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To The Membership



KARL G. HARR, JR.



The achievements of the aerospace industry in 1966 were unprecedented.

Sales reached a record \$24.2 billion, an increase of 17 percent over the previous year, representing the largest annual gain in sales in a decade and a half. Gains were reported in all major categories — aircraft, missiles and spacecraft — with aircraft accounting for nearly half of all sales.

Exports of U.S. aerospace products achieved a record of \$1.5 billion, due to a 19 percent increase in commercial transport exports and a 28 percent increase in general aviation aircraft.

Employment in the aerospace industry averaged 1,298,000, a rise of 14.6 percent over 1965, highest annual increase in recent years.

Aerospace payrolls increased to \$11.2 billion, a gain of 18.2 percent over the previous year.

Backlog of orders at the end of 1966 rose to \$27.8 billion, a rise of \$7.4 billion over 1965, and almost double the backlog reported at the end of 1961.

The industry met the challenge of providing the equipment for Vietnam operations while responding to an increasing demand for its civil aircraft — commercial transports, general aviation and V/STOL aircraft.

Concurrently space exploration moved ahead on a broad front of manned flight and scientific spacecraft.

The industry produced 344 commercial transports, up from 233 in 1965. The output of general aviation aircraft amounted to 15,747 units, worth \$444 million. There were 586 civil helicopters produced, as well as a record number of military helicopters. In space exploration by the end of 1966 the U.S. had accumulated 2,000 hours of manned orbital flight time, about 80 percent of the world's total experience. Lunar Orbiter 2 was placed in orbit around the moon and, in addition to spectacular views of the crater Copernicus, provided photographs of twelve potential Apollo landing sites. An Applications Technology Satellite was launched to initiate a new series of communications, meteorological and control experiments in a synchronous equatorial orbit. A major accomplishment was cloud cover photography of one-third of the earth.

In all there were 97 spacecraft launches during the year.

Finally, during the year there emerged a much greater degree of realization of utilizing the industry's highly advanced technological and managerial capabilities for the solution of problems other than de-

fense and space exploration. The application of industry's techniques to a wide variety of socioeconomic problems still is in an evolutionary phase, but the proposition that they can and will be used was firmly established.

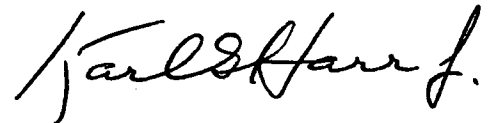
Behind such achievements lay less dramatic but at least equally important advances in the sophistication and effectiveness with which government and industry addressed themselves to common problems in their complex relationship. An outstanding example of this was the recognition of the need for new ways of coping with the proliferation of management systems. Accepting that there must be a body of systems to assure that the best possible management techniques are utilized, it is also becoming increasingly recognized that such systems must be constantly surveyed, coordinated and modified as appropriate if the process is not to defeat the objective. A report of the activities of the Association's Systems Management Analysis Group on Page 30 describes industry and government efforts to make management systems work within the continuously changing realities of defense procurement.

During the year, a major organizational change was made in the Association. The Industry Planning Service was abolished

and its responsibilities assumed by two new services—Aerospace Operations Service and Aerospace Procurement Service. This change improved the support and coordination of related administrative and management functions. Aerospace manufacturing, quality assurance, subcontract and materiel management and the broad range objectives of after-delivery product support are major responsibilities of the Aerospace Operations Service. The Aerospace Procurement Service supports the functions of finance, accounting, contract administration, patents, legal activities pertaining to procurement, industrial relations and security and government reports.

This 1966 *Annual Report* of the Association does not attempt to cover all projects and programs carried forward by the Association. There are literally hundreds of such actions during the year. The *Report* covers representative highlights of the activities of the Services and Councils.

Respectfully submitted,



Karl G. Harr, Jr.
President

Aerospace Operations Service

The Aerospace Operations Service is involved in the areas of manufacturing, materiel management, product support, quality assurance, service publications and spare parts.

The principal efforts of the Service's six committees are undertaken by subcommittees and task groups of industry experts which consider new and revised policies, regulations, statutes and procedures which affect their areas of responsibility.

The Aerospace Operations Service during 1966 was substantially involved in the special problems caused by the accelerated efforts of the aerospace industry to fulfill requirements during a period of increasing commercial and military sales.

Special problems included the need for advance planning and surveys upon which to forecast equipment and material shortages in order to alert government and industry in sufficient time to permit timely action.

Logistics Support Requirement Review

Promoting the development of military service documents that recognize the need and provide for the integration of logistic support is a prime AIA objective. The Integrated Logistic Support Program Requirements for Weapons/Weapons Systems/Equipments of the Navy, and the U. S. Army Aviation Materiel Command (AVCOM) Integrated Logistic Support documents were reviewed in 1966. The documents exemplified the progress that is being made in the acceptance of the principle of integrated logistic support policy and planning for its implementation.

Vendor Evaluation Program

A study was conducted of the prime contractor programs for evaluating the capability and capacity of vendors to serve the aerospace industry. The results were com-

pared for member companies in the form of a standard and a checklist for comparison with their own programs.

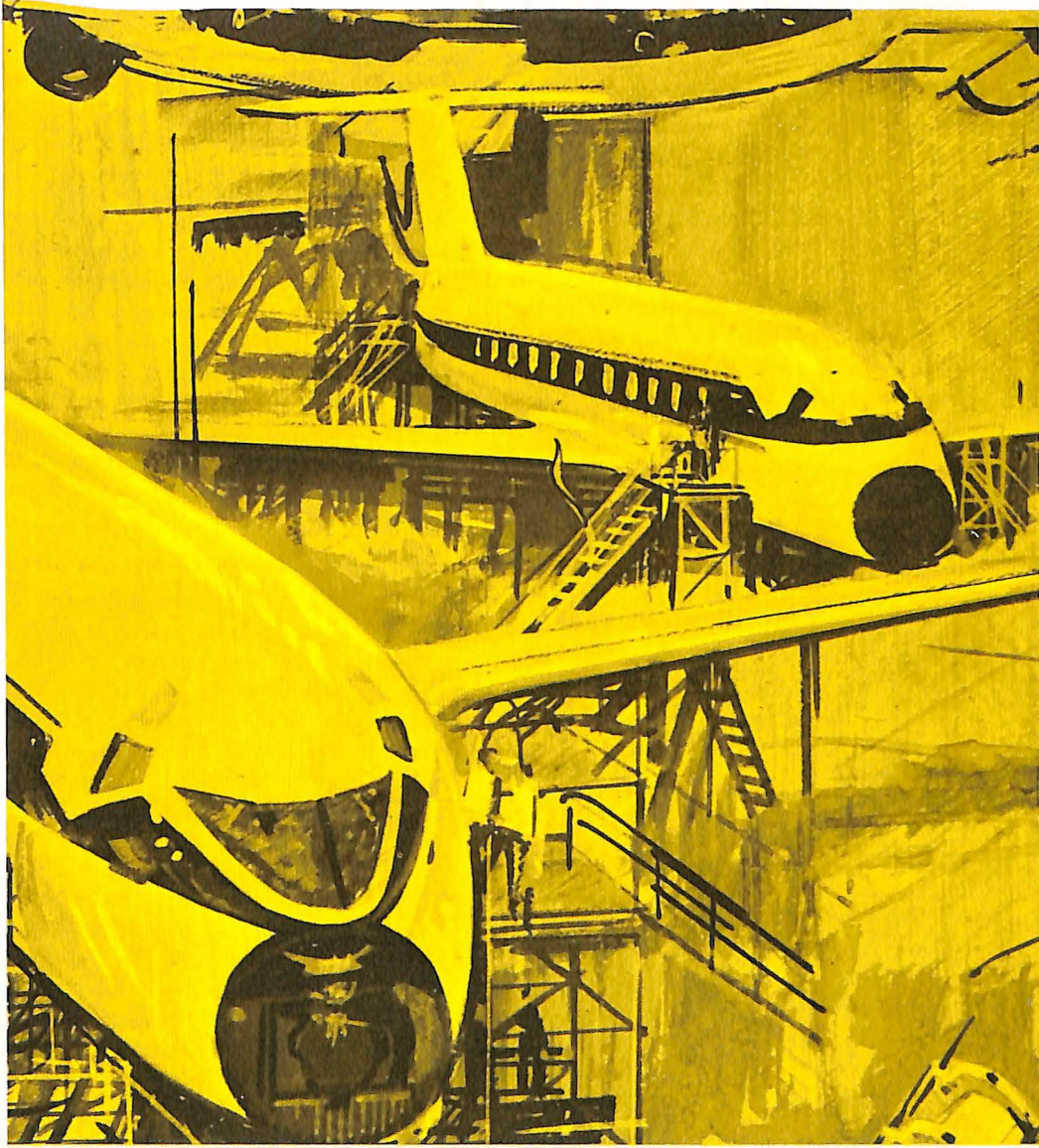
Increase in Cost and Lead Time

A continuing study of the increase in material cost and procurement lead times was carried out.

Using Aug. 31, 1966 as a base line, a study conducted on 33 basic aerospace materials and commodities indicated that as of Jan. 1, 1967 the lead time had increased 100 percent and the cost 7.6 percent. The survey further indicated that cost and lead time were continuing to increase but at a decreasing rate. This information was used by contractors, DoD, military services and NASA for planning purposes and for advancing the initiation of procurement actions in order to avoid delays or breakdowns in the manufacturing cycles.

Small Business

Several meetings were held during the year with the Administrator of the Small Business Administration (SBA). The SBA is assisting in alerting small business machine shops and subcontractors to the importance of developing a capability to convert to numerical control of machine tools. Three Small Business Workshops were held this year by the SBA in Dallas, Cincinnati and San Francisco, with the coop-





J. J. BURNS
Lear Siegler, Inc.
Chairman, Manufacturing
Committee



W. W. GRAALMAN
Martin Marietta Corporation
Chairman, Materiel
Management Committee



O. F. JANSSEN
The Garrett Corporation
Chairman, Product
Support Committee



E. H. DALE
Honeywell Inc.
Chairman, Quality
Assurance Committee



HOWARD G. MAXWELL
Lockheed Aircraft
Corporation
Chairman, Service
Publications Committee



DONALD J. ARBUTHNOT
McDonnell Company
Chairman, Spare Parts
Committee

eration of the AIA. Combined attendance was 2,000 persons. These workshops attracted additional small business firms into the aerospace industry as subcontractors and stressed the quality, timely delivery and firm prices required by the aerospace industry.

Ratings for Civil Air Carrier Aircraft

The Office of Emergency Planning, Executive Office of the President, at mid-year questioned the continued use of material priority ratings for Civil Air Carrier Aircraft. AIA took the initiative in proposing a continuation of the rating. The Office of Emergency Planning extended the use of the material priority rating for Civil Air Carrier Aircraft until June 30, 1970, making it possible to fulfill the urgent aircraft needs of the airlines.

Vendor Packaging Standards

Twelve National Aerospace Standards on vendor packaging were developed in 1966. More than twenty more standards are under consideration. These standards have eliminated individual company cost of preparing vendor packaging standards, and reduced the vendors' costs by eliminating the need for packaging differently for each customer. More than 50 percent of the dollar value of most prime contracts is procured from subcontractors and vendors, and the standardization of packaging requirements results in significant savings.

Air Pollution Control

Recent federal, state and local air pollution control measures conflict with military specification requirements to which the aerospace companies are contractually committed. AIA has had significant success in developing or identifying acceptable substitute solvents, eliminating the need for installation of expensive solvent recovery systems. Although the work is not completed, more than 50 percent of the non-exempt solvents used in aerospace manufacturing can now be replaced by exempt materials. One company estimated that the change to exempt solvents will make unnecessary \$8 million in capital expenditures for solvent recovery systems and \$1.5 million annually for maintenance. Because some of these substitutions will

require changes in military specifications, AIA is working with the Department of Defense to accomplish such changes. Efforts on the remaining non-exempt solvents continue in coordination with other organizations such as the National Paint, Varnish, and Lacquer Association and the Manufacturing Chemists Association.

Manufacturing Engineering Equipment Symposium

In the Fall of 1966, approximately 150 aerospace manufacturing and equipment technical executives met under AIA auspices to exchange and update their knowledge on recent machine tool and equipment problems. A principal subject covered was the processing of the newer hard metals and high strength steels. The meeting demonstrated the value and the desirability of this type of program to advance the state-of-the-art of manufacturing engineering.

