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THE WHITE HOUSE
WASHINGTON

November 18, 1976

MEMORANDUM FOR: JIM CANNON
FROM: JUDITH RICHARDS HOPE
SUBJECT: Aviation Noise Policy

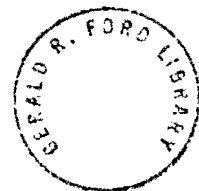
JRH

I attach copies of the Aviation Noise Abatement Policy, the Statement of Issues for Public Hearing, and the Final Environmental Impact Statement in connection with the above issue. These were released by Secretary Coleman at 9:30 a.m. today. As far as I can see after a quick review, all changes which we discussed are incorporated.

Attachment

cc:
Art Quern

*Judy
Thank you
Good job
JRH*





DEPARTMENT OF TRANSPORTATION

NEWS

OFFICE OF THE SECRETARY WASHINGTON, D. C. 20590

COLEMAN ANNOUNCES POLICY
ON AVIATION NOISE ABATEMENT

FOR RELEASE THURSDAY
November 18, 1976

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Actions needed to significantly reduce aviation noise levels are set forth in a policy statement made public today by Secretary of Transportation William T. Coleman, Jr., and Federal Aviation Administrator John L. McLucas.

"In addition to reducing aircraft noise at its source as directed by President Ford on October 21, our policy statement promotes safe operational procedures to abate the impact of noise on populated areas and the attainment of compatible land uses in areas adjacent to airports," Secretary Coleman said.

The Aviation Noise Abatement Policy establishes a schedule under which all jet aircraft in domestic service must comply with noise levels specified by Federal Air Regulation 36 (FAR-36) within six to eight years, starting January 1, 1977.

Promulgated in 1969, FAR-36 applied originally to type certificates of new aircraft such as the L-1011, DC-10, and later versions of the 747. The regulation was subsequently broadened to include all jet aircraft coming off production lines after December 31, 1974.

Under the federal action plan contained in the policy statement the Federal Aviation Administration (FAA) will issue a rule requiring that subsonic jet airplanes with maximum gross takeoff weights in excess of 75,000 pounds that do not meet FAR-36 noise levels must be retired from the fleet or modified ("retrofitted") to meet those levels according to the following phased-in schedule:

747s within six years, with one-half to be completed within four years.

727s, 737s, DC-9, BAC 1-11s within six years, with one-half to be completed within four years.

720s, 707s, DC-8s, CV-990s within eight years, with one-quarter to be completed within four years, and one-half to be completed within six years.

- more -

The time period will start on January 1, 1977.

The policy statement points out the potential advantages of replacing older aircraft rather than retrofitting them.

"Many of the four-engine jets are old and relatively inefficient to operate. After weighing the advantages of retrofit and replacement of these aircraft, we have concluded that it is in the best public interest that most of these aircraft be replaced by new airplanes because of the benefits of reduced noise and pollution emission levels, energy efficiency, advanced technologies, increased employment opportunities, the improved competitive position of the American aerospace industry and other national objectives that replacement would serve," Secretary Coleman said.

Secretary Coleman on November 2 scheduled a public hearing for December 1 on the financing needed by aircraft operators to meet more stringent noise standards either by plane replacement or retrofitting.

INTERNATIONAL CARRIERS

The 6 to 8 year schedule under which jet aircraft in domestic service must meet noise reduction requirements does not apply to U.S. aircraft in international service or to the aircraft of foreign carriers. In regard to international carriers, the policy statement says: "The United States will work through the International Civil Aviation Organization to reach agreement with other nations on means to abate aircraft noise. If agreement is not reached in three years, aircraft flown by carriers of other countries will be required to meet Part 36 noise levels at the end of five additional years. During the initial three years, aircraft operated by foreign carriers and the proportion of the fleet of U.S. carriers that are used in international service will be exempt from the noise regulations issued pursuant to this statement."

FUTURE DESIGN AIRCRAFT

The FAA will complete by March 1, 1977, its consideration of new and more stringent noise standards for new aircraft designs that reflect recent advances in noise suppression technology. Regulations resulting from the analysis will be applicable to all subsonic aircraft type certificated after the effective date of the regulation.

SUPERSONIC AIRCRAFT

The aircraft noise reduction requirements are not applicable to supersonic aircraft (SSTs). In regard to SSTs, the statement says: "Using information that is now available on a continuing basis from the Concorde demonstration, the FAA will, within 30 days after the conclusion of the 16-month demonstration period, act to promulgate a noise rule applicable to supersonic aircraft that is necessary to protect the public health and welfare and that is consistent with

the statutory requirement that the (FAA) Administrator consider technological practicability, economic reasonableness and appropriateness to aircraft type."

