Creating Social Progress* which details many examples of how AIA member companies are applying aerospace-generated systems approach techniques and methods to the solution of urban problems and crime control, as well as to the fields of medicine and education. This was printed in 20,000 copies and distributed widely.

Economic Data Activities

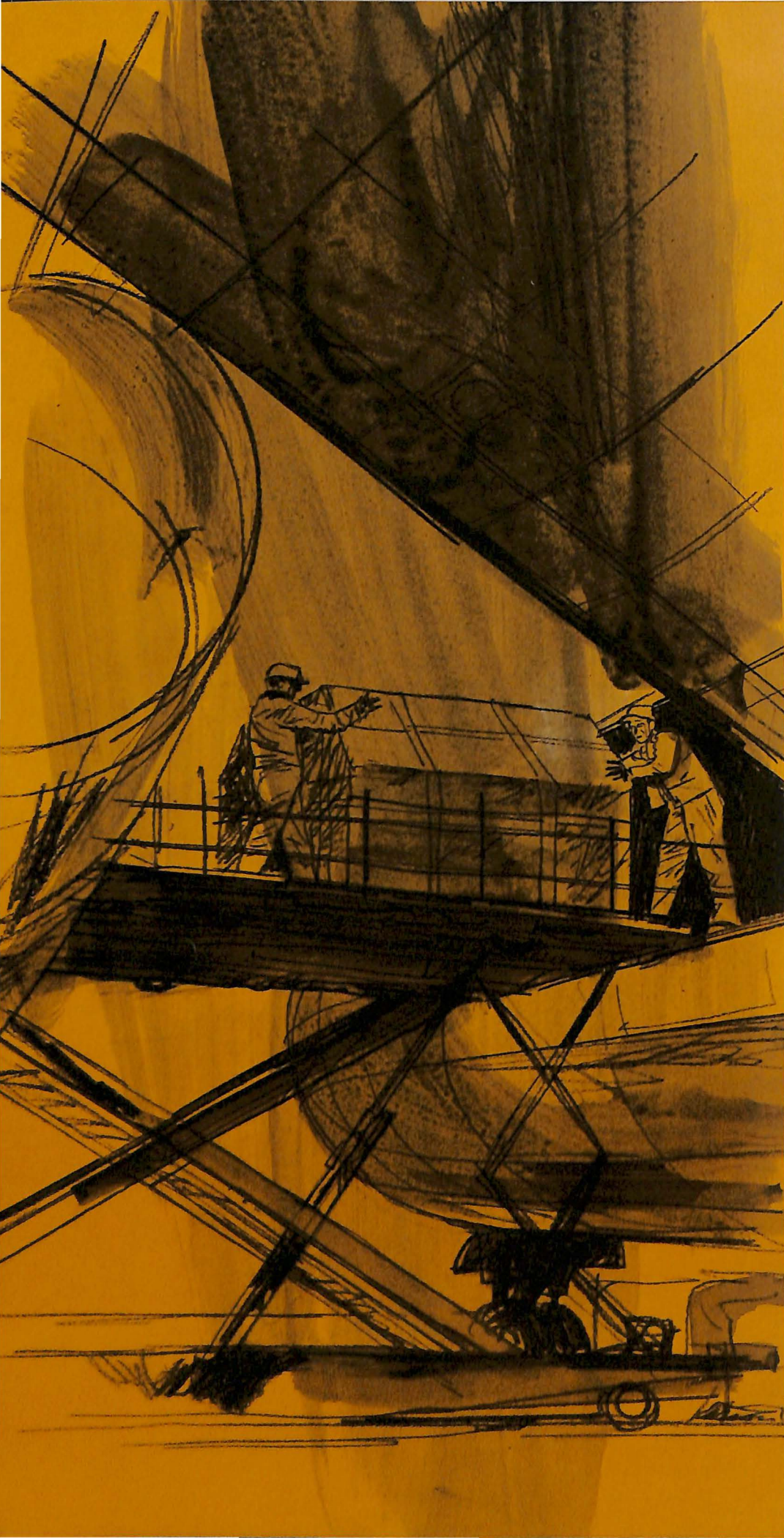
The Public Affairs Office continued to work on the improvement of the collection of aerospace statistics with the Federal Aviation Administration's Statistical Advisory Committee established in 1966 and subsequently extended and enlarged in scope. The office also worked with the Bureau of Labor Statistics of the U. S. Department of Labor in developing an information index for general aviation and helicopter manufacturers.

