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STATEMENT OF DR. ROBERT H. CANNON, JR., ASSISTANT SECRETARY FOR SYSTEMS DEVELOPMENT AND TECHNOLOGY, BEFORE THE SUBCOMMITTEE ON ADVANCED RESEARCH AND TECHNOLOGY, HOUSE COMMITTEE ON SCIENCE AND ASTRONAUTICS, REGARDING AERONAUTICAL RESEARCH AND DEVELOPMENT, ON TUESDAY, JANUARY 18, 1972

Mr. Chairman, and members of the Subcommittee.

It is an honor for me to appear before you. I should like to first add my own words of deep gratitude as a citizen for this Subcommittee's unwavering and immeasurably valuable support for Aeronautical Research and Development.

The Joint DOT/NASA/R&D Civil Aviation Policy Study was undertaken by this Administration in 1969 under the auspices of my office and was completed with publication of a final report in March of 1971. The Study took its direction from the concerns, recommendations, and conclusions put forth by this Subcommittee as well as those of the Committee on Aeronautical and Space Sciences of the U.S. Senate. We believe the Study addresses directly the concerns expressed in this Subcommittee's 91st Congress Report on "Issues and Directions for Aeronautical Research and Development" as well as those of Senate Report No. 957.

The Joint DOT/NASA CARD Study has been characterized as the most comprehensive in-house interagency activity that has been undertaken in recent years. Although the name suggests only two organizations, the Study was developed with vital collaboration and support of the National

Aeronautics and Space Council, the Department of Defense, and the Civil Aeronautics Board. The manufacturing and operational industries, universities, and local government organizations participated in the program by both direct contribution and by top management advice.

As Under Secretary Beggs indicated in his opening statement, the general thrust of the CARD Policy Study and its emphasis on directing R&D efforts toward the solution of problems identified in the Study has been generally accepted by DOT and NASA as a basic reference in defining and guiding the aeronautical R&D programs of both agencies.

Today I am pleased to be able to report that substantial progress has been made toward implementing recommendations of that Study, and it is our purpose here today to discuss that progress in response to your invitation.

I should like to begin by reviewing the background relating to the CARD Study--its objectives, its structure, the organizations that were involved in its preparation, and its major findings and conclusions. The CARD Study was organized by Mr. Lawrence P. Greene of my office in August, 1969. Mr. Greene brought together key people from the Department of Transportation (both the Office of the Secretary and the Federal Aviation Administration), the National Aeronautics and Space Administration , the Department of Defense and the Civil Aeronautics Board. The structure of the Study was developed by this group in response to the charge from Congressional groups and the sponsoring agencies.

Beginning in July, 1970, Mr. Clarence Syvertson was detached from the NASA Ames Research Center and detailed to my office for a period of eight months to continue direction of the Study and of the preparation of the CARD Policy Study report. I want to note that it was typical that generating members of the Study group were key people from all the organizations who are now involved in implementing the Study's recommendations. This was deliberate, and it is now paying off, as I shall describe when Mr. Jackson and I discuss the progress of implementation a little later on.

I am fortunate in having Mr. Syvertson with me today, and at this time I want to ask him to review for you the nature of the CARD Study and its recommendations.

Following Mr. Syvertson's Presentation

I would like to commend Mr. Syvertson for his succinct summary of the CARD Study Report and to express here our gratitude for his leadership in its preparation. As Secretary Volpe and Acting Administrator Low have previously indicated we believe the Study represents a basic policy framework for DOT and NASA for the future and a foundation for continuing analysis of civil aviation policies, problems, and potential.

Our moves to act on recommendations of the CARD Study are of three kinds. The first involved immediate programmatic action: many of our ongoing programs were, of course, directly relevant to those recommendations, and those programs have already been thoroughly reviewed in the context of the CARD recommendations, and have been sharpened, restructured, and enlarged as appropriate to be fully responsive.

The second moves were organizational. In restructuring my office to provide effective management of the research and development of the Department of Transportation, I have established a permanent division for ongoing R&D policy studies across the whole spectrum of transportation for which we are responsible, using the CARD Study as a model, and I have established a permanent division for R&D policy implementation to provide comprehensive direction to the CARD recommendations in toto and be sure that all the necessary programs are established and moving. The latter is set up as a joint program office with NASA.