OPERATING PROCEDURES

To maximize, through practical procedures, the noise reduction benefits of new aircraft and retrofitted aircraft, consistent with the highest degree of safety, the FAA has completed rulemaking on a number of EPA proposals for aircraft noise operating abatement procedures including minimum altitude rules and approach procedures. Departure rules will be developed within one year.

AIRPORT DEVELOPMENT AND PROGRAMS

Under new authority granted in the 1976 amendments to the Airport and Airways Development Act, the FAA will establish a high priority for the allocation of discretionary trust funds for airport land acquisition for compatible usage, the purchase of noise suppressing equipment, the construction of physical barriers and other noise reduction activities.

In appropriate cases, the FAA will encourage the development of new airports to replace older airports in areas with large populations adversely affected by noise. In new airport development, federal financing will be conditional on effective noise abatement planning and require all reasonable steps to be taken to assure that the use of land areas exposed to serious levels of noise around airports is restricted to uses compatible with airport operations projected for the foreseeable future.

The FAA will request Congress to amend the Airport and Airway Development Act to include among airport proprietor activities eligible for federal-aid funding the acquisition, installation and operation of airport noise monitoring equipment.

AIRPORT NOISE

The FAA is promulgating an airport noise policy to encourage airport proprietors to develop aggressive noise abatement programs for their airports, to assist them through federal air traffic control actions in attaining their noise abatement goals, and to advise them on how their proposed plans affect the overall air transportation system.

Although arguments that the FAA advisory program on airport use restrictions should fully preempt the legal authority and responsibility of airport proprietors to limit the noise impacts around their airports were fully considered, that program was designed not to do so.

The FAA will consider preliminary proposals from airport sponsors for comprehensive noise abatement plans and will fund a select number of innovative noise abatement model plans and demonstrations.

LOCAL ACTIONS

The FAA will encourage airport proprietors to assess the noise problem in surrounding communities and, where local authorities determine that there is a significant problem, to develop an action plan to reduce the impact of noise. That action plan should include a program to provide maximum land use compatibility with airport operations and consequent airport noise, both by the acquisition of easements or other rights in the use of land or airspace and by encouraging local governments to adopt and enforce zoning or other land use controls.

State and local governments are directly and uniquely responsible for ensuring that land use planning and zoning, and land development activities in areas surrounding airports attain the objective of land use that is compatible with present and projected aircraft noise exposure in the area. They should support airport land use programs developed by airport proprietors, and regulate the construction of buildings to ensure insulation from aircraft noise and provide for insulation of public and residential buildings.

State and local governments also should require that appropriate notice of airport noise exposure be provided to the purchasers of real estate and to prospective residents in areas near airports to ensure awareness of the nature of the airport environs.

EPA CONSULTATION

All the new rules are being developed in consultation with the Environmental Protection Agency, which supports the Part 36 compliance rule as an important step, but will continue to offer additional measures in other areas for FAA consideration. In particular, the EPA has proposed a more comprehensive airport noise regulation, which will appear in the Federal Register November 22.

FINANCING NEEDS HEARING

In a separate but related action, Secretary Coleman today outlined the major issues to be covered at a public hearing in Washington on December 1 on the financing needed by aircraft operators to meet FAA standards of aircraft noise emissions.

The Secretary said the four major issues that should be discussed are:

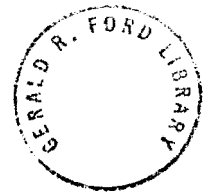
1. Whether there is a need for special financing provisions to enable aircraft operators to meet the deadlines stipulated in the new standard.
2. Whether it is desirable to meet the noise standards by replacing some or all 707s and DC-8s with new technology aircraft rather than by modification.

3. What specific financing arrangements, should any be found necessary, are most desirable.
4. Whether foreign flag carriers should be included in a financing program.

In a notice to be published in the Federal Register, the Secretary will set forth the matters bearing on the main issues and discuss them at length.

The December 1 public hearing will be held in the Departmental Auditorium, Constitution Avenue, between 12th and 14th Streets, and will begin at 10:00 a.m.

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AVIATION NOISE ABATEMENT POLICY

November 18, 1976



OFFICE OF THE SECRETARY

FEDERAL AVIATION ADMINISTRATION

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PART ONE

INTRODUCTION AND SUMMARY OF AVIATION NOISE ABATEMENT POLICY

I. INTRODUCTION

Aircraft noise is a significant annoyance for six to seven million Americans. The annoyance is particularly serious at many of our major airports, including those in large metropolitan areas from coast to coast. But noise constitutes a present or potential problem for residents living near many other airports across the nation, and as air travel increases it will become a serious problem at some of these other airports as well.