Manufacturing Equipment Problem Areas

AIA spearheaded government-industry studies to determine the extent of industry capacity versus requirements in critical areas of manufacturing equipment. Eight task groups were set up with members from the AIA member companies, the government and the equipment manufacturing companies. The task groups were: Profile Milling; Gear Machining and Grinding; Stressfree Machining; Metal Forming; Process; Forging and Heavy Metal Press; Bearing Manufacturing and Welding and Joining. After initial studies, it was found that the problems involving Bearing Manufacturing, Process and Stressfree Machining were of lesser importance and these studies were discontinued. The profile milling study showed that there will be a shortage of about 1,400 machines during the next five years. The remaining four task groups are continuing their studies.

Long-range Handbook Study

AIA is conducting a long-range study of prospective new methods of preparing instructions for operation, service, maintenance, overhaul and modification of hardware in response to an invitation from the Department of Defense. These instructions have traditionally been in the form of

manuals or handbooks. However, this study is intended to take advantage of state-of-the-art developments in preparing instructional material through the medium of visual and audio devices, tape, recording and microfilm information retrieval and storage systems, and computer controlled data processing equipment which can provide operation and maintenance malfunction information in a manner understandable to different skill levels. This study, which is in its initial stage, is expected to prove helpful for long-range planning.

Manual Specification Reviews

Recommendations were provided during the year on a number of specifications proposed for the DoD Technical Manual Specifications and Standards Program. Among the new draft specifications reviewed were the general style and format requirements for all technical manuals and instructions for preparation of intermediate and depot maintenance manuals for aircraft engines. In most cases recommendations called attention to numerous redundant multi-service instructions for the same requirement and also restrictive requirements which, if implemented, would unnecessarily increase manual costs.

Recommendations for improvements and clarification of requirements were also provided to each of the military services for a series of proposed specifications dealing with the preparation of equipment maintenance instructions and other technical manuals and technical orders. Adoption of the industry recommendations should facilitate cost reductions in the documentation preparations.

Review activities with the Air Transport Association in connection with their specification for manufacturers' technical data which apply to commercial aircraft and component manufacturers were continued in 1966. Recommendations for clarifications and improvements in specification revisions for the identification of text produced by automated equipment, the duration of effectiveness of temporary changes and the requirements dealing with technical data revision services for the service life of the equipment have been submitted to ATA.

Phased Spare Parts Provisioning

Recommendations to the DoD were provided following a study of the differences in the implementation of phased provisioning of spare parts by the military services. The recommendations covered standard terminology, guidelines and "boilerplate" language for use by all the services to simplify the paperwork and procedures. Joint DoD and AIA efforts in continuing to refine this specialized technique are planned for 1967. Phased provisioning provides economies through the early procurement of specific long lead time items in quantity lots as well as by deferring costly machining and processing until the anticipated requirements are confirmed through operational use.

Shortcut Spare Parts Provisioning

AIA assisted the Air Force in refining a proposed procedure for use when the procurement and manufacturing lead time is insufficient for timely delivery of spare parts through normal ordering methods. This procedure streamlines and minimizes provisioning documentation and simplifies procedural requirements for vendors, permitting 30 to 90 days earlier Air Force release of spare parts orders to contractors on urgent military requirements. AIA participated with the Council of Defense and Space Industry Associations in this project.

Initial, Follow-on and Shortform Spares Provisioning

A study was made involving Air Force procurement instructions on initial, follow-on and shortform procedures for spare parts selection and ordering to ascertain the feasibility of consolidating them into a single document containing optional exhibits covering specific requirements. The goal of the recommendations is to clarify and simplify procedures between the Air Force and contractors.

Air Transport Association Liaison

Participation from manufacturers is being encouraged by the Air Transport Association in spare parts procedures development. AIA member companies involved in commercial airline activities were invited to comment on a proposed new ATA specification revision. This specification

establishes a communications system between manufacturers and airline customers based on integrated data processing techniques used to simplify, standardize and coordinate all procurement and sales activities involving spare parts. The ATA-AIA review action has paved the way for future, regular AIA participation with ATA in developing necessary amendments to the ATA specification. It is expected to result in a reduction of paperwork and greater speed and accuracy in processing spare parts transactions.

Quality Assurance Requirements

A major AIA project developed as a result of an evaluation of current operations under the NASA and DoD quality specifications. Fixed price and incentive contracts require definition of the quality tasks during the proposal phase. This is especially evident in quality assurance operations when the quality program specifications are oriented toward a system for control of product quality, but lack the detail required to evaluate the controls required by an individual product. The task is the development of guidelines to indicate specific quality assurance requirements. The guidelines are intended for use by the government procurement officers for specifying the applicable quality requirements in the Request for Proposal.

Calibration and Measurement

Two military specifications and a handbook applicable to calibration procedures, requirements and evaluation methods were studied, and recommendations made to bring them up-to-date and remove inconsistencies. The recommendations have been prepared and delivered to the government sponsor. Existing specifications continue to be reviewed with the objective of developing improved methods for establishing and interpreting specification tolerances and calibration accuracy ratios.

Quality Management Analysis

This project produces every two years, a statistical analysis of the allocation of contractor manpower to the various quality functions, and permits AIA members to evaluate their departmental operations against the industry compilation.

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.

The Service operates through five principal committees to provide a medium for conducting evaluations and resolving problem areas of mutual interest in government-industry relationships, particularly with respect to new or revised government policies and regulations or other subjects affecting business activities of aerospace companies. The committees also serve as a means for maintaining liaison with professional societies and other trade associations in matters of common interest.

During 1966, the Aerospace Procurement Service engaged in many activities in connection with proposed additions or revisions to government procurement policies and regulations affecting business activities of AIA member companies.

Major areas of activities include:

- Review of a proposed Department of Defense management control system covering schedule and cost planning and participation in the Council of Defense and Space Industry Associations (CODSIA) in the development of an industry position which resulted in a reconsideration by DoD of the proposed system and the probability of the substitution of an alternate system.
- Initiation of several AIA studies furnished to the DoD to refine and improve the Armed Services Procurement Regulation (ASPR) provisions relating to contract cost principles, and to revise ASPR progress payment coverage in the light of present economic conditions.
- Review of ASPR patent and data matters and the submittal, through CODSIA, of comments that resulted in the issuance of substantially improved and equitable regulations.
- Compilation and publication of a "Glossary of Terms in the Compensation Benefits Field" to provide uniform terminology in this area.

- Evaluation and submittal of comments on a proposed DoD Industrial Security Manual which resulted in cost savings and more workable security requirements in the manual for industry as issued.

- Continuous review of DoD and National Aeronautics and Space Administration financial and economic reporting requirements which resulted in the reduction of administrative burdens and redundant data submittals for contractors.

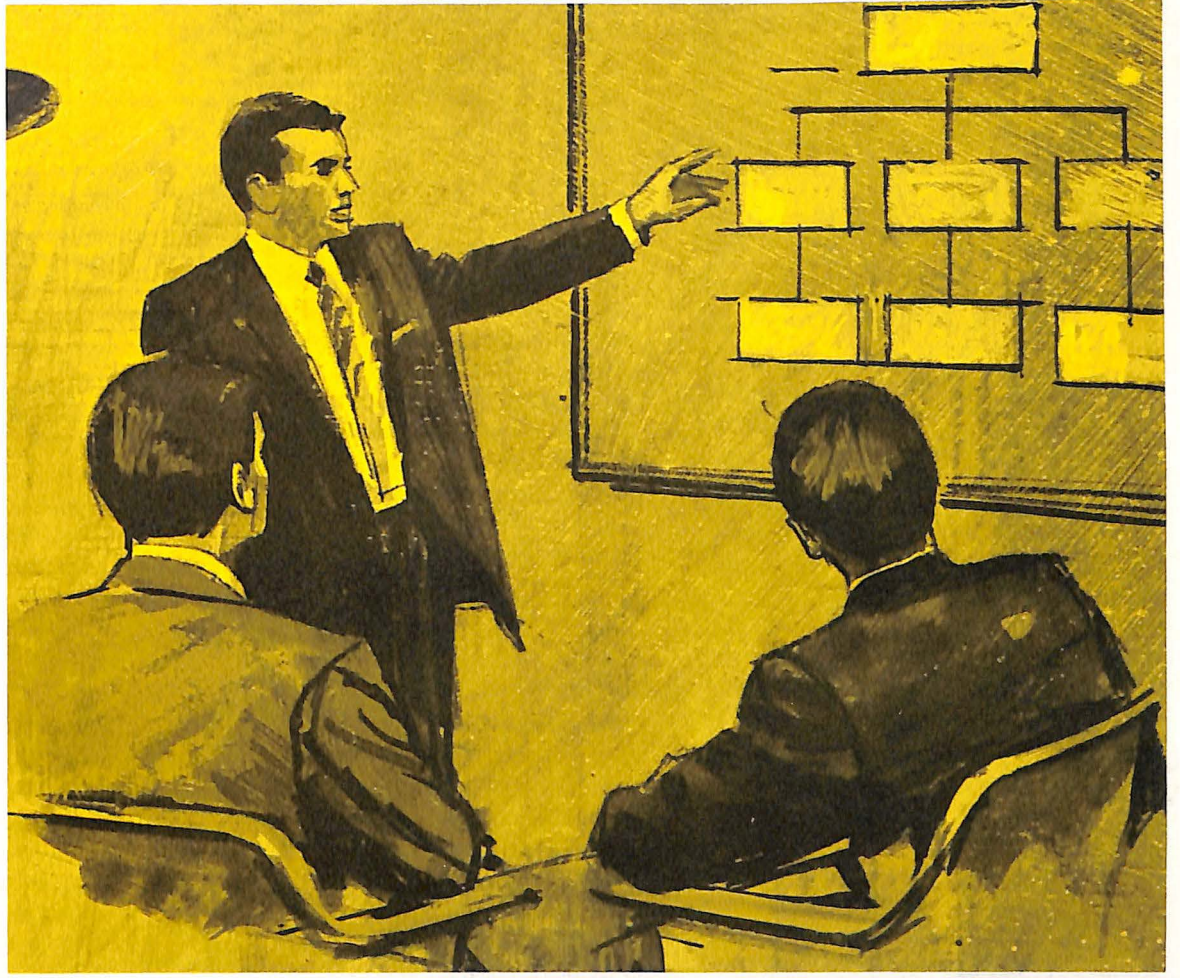
Contract Cost Principles

During 1966, the Service has reviewed and commented on proposed additions or revisions to the ASPR cost principles including general and administrative expenses to government-owned contractor-operated plants, depreciation costs, material cost, professional and consultant service costs and travel cost. The task group also initiated studies suggesting revisions to such cost principles as patent department and recruitment costs.

An AIA position paper was developed requesting DoD consideration of revising and improving the ASPR coverage on progress payments, particularly in the light of existing economic conditions. The DoD is considering the proposed recommendations.

Contract Terminations

Prior years' efforts by AIA through CODSIA





G. L. WARRICK
Northrop Corporation
Chairman, Government
Reports Committee



R. E. McGRUTHER
The Bendix Corporation
Chairman, Industrial Relations
Committee



M. W. McFARLIN
Lockheed Aircraft Corporation
Chairman, Industrial Security
Committee



ROGER W. JENSEN
Honeywell Inc.
Chairman, Patent
Committee



EDWARD CURTIS
Douglas Aircraft
Company, Inc.
Chairman, Procurement and
Finance Committee

to improve contract termination procedures resulted in the removal, by an ASPR revision, of the profit formula on terminations which could be arbitrarily imposed on contractors by the government without any appeal mechanism being available. Other ASPR provisions remained which prevented the timely and equitable recovery of costs and reasonable profits in contract termination settlements. Additional effort was applied by AIA in developing and presenting to the DoD, through CODSIA, recommendations for improved ASPR provisions together with their justification. It is apparent that favorable action will be taken to enable more expeditious contract termination settlements and acceleration of partial payment of cost incurred, when a delay is not the fault of the contractor. This will help in substantially reducing the financial burden carried by contractors' terminations for the convenience of the government.

Government Property

The Service in 1966 reviewed a proposed revision to ASPR coverage on government-owned property in the possession of contractors. A majority of industry recommendations were accepted and the ASPR requirements are less burdensome and more compatible with other applicable ASPR Sections and regulations concerned with the use of government property.

The Service was active in the development of a DoD policy to charge rent across-the-board for use of government property as a more practical method to eliminate competitive advantage, contractual requirements for the determination of savings resulting from the DoD industrial equipment modernization and replacement programs, and procedures requiring an active government program to assure that government-furnished industrial production equipment in possession of contractors is being effectively utilized.