Finally, under the leadership of that office, a comprehensive implementation plan is being developed with great care. I wish to make the point that vigorous action is already going on in all of the key areas--action that is fully responsive to specific CARD recommendations--because the people leading it were fully involved in the CARD Study. At the same time we are developing the Implementation Plan to be sure that our response is comprehensive, fully supported, and moving forward with all deliberate speed.

At this point I should like first to summarize for you specific programmatic and organizational moves we have made, and then describe the status of development of the CARD Implementation Plan.

As Mr. Syvertson has just presented to you, the high priority requirements identifed in the CARD recommendation are for major reduction in aircraft noise, and particularly for development of very quiet short-haul aircraft; for alleviation of air congestion through air traffic control,

airport development, and the encouragement of high density short-haul development; and for developing an experimental approach to identifying short-haul air transportation's appropriate role in producing positive economic and social benefits in low-density regions.

DOT's Noise Abatement Office, which reports to me, has been a very strong office technologically and programmatically for some years. Its Director, Mr. Charles Foster, chairs the Interagency Aircraft Noise Abatement Program Coordinating Committee. Among the noise abatement programs responsive to the first CARD recommendation are the following:

A jet exhaust noise research program which has been developed and coordinated with NASA and FAA to provide a comrepehensive attack on the unresolved problem of high-speed jet noise.

Aircraft noise research projects with three universities which include the study of jet noise, V/STOL noise tradeoffs and noise propagation into the built-up urban environment.

A major ongoing analysis of the related factors of technology, economics and social consequences of noise abatement and controls upon the community.

An Airport Noise Reduction Forecast Study to predict the noise reduction achievable from proposed changes in aircraft hardware and operations.

A major research program in the FAA for ground and flight testing of possible retrofit modifications for the Boeing 707 and Boeing 727 airplanes.

A joint FAA/NASA project aimed at developing flight demonstration equipment to reduce pilot workload involved in conducting two-segment approaches to landing.

The NASA aircraft engine noise work at Lewis has always been an important, fully-coordinated part of the national aircraft noise abatement program, and the quiet engine program there has clearly resulted in a dramatic step forward in quiet aircraft operations in the DC-10, L1011 class of wide-body jets. Mr. Johnson of the Lewis Research Center will describe that program in detail tomorrow.

In response to the CARD recommendations, many months before publication of the formal CARD report, both DOT and NASA reviewed together and strengthened research and development in the noise abatement area, as is reflected in our 1972 budgets. In August 1971, the DOT office was made a Joint DOT/NASA Office of Noise Abatement and Mr. Walter Dankoff of NASA was named as Deputy Director under Mr. Foster. Mr. Foster is here today and will discuss the Noise Abatement programs in more detail a little later in the hearings. I may add that you will be seeing further evidence that we mean business in this area in the President's 1973 budget submission to the Congress later this month.

There is another environmental area of potential importance in which we are moving rapidly to head off any possible problems before they develop, and this is the area of engine emissions, including emissions at high altitude. Aviation is one contributing source of toxic and noxious air pollutants in urban areas. It is a minor contributor, both on the

scale of the typical urban area and nationwide, but its contribution has been growing, and we intend to keep it from becoming a major contributor by developing the technical basis upon which realistic standards can be established and regulatory procedures adopted.

Meanwhile, it has also been suggested that adverse environmental effects could accrue from future aircraft fleets operating in the stratosphere. There is simply not enough scientific knowledge at this time to know. We intend to obtain the necessary knowledge before the fleets begin to fly. We have mounted an aggressive program through which we will gain the understanding of the character of emissions and the assessment of the environmental and meterological effects of high altitude operations necessary to provide a basis for federal policy decisions by 1974, when foreign SST fleets may begin to develop. This program, under the direction of my office, is called the Climatic Impact Assessment Program. It is funded at $7 million through FY-72, and involves fully the pertinent capabilities of NASA, DOD, EPA, NOAA, and numerous other research organizations.

