

International Board of Editors Editorial

THE International Board of Editors for the *Journal of Aircraft* plays a vital role in helping to bring to the journal notable contributions to aeronautical science and technology made by authors in their own countries. An International Editor is also in a unique position to provide valuable insight into the important applied aircraft technology developments in his or her country. The following is such an assessment of activities in Japan by Hirotohi Kubota, who is our International Editor representing Japan.

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Aeronautical Activities in Japan (Annual Review for 1992)

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THE collapse of the Soviet Union in 1991 has caused the termination of the cold war within dipole structures between the West and the East. Due to the decrease of military demand in the world aeronautical industries, Japanese aeronautical activities have also been strongly influenced. On the other hand, historical and new regional struggles create problems originated by human race and religion. This has caused, for example, the Japanese participation in the PKO in Cambodia. A global economical recession has influenced the diminution of the aeronautical activities.

Transport Aircraft

The work for the design of the 777 in which Japanese aeronautical industries joined in cooperation with the Boeing Company is steadily proceeding. This project is developed to the phase of detailed design work in Japan from the first stage design work in the United States.

Development of civil transport in Pacific routes is expected to increase toward the 21st century, while passenger growth in the American and European routes is less optimistic, being influenced by the recent world economical retardation. Development of new super large transports, bigger than the present wide-body airplane, is desired soon. The configuration outlines have been presented by the Boeing and the Airbus industries, which are expected to begin to work in the early 21st century. An effort to develop such an airplane is considered international, therefore, there will be the possibility of Japanese participation in spite of several difficulties.

Studies of a Supersonic and Hypersonic Transport (SST/HST) are being conducted by the Society of Japan Aerospace Companies, Inc. (SJAC) and the Japan Aircraft Development Corporation (JADC) under the support of the Ministry of International Trade and Industries (MITI), in cooperational study with the American and European industries. The specifications of the SST being studied by the SJAC are a Mach number of 2.2 to 2.25 with 300 passengers and a range of 6000 nautical miles as a baseline configuration. The studies are focused on the technology; market research; and the environmental issues of community noise, sonic boom, and ozone depletion by NO_x emission. The type certificate is requested in the years 2005-2010. The SJAC organizes the committees for both "Study of Development of SST/HST" and "Study of International Cooperative Testing Facilities for Development of SST/HST".

Small-Size High-Speed Aircraft

The principal design for the next generation support fighter (FS-X) has been completed under the cooperation of the United States and Japan and proceeded to the phase of the detailed design and productional development. The mock-up review was conducted in May 1992, verifying the vehicle con-

figuration and equipment arrangements, etc., which were settled in the principal design.

Rotary Winged Aircraft and Ground Effect Vehicles

Retardation of the economy also brings a decrease in newly registered rotary wing aircraft. But it is noted that there doesn't seem to have been any accidents with them, evidence of progress in vehicle safety. The FBW (Fly-By-Wire) experimental flight of helicopters was tried first in Japan where the various equipment was developed.

In the trend of international cooperation, the joint work for development projects with the former Eastern bloc countries as well as the United States, Europe, and Asia are beginning. The first flight of the MDX with NOTAR system was performed in cooperation with the United States, Japan, and Australia. In the development of a tilt wing aircraft TW-68 of the Ishida Foundation, the specifications of the engine and rotor have already been decided and construction of the factory for testing vehicle production has begun. The first flight is expected in 1995.

The small military helicopter program by the Department of Defense is beginning. This vehicle will be developed by 1998 as the successor to the observing helicopter and its engine will also be developed. Therefore, this program should be a great step in the advancement of the Japanese helicopter developmental technologies.

The reports of the "Committee for the Study of Future VTOL/STOL Transport" and the "Committee for the Study of Medium-Range New Transport Systems" by the SJAC has been published and will give the direction of the VTOL study.

Propulsion System

The thrust-improved V2500-A5 engine (30,000 lbs) and V2500-DS engine in a side-mounted configuration for MD-90 are steadily progressing at the International Aero Engine Company, and both types took the FAA Type Certificate in November 1992.

The Japanese project for the development of airbreathing engines for supersonic and hypersonic transport is propelled by MITI in cooperation with domestic national institutes, manufacturers, and overseas manufacturers (i.e., General Electric, Pratt & Whitney, SNECMA, and Rolls Royce). It needs ten years to build up high efficiency engines for the SST/HST. An international symposium for its interim report was held in October 1992.

The fan-engine XF3-400 has been studied and built by the Research Laboratory, Department of Defense. The first prototype was tested in March 1992, reaching to the targeted thrust. The first demonstrational operation of the turbo-shaft engine for a small-size helicopter was begun in November 1992.