BLS was provided inputs through its Advisory Council in such areas as economic growth, employment, international statistics and others in order to improve that agency's aerospace industry statistics. Public Affairs also continued its work with the Bureau of the Census of the Department of Commerce on improving aerospace statistics published by that agency.

Two statistical surveys of the industry's employment were published during 1968 and the monthly Economic Indicators of the industry's health were distributed widely. A survey of aircraft on order from the industry was also conducted.

NAEC Support

AIA continued its support of the National Aerospace Education Council in order to enrich and enhance the curriculum offered the nation's students and assist the teaching profession.



TRAFFIC SERVICE



C. HARRIS CROOK
*United Aircraft
Corporation
Chairman, Traffic
Committee*

The Traffic Service is responsible for obtaining adequate, economical and efficient transportation facilities for the aerospace industry.

The dominant concern of Traffic Service in 1968 was to provide efficient representation of members' interests and effective coordination of their traffic organizations to respond to the shipping requirements of the industry.

While handling a wide range of cases before the transportation regulatory agencies, primarily the Interstate Commerce Commission and the Civil Aeronautics Board, and carrier rate bureaus and boards, Traffic Service has also concentrated full attention to maintaining close liaison with the federal executive agencies responsible for transportation policy and administration.

Common Carrier Rates and Service

Traffic Service and the Traffic Committee continue to play an important role with respect to the rates and service of carriers. Carriers subject to federal regulations are unique in that they have been granted statutory immunity from anti-trust provisions and are permitted to consider and agree jointly to the level of rates which they charge the public for their service. Behind this shield of anti-trust immunity ICC-regulated carriers have organized into national and regional rate bureaus. Against this concentration of rate-making power the efforts of individual shippers are often ineffective to obtain relief from unreasonable carrier rate agreements. The efforts of Traffic Service have been effective in this area during 1968 and have accomplished significant cost savings.

The following are representative of the twenty-five proceedings in which Traffic Service represented the interests of AIA members before various carrier rate bureaus:

- Defeated the efforts of transcontinental motor carriers to establish special charges for protecting shipments from normal temperature variations.

- Opposed and obtained withdrawal of a motor carrier proposal to discontinue providing exclusive use of equipment for aerospace articles requiring special carrier handling.
- Defeated attempts by motor carriers to assess added penalty charges for delivery of shipments in other than line-haul vehicles.
- Protested the imposition of increased freight charges for highway shipments of aircraft seats and aircraft galley units. Disposition is pending in both cases.

In those instances where actions taken by Traffic Service before carrier rate bureaus are unsuccessful, it becomes necessary to seek relief from the Interstate Commerce Commission with respect to surface carriers, and the Civil Aeronautics Board in cases involving air carriers. The following cases were handled:

- A petition was filed with ICC to suspend and investigate a 4.25 percent general increase in rates for carriers of household goods. The petition was granted, the increases were suspended, and the increased tariffs were cancelled. Subsequently, the carriers republished the increases but specifically made them non-applicable at locations of principal aerospace companies.
- Intervened in opposition to a general increase in rail freight rates. AIA's protest questioned the reasonableness of the increases applicable to aircraft parts. Although the ICC suspended and investigated the increases, the higher schedules were ultimately permitted on the grounds the railroads required additional revenue in order to maintain adequate service to the general public.
- Traffic Service participated in proceedings before both the ICC and the CAB with respect to proposed regulations of carriers governing the collection of charges and granting of credit. Disposition is pending in both proceedings.

Government Interface

After one year of existence, it is clear that the policies and programs of the new Department of Transportation (DoT) will not leave unchanged the relationships of the individual modes of transportation. As these changes occur, their effect will be felt by the shipping community as a result of transportation innovations accompanied by reformations in carriers' pricing structures. In their dual capacity as suppliers of transportation equipment and users of the service of commercial carriers, AIA members have an overriding interest in the

programs of the Department of Transportation. Accordingly, Traffic Service and representatives of its Traffic Committee are ensuring representation of this interest by serving on various DoT task forces and work groups.

