

U. S. DEPARTMENT OF TRANSPORTATION
OFFICE OF THE SECRETARY
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STATEMENT OF CHARLES R. FOSTER, DIRECTOR, OFFICE OF NOISE ABATEMENT,
DEPARTMENT OF TRANSPORTATION, BEFORE THE SUBCOMMITTEE ON ADVANCED
RESEARCH AND TECHNOLOGY OF THE HOUSE COMMITTEE ON SCIENCE AND
ASTRONAUTICS, REGARDING THE JOINT NASA/DOT AIRCRAFT NOISE ABATEMENT
PROGRAM, WEDNESDAY, JANUARY 19, 1972

Mr. Chairman and Members of the Committee:

I am pleased to appear before you to discuss how the Department of Transportation and NASA are jointly attacking the aircraft noise problem.

The CARD Policy Study Report recognized that aircraft noise is a primary constraint upon the growth of civil aviation. This led to the recommendation that noise abatement research be greatly expanded and that a joint office of noise abatement be established within the Department of Transportation to facilitate coordination and to enhance the development of the accelerated Federal aircraft noise abatement program.

In support of this recommendation, the role of the DOT Office of Noise Abatement has been broadened and its staff will be expanded with the addition of four professional personnel from NASA. The new Deputy Director of my Office is a NASA employee, Mr. Walter F. Dankhoff, who came to us from NASA's Lewis Research Center where, as you know, many of NASA's noise abatement programs are being conducted.

A major purpose of the new joint office is to facilitate the needed expansion of government aircraft noise abatement programs in addition to providing a focal point for the integration and coordination of these efforts. Through this office, a national aircraft noise abatement program plan is being developed. The cornerstone of the overall program will be major objectives, with associated noise reduction goals, based upon the CARD Policy Study and further study and evaluation of applicable data.

Since each aircraft type, CTOL, STOL and VTOL, has a different base of technology on which to establish its noise goals, it is necessary to establish separate noise goals for each aircraft. In addition, there are two classes of subsonic CTOL jet transports. The older jet transports have either straight jet or low-bypass-ratio engines, while the new transports have high-bypass-ratio engines. Since there is a substantial difference in the noise generated by these two types of transports and the noise reduction solutions differ, different noise abatement goals must be established for each.

To achieve these noise abatement goals we break the program into manageable pieces and identify specific elements of precursor research as well as viable demonstration projects. Our first elemental breakdown of the program includes the following research areas: (1) research in source noise reduction; (2) noise control and abatement by means of noise path modification; and (3) individual and group noise receiver response. These three areas provide the ingredients for a fourth area of overall system studies which lead to implementation programs through regulations and specifications.

We have prepared a first draft or "strawman" plan in consonance with the above objectives which is organized in the four elements or work areas. A series of detailed status and programming reviews with the working level and management personnel of NASA and DOT is presently underway to refine this plan and to tighten up preliminary planning.

The joint office, in accordance with the recommendations of the CARD Study, is to provide the overall leadership and to act as a focal point for a national program to attack the noise problems associated with the current and planned transportation systems. This office provides a definite means of integrating the efforts of the two government organizations most involved in noise abatement. However, there are other government organizations such as DOD, HUD, HEW, and EPA also involved, and this joint office will be responsible for integrating noise abatement programs with other agencies through the already established and operating Interagency Aircraft Noise Abatement Program (IANAP) whose Coordination Committee I chair. It should be pointed out that IANAP has representatives not only from all appropriate Government agencies but industry and universities as well.

Since 1968 this management structure has been the mechanism for interagency aircraft noise abatement program coordination. Its activities will be enhanced by the establishment of this joint office in view of the fact that NASA and DOT personnel occupy key positions in IANAP and the new responsibility and authority to be vested in the joint office will assist in the implementation of the programs developed through this office. We are very confident that the integration and coordination

responsibilities placed upon the joint office can be achieved because of the continuing successful interagency coordination evidenced through IANAP.

I should also emphasize the fact that, through IANAP, DOT and NASA have regularly participated jointly in research programs and have on occasion directly assisted each other's projects. One of the most recent examples is in the area of SST jet noise suppression. In this case, NASA agreed to initiate a research project with the Boeing Company to guide the development of acoustic lining technology -- in which NASA has pioneered -- for SST-type ejectors. This effort is now directly complementary to the close-out program of the SST within DOT and to high-speed jet noise research to be undertaken under sponsorship of my office. Together these three projects have been shaped by pre-contract award coordination between DOT and NASA into a cohesive attack on the unresolved problem of high speed jet noise.