Comments were prepared for transmittal to the ASPR Committee on a proposed new section of ASPR covering the disposal of government-owned property.

Conflicts of Interest

Government policy regulations on organizational conflicts of interest, while representing worthwhile objectives, were found to be generally over-applied. As a result, healthy competition among potential contractors was inhibited. By means of extensive surveys and presentations of factual situations through CODSIA to the agencies involved, DoD and NASA accepted the need for corrective action. The DoD has published an ASPR revision which accomplishes much toward deterring over-appli-

cation and is engaged in a continuing study to determine what additional action is required.

Schedule and Cost Planning

The DoD transmitted to AIA a proposed management control system covering schedule and cost planning with the stated objective of reducing the proliferation of similar management systems in the acquisition process while retaining the visibility deemed necessary by the government. While the objective was excellent, the proposed system contained so many rigid, detailed requirements that it would remove all flexibility and inhibit motivation for contractors to seek improved, internal management systems on a more cost effective basis. The AIA developed a more flexible approach which would retain competitive motivation. This position was adopted with minor refinements by CODSIA and presented to DoD. DoD has indicated general acceptance of the industry position.

Warranties

An AIA position paper which stated the Association's concern with respect to inconsistent applications of the ASPR provisions on warranties was initiated and forwarded to the DoD. Subsequently, the Air Force substantially improved the Correction of Deficiencies clause. In addition, a recently proposed ASPR revision, covering the entire section on warranties including a Correction of Deficiencies clause, has been issued which contains significantly improved ASPR provisions.

Special Task Group

To provide a medium whereby AIA may take the initiative, where possible, in identifying problems within the fields of procurement and finance that may arise in the future — not only in contract matters but in the broad field of management practices and techniques — a Task Group has been established. It is comprised of the present chairman and past chairmen of the Procurement and Finance Committee, and will hold its organizational meeting in 1967.

The committee, through its task groups, has also been concerned with such matters as the Renegotiation Act, incentive contracts, cost and pricing data and other procurement matters.

Economic Information System (EIS)

The instruction and forms for use in the Economic Information System were made available by DoD and NASA for industry review and comment in 1966. As a result of industry recommendations, the reporting procedures were simplified and the system tailored to provide the necessary data from contractors. Experience gained in complying with EIS has pointed up some

problem areas, but recent suggestions by industry to correct these areas have been incorporated into the current request for data by DoD and NASA.

Cost Information Reports (CIR)

Activity continued on the CIR reporting requirements which are designed to collect cost and related data on certain items of military equipment. Recommendations made to the DoD resulted in improving the procedures to simplify requirements, restrict application and facilitate compliance. Recommendations for revision of the procedure also were made to minimize the burdens of coordinating this reporting system with others. The procedure omitted a number of reports previously required and satisfies customer requirements for data banks and independent cost estimating capability.

Contract Funds Status Report (CFSR)

The reports of this procedure are a part of an overall management and reporting system, and consist of comparison reports designed to furnish specific financial detail on certain contracts.

As a result of AIA recommendations, revisions were made in the procedures to reduce the burdens of reporting and, at the same time, provide meaningful information to meet the objectives of the DoD.

NASA Financial Management Reports

In early 1966, NASA proposed procedures changing the existing NASA 533 series (Contractor Financial Management Reporting System) as well as establishing the NASA 534 series (Special Cost Study Reporting System). The latter series of reports is comparable to the Cost Information Reports of the DoD.

As a result of industry recommendations, some of the more burdensome requirements were eliminated. However, the procedures to be issued by NASA will provide the necessary information for detail in cost data banks and establish capability for independent cost estimating. The procedures and reports to provide data concerning Overhead Cost Analysis, originally a part of the NASA 534 series, were withdrawn and made a separate project.

A part of the overall problem in this area is to develop management systems to meet NASA's unique needs and, at the same time, be compatible with the DoD systems.

Material Inspection and Receiving Report

The Material Inspection and Receiving Report (DD 250) is used as an acceptance document, shipping document and invoice. It is a significant part of a contractor's operation in the delivery of contract end items to the government. The DoD proposed ASPR coverage for the purpose of

establishing a standard procedure for the mechanized handling of DD 250 form which, prior to this change, could be modified to suit individual contractor needs. A major portion of the industry recommendations to minimize impact on contractors and yet satisfy the DoD's needs were adopted and incorporated into ASPR.

Collective Bargaining Agreements

A survey of collective bargaining agreements was conducted, covering each agreement with a union, duration, number of employees in the unit, union security, date and amount of last wage increase and any deferred increase.

Compensation Benefits Glossary

A "Glossary of Terms in the Compensation Benefits Field" was compiled and supplied to member companies. The adoption of standard language in the compensation benefits field in the industry should provide uniformity of survey material. Information acquired will be more useful and comparisons more meaningful.

McNamara - O'Hara Extended Coverage

The Secretary of Labor in 1966 proposed to exempt from provisions of the Walsh-Healey Act those employees furnishing material under a contract whose principal purpose is the furnishing of service through service employees, and apply provisions of the McNamara - O'Hara Service Contract Act to those exempt employees. Members were contacted for the effect on their companies. Later the Secretary of Labor halted any immediate action.

DoD Industrial Security Manual

The OIS requested a review of the proposed DoD Industrial Security Manual. A comprehensive review was undertaken of all sections of the voluminous document and suggestions were made and coordinated by a task force for submission to OIS. The proposals were discussed at a joint government-industry meeting, and the acceptance of many of the recommendations resulted in cost savings and more workable security requirements for industry.

Security Requirements Check List

The Security Requirements Check List is prepared by the user agency to provide industry with the information to properly mark documents as to the degree of classification. DoD drafted a possible concept for improving the form which was reviewed and recommendations made for improvements so that the check list would provide better security classification guidance to industry.

Federal Patent Policy

During the 1st Session of the 89th Con-

gress, by invitation, AIA filed a statement with and testified before the Senate Subcommittee on Patents, Trademarks, and Copyrights in general support of S.1809, with suggested changes to protect the equities of the parties concerned. In furtherance of this effort, during the 2nd Session of the 89th Congress, AIA also submitted to the Senate Judiciary Committee a statement supporting S.1809 as amended. Although no legislation was enacted the subject can be expected to be revived in succeeding Congresses. The Patent Committee studied and reviewed for the information of members additional proposed legislation for establishing a federal patent policy, amending the rules of the Court of Customs and Patent Appeals and establishing a procedure for publication of patent applications.

Government Patent Regulations

In the latter part of 1966, a major revision of the ASPR dealing with patents and technical data was issued. It contained many of the suggestions embodied in a CODSIA position paper, which was based on an AIA study that had been filed with the DoD in 1965, in response to the DoD's request for review and comment on the proposed revision. The CODSIA recommendations embodied in the revised ASPR included the deletion of liquidated damages, increased time to report inventions and an improved definition of inventions to be reported.

A comprehensive review and evaluation of ASPR Section IX dealing with patent and data matters is under way.

Proprietary Rights

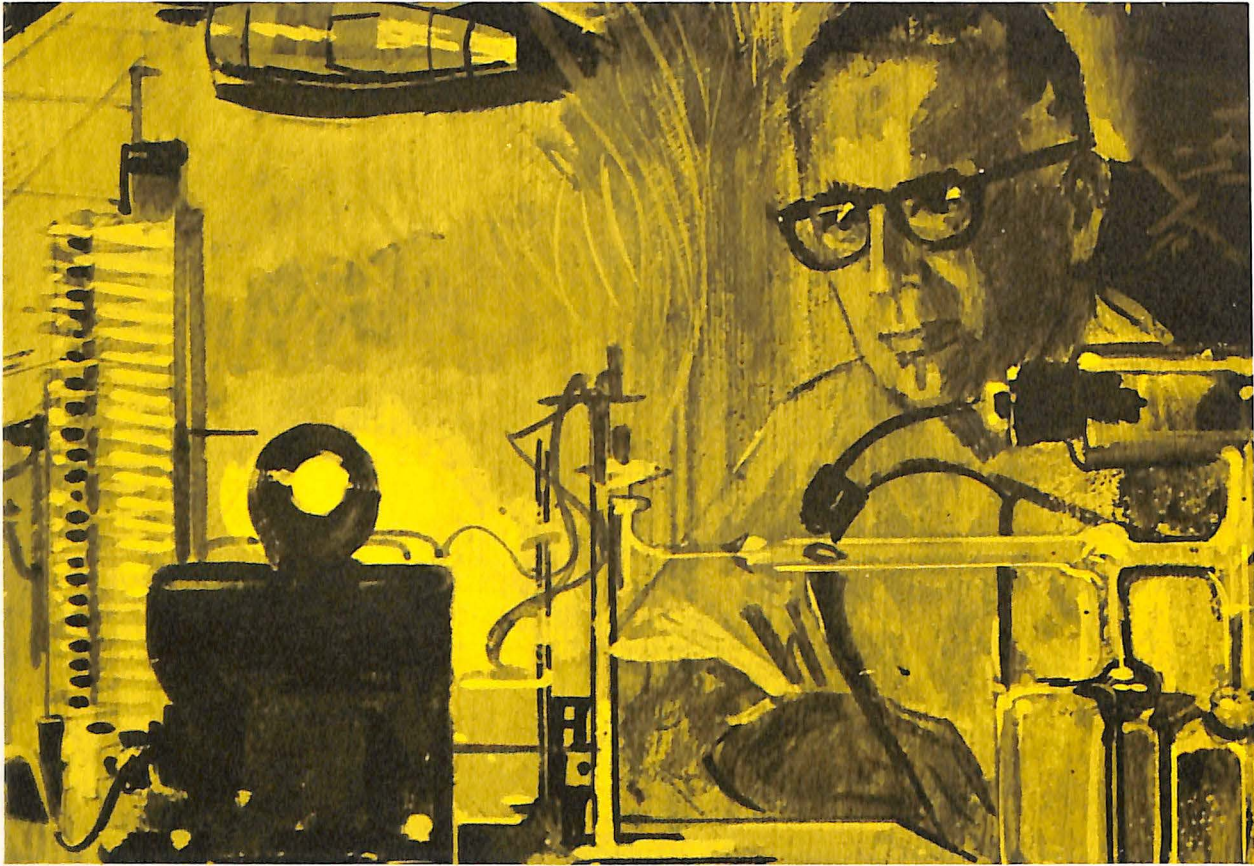
The Service participated in joint Air Force-industry follow-up activities of the 1965 AIA-Air Force Data Management Symposium, resulting in proposed revisions to Air Force policy and procedures that should materially reduce administrative burdens in the handling of rights in technical data.

NASA Patent Policy and New Technology Clause

The Service also worked on a recently issued NASA Procurement Directive concerning procurements which appear likely to infringe a valid patent, NASA waiver regulations and forms and NASA foreign licensing regulations.

General

Many other projects were undertaken which in the aggregate substantially benefited the aerospace industry. The primary objectives of all efforts were efficiency and cost effectiveness.



Aerospace Technical Council

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

During 1966, the Aerospace Technical Council and its Divisions and Committees were actively 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 with the customer and others to present the views of the industry, either in response to requests or on its own initiative.

The Council maintained a productive liaison with senior technical management counterparts in the Department of Defense and the National Aeronautics and Space Administration with the goal of improving industry-government relationships as they affect technical management and to exchange viewpoints on planned new and revised policies. Typical were such subjects as key personnel clauses, use of fixed price contracts for research and development efforts and proper application of management systems.

Systems Management

The Council continued to direct much of its effort to the broad area of systems management and to the details of disciplines, techniques and management tools used to direct and control the total program life cycle of an aerospace system. There has been close cooperation with the Office of the Secretary of Defense, the services and the National Aeronautics and Space Administration to provide for continuous review and refinement of the several systems. Considerable attention has been focused on efforts toward the elimination of duplication and conflict in program requirements.

An intensive review was made of the Air Force Systems Command's proposed manual covering the preparation of contract statement of work. This document is highly significant to AFSC and contractors. It

describes in detail the requirements and contents of the statement of work which is the heart of the contract. Industry considered this document a valuable aid in the drafting of consistent, uniform, complete statements of work when used as a guide in preparing contracts. However, the contents of the manual and its exhibits should not be mandatory for direct incorporation in the statement of work. This position was successfully negotiated with the sponsors of the document.