Traffic Service and Traffic Committee have worked closely with the military departments to minimize to the greatest extent possible overlapping and duplicating traffic management efforts in connection with the movement of material in support of government contracts. Concurrently, close advance coordination has been maintained in drafting and publishing Department of Defense policies and guidelines affecting contractors' performance of the traffic management function.

Following are examples of accomplishments in this area:

- The Traffic Committee drafted comprehensive recommended changes to the transportation provisions of the Armed Services Procurement Regulation proposing relaxation of government controls, elimination of government/industry jurisdictional conflicts and duplications of effort. The committee's recommendations with respect to material provisions were adopted in almost every instance.
- The Traffic Committee's analysis in depth of existing defects in DoD policies governing the transportation of classified material resulted in the publication of a complete revision of the governing DoD directive. Implementation of the directive will make available improved carrier service at substantial cost savings. The committee is working closely with the Defense Supply Agency in the preparation of implementing regulations and procedures.

The transportation of large and bulky aerospace vehicles and components presents a unique problem for the industry, particularly so when highway transportation is involved and movements are impeded by restrictive road clearances. The Traffic Committee has established liaison with the Bureau of Public Roads to ensure that aerospace requirements are considered in future planning and construction of the interstate highway system.

AIA members with facilities in Southern California are being threatened by the expanding freeway program which, unless present plans are modified, will block access to some plants and force them to close. To correct the situation, a task force of the Traffic Committee is

studying the problem with state and local officials.

Additional Task Force Activities

Special task forces of the Traffic Committee were assigned responsibility to take action in connection with specific problems. These small task forces are composed of individuals with special competence and expertise in the areas concerned. Examples of such task force activities include:

- A comprehensive listing of individual aerospace parts was prepared and placed on punch cards together with cross-references to common carrier identification of the parts for bill of lading and freight rating purposes. The data thus compiled was printed in manual form and made available to contractors, vendors and carriers as the *Blue Book of Aerospace Parts, No. 5*. The publication facilitates the preparation of paper work in shipping material and reduces costly errors in billing by carriers.
- A special task force was assigned responsibility to coordinate the interests of AIA members with air and surface carriers with respect to carrier liability for loss or damage to shipments and the facilitation of claim settlements. The task force held several meetings with carrier groups throughout the year under the sponsorship of the ICC and the CAB and reported favorable progress.
- The transportation of aerospace components with explosive contents presents a particularly vexatious problem for the industry. Rates are high and service is poor. A special task force of the Traffic Committee was assigned responsibility to work with carriers in solving the problem. This past year the task force held meetings with the Munitions Carriers Conference of the American Trucking Associations and with individual carriers. Programs have been initiated and new handling techniques have been adopted which should provide needed relief.

Cost Savings

Traffic Service during 1968 continued its program of gathering and exchanging ideas and information relating to improved techniques used by member companies to support government cost savings efforts. Successful actions by individual aerospace traffic managers resulted in savings of approximately \$17.5 million. The results of coordinated actions taken by the AIA Traffic Committee are reflected in this amount.

WEAPON SYSTEMS DEVELOPMENT STUDY

The Aerospace Industries Association, because of its concern about the impact of technical considerations upon profitability and risk, conducted a study during 1968 on the DoD development process and procurement methods for major weapon systems acquisitions. Phase I of the study modeled the engineering development process from conception through operational deployment, and Phase II gave consideration to and superimposed the legal, contractual and financial constraints on the basic model.

Three recommendations were made at the conclusion of the study to correct this serious and mutual government and industry problem. These recommendations, which were presented to DoD management, are:

- DoD policies be revised to recognize that technical uncertainty in weapon systems acquisition is a major factor to be considered in determining the appropriate contract method for each individual weapon system.

- OSD establish a standing board for the purpose of review and final determination of the contracting method to be used on all major acquisitions.

- OSD establish a working interface with industry representatives to continue the study of this mutual problem with the objective of developing further guidance regarding the selection of contract type for system developments.

In support of these recommendations, the group developed several possible approaches. These include:

- A revision to DoD Directive 3200.9 which covers Contract Definition.

- A revision to Section 3 of ASPR which covers contract types.

- A proposed charter for the standing contract review board.