The aircraft noise issue became increasingly apparent in the early 1960's with the advent of jet aircraft and was soon magnified by the rapidly increasing number of commercial operations in the latter part of the decade. Because of its adverse effect on people, aircraft noise was recognized as a major constraint on the further development of the commercial aviation network, threatening to limit the construction and expansion of airports and access to them. Joint action by government and the private sector was taken to address it. The engine manufacturers and the federal government both engaged in extensive research into quieting jet engines. In 1969, Congress gave the Federal Aviation Administration ("FAA") the responsibility to regulate aircraft design and equipment for noise reduction purposes. The FAA then embarked upon a long-term program of controlling aircraft noise at its source.

A regulation promulgated in 1969 established noise standards for turbojet aircraft of new design effective December 1, 1969; an amendment in 1973 extended the same standards to all new aircraft of older design. The third step in the source noise control program is a regulation requiring compliance with noise standards by jet aircraft already in the fleet. Initially called the "retrofit" rule, it has been the subject of two major FAA rulemaking proposals, a notice of proposed rulemaking published in 1974 and a similar Environmental Protection Agency (EPA) proposal published in 1975. The FAA noise proposal for operating aircraft was the product of considerable study and analysis and was submitted by the Federal Aviation Administrator to the Secretary of Transportation in January because consultation with the Secretary is required by the Noise Control Act of 1972, and because the FAA concluded that some form of federal financing might be required to complete that program.

Intensive review of various proposals by the Secretary of Transportation, with the support of the FAA Administrator, led to a far-ranging analysis of the aircraft noise problem, alternative methods of dealing with it, and the economic consequences of imposing a rule applicable to operating aircraft as well as to newly certificated aircraft.

On October 21, 1976, President Ford advised us that, after considering the proposal we jointly presented to him, and the views of other interested agencies, including EPA, he had accepted our recommendation that action should be taken to extend current noise standards to domestic U.S. commercial airplanes in not more than eight years. He directed that the FAA promulgate its noise compliance rule not later than January 1, 1977. Our statement today announces that action, and the companion measures we believe are an integral part of a comprehensive aviation noise abatement policy.

The scope of the noise problem, the interrelationship and special responsibilities of the many parties concerned with it, and the general confusion and prevalent uncertainty about what it is possible to achieve and who is responsible have led us to conclude that the federal government should address the overall noise problem with a more comprehensive approach than mere promulgation of a new regulation. From recognition of the need for a comprehensive response to the noise problem, this policy statement will analyze the aviation noise problem, and delineate the shared responsibilities of those who must act to alleviate it - industry, government and private citizens.

Although progress has been made in the development of quieter aircraft, much remains to be accomplished. Aircraft noise, of course, cannot be completely eliminated unless we go back to the glider; its adverse effect on people can only be reduced. The complex division of legal authority and practical responsibility among airport proprietors, federal and local government agencies, air carriers, and manufacturers calls for a clearer understanding, first, of what is technologically and financially attainable and, second, of how each of these parties can and must perform those functions for which it is uniquely suited. Only if each party assumes responsibility and acts on the basis of complete cooperation and coordination will we achieve significant and measured progress in reducing the impact of aircraft noise on airport neighbors.

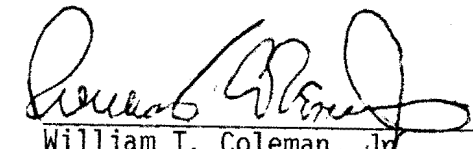
As the federal officials principally concerned with aviation noise, it is our duty to provide leadership in a national effort to reduce aircraft noise. The aviation noise abatement policy that follows represents our views about what action should be taken. Within the constraints of technology, productivity, and financing, it clarifies the responsibility of the federal government to reduce aircraft noise at its source, to promote safe operational procedures that abate the impact of noise on populated areas and to promote positive efforts to attain compatible land use in areas adjacent to airports. It deals realistically with the time that will be required to bring the current fleet of aircraft into compliance with noise level standards that are now technologically feasible and with the financial requirements necessary to make compliance possible.

Those who anticipate a complete federal solution to the aircraft noise problem misunderstand the need for federal, local and private interaction. The primary obligation to address the airport noise problem always has been and remains a local responsibility. Consequently, we have also set forth what we believe to be the legal and proper responsibilities of the airport proprietors, air carriers and other aircraft operators, aeronautical manufacturers, state and local governments, and private citizens. The full benefit of a federal plan of action will be realized only if complementary action is taken by all these participants.