Another current example of interagency cooperation is in the area of noise abatement operational procedures. NASA and FAA have both been active in this area and last May NASA initiated a flight demonstration program to evaluate the benefits and feasibility of two segment approaches using a commercial airplane with area navigation equipment. FAA pilots participated in this NASA program and a NASA Ad Hoc Committee to evaluate and recommend future flight operational procedure programs is, in fact, chaired by Mr. Ralph Noltemeier of FAA Flight Standards Service. The natural division of efforts is between NASA's flight dynamics research capability and FAA's operational responsibility.

Let us now look at our basic approach to solving the aircraft noise problem. We start with noise reduction at the source and modification of flight operations to reduce the land area which is subject to high noise levels. In addition, guidance will be provided for controls on the use of the remaining land area adjacent to the airport which is still subject to high noise levels, and specific airport design methodologies will be developed. There are definite tradeoffs involved in this approach which require total system analyses to evaluate and present various alternatives for decisions.

The main steps to a systematic analysis and solution to the problem are shown in Figure 1 and described below:

1. Identify and define the sources of the noise;
2. Develop technical and operational means to eliminate, reduce or suppress the noise;
3. Determine the effects of noise on individuals and the community and develop the methodology which will reasonably predict the reaction of communities resulting from noise emanating from various numbers and types of aircraft; and
4. Conduct technical, economic and tradeoff analyses to determine the set of alternatives which are most practical and economical.

The research and development program is keyed to the development of a sound basis for the implementation steps such as regulations for type-certification or flight operational procedures. Such regulatory or other implementation actions will place specific noise abatement responsibilities on the industry.