The past few years have seen significant changes in government contracting procedures. First, with the objective of assuring that the most cost effective system will be procured by the government, a Concept Formulation Phase was established in which trade-offs of system performance versus costs and definition of major technical uncertainty areas are developed. This phase, which has lasted as long as two to three years, has normally been competitive.

Second, because of significant overruns on previous weapon systems procurements which made government budgeting for fiscal years extremely difficult and, because of the tendency to underestimate costs in the CPFF type development contract, the government instituted the Contract Definition Phase and has increasingly applied fixed-price and total package procurement contracts.

The end result of these actions has been the imposition of low profit and high loss potential fixed-price contracts.

Project Formed

The AIA Aerospace Technical Council conceived this program and formed a project group in January 1968 and suggested two phases of activity for this project.

Objectives of Phase I were to:

- Identify the essential technical steps in the development of military weapon systems.

- Analyze the inherent uncertainty in these steps as they relate to the evolu-

tion of a sound technical baseline for systems development.

- Relate these steps to present DoD systems development requirements.

Objectives of Phase II were to:

- Develop suggestions for improved processes and contractual patterns based on the findings of Phase I.

- Recommend to DoD the appropriate action required to implement the changes which may be developed.

Problems Identified

Many changes have taken place in the government procurement environment over the last several years. Contractors' risks have increased as a consequence of policies regarding fixed-price contracting, cost ceiling, multi-incentives, schedule penalties, warranties, correction of deficiency clauses and total package procurement concept without realistic consideration for the balance between profit and loss potential.

The Contract Definition Phase is intended to provide an opportunity for the competitive development of adequate technical baseline information for the purpose of contracting for the systems.

The problem is that the DoD life cycle process, the contracting patterns used, and the procurement environment today do not recognize the inherent uncertainties and the degree of incompleteness of the technical baseline information actually used for the contracting of systems.

This problem is seriously compounded when it is recognized that this technical baseline information becomes the basic input from the engineering organization to other organizations within companies for determination of program cost and schedules.

System Models

The project group modeled the system development process by identifying the essential technical steps and then related uncertainties associated with each step as expressed by certain significant knowns and unknowns. This was accomplished by first divorcing from the process the many constraints of today's wide variety of procurement practices and management systems and identifying the essential technical steps involved in systems development. Next, four different types of product models were constructed using the essential technical steps:

Model 1: Low technical content, high production volume. Examples: ordnance

items such as unguided rockets, rifles, trucks, ground power units.

Model 2: High technical content, high production volume. Examples: missile and aircraft systems, ground radar systems.

Model 3: High technical content, low production volume. Examples: space and research vehicles, ships, communication systems.

Model 4: Subsystems. Examples: engines, navigation systems, electronic counter measures systems.

Based on data derived from the study of a number of programs, activities common to all models were identified, and charts showing phasing overlap and duration for each of the product categories were developed. As a result of this analysis, one fundamental model was constructed.

Those factors then were identified which contribute to uncertainty during a typical development program. The point of transition of these factors from "unknown" to "known" status for several representative programs was reviewed and defined.

Finally, a comparison was made between the typical DoD cycle and the fundamental model giving consideration to the uncertainty factors.

Continuation of the Study

The AIA Board of Governors approved the continuation of this study during their May 1968 meeting and established an *ad hoc* group of its members to direct a joint Aerospace Technical Council and Procurement & Finance Committee effort to pursue Phase II of the study. A new project group was then formed consisting of representatives assigned by the Aerospace Technical Council and the Procurement & Finance Committee.

During the Phase II study, the Phase I report was reconfirmed, present DoD procurement policy and practice were analyzed and recommendations were developed to present to DoD. This was accomplished by superimposing the legal, contractual and financial constraints onto the basic engineering considerations developed during Phase I. This included the time phasing and management systems inherent to the DoD procurement system.

Further study of this important mutual problem by a joint government and industry team is anticipated, and resolution of this problem should bring about more efficient use of the nation's resources.