Local capability to plan and take action will be enhanced by a clearer understanding of what the federal government intends to do. As the federal government reduces cumulative noise exposure by controlling the source of noise, so must local governments and airport proprietors, with federal financial assistance in some instances, acquire land and assure compatible land use in areas surrounding the airport in order to confine severe noise exposure within the boundaries of the airport and to minimize the impact of noise beyond those boundaries.

Because of the complexity of the noise problem, we have set forth the following synopsis of our Aviation Noise Abatement Policy which summarizes the key responsibilities of each participant and highlights the federal action program. The analysis of the noise and financing problems that led to the formulation of this policy, the legal foundation upon which the policy rests, and the specific explanation of how certain timing, noise levels and policy conclusions were reached are set forth in Part Two. Accordingly, we invite your attention to Part Two and the underlying rationale that we believe will clarify and support the conclusions set forth in the following section.


John L. McLucas
The Federal Aviation Administrator


William T. Coleman, Jr.
The Secretary of Transportation

II. AVIATION NOISE ABATEMENT POLICY

A. Basic Policy Principles

- . Because aircraft noise adversely affects a significant portion of the nation's population, a nationwide commitment, involving federal, local and private resources, is required to reduce the impact of aviation noise on the people who live in areas surrounding airports.
- . Public understanding is essential to an effective program to reduce aircraft noise so that we do not raise the expectations of airport neighbors for noise reductions beyond the levels which technology and reasonable cost-effectiveness make possible.
- . Each of the participants in the noise abatement effort - the airport users, aircraft manufacturers, the airport proprietors, federal, state and local governments, and residents in communities surrounding airports - must take specific steps that are essential in reducing the number of people adversely affected by noise and the severity of the effect on all people.
- . Planning and acting in coordination, each of these parties should move toward the goal of confining severe aircraft noise exposure levels around U.S. airports to the areas included within the airport boundary or over which the airport has a legal interest, and of reducing substantially the number and extent of areas receiving noise exposure levels that interfere with human activity.

B. Authorities and Responsibilities Under the Policy

The Federal Government has the authority and responsibility to control aircraft noise by the regulation of source emissions, by flight operational procedures, and by management of the air traffic control system and navigable airspace in ways that minimize noise impact on residential areas, consistent with the highest standards of safety. The federal government also provides financial and technical assistance to airport proprietors for noise reduction planning and abatement activities and, working with the private sector, conducts continuing research into noise abatement technology.

- . Airport Proprietors are primarily responsible for planning and implementing action designed to reduce the effect of noise on residents of the surrounding area. Such actions include optimal site location, improvements in airport design, noise abatement ground procedures, land acquisition, and restrictions on airport use that do not unjustly discriminate against any user, impede the federal interest in safety and management of the air navigation system, or unreasonably interfere with interstate or foreign commerce.

State and Local Governments and Planning Agencies must provide for land use planning and development, zoning, and housing regulation that will limit the uses of land near airports to purposes compatible with airport operations.

The Air Carriers are responsible for retirement, replacement, or retrofit of older jets that do not meet federal noise level standards, and for scheduling and flying airplanes in a way that minimizes the impact of noise on people.

Air Travelers and Shippers generally should bear the cost of noise reduction, consistent with established federal economic and environmental policy that the adverse environmental consequences of a service or product should be reflected in its price.

Residents and Prospective Residents in areas surrounding airports should seek to understand the noise problem and what steps can be taken to minimize its effect on people. Individual and community responses to aircraft noise differ substantially and, for some individuals, a reduced level of noise may not eliminate the annoyance or irritation. Prospective residents of areas impacted by airport noise thus should be aware of the effect of noise on their quality of life and act accordingly.

C. Federal Action Plan to Implement These Policies.

1. Aircraft Source Noise Regulation

a. Currently Operating Aircraft

The Federal Aviation Administration will promulgate a rule requiring that subsonic jet airplanes with maximum weight in excess of 75,000 pounds that do not meet the present Federal Aviation Regulations Part 36 noise levels must be retired from the fleet or modified ("retrofitted") to meet those levels in accordance with the following schedule. To bring about the earliest reduction of noise levels possible, the phased-in compliance deadlines for each aircraft type have been established on the basis of what is technologically practicable and economically reasonable. The deadlines are:

747s within six years, with one-half to be completed within four years;

727s, 737s, DC-9, BAC 1-11s within six years, with one-half to be completed within four years; and

720s, 707s, DC-8s, CV-990s within eight years, with one-quarter to be completed within four years, and one-half to be completed within six years.*

These time periods will start to run with the issuance of appropriate regulations to be effective January 1, 1977. In accordance with such procedures as are authorized by law and FAA regulations, persons subject to these regulations may petition for an exemption. In evaluating petitions for an exemption, the FAA will consider the economic ability of the petitioner to meet the regulatory timetable and whether the petitioner is able to operate the airplanes for which an exemption is sought into airports where a significant noise problem does not exist. As a matter of policy, it is our view that such exemptions should not in any event extend to more than one-third of the JT8D powered airplanes in an operator's fleet.