Systems Engineering

A close, continuous relationship with the AFSC was maintained during the evolutionary period of systems engineering management procedures. A review of the first full application of this system to a contract has resulted in a reevaluation by the USAF in which the AIA assisted. As a result, there has been an industry-supported orientation of philosophy toward a system which will specify requirements rather than procedures. The Council is working closely to advise and assist AFSC in the preparation of a "Systems Definition Specification" which will take precedence over existing documents covering systems engineering requirements. It is an industry objective that this specification be a tri-service specification which would have DoD-wide application.

Systems Effectiveness

The evolution of a systems effectiveness concept within the military services has been monitored because of the potential impact on system contractual requirements. The DoD definitions standard published in 1966 includes the term systems effectiveness, defined as a measure of the degree to which an item can be expected to achieve a set of specific mission requirements, and which may be expressed as a function of availability, dependability and capability.



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PETER R. TAYLOR
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The concept seeks to quantify the overall mission effectiveness of a system by an interrelation of the many factors which contribute to effectiveness. There has been some progress in the development of math modeling techniques for systems effectiveness analysis. There are also other projects in progress to develop methods of quantifying the parameters to be used in the math model. It appears, however, that there are significant reasons why contracting for systems effectiveness as an overall requirement has not yet been feasible. A continuing effort is under way by the Council to keep abreast of developments within the government on this new discipline and to anticipate the impact on future contractual requirements.

Reliability and Maintainability

An extensive list of maintainability and reliability terms and definitions was coordinated by the Council and proposed to DoD for use in the new military standard on effectiveness terms. Efforts are being made to obtain their adoption so that there will be common agreement on their meanings in contract terminology.

A major deficiency related to reliability and maintainability analysis and prediction has been recognized in the systems for feedback of operational experience from the field. A project is under way to analyze the military data feedback systems and to recommend changes which will make it possible for industry to obtain more meaningful reliability and maintainability information on a timely basis.

Government requirements for the contractor's reliability and maintainability program under a development contract were examined in the light of recent experience. Changes were recommended to provide for appropriate emphasis on reliability and maintainability in the engineering design, with least control by the government.

Industry-initiated projects were completed to document methods for demonstrating achieved reliability for aircraft gas turbine engines and for liquid and solid propellant rocket motors. These are expected to provide the basis for acceptable contractual demonstration plans. Similar projects are in progress for structures and electronic systems.

Data Management

In the area of data management there is continuing effort to develop a guidance document concerned with the "Judgment Factors Involved in Determining the Need for Data." This document will provide guidance to Program Managers and their Data Management Officers in developing program data requirements which are properly

balanced with respect to government and industry responsibilities and prerogatives, program phase and contract type, and government agency requirements.

Another project involved working with the Air Force Logistics Command in the broader application of the "Supply of Essential Engineering Data" (SEED) concept. This concept provides that the systems contractor maintain the continuously updated repository for essential engineering data which are delivered to properly designated activities on an as required basis. Development and implementation of this concept could result in a simplified, improved, reduced cost supply of current engineering data to the using service organizations. AIA is maintaining close liaison with OSD to assist in the formulation of a policy which will call for service-wide implementation of the deferred delivery of technical data.

Configuration Management

During 1966, AIA provided information and comments to improve the effectiveness of the Army and USAF configuration management documents and is providing active assistance to USAF in the current effort to revise its document. Active follow-up has been made on the development of the Navy document on configuration management which is expected to be available for review in 1967.

The Council worked closely with NASA to determine what effect on cost and administrative effort may be due to the lack of uniformity in configuration management systems between various centers. Efforts will continue to be concentrated on the establishment of an agency-wide system.

Close contact has been maintained with OSD to insure the maximum responsiveness to the proposed DoD-wide configuration management system which will be reviewed in 1967. Assistance to this program was provided through an industry initiated development of a concise definition of Contract Management Items (Contract End Items) which is an essential ingredient of a configuration management system. This development, which contains the previously developed "Standard Identification Numbering System," was presented to and accepted by the OSD for incorporation into the DoD configuration management system. This definition has gained acceptance with other agencies, including NASA, and has been widely endorsed by industry.

Engineering Drawings

Substantial effort was devoted to the two major DoD documents dealing with the acquisition and preparation of engineering

drawings. Initial review of one of the documents indicated a wide divergence of viewpoint both in government and industry. To unify these viewpoints a study, "The Engineering Drawings—Its Purpose and Application," was prepared. The presentation of this study to OSD resulted in a project to assist in the preparation of an applications guide to be used by DoD personnel when developing contract requirements from the specification for the acquisition of drawings and associated lists. This study has been also the subject of considerable interest to other government agencies and segments of industry. The other document concerned with the preparation of drawings was circulated in draft form for industry comment during 1966. A well-developed industry position and response was delivered to the sponsoring office and coordination meetings were arranged.

Turbojet Design Requirements

For eight years there has been a growing concern over the difference in the government and industry views on turbojet specification requirements. This concern was alleviated during a meeting with policy level government representatives. It was agreed that these specifications fail to express the military intent in some important areas and that there was a need for a general revision to correct the basic problems. The government representatives requested that industry prepare a proposed revision to accomplish these objectives, and further advised of plans to insure improved government/industry communication at policy forming levels, as well as working levels in future coordination of revisions to these specifications.

Lift Engine Design Requirements

At the request of the military services, the technical work has been completed by AIA for design, development and testing requirements of lift engines. Final submittal of this to the military is scheduled for May 1967.

Liquid and Solid Rocket Design Requirements (Including Propellants)

In response to a request from the USAF Rocket Propulsion Laboratory, AIA prepared a proposed revision to a liquid rocket specification and assisted the USAF in final review and coordination of this draft, with NASA and the other two services.

In addition, the Council worked on a revision of Solid Rocket Specifications in response to the USAF Rocket Propulsion Laboratory's request. This will provide design guidance rather than impose detail

requirements, reduce the number of specifications from five to two, and incorporate the 375-1 Configuration Control philosophy. The industry draft is scheduled for completion and coordination with AFRPL, Army, Navy and NASA in 1967.

Assistance was also provided to both the USAF and NASA in developing and updating critical chemical composition requirements and safety handling procedures for solid and liquid propellants.

Air-Breathing and Rocket Propulsion Component Specifications

At the request of the USAF and Navy, coordinated comments have been provided on specifications and standards of concern to propulsion systems producers and users. The ability of government-industry coordination to keep these up to date is of considerable value in simplifying contractual and procurement processes.

Structural Design Criteria

Industry specialists joined with the Naval Air Systems Command and USAF in a task of revising and updating the series of 24 military specifications covering structural design criteria for aircraft and missiles. The major revision effort is being accomplished in two stages. The first phase, which is nearing completion, will bring the documents current with known technology and requirements, and will identify those areas requiring additional research and development which will be accomplished in the second phase.

The need for the establishment of common non-specific criteria for structural design of spacecraft and their launch vehicles was cited in a special report to NASA and the USAF. These basic criteria are necessary to prevent the development of a launch and spacecraft system using different environmental criteria even though the system in many instances sees the same natural environment at the same time.

The successful use of damage tolerance (fail-safe) techniques in the design of commercial aircraft prompted a review of the use of these practices in military aircraft design. A project report was submitted to the military services, identifying damage tolerance techniques and the extent of their use by industry. The report discusses the relationship of damage tolerance to other design considerations such as fracture toughness and structural fatigue and provides recommendations for knowledge in this area.

Military Specifications for Structural Materials

A continuing and important activity is the

review of military specifications for structural materials. Industry experience with these materials provides the background for improvements in the documents resulting in better materials and processes at lower cost. During 1966, coordination meetings were held to resolve comments on specifications covering aluminum alloys, titanium alloys, aluminum honeycomb core materials, and the heat treatment of aluminum. Through these meetings with representatives of the military services, aerospace contractors and material producers, documents acceptable to all have resulted.

Mechanical properties, fracture toughness, fatigue life, and resistance to stress corrosion were determined for all forms of a new aluminum alloy (7001-T75) through a cooperative test program. The results indicated that the new alloy has improved corrosion resistance over those now in use without any decrease in strength properties.

Electromagnetic Compatibility

In response to a DoD request, AIA worked closely with the government and three other industry groups to achieve government-industry accepted tri-service standardization for design requirements and test procedures used to determine levels of interference generated by electronic equipment, and the levels of interference which electronic equipment must be designed to tolerate without deterioration of its performance. The resulting standards are expected to be printed in 1967.

Aircraft, Space and Missile Electronics

A number of important changes recommended by AIA in the requirements for airborne and related ground test equipment specifications were approved by the government to keep these specifications current with rapidly changing technology.

AIA is also preparing a response to a proposed tri-service design specification for electronic equipment for long time space usage. This specification is needed to eliminate the need for each space contract to contain its own general requirements. The requirements under development include hard vacuum, radiation, high oxygen content and out-gassing.

Due to an entirely different induced environment, missile electronic systems design has gradually shifted away from accepted aircraft electronic systems practices. This prompted the DoD (Aeronautical Standards Group) to request AIA to propose revisions to missile electronic requirements. This is being closely coordinated with space and aircraft design specifications so that all requirements that are common will be so recognized and

only truly missile requirements will be altered.

Microelectronics

Industry senior technical management, with the support of the disciplines of systems design, reliability, maintainability and product support, endorsed the DoD policy for use of microelectronics in military systems and equipment as a commendable step forward. That policy represents the first real marriage of the development and logistics teams from a policy standpoint that has its start early enough in the development cycle to be an effective tool in guiding development, engineering and support efforts toward an integrated support capability.

AIA is continuing to support the DoD standardization task on terms and definitions, test methods and procedures, parameters to be controlled for circuit characterization, and general applications guidelines. The output of these DoD tasks will be important tools for increasing the efficiency of incorporation of microelectronics into systems, and will hasten the achievement of the potential of this technology for significantly greater performance capability, greater reliability, longer life, and lower cost per function.

Electronic Design Requirements — Uniformity Program

This joint DoD-industry program has achieved the 400 percent accelerated pace targeted by DoD-industry's 1964 workshop plan. Progress of 50 tasks in process indicates that this same pace will be maintained up to program completion in 1968. Forty-one tri-service design practices have been approved and issued, and six others were completed and combined with previously issued requirements. This program has achieved an estimated cost avoidance to date of \$6 million, and at the present rate of progress will yield an estimated \$33 million cost avoidance by 1970.

Environmental Testing Methods

The Council worked with DoD (ASG) in the preparation of tri-service standards covering 18 major environmental test methods for aeronautical equipment. Extensive changes were suggested to test procedures and test facilities proposed by the services to make them more realistic and acceptable as contractual testing requirements. Emphasis was on reduction of costs of testing without degradation of results, particularly by eliminating requirements for additional test facilities and reduction of test time. A continuing effort is being made to obtain acceptance of these recommendations.

Flight Testing Requirements

Extensive comments were submitted on the Navy's proposed revision to the basic specification concerning the demonstration program for new airplanes. Changes recommended are aimed at making the specified testing procedures technically acceptable for current aircraft and to permit more independent contractor action compatible with fixed price incentive contracting.

A project was initiated to work with the Air Force in reducing many of the controls it exercises over the Air Force contractors' flight operations activity. These controls have recently been documented in a new manual which is being reviewed to obtain a relaxation of controls which add costs to the flight test program and delay schedules.

Standardization Management

The Council initiated in 1966 a continuing study of the overall aerospace standardization management effort which is expected to define the alignment of the aerospace industry with respect to government, national and international standardization activities.

The National Aerospace Standards (NAS), which this year marked its 25th anniversary, is a series of AIA-developed standards covering such aerospace hardware as fasteners, fittings and electrical items; specifications for aerospace materials, packaging materials and machine tools; and testing procedures. Approximately 100 standards were issued or revised in 1966.

Proposals are being considered which will result in a more general acceptance of industry standards by government agencies and eventual complete delegation of parts standardization to industry association groups. As a first step in this direction, the USAF has accepted all NAS standards for use on their systems and equipment without a formal review.

Eighteen liaison representatives from USAF, Army, Navy, DoD and NASA participate directly in AIA National Aerospace Standards meetings. The free exchange of technical information and discussions which take place contribute considerably to the resolution of mutual standards problems, and eliminate duplication of standardization efforts.

An important achievement in the government-industry standardization is the successful 20-year joint military and AIA support and direction of development and maintenance of aeronautical materiel specifications and propulsion utility hardware standards, and the related bulletin

which recognizes these and other specifications and standards applicable to aircraft engines, rockets and propellers. This AIA activity utilizes the Society Automotive Engineers' aeronautical materiel specifications and utility hardware standards.