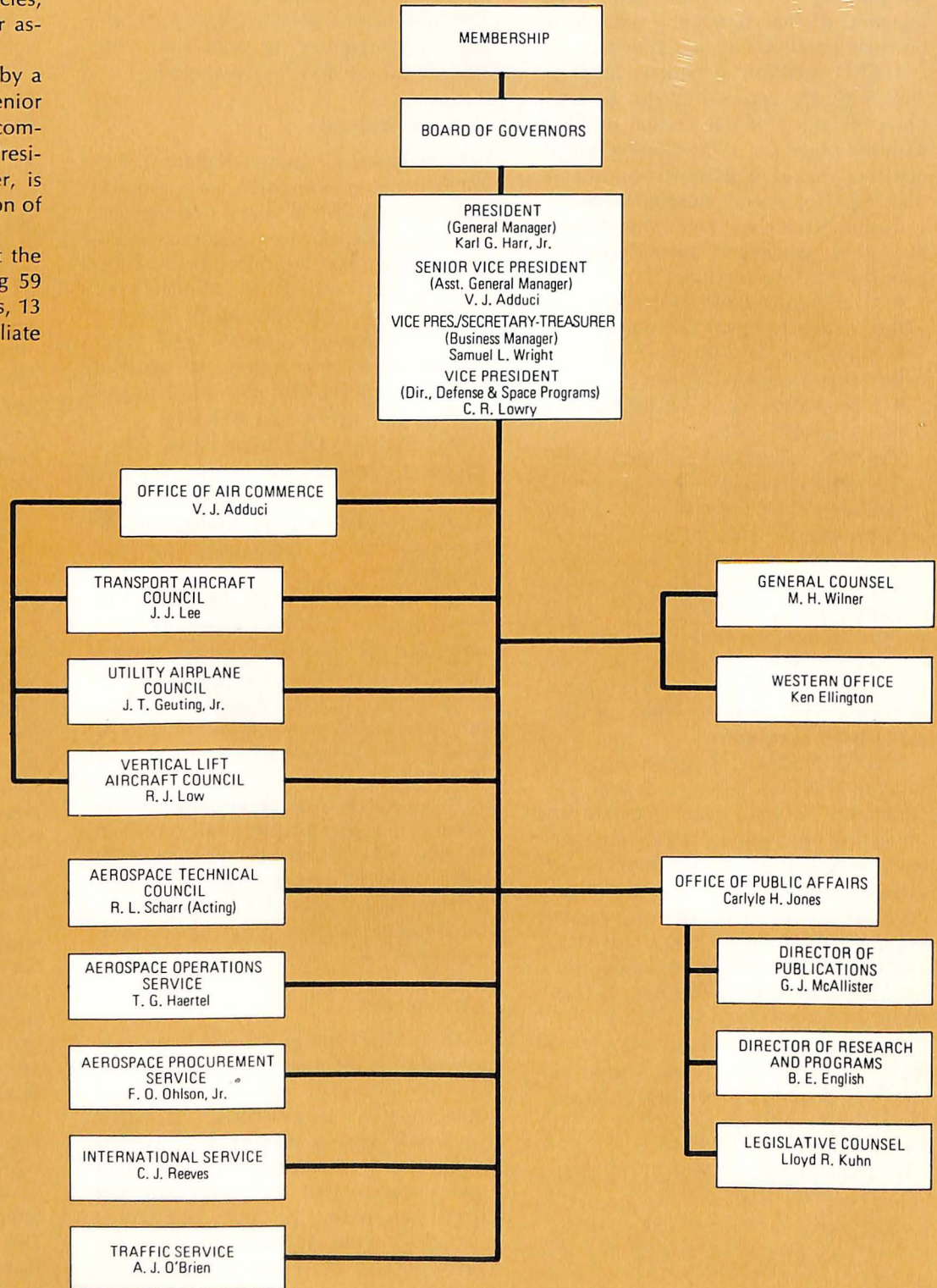
The Aerospace Industries Association of America, Inc. (AIA) is the national trade association of companies in the United States of America engaged in the research, development and manufacturing of aerospace systems, including but not limited to manned and unmanned aircraft, missiles and astronomical 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 89, including 59 Division A (manufacturing) members, 13 Division B members, and 17 affiliate members.