AIRCRAFT NOISE ABATEMENT PROGRAM ELEMENTS

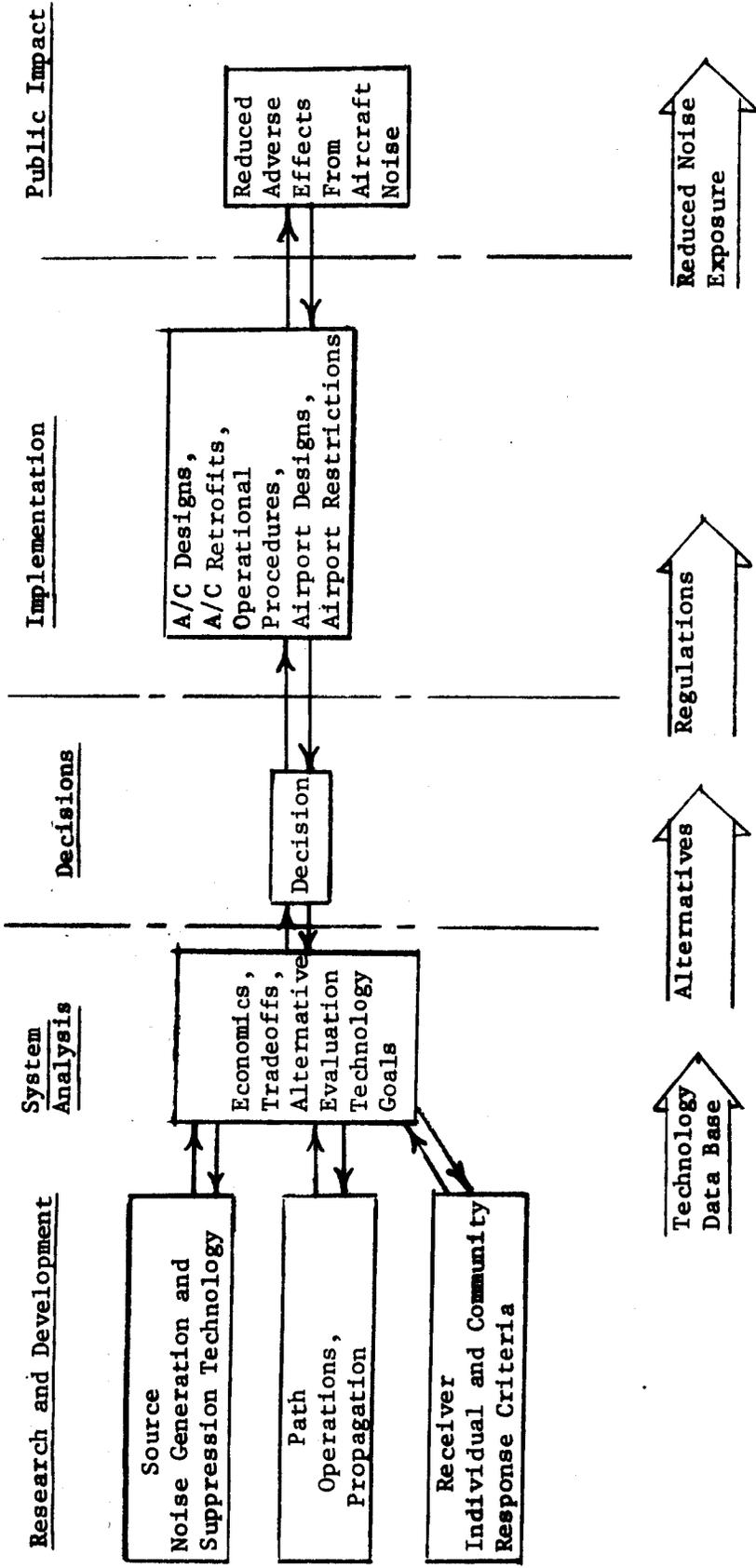


Figure 1

Requirements placed upon industry by the regulatory decisions may range from design requirements for certification of new aircraft to retrofit of existing aircraft and adoption of new operating procedures. Requirements placed upon airport operators may center on airport design and operating procedures.

I would like to identify additional R&D projects which make up the DOT aircraft noise abatement program. We have established an ongoing Transportation Noise Research Information Service within the National Academy of Sciences which publishes semi-annual summaries of research in progress and abstracts of available literature. This Bulletin is the first comprehensive information document to address all forms of noise research with major emphasis upon transportation noise. I have copies of this document available which may be of interest to the Committee.

DOT aircraft noise research projects are being sponsored in three universities:

(a) In the V/STOL area, we have an ongoing program whose main efforts center on noise propagation into built-up areas and associated vehicle noise design -- operations-tradeoff studies.

(b) Investigation into jet noise, using optical holography is also underway to assist in providing a better understanding of jet noise generation. We also have a program dealing with jet noise scaling laws under a wide range of conditions using the shock tube technique.

(c) We have a basic research program in jet noise modeling to develop engineering guidelines for noise abatement of subsonic and supersonic jets.

(d) We also have a study of coaxial jets and their interaction for purposes of obtaining jet noise reduction.

An Airport Noise Reduction Forecast Project is underway to quantify the dollar costs associated with candidate aeronautical system and land use changes that may be available to achieving airport and community capability throughout the U.S. This program will bring together the results and analytical tools developed by DOT and NASA airport noise abatement research programs in a form which will provide the Department of Transportation information necessary to objectively act to reduce airport community noise incompatibility.

A Community Noise Survey Project has been initiated to measure the noise environment of six cities according to a statistically validated plan in order to determine noise levels throughout the day and night. The project is designed to validate community noise level estimating procedures, to ascertain relationships between operations of the transportation system and the noise levels, and by means of concurrent surveys of residents and workers to determine the subjective response of individuals exposed to the noise.

In addition to the above-mentioned programs, the FAA also has a comprehensive aircraft noise program. The major elements of their program include:

(a) A project to acquire and analyze noise measurements made at selected locations in the vicinity of hub airports before and after initiation of higher altitude approach procedures.

(b) A program to study the noise characteristics unique to various types of V/STOL aircraft. This will entail investigation of the noise generation and transmission mechanism, development of meaningful

prediction methods, investigation by test methods, and evaluation of design parameters and methods to reduce the perceived noise levels.

(c) Several interrelated projects bearing on the problem of possible retrofit modifications to current aircraft equipped with JT3D and JT8D engines. These projects include ground and flight demonstrations to acquire data on noise reduction potential.

(d) Several selected studies of structural and animal response to sonic booms. These support FAA's regulatory authority involved in control and operation of supersonic aircraft within the boundaries of the United States.

We have found it to be in everyone's interest to interchange ideas between agencies to relate the various points of view and to jointly pursue solutions to the noise problems. It is expected, therefore, that as we evolve the national aircraft noise abatement program plan such integration of activities will pose options and questions. Reactions and adjustments to the plan will be made as we progress to ensure maximum utilization of each agency's capabilities. This will not, however, change the basic program approach presented here today.

Mr. Chairman, this concludes my prepared statement, and I will be delighted to try to answer any questions you might have concerning our programs.