In air traffic control, the FAA is now well along in installing the Third Generation Air Traffic Control System--of which the "ARTS III" terminal system and the NAS Stage A en route system are the major components--and is well into the development of the Upgraded Third Generation Air Traffic Control system, which will employ automation, data link and microwave technology to advance the Third Generation system to provide for a major increase in ATC system capability in the 1970's and early 80's. In parallel, my Office of Systems Engineering is continuing a small

effort on the system concepts for a Fourth Generation Air Traffic Control system to be developed subsequently by the FAA in order to provide for a five-fold and greater increase in ATC system capacity. We are determined that ATC capacity will never again limit economic growth or the free movement of people and goods by air.

This sequence of system developments has been influenced by and is fully responsive to the CARD recommendations. General Lundquist, the Associate Administrator for Engineering and Development of the FAA will discuss this action in detail for you later today. I know the members of this Committee will be pleased but not surprised to learn that the DOT Transportation Systems Center under Jim Elms--the former NASA Electronics Research Center--is playing a strong technical role in the development of both the new and the advanced air traffic control systems.

In the airport area, FAA is providing financial assistance to state and local governments through the Airport Development Aid Program for the planning, construction and improvement of airports. Also, FAA is conducting airport research and development programs aimed at new airport design and layout for increasing airport capacity.

General Lundquist will describe for you the establishment of a V/STOL Special Project Office and the plans being made to pursue the viability and consider how to encourage the development of viable short-haul air transportation. The proposed NASA programs to construct and experiment with research STOL aircraft are a key part of these determinations.

In all of these programs the great technical competence of the NASA is thoroughly integrated into the national development programs in two compelling ways: our R&D budgets in these areas are developed in a fully integrated manner at the working level, through our joint offices, and through the formal medium of the DOT/NASA Coordinating Council; and our development of top-level decisions is coordinated through the auspices of the National Aeronautics and Space Council.

Superposed upon the strong specific moves we have made in response to discreet recommendations of the CARD Study is the generation of a formal CARD Implementation Plan. A group of DOT (FAA) and NASA people were assigned to my R&D Policy Office to undertake this task on a full-time basis, with instruction to prepare a Joint DOT/NASA Card Implementation Plan.

I want to mention at this point that DOT's Northeast Corridor Study--which addresses the total intercity transportation system in that geographic area--also calls for vigorous R&D to establish the appropriate role of short-haul air transportation, as a component of that system, prior to national decisions which may be required in the mid-70's. In the common area of short-haul aviation in the Northeast Corridor the CARD Implementation Plan will constitute also the Northeast Corridor R&D Implementation Plan.

The CARD Implementation Plan will first identify and describe all the civil aviation oriented research and development efforts of DOT and NASA, as well as related work of other departments and agencies, with emphasis on those efforts directly related to the Joint DOT/NASA Card Policy Study

recommendations. Next, it will establish specific goals to be achieved by research and development based on recommendations of the CARD Study. Finally, it will describe the programs that DOT and NASA intend to pursue in order to satisfy those goals, identifying the responsible organizational element in each case.

I am pleased to report that development of that Plan is progressing well and that preliminary results have recently been reviewed by Mr. Anders, Mr. Jackson and me. I hasten to add that this preliminary result represents a collection of working level inputs which will require much integration and substantial in-depth review and consideration at the decision-making level prior to being accepted as a plan for R&D programs to be implemented.

Nevertheless, this initial progress is a valuable first step beyond the CARD Policy Study with respect to identifying all the civil aviation-oriented programs that DOT and NASA intend to pursue and in establishing goals for those programs which, for the first time in many cases, extend beyond the two year budgetary cycle.

I am certain you appreciate the importance of having an Implementation Plan along the lines I have just described, and the iterations that will be necessary before such a document can be refined to reflect the positions of the agencies involved prior to the publication of the document or its adoption as an official DOT/NASA plan. But we are moving with all deliberate haste to accomplish this.

Mr. Chairman, this concludes my prepared testimony. I shall be happy to try to answer any questions the Committee may have.