Aircraft Noise

The Council, actively concerned with problems related to aircraft noise, established a special *ad hoc* group to be the focal point for the technical policy considerations. This special group will consider forthcoming AIA projects in this area and will provide coordination between the industry and government with such offices as the President's Office of Science and Technology and the Federal Aviation Agency.

Crashworthiness and Passenger Evacuation

A top level industry *ad hoc* group was established to prepare a response to the FAA's proposed new rules on crashworthiness and passenger evacuation affecting transport category airplanes. This group, composed of a Council member from each company engaged in the manufacture of transport category airplanes, prepared a detailed industry position regarding the FAA's proposal. The industry proposal identified several of the requirements which could be incorporated immediately on all newly manufactured aircraft, suggested a one year research program to evaluate other requirements and recommended that those proven desirable by the research program be phased into production lines over an 18 month period. This AIA proposal is under consideration by the FAA.

V/STOL Aircraft Airworthiness Rules Development

A special project group was also established to draft a complete set of airworthiness requirements for V/STOL aircraft to be presented to the FAA for their consideration. The need for such regulations was determined in conjunction with the AIA's Vertical Lift Aircraft Council and was expressed to the FAA in the AIA report, "Economies of VTOL Systems." The FAA requested that the AIA develop the first draft which is to be presented to the FAA in September 1967.

SST Airworthiness and Performance Standards Review

Council representatives met with the FAA, NASA, Air Transport Association, Air Line Pilots Association, and others in a complete review of all airworthiness and per-

formance standards for supersonic transport aircraft. The group presented the industry position, which highlighted the latest developments in technology, for consideration in the updating and revision of these tentative FAA standards. The results of this meeting will be reflected in a further revision to the tentative standards. The FAA still plans to issue the Notice of Proposed Rule Making in December 1969, with the final rule being adopted concurrently with the first flight of the SST.

FAA Procedural Regulations

AIA reviewed and presented industry positions on many FAA proposals concerning FAA procedural regulations on certification of aircraft. The subjects covered included FAA procedures for the issuance of airworthiness directives, identification of aircraft engines and propellers, assignment of aircraft registration numbers, conformity of products to their type design, special airworthiness certificates and others.

International Airworthiness Regulations

Industry positions were incorporated in many of the papers delivered at the Seventh Meeting of the International Civil Aviation Organization Airworthiness Committee. The subjects included gust criteria, crash fires, including interrelated aspects of human survivability, provisions to enable aircraft to withstand bird strikes, development of a uniform static pressure system calibration method, minimum demonstrated threshold speed and revisions to the United Kingdom Transport Airplane Performance Requirements.

FAA/Industry Review of Transport Airplane Airworthiness Requirements

AIA and the FAA conducted a major review of all regulations concerning transport category airplanes to update these regulations in line with technical advances and to remove obsolete requirements. Also participating were members of the military services, NASA, ATA, ALPA and representatives of several foreign countries. The discussions provided the FAA with the technical expertise necessary for it to base proposed revisions to the airworthiness regulations.

FAA Airworthiness Standards Evaluation Committee

The Council participated in FAA's Airworthiness Standards Evaluation Committee, studying and recommending changes to the philosophy and policy of the FAA airworthiness regulations. When implemented, these recommendations will be reflected in materially improved FAA regulations and certification procedures.

International Service

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

1966 was a year of continuing evidence of a Free World demand for United States aerospace products. Gains in the commercial jet transport and general aviation airplane categories accounted for record post-war export sales of \$1.536 billion, representing nearly a five percent increase over 1965. The 1967 sales outlook is generally strong. The International Service projects a \$2 billion level of annual exports by the early 1970s.

WORKSHOPS

During 1966, the International Committee identified several projects which were important in increasing foreign trade and established experimental workshops to focus on these projects.

International Cooperation in Space

U. S. exports of space products and services in 1966 climbed to an estimated \$10.3 million, a 100 percent increase over 1965. Although the amount is a small portion of the export total, the significance is the gradually increasing willingness of the State Department and National Aeronautics and Space Administration to allow the pursuit of space business in Europe and Japan. The International Cooperation in Space Workshop was established for the purpose of developing a set of guidelines by which U. S. industry could continue to strive for a share of European space business, and also establish more freely business relationships for the same purpose.

The International Committee worked with NASA's Director of International Programs and the State Department, Office of Outer Space Affairs, to develop an approach that would make industry's effort parallel to government objectives.

Export Licenses and Clearance Procedures

For many years the Office of Munitions Control, Department of State, has placed heavy reliance on AIA's International Committee for the continuous review of the International Traffic in Arms Regulations. The Director of the Office of Munitions Control opened discussions in mid-1966 with AIA regarding proposed amendments to the International Traffic in Arms Regulations.

AIA responses to subsequent distribution of the amendments to the full committee generated a meeting jointly chaired by representatives of the International Committee and the State Department.

Following AIA responses a joint meeting was called to discuss regulations setting forth the procedures for obtaining governmental approval for the export of military items and related technical information. Especially involved in the 1966 review were those sections pertaining to foreign manufacturing licenses and technical assistance agreements. Timely approval of these sections is important to industry's competitive position in the overseas military market.

The State Department agreed to incorpo-

rate 13 AIA-recommended changes to the regulations.

Tariff Developments

Removing tariff and trade barriers affecting international trade of aerospace products is a long-term AIA project. Worldwide reciprocal reduction of tariffs complements the nation's overall economic objectives and stimulates an internationally oriented industry.

The aerospace industry's basic tariff position in 1966 was reappraised in view of the possible employment during General Agreements on Tariffs and Trade (GATT) negotiations of the 1962 Trade Expansion Act's "dominant supply provision" authorizing the President to eliminate completely the 10 percent U. S. duty on aircraft within a five-year period if, in fact, the U. S. and all countries of the European Economic Community (EEC) together accounted for 80 percent or more of the aggregated world export value of aircraft.

After a comprehensive industry review with the government Trade Information Committee, AIA was unable to obtain assurances that reciprocal response would be demanded from other trading nations if talks entered the aviation equipment phase. AIA was notified by the Special Representative for Trade Negotiations that U. S. tariff negotiators would not implement this provision of the Trade Expansion Act.

In December 1966 the EEC announced that the suspension of its common external tariff on aircraft in the over 30,000-pound category would be continued until December 31, 1969.

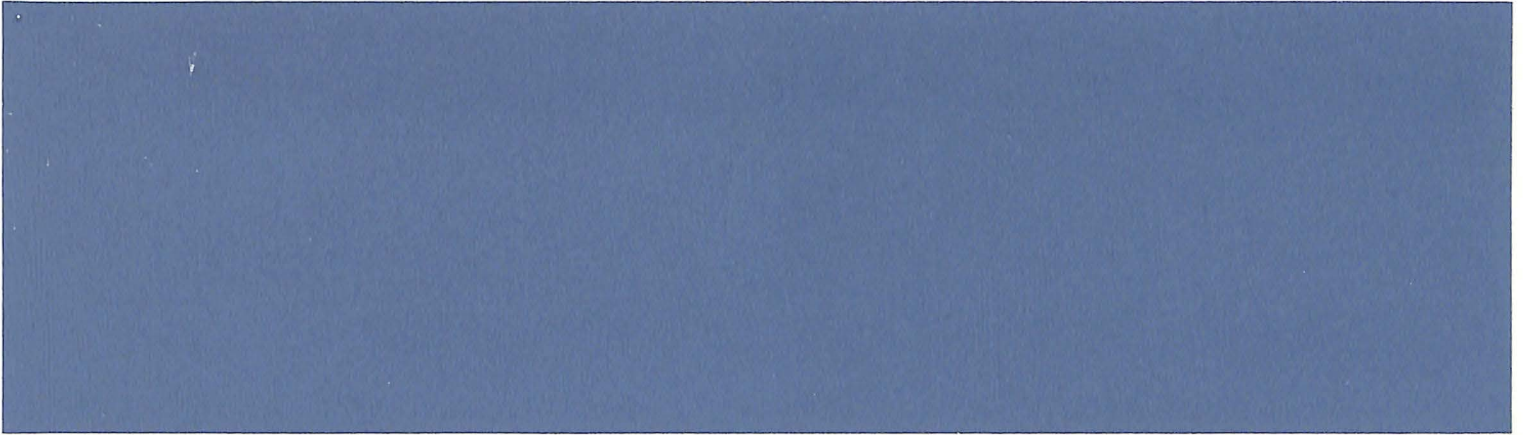
International Finance

The impressive international demand in 1966 for U. S. jet transports clearly emphasized the necessity for a more extensive commercial monetary capability by the financial community.

Aerospace manufacturers competed with all capital goods producers for financing at a time when voluntary but stringent



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*Chairman, International
Committee*



controls and tight money virtually evaporated all sources except the Export-Import Bank. However, meeting the immediate requirement, EximBank responded dynamically by allocating aircraft export credits amounting to \$109.9 million in Fiscal 1966, against \$83.4 million in Fiscal 1965; and, as of January 31, 1967, had allocated \$473.2 million for seven months of Fiscal Year 1967. This response points to the longer-term requirement for financing all categories of aerospace exports.

With the increase of utility aircraft exports and the challenging new demands for jet transports of increasingly large size and cost, AIA will continue to assist in establishing new and longer range export financial capability to meet medium and long-term requirements.

International Airworthiness Standards

General aviation exporters in 1966 uncovered a serious impediment to sales in at least two formerly heavy importing markets. Most countries with a manufacturing capability have established technical criteria to be met on imported aircraft and do not have parallel requirements. In most cases, it is not so much a question of structural integrity of the basic airframe as one of dissimilar technical formulas for arriving at the integrity levels. The differences in certain instances, however, could have an effect on export prices of various U. S. aircraft caused by required, although perhaps unnecessary, modifications to domestically acceptable configurations.

The International Airworthiness Standards Workshop, together with the AIA Utility Airplane Council and Aerospace Technical Council, requested that the FAA's Deputy Administrator for International Aviation Affairs study the problem. The FAA found that U. S. foreign airworthiness bilateral agreements need updating, and submitted for AIA review the first draft of a study to modernize these agreements.

1967 Paris Air Show

AIA responded in 1966 to a Department of Commerce request from the Paris Air Show Steering Group to prepare for the 1967 Show. AIA, on behalf of Commerce, organized a series of joint meetings in 1966 to suggest ways by which a better balance in the total U. S. government-industry image could be achieved. There are some 70 U. S. aerospace companies that will exhibit at the show, over half of which are AIA members.

Emphasis of the show in 1967 will be on commercial aviation and space exploration. The U. S. Pavilion is a result of the high degree of cooperation between the aerospace industry and government.

Public Relations Service



WILLIAM E. VAN DYKE
North American
Aviation, Inc.

Chairman, Public Relations
Advisory Committee

The Public Relations Service is the communications channel through which the Association's policies and the industry's accomplishments and contributions to national security, space exploration, air commerce and overall advancement of technology are presented to the public. With advice and counsel from the Public Relations Advisory Committee, its aim is twofold:

- *Broaden the base of public understanding regarding the contributions of the aerospace industry not only in meeting the demanding needs of national defense and space exploration but also describing the capability to apply its managerial and technical talents to socioeconomic problems.*
- *Serve as an information center in responding to requests for information from the public, the various media, government agencies and educational and financial institutions.*

The Public Relations Service in 1966 pursued its major goal of telling the ways in which the industry is heavily involved in the mainstream of American life because of demands placed upon its technological and managerial skill and experience. The principal message advanced was that the aerospace industry, in meeting its responsibilities in the areas of national security, space exploration and air commerce, is a *capability* industry with a significant role to play in ever-broadening fields of endeavor.

Utilizing the talents and knowledge of the entire Association staff to establish public recognition as an authoritative source of information, the Service actively engaged

in a variety of programs to improve internal communications as well.

- Publications were designed and prepared to serve both a wider audience and to assure a higher quality of readership in depth.
- Speeches and public statements by the Association president and staff were given top priority.
- Radio programming for foreign broadcast continued and selective television and domestic radio projects were undertaken.
- Communications with Department of Defense and National Aeronautics and Space Administration officials increased, with particular emphasis on the U.S. Air Force



Institute of Technology lecture series at Wright-Patterson AFB, Dayton, Ohio.

- Periodic summaries of AIA activities and achievements were edited and published for distribution to company executives and their participating committee members.
- The Economic Data Branch broadened its base of data gathering and analysis and increased its cooperation with government agencies in improving statistical reporting methods and procedures.

Publications

Beginning with the February issue, *Aerospace Magazine* in 1966 began its schedule of monthly issues with extensively revised mailing lists that reach 16 well-defined audiences such as editors, public officials, industry executives, libraries, and educational and financial institutions.