ORGANIZATION CHART

(January 1, 1969)



MEMBER COMPANIES

ABEX CORPORATION
AERODEX, INC.
AEROJET-GENERAL CORPORATION
AERONCA, INC.
AERONUTRONIC DIVISION, PHILCO-FORD CORPORATION
AMPHENOL CONNECTOR DIVISION
The Bunker-Ramo Corp.
AVCO CORPORATION
BEECH AIRCRAFT CORPORATION
BELL AEROSPACE CORPORATION
THE BENDIX CORPORATION
THE BOEING COMPANY
CESSNA AIRCRAFT COMPANY
CHANDLER EVANS, INC.
Control Systems Division of
Colt Industries, Inc.
CONTINENTAL MOTORS CORPORATION
CURTISS-WRIGHT CORPORATION
FAIRCHILD HILLER CORPORATION
THE GARRETT CORPORATION
GENERAL DYNAMICS CORPORATION
GENERAL ELECTRIC COMPANY
Defense Electronics Division
Flight Propulsion Division
Missile & Space Division
Defense Programs Division
GENERAL MOTORS CORPORATION
Allison Division
THE B. F. GOODRICH COMPANY
GOODYEAR AEROSPACE CORPORATION
GRUMMAN AIRCRAFT ENGINEERING CORP.
GYRODYNE COMPANY OF AMERICA, INC.
HARVEY ALUMINUM, INC.
HERCULES INCORPORATED
HONEYWELL INC.
HUGHES AIRCRAFT COMPANY
IBM CORPORATION
Federal Systems Division
INTERNATIONAL TELEPHONE & TELEGRAPH CORP.
Defense & Space Group
ITT Aerospace
ITT Avionics
ITT Defense Communications
ITT Aerospace Controls
KAISER AEROSPACE & ELECTRONICS CORPORATION
KAMAN CORPORATION
KOLLSMAN INSTRUMENT CORPORATION
LEAR JET INDUSTRIES, INC.
LEAR SIEGLER, INC.
LING-TEMCO-VOUGHT, INC.
LOCKHEED AIRCRAFT CORPORATION
THE MARQUARDT CORPORATION
MARTIN MARIETTA CORPORATION
MC DONNELL DOUGLAS CORPORATION
MENASCO MANUFACTURING COMPANY
NORTH AMERICAN ROCKWELL CORPORATION
NORTHROP CORPORATION
PACIFIC AIRMOTIVE CORPORATION
PIPER AIRCRAFT CORPORATION
PNEUMO DYNAMICS CORPORATION
RCA
Defense Electronic Products
ROHR CORPORATION
RYAN AERONAUTICAL COMPANY

SINGER-GENERAL PRECISION, INC.
SOLAR, DIVISION OF INTERNATIONAL HARVESTER CO.
SPERRY RAND CORPORATION
Sperry Gyroscope Division
Sperry Systems Management Division
Sperry Flight Systems Division
Vickers Division
SUNDSTRAND AVIATION, DIVISION OF SUNDSTRAND CORPORATION
THIOKOL CHEMICAL CORPORATION
TRW INC.
TWIN INDUSTRIES CORPORATION, DIVISION OF THE WHEELABRATOR CORP.
UNITED AIRCRAFT CORPORATION
UNIVERSAL OIL PRODUCTS COMPANY
WESTINGHOUSE ELECTRIC CORPORATION
Aerospace Electrical Division
Aerospace Division
Astronuclear Laboratory
Marine Division

DIVISION B

AVIQUIPO, INC.
PARKER & COMPANY INTERNATIONAL, INC.
MANUFACTURERS AIRCRAFT ASSOCIATION, INC.
BRUKNER, CLAYTON J.
CHAMBERS, REED M.
CONDON, CYRIL HYDE
DE SEVERSKY, A. P.
FALES, HERBERT G.
HANKS, COL. STEDMAN SHUMWAY
MAC CRACKEN, WM. P., JR.
SIKORSKY, I. I.

HONORARY LIFE MEMBERS

LOENING, ALBERT P.
LOENING, GROVER

DIVISION OF AFFILIATE MEMBERS

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COMMERCE OVERSEAS CORPORATION
DOYLE, O'CONNOR & CO., INC.
EASTERN AIRCRAFT CORP.
INFORMATION HANDLING SERVICES, INC.
LYBRAND, ROSS BROS. & MONTGOMERY
NATIONAL AVIATION CORP.
NATIONAL CREDIT OFFICE, INC.
SPACE/AERONAUTICS
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