Aerodynamics

The International Union of Theoretical and Applied Mechanics Symposium on High Angles of Attack Fluid Mechanics was held in Tokyo in September 1992. The research on flow separation and vortex flow around high-angles-of-attack bodies by experiment and numerical simulation were presented by researchers of universities, national institutes, and industries. The proceedings were published in August 1993 by Springer-Verlag. The 18th International Council of the Aeronautical Sciences was held in Beijing, China, in September 1992, and several papers from Japan were presented.

Recession of the world economies and the ongoing trend of contraction of the aerospace industries due to the cut-off of military demand will drive the international cooperation and collaboration of all aerospace areas, including computational fluid dynamics (CFD) and supersonic technologies. CFD is one of the most preferable fields in Japan and is expected to contribute to the advancement of the world aerospace technologies.

Material

The detail of composite material for the tail of the 777 has been clarified. The ratio of composite material in total structural weights is 9%. The fatigue test of a prototype under real load conditions is steadily proceeding. The CFRP materials have been requested from several suppliers.

Research for the realization of composite material by the National Aerospace Laboratory accomplishes the model of wing structure box of high quality made by adhering technology using one-direction tape and awaiting strength evaluation. The goal of this research is to verify the high failure tolerance characteristics to a more realistic level.

Operation and Maintenance

At the request of the FAA, inspection and maintenance of the pylon mid-spar phase pin of all 747 aircraft were performed after the accident involving El Al Israel 747-200F in Amsterdam in October 1992.

CD-ROM standardization of the maintenance manual is now being prepared by the Air Transport Association/Aerospace Industries Association and will soon be used by all Japanese airlines.

Industrial Technologies

During the design work process of the 777, each Japanese aerospace company has begun the manufacture of parts and its assembly. In the Japanese companies new assembly lines and new plants have been constructed for the 777, in preparation of its mass production.

Utilization of automatic design and manufacture using CATIA has become popular in the aerospace companies.

Equipment and Electronics Information System

The Ministry of Transportation of Japan has started the realization test of a crash avoidance system in cooperation with airline companies. Operation of the VHF data Link Processing System began at the 16 major airports in Japan in December 1992, transferring the ATIS and AEIS.

The research on a GPS navigation system, using satellites, is being conducted at several institutes and laboratories. The R&D of differential GPS (DGPS) is focused to improve the accuracy for measurement of position. The hybrid navigation system with DGPS, INS, and MLS is in its research phase.

Editorial Policy Statement on Numerical Accuracy and Experimental Uncertainty

The purpose of this statement is to reiterate the desire to have high-quality investigations with properly documented results published in the AIAA journals, and to clarify acceptable standards for presentation of numerical and experimental results. Recently there has been considerable concern with the quality of published numerical solutions. Also the practice of including error bars on experimental results is often lacking. In response to these problems, a succinct policy statement on these items is as follows:

The AIAA journals will not accept for publication any paper reporting (1) numerical solutions of an engineering problem that fails adequately to address accuracy of the computed results or (2) experimental results unless the accuracy of the data is adequately presented.

The implementation of this policy will be at the discretion of the Editors and Associate Editors of the journals.

The accuracy of the computed results is concerned with how well the specified governing equations in the paper have been solved numerically. The appropriateness of the governing equations for modeling the physical phenomena and comparison with experimental data is not part of this evaluation. Accuracy of the numerical results can be judged from grid refinement studies, variation of numerical parameters that influence the results, comparison with exact solutions, and any other technique the author selects. The validity of the accuracy estimation will be judged by the reviewers of the paper. An estimate of accuracy of the numerical results must be presented when comparisons with other numerical and experimental results are given, and when new results of the au-

thor will likely become data for future comparisons. Since accuracy of various computed results obtained from a numerical solution can vary significantly, the accuracy of the result being used must be stated. Accuracy of results from a validated code must still be established to show that proper input parameters have been used with the code.

Estimates of experimental uncertainty are required for all plotted or tabulated data obtained by authors. If data from other workers are used, they require no uncertainty. Unless otherwise stated and properly referenced, it is assumed that the uncertainty of authors' output data is estimated by the small-sample method¹ with assumed odds 20:1. All reported data must show uncertainty estimates if used in text or tables; for example, $T = 642 \pm 8$ K. All figures reporting new data should contain uncertainty estimates either on the figure with error bars in both coordinate directions or in the caption; for example, uncertainty in $T = \pm 8$ K at 20:1 odds. Investigations with limited data should present tabulated results in the paper while extensive data should be available elsewhere in tabulated form for use by other workers.

Finally, the accepted documentation procedures for a technical investigation must be used. For computational papers, the author must provide an adequate description of the numerical solution procedure, if not documented elsewhere. In addition, the complete governing equations must be specified with sufficient detail along with the input parameters to the code so that a reader could reproduce the results of the paper. For papers concerned with experimental test, thorough documentation of the experimental conditions, instrumentation, and data reduction techniques is required.

¹Kine, S. J., and McClintock, F. A., "Describing Uncertainties in Simple-Sample Experiments," *Mechanical Engineering*, Jan. 1953, pp. 3-8.