Addition of the Economic Indicators as a profile of industry activities was widely accepted. The monthly schedule and the departmental format brought the views of industry and executive spokesmen quickly to the attention of the public.

Articles concerned with the industry's expertise in advanced technology and the transfer of systems analysis approach capability to socioeconomic areas have been extensively reprinted. Equally encouraging is use of material pointing out the growth of commercial air carrier operations, utility aircraft and helicopters.

Publication of the *Aerospace Year Book* resumed in 1966 with distribution totalling more than 8,000, the largest circulation in its 44 year history. It was selected by the AeroSpace Book Club as a Book of the Month. Most of the work on the 1967 publication was completed at year's end and publication is scheduled in May with dis-

tribution estimated at considerably more than the 1966 total.

Aerospace Facts and Figures is the basic statistical book of the industry, and is commercially distributed.

Continued cooperation with the United States Information Agency resulted in completion of the four-color booklet, *U.S. Aerospace: Skills Forge the Future*, and the decision to make the May issue of *Aerospace* a special for the 1967 Paris Air Show with a distribution of 300,000 in the French language at the U.S. Pavilion. A revision was made of the *AIA Organization and Functions* booklet designed to describe the mission and operation of the Association. A manual, *U.S. Supersonic Transport: New Era in Air Travel*, was prepared through cooperation of member companies for broad distribution to the public.

Speeches

The AIA president, vice president and staff members made public speeches in numerous cities and before a variety of audiences in 1966. A regular schedule of appearances by the Association president is a priority project, as well as interviews for articles, radio programs and TV features. The AIA president spoke to professional, scientific, financial, civic and business groups in San Diego, Atlanta, Chicago, Dallas, Los Angeles, Hartford and Washington, developing the concept that the industry is a dynamic force with technological and managerial capabilities to broaden its efforts beyond astronautics and aeronautics into compelling needs in other sectors of American life. He made the year-end review and forecast report again before a regional Aviation/Space Writers Association meeting in Washington in December. This is now recognized as the authoritative state-of-the-industry report.

Economic Data

The Economic Data Branch gave support to the Utility Airplane Council in establishing an advisory statistical committee on general aviation for the Federal Aviation Agency. The advisory committee is designed to help create a consistent FAA data base from which to produce reliable and significant economic data for official use as well as for public information.

Along with the AIA International Service, the staff worked with the U.S. Department of Commerce to establish an improved reporting system for export of aerospace products, and a more timely process is now being formed, using Association definitions of products.

Equally productive has been cooperation with the National Aeronautics and Space Administration in helping to identify changes in space employment, and with the Bureau of Labor Statistics regarding reporting of employment, hours, earnings and other significant economic factors.

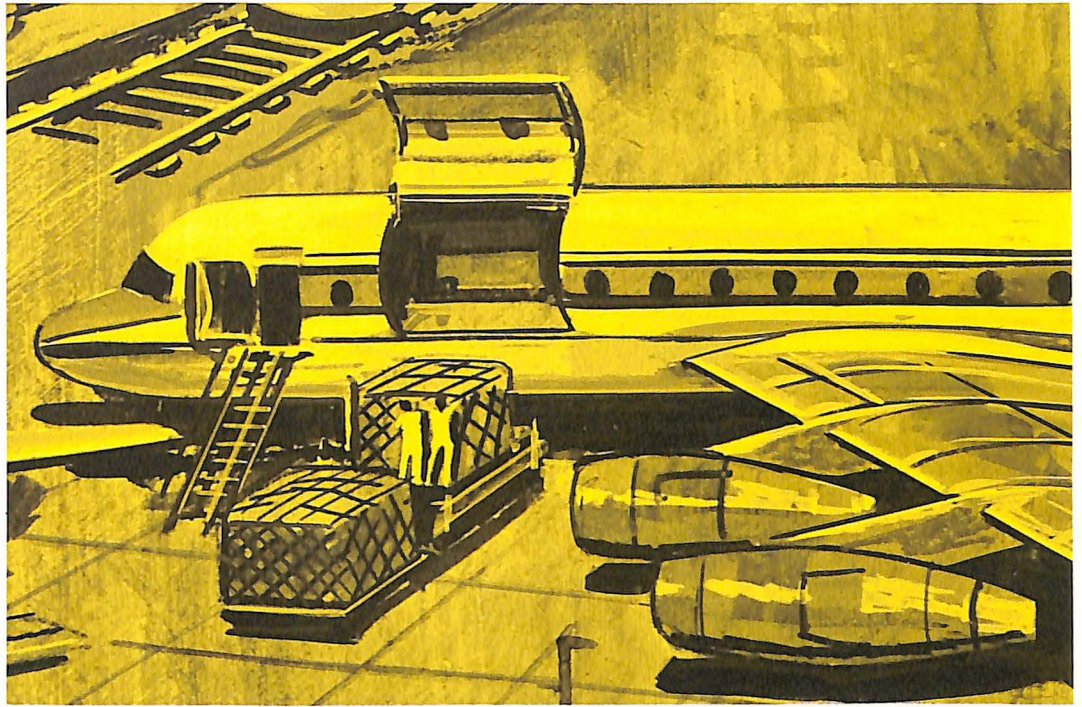
NAEC

The Public Relations Service continues to support the National Aerospace Education Council which, under a new director, is giving the Service valuable assistance in answering requests of students.

Radio - TV

Film and radio clips were distributed to stations nationally, covering such activities as the Association's semi-annual employment report. The Voice of America interview project continued, covering more than 25 member companies which produced approximately 800 segments for the VOA's Breakfast Show English language broadcast overseas. Preparations were made for similar distribution by the Service to selected domestic radio stations.

Traffic Service



The Traffic Service is responsible for obtaining for the aerospace industry adequate, economical and efficient transportation facilities and service. Because of the mutual interests and objectives of aerospace companies in this field, the coordinated efforts of aerospace company traffic organizations, working through the Traffic Service, can achieve results not otherwise possible by the separate efforts of member companies.

During 1966, the Traffic Service was active in five principal areas: Common carrier rates and service; litigation before federal regulatory agencies with respect to the foregoing area of activity; the promotion and development of commercial air freight service; liaison with government traffic management offices on mutual problems, plus several programs to increase the over-



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all effectiveness of aerospace industry traffic organizations with particular emphasis on reducing costs and improving the effectiveness of aerospace logistics programs.

Carrier Rates, Charges and Services

The coordination and representation of the interest of members before carrier rate bureaus constitutes an important activity of Traffic Service.

It is an area where an industry approach can accomplish results more effectively and economically than can otherwise be obtained by the individual efforts of company traffic managers. A Rate and Classification Subcommittee of the Traffic Committee is assigned responsibility to identify and recommend action with respect to AIA efforts in this area.

The Traffic Service in 1966 participated in 13 cases concerning carrier rates and charges on a wide variety of aerospace commodities. At issue were carrier proposals affecting the transportation of aircraft engines, missiles, rockets, explosives, electric and electronic equipment and aircraft parts. Several proceedings were concerned with carrier proposals to establish tariff rules and bill of lading terms and conditions which would adversely affect the aerospace industry and its customers. The AIA position was upheld in seven of these cases. Disposition is still pending on the remaining six.

Transportation Litigation

The representation of the industry's interests in proceedings before regulatory agencies such as the Civil Aeronautics Board and the Interstate Commerce Commission is a prime responsibility of Traffic Service. Most often, litigation before a regulatory agency follows the prior handling of a problem before a carrier rate bureau. Representation of the coordinated interests of AIA members before such agencies is effective and economical.

In 1966 Traffic Service represented the interests of AIA members in five formal proceedings before the ICC.

The Commission ordered the household goods carriers to double their liability for loss or damage to cargo transported. In the same proceeding the Commission required the carriers to institute practices which will improve the service which they provide the aerospace industry.

The Commission permitted, over AIA objections, a 3 percent across-the-board increase in the rates and charges of household goods carriers.

The Commission has not ruled on a third AIA complaint concerning the unreasonableness of certain rates and charges of transcontinental motor carriers applicable to aerospace commodities.

Decisions have not been handed down in two other cases concerning AIA complaints against increased per-shipment charges of household goods carriers and a proposed 1½ percent credit charge which the same carriers are attempting to invoke.

Promotion of Commercial Air Freight Service

As a result of action taken by the Traffic Committee, the CAB agreed to sponsor several regional shipper-carrier air cargo workshops.

In 1966, following through on formulated plans, the CAB jointly with the National Industrial Traffic League (NITL) conducted workshops in Seattle, Miami, New York, Chicago and Los Angeles. The workshops were attended by a total of 1,700 persons, approximately half shippers and half air carrier personnel.

AIA Traffic Committee members served as workshop moderators and the Director of Traffic Service served as coordinator of the program. The CAB stated that the workshops were one of its most important activities of the year. Undoubtedly, the

workshops made a valuable contribution to the promotion and development of air freight transportation. Plans are now underway to conduct additional workshops on a continuing basis.

Coordination with Government Agencies

Traffic Service and the Traffic Committee maintain a close working relationship with the traffic and transportation organizations of the various military and civilian agencies of the federal government.

Programs in this area have successfully kept to a minimum overlapping and duplication of functions and activities which would otherwise result due to the parallel responsibilities of the traffic departments of government and industry. Federal traffic managers attend meetings of the Traffic Committee on a regular basis and coordinate their interest with aerospace traffic managers in formulating plans and programs designed to resolve mutual problems.

In 1966, the mutual interests of government and aerospace traffic managers in rate and litigation proceedings required close coordination of effort so as to ensure effective and non-conflicting representation of positions with respect to the matters at issue. Additionally, the government agencies on several occasions during the year sought and received the comments and recommendations of the Traffic Committee on proposed government regulations and policy enunciations affecting the functions and responsibilities of aerospace traffic departments. For example, the Traffic Committee was called upon to perform an advance review and to provide comments on the following:

Department of the Army Study on Utilization Systems, Policies and Techniques (SUNSPOT). This is a project of the Army Supply and Maintenance Command to explore the development of a system for materiel handling, including containeriza-

tion of shipments in transit most favorable for the economic and expeditious handling of military cargo from source to destination. The Traffic Committee recommended several additional areas be considered in developing this study.

NASA Apollo Logistics Requirement Plan. The Traffic Committee commented on the transportation and traffic management portions of the document which proposed to spell out requirements upon contractors for development of a comprehensive transportation management program for application throughout the life of the Apollo program.

Department of Defense Armed Services Procurement Regulation Section XIX. The Traffic Committee recommended changes to the proposed section which is designed to set forth contractual transportation terms, conditions and procedures.

Defense Supply Agency, Defense Contract Administration Services, Traffic Management Procedure. The Traffic Committee commented on the proposed procedure to be followed by DCAS contractors when shipping government property from commercial sources.

Task Force Activities

Small task forces of Traffic Committee members are established as required to devote effort to specific areas of activity. This concentration of expertise accelerates the identification of problems and the formulation of recommended courses of action to solve them. The activity of the Air Cargo Development Task Force illustrates the effectiveness of this approach in advancing the interests of the aerospace industry. The Air Cargo Task Force devised the plan for the series of cargo workshops which were jointly conducted in 1966 by the CAB and NITL.

The Shock Mitigation Task Force secured agreement of NASA and the military serv-

ices in 1966 to join with AIA in a project under the Research Associate Program of the National Bureau of Standards to establish testing standards for determining the shock mitigating effectiveness of transportation vehicles.

Additional task forces are devoting attention to:

Identification and maintenance of a national highway network capable of accommodating movements of extreme dimension aerospace components; Development of a program to promote the transportation of household goods by air:

Compilation of a Blue Book of Aerospace Parts which will provide a listing of aerospace parts translated to transportation nomenclature which will facilitate the documentation of such parts when transported in common carriage; Identification of export/import problems for resolution with the U. S. Customs Service.

A Travel Task Force is assigned responsibility to keep Traffic Committee members abreast of developments affecting passenger transportation, an area of vital concern to the aerospace industry.

Other task forces are active in the areas of government policies and procedures, aerospace traffic management education, in-plant transportation and transportation planning.

Cost Savings Activities

In addition to the activities previously discussed, the Traffic Committee in 1966 continued its program of exchanging ideas and information relating to improved techniques which can be used by all committee members to support government cost reduction efforts. Under this program successful actions by individual aerospace traffic managers in 1966 resulted in savings of \$13,741,755 million. Reflected in this sum are the results of coordinated actions taken under the aegis of the Traffic Committee.



JAMES MURRAY
*Chairman, Utility
Airplane Council*

Utility Airplane Council

The Utility Airplane Council is active in all areas concerned with general aviation which includes all flying 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.

The Utility Airplane Council in 1966 directed its efforts toward increasing public understanding of the significant role general aviation plays in the nation's economic and social areas.

In 1966 approximately 16,000 new general aviation airplanes were delivered, an increase of 33 percent over the previous year, and general aviation movements at the 302 airports where the Federal Aviation Agency maintains air traffic control towers increased 26 percent over 1965.

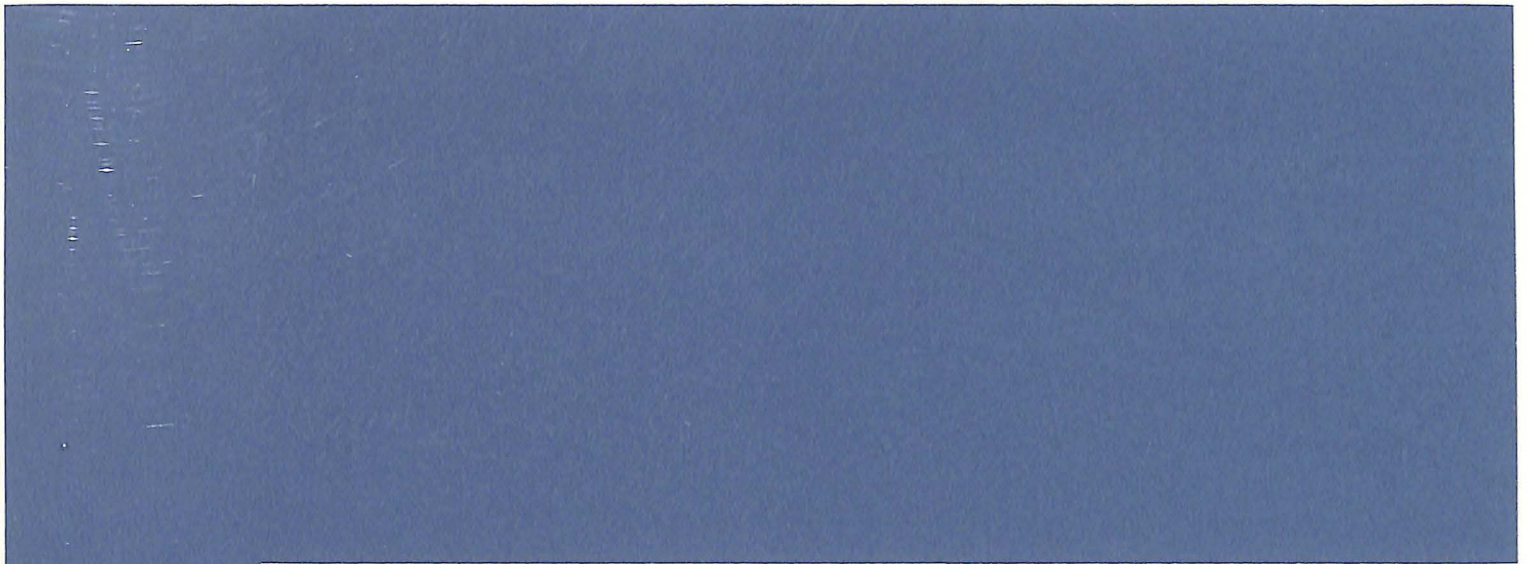
School Assembly Program

Four hundred thousand high school students are being reached during the 1966-67 school year by a program presented during assembly periods. A professional lecturer

carries the message of careers and benefits of general aviation into school auditoriums. While a primary purpose of the program is to interest young people in general aviation during their formative years, a corollary objective is to interest faculties at hundreds of high schools in planning aviation-oriented curriculum. Feasibility studies concerning aviation curriculum, guides to curriculum and similar classroom materials are distributed as follow-up aids.

'General Aviation Today and Tomorrow'

The Council conducted a conference-briefing — "General Aviation Today and Tomorrow" — in Oklahoma City to which distributors of member company products brought local newspapermen, city officials,



bankers and other prominent persons. A series of similar briefings is planned in other areas.

Information Programs

At the Aviation/Space Writers Association annual meeting in New York City, the Council presented programs on air taxi and commuter airline operations, airport problems and safety facts.

Dissemination of information involves several of the educational objectives. An average of one staff written feature article was published every two months and 20 press releases were issued.

During the year the Council staff made more than 12 talks before such groups as state and national aviation organizations, Rotary Clubs and radio/TV audiences.

Airport Development Kit

The Airport Development Kit, originally developed in 1965, was updated during 1966 and new material sent to those who have the original kits.

This kit represents the most comprehensive collection of airport development data ever assembled. Included are guidance materials ranging from specific examples of economic importance of airports to communities, through planning guides for establishing local effective operating committees, to prepared speeches. More than 5,000 of these kits have been distributed around the world. By maintaining a file record of those persons receiving the kit, the Council is able to send new material. In addition to the kit, more than 300,000 airport brochures have been distributed and local publications are given copies of prepared airport development feature articles.

The kit is intended to supplement local efforts and provide guidance. Airports are being built in Carlisle, Pa., and Ashboro and Andrews, N. C., because of the help and outlines of the airport development material. These communities represent only a portion of the several dozen areas where action has been generated.

Films, both color motion picture and slides with sound, are on rotating loan with bookings being as much as two months in advance because of the demand.

The "GROW Kit," a package of film strips, manuals and records covering various subjects of general aviation education, continued to be used during 1966. Nearly 600 of these kits are now in use.

During 1966, education about general aviation was felt in other areas of the world. Cooperating with the International Aircraft Owners and Pilots Association, the Council helped to arrange a study tour by 24 offi-

cial from the governments of Germany, Austria and Switzerland. These guests flew in general aviation airplanes supplied by member companies on a ten-day, 4,500 mile inspection and experience tour planned to demonstrate the ease of movements by general aviation airplanes and the role this form of transportation plays in the total air system and the impact it has on local and national economies.

Other Activities

Washington National Airport continues to operate on a first-come, first-served basis for all airplanes largely because the Council joined with other general aviation groups in working out objections.

The procedures for licensing pilots and the requirements for obtaining various ratings and licenses continued to receive specific study. The UAC's concept for licensing and its work toward development of this concept is being shared with the FAA where there are indications of acceptance and encouragement.

A presentation on the growth and future of the air taxi and commuter airline operations was prepared by the Council and given to members of the Civil Aeronautics Board.

An FAA Notice of Proposed Rule Making which would tie traffic rules at all airports within a control zone to the weather conditions at the primary airport was effectively opposed.

The problem of clear title to an aircraft and the frequent necessity to conduct title searches in many places has been difficult. At present there is no single repository for recording various documents which may be involved in a financed sale and which affect the title.

The Council responded to a rule making proposal by the FAA, with a brief urging a complete overhaul of the recordation system. Work continues in the field of recordation and title procedures.

Similarly, working with the AIA Statistical Branch and the FAA Office of Policy Development, significant gains were made in establishing new and better methods of securing statistical data about general aviation operations.

The Council effectively joined with other general aviation interests to oppose a proposal to place a non-refundable 4 cent a gallon federal tax on all general aviation fuel. The opposition was based on the belief that the proposal was discriminatory.

Vertical Lift

Efforts of the Vertical Lift Aircraft Council early in 1966 were concentrated on preparation of an economic analysis of vertical takeoff and landing (VTOL) systems as part of a multi-mode transportation network. A report, "*The Economies of VTOL Systems*," was presented to the Governmental Task Force on Interurban Air Transportation by the president of AIA and the chairman of the Council.

The report provided additional emphasis and impetus in the area of government-industry exchanges on matters of common interest. Agreement has been reached on additional industry inputs to National Aeronautics and Space Administration/Federal Aviation Agency research and development planning. This is the initial move in establishing a firm procedure for assuring consideration of industry views on the scope and nature of government research and development programming. Development of airworthiness regulations for vertical rising aircraft was accelerated.

International Programs

As a part of discussions with the Department of State, the Council staff assisted in preparing a presentation for the Agency for International Development to demonstrate the effectiveness of the helicopter and utility aircraft in promoting economic development of underdeveloped areas.

The presentations will be followed in 1967 by detailed capabilities briefings as required by AID in its consideration of specific country programs.

VLAC Publications

During the year, the Council staff prepared and distributed:

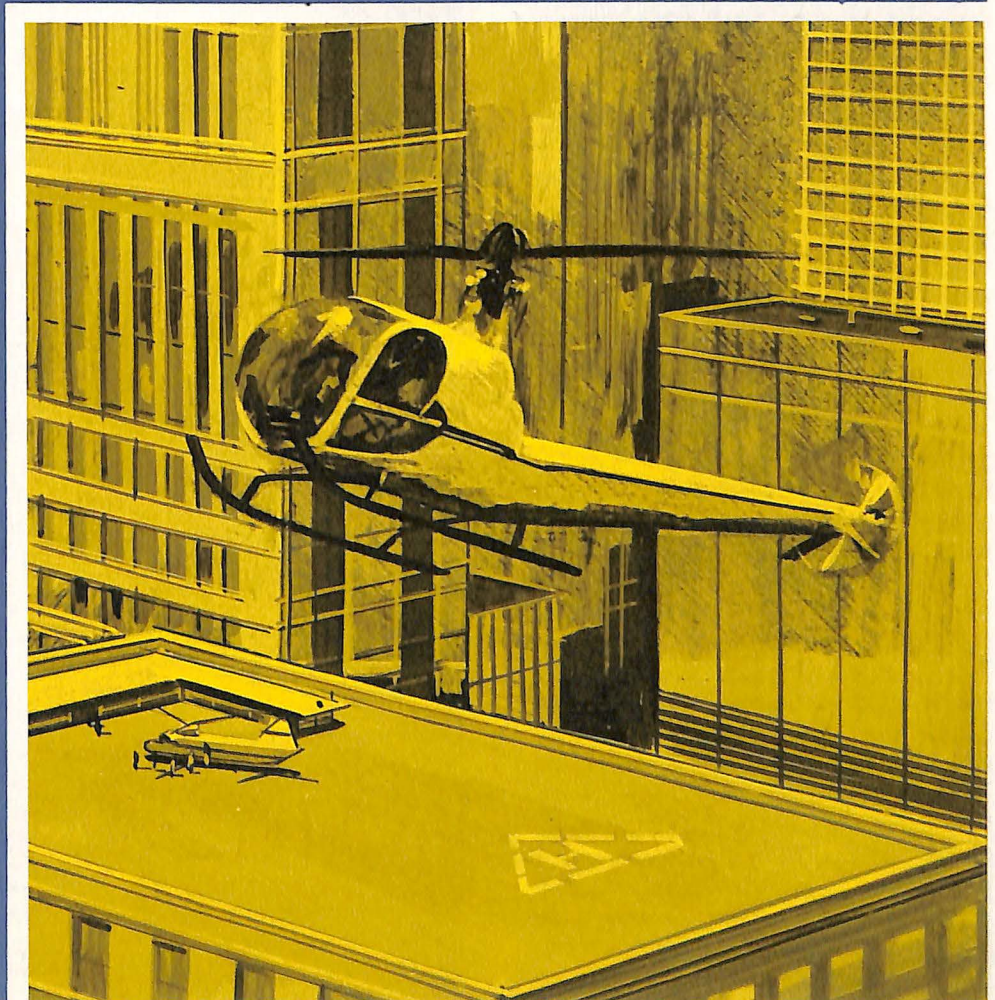
The Vertical Lift Aircraft Designation Chart. The Chart covered 40 models in production, and six research and development projects.



M. CARL HADDON
Lockheed 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.

Aircraft Council



Organization and Functions

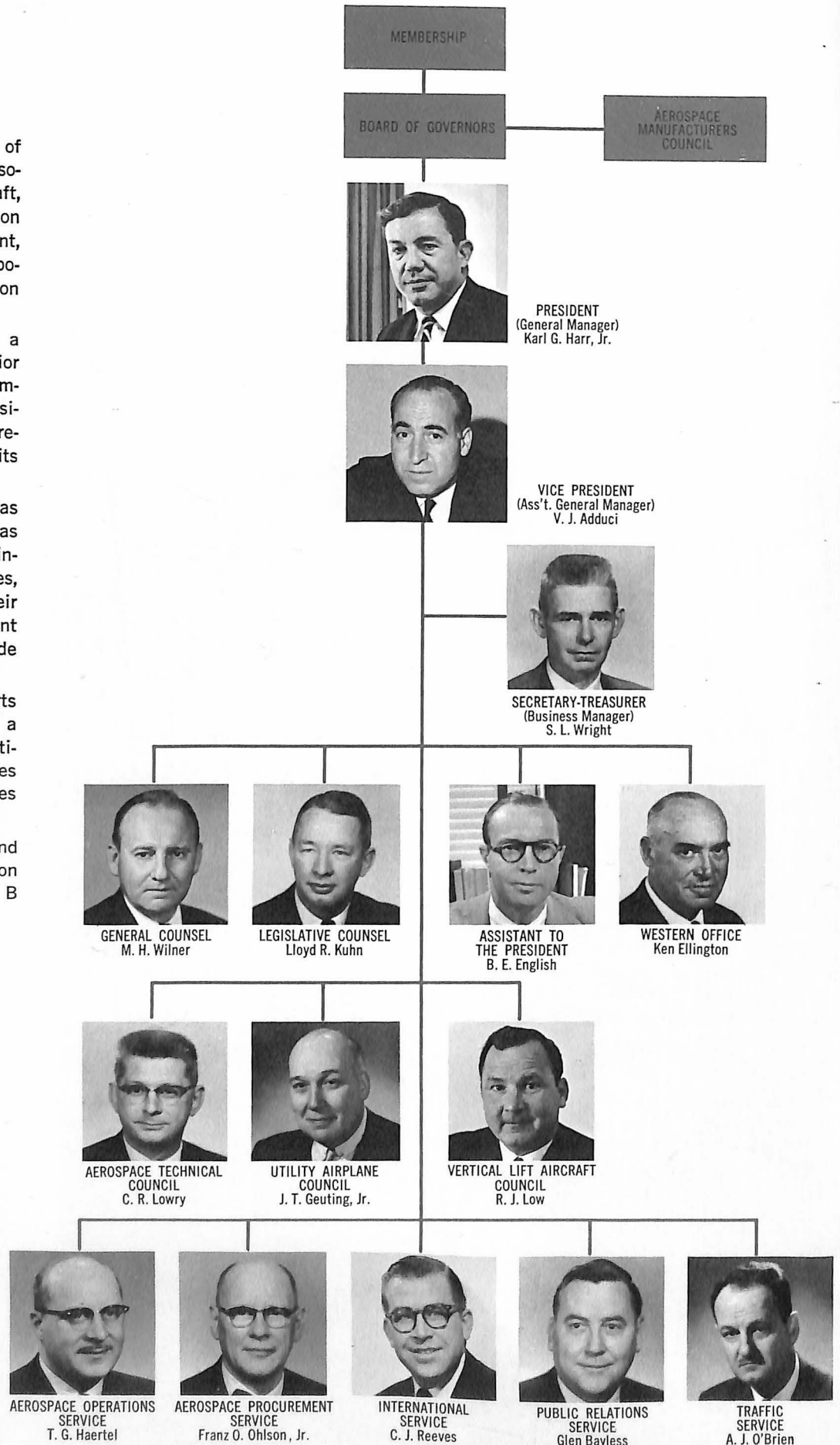
The Aerospace Industries Association of America, Inc. is the national trade association of the manufacturers of aircraft, missiles, spacecraft, propulsion, navigation and guidance systems, support equipment, accessories, parts, materials and components used in the construction, operation and maintenance of these products.

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.

The Aerospace Industries Association was created over forty years ago to serve as a vehicle for the lawful interchange of information among its member companies, and to represent those companies in their relations with their customers, government or commercial, on matters of industry-wide interest.

Through its committees of industry experts and its staff, the Association provides a medium for collaboration on non-competitive problems common to the industries and major segments of the industries which comprise its membership.

Membership of the Association at the end of the year totals 92, including 61 Division A (manufacturing) members, 15 Division B members, and 16 affiliate members.



The 1966 Directory of Helicopter Operators — Commercial-Executive-Civil Government and Helicopter Flight Schools in the U. S. and Canada. The Directory listed 933 operators operating 2,318 helicopters. These totals represent an increase of 9 percent in the number of operators and 13 percent in the number of helicopters compared to 1965. The largest increase — 18 percent — was in the number of companies and executives that own and operate helicopters.

The Directory of Heliports/Helistops in the United States, Canada and Puerto Rico. The Directory listed 1,118 helicopter landing facilities.

The Directory of Hospital Heliports in the United States. This Directory listed 69 hospitals in 22 states and the District of Columbia — more than double the 1965 total. Three annual VLAC publications—*The Versatile Helicopter*, *Federation Aeronautique Internationale Directory of Helicopter Records* and *Recipients of Helicopter Awards 1944-1966*—were brought up to date.

Highway Safety

The Council discussed with Department of Commerce officials the application of vertical lift aircraft for highway accident patrol and rescue operations. As a result, the new National Highway Safety Agency has been delegated responsibilities which include emergency service and demonstration of highway safety research and development. The Agency asked interested VLAC members to name company representatives to serve on an Agency-Industry Task Force, and assist in developing a proposed helicopter highway test and evaluation. The first meeting of this Task Force is scheduled in 1967.

Heliport Program

As part of the Council's program to aid in the establishment of heliports, 12 prints of the AIA public service film "*When Minutes Really Count*," dramatizing the need for city-center, suburban and hospital heliports and demonstrating the rescue role of the helicopter in highway accidents, were made available for showings before civic groups and city planning officials.

A direct result of this Council program was the Montana Aeronautics Commission inauguration of a Hospital Heliport Program. Under this program, the Commission will construct hospital heliports at any location in the state where hospital administrators will provide a usable ground or rooftop area. The Commission will then design, develop, construct and mark the hospital heliport. Two more states—Michigan and Wyoming—have announced plans for similar programs.

Management Systems



The proliferation of government systems management controls has been of chief concern to the aerospace industry over the past few years.

In 1965 a preliminary evaluation was made of the impact of these increasing controls, and the resulting serious implications led to the establishment by the Aerospace Manufacturers Council of a top level three man *ad hoc* Systems Management Committee. This Committee was to identify and analyze the overall relationships of major management systems being used or developed by the government and imposed directly, or indirectly, upon the aerospace industry; and make appropriate recommendations. To conduct the study, the AIA *ad hoc* Systems Management Analysis Group (SMAG), composed of representatives from the various management functions and product areas of member companies, was formed.

In January 1966, the SMAG Report was concluded. The study focused on the concern of industry with respect to the increasing proliferation of divergent and incompatible management systems being imposed upon industry by government agencies. The apprehension of industry dealt with the application of the diverse systems rather than with their objectives and stemmed from these facts:

- The government is applying to industry management systems designed for government's internal operations and that too many detailed procedures are being specified causing loss of contractor flexibility to use his own proven management techniques.
- There is inadequate trade-offs between real cost and utility of management systems, both individually and collectively.
- The increasing emphasis on fixed price contracts, which places more responsibility on contractors, has not been recognized in the application of management systems and advantages gained from such fixed price contracts are being negated by rigid rules of detailed procedures and government management controls.

The SMAG study concluded that the development of management systems is largely independent, uncorrelated and spear-headed by functional groups within each agency, and the use of committees and boards to provide desired coordination has not been effective.

AIA representatives discussed the content of the SMAG report with the Deputy Secretary of Defense and other senior staff members of OSD, highlighting such problems as conflicts between management systems, the mating of appropriate systems to be used in a given case with the type of contract selected and the need to tailor the degree of government management to the complexity of the program involved.

AIA urged that because the current spectrum of management systems presents a serious problem, correction could only be assured by cooperative attention at that level of the DoD and industry to which all functional elements are responsible; it is only from this vantage point that the inter-relationship of these systems and their cumulative effect can be properly appraised and adequately addressed.

To set in motion resolution of the overall problem, AIA therefore recommended that OSD:

Establish a single office in OSD with direct operational responsibility for all management systems, and counterpart offices in each service.

Through use of the Council of Defense and Space Industry Associations (CODSIA), initiate a joint DoD-industry problem resolution effort.

The Assistant Secretary of Defense (Comptroller) was given the primary responsibility to provide for the design, installation and control of management systems throughout the DoD. These responsibilities, defined by a DoD directive, gave to the OASD (Comptroller) authority to maintain overview of existing or proposed management systems within the various military departments and agencies, review and approve proposed changes to existing or new systems, insure systems compatibility and uniformity, and provide policy guidance and general cri-

teria governing management systems.

Subsequent to this action, DoD invited CODSIA to participate in a joint effort in the development of necessary courses of action to resolve the problem. In response to this request, a CODSIA Management System Task Group was established under the aegis of the CODSIA Policy Committee.

A series of planning and coordination meetings were held between OSD and CODSIA to organize and develop courses of action responsive to this objective. From the outset there was ready agreement among the participants with regard to the work to be done: the combined effort of the group would be directed toward achieving balance, compatibility, simplicity and an adequate measure of uniformity among the multitude of management systems and subsystems already in existence and under development.

By the end of 1966 initial planning for the program and the development of the approved plan of scheduled activities were almost completed. A detailed "need-use" analysis of selected management systems and preparation of DoD documents controlling development and application of systems are scheduled for 1967.

The recognized intent of this cooperative government-industry effort is to reduce markedly the volume and variety of management-type reports and controls and, whenever possible, to make maximum use of effective contractor management systems that already provide credible and timely data. There is recognized agreement on the part of all participants that data requirements differ at various management levels. Accordingly, consideration is to be given to means whereby the flow of data up through the organizational structure is to be limited to those data needed to carry out top management responsibilities.

Both government and industry spokesmen hold that this is one of the most difficult and complex operational problems that can be identified today. However, the overall plan that has been developed by the joint DoD/CODSIA Committee offers promise to resolve major problems in this area.

AIA Member Companies

DIVISION A

ABEX CORPORATION
AERODEX, INC.
AEROJET-GENERAL CORPORATION
AERONCA INC.
AERONUTRONIC DIVISION, PHILCO-FORD CORPORATION
ALUMINUM COMPANY OF AMERICA
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
COOK ELECTRIC COMPANY
CURTISS-WRIGHT CORPORATION
DOUGLAS AIRCRAFT COMPANY, INC.
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 LABORATORY ASSOCIATES, INC.
GENERAL MOTORS CORPORATION
Allison Division
GENERAL PRECISION, INC.
THE B. F. GOODRICH COMPANY
GOODYEAR AEROSPACE CORPORATION
GRUMMAN AIRCRAFT ENGINEERING CORP.
GYRODYNE COMPANY OF AMERICA, INC.
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HONEYWELL INC.
HUGHES AIRCRAFT COMPANY
IBM CORPORATION
Federal Systems Division
INTERNATIONAL TELEPHONE & TELEGRAPH CORP.
ITT Federal Laboratories
ITT Gilfillan, Inc.
KAISER AEROSPACE & ELECTRONICS CORPORATION
KAMAN CORPORATION
KOLLSMAN INSTRUMENT CORPORATION
LEAR JET INDUSTRIES, INC.
LEAR SIEGLER, INC.
LING-TEMCO-VOUGHT, INC.
LOCKHEED AIRCRAFT CORPORATION
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MARTIN MARIETTA CORPORATION
MC DONNELL COMPANY
MENASCO MANUFACTURING COMPANY
NORTH AMERICAN AVIATION, INC.
NORTHROP CORPORATION

PACIFIC AIRMOTIVE CORPORATION
PIPER AIRCRAFT CORPORATION
PNEUMODYNAMICS CORPORATION
RADIO CORPORATION OF AMERICA
DEFENSE ELECTRONIC PRODUCTS
ROCKWELL-STANDARD CORPORATION
Aircraft Divisions
ROHR CORPORATION
RYAN AERONAUTICAL COMPANY
SOLAR, DIVISION OF INTERNATIONAL HARVESTER CO.
SPERRY RAND CORPORATION
Sperry Gyroscope Company
Sperry Phoenix Company
SUNDSTRAND AVIATION, DIVISION OF SUNDSTRAND CORPORATION
THIOKOL CHEMICAL CORPORATION
TRW INC.
UNITED AIRCRAFT CORPORATION
WESTINGHOUSE ELECTRIC CORPORATION
Aerospace Electrical Division
Aerospace Division
Astronuclear Laboratory
Marine Division

DIVISION B

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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.

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LOENING, GROVER

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BOOZ, ALLEN APPLIED RESEARCH, INC.
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EASTERN AIRCRAFT CORP.
INFORMATION HANDLING SERVICES, INC.
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