In conjunction with the issuance of the Part 36 compliance regulation, the United States will work through the International Civil Aviation Organization to reach agreement with other nations on means to abate aircraft noise. If agreement is not reached in three years, it is the intention of the federal government to require aircraft flown by carriers of other countries to meet U.S. established noise levels at the end of five additional years. For the time being, aircraft operated by foreign carriers and that portion of the fleets of U.S. air carriers used in international service will not be covered by the noise regulations issued pursuant to this statement.

b. Future Design Aircraft

The FAA will complete, by March 1, 1977, its consideration of new, more stringent noise standards for new aircraft designs that reflect recent advances in noise suppression technology and are technologically practicable, economically reasonable, and appropriate for the particular type of aircraft. These regulations will be applicable to subsonic aircraft developed for the replacement of the old four-engine jets and to airplanes type certificated after the effective date of the regulation.

* In the establishment of the eight year deadline for the older four-engine jets, we considered, for example, the time required to develop and certify for production a retrofit kit for the 707 (two years) and the DC-8 (36 months) and the time required to produce and install enough kits to bring these planes into compliance (there are currently over 500 in operation).

c. Supersonic Aircraft

Using information that is now available on a continuing basis from the Concorde demonstration, the FAA, not later than thirty days after the conclusion of the sixteen month demonstration periods, will act to promulgate a noise rule applicable to supersonic aircraft that is necessary to protect the public health and welfare and that is consistent with the statutory requirement that the Administrator consider technological practicability, economic reasonableness, and appropriateness to aircraft type.

2. Operating Procedures

The FAA has evaluated a number of concepts for aircraft operating procedures designed to abate noise. The FAA has taken regulatory action this week to maximize the noise reduction benefits of new aircraft and retrofitted aircraft, consistent with the highest degree of safety. Additional analysis and evaluation is underway which is expected to lead to future regulatory action.

3. Airport Development Aid Program

Under the new authority granted in the 1976 Amendments to the Airport and Airway Development Act, the FAA will establish a high priority for the allocation of discretionary Airport and Airway Trust Funds for airport land acquisition to ensure compatible use of land near airports, the purchase of noise suppressant equipment, the construction of physical barriers and other noise reduction activities.

The Department of Transportation, in appropriate cases, will encourage the development of new airports to replace some of the older airports in areas with large populations adversely affected by noise. In the development of new airports, federal financing will be conditioned on effective noise abatement planning. Federal funding for new airport development and for airport expansion and improvement will require documentation that the proprietor is taking all reasonable steps to ensure that the use of land areas exposed to serious levels of noise is restricted to uses compatible with airport operations projected for the foreseeable future.

The Administration will request the Congress to amend further the Airport and Airway Development Act to include among airport proprietor activities eligible for federal-aid funding the acquisition, installation and operation of airport noise monitoring equipment. Use of such equipment is vital to

assist airport proprietors in quantifying noise exposure, identifying specific airplanes and operators that are major contributors to community noise, and developing programs to reduce aircraft noise exposure.

4. Airport Noise Policy

To bring about further relief from excessive aircraft noise, airport proprietors are encouraged to develop aggressive noise abatement programs for their airports. The FAA will assist proprietors in attaining their noise abatement goals and will advise them on how their proposed plans affect the overall air transportation system. The FAA will accept preliminary proposals from airport sponsors for comprehensive noise abatement plans and will fund a select number of innovative noise abatement model plans and demonstrations. In addition, the FAA will encourage noise abatement plans from airport proprietors in conjunction with both applications for major airport development grants and proposals to establish use restrictions, such as curfews or scheduling and equipment restrictions. The FAA will advise airport operators whether proposed use restrictions are unjustly discriminatory or place an undue burden on interstate or foreign commerce because of their impact on the national air transportation system. Where necessary, the FAA will seek adjudication of the constitutional issues involved if it believes that a use restriction established at an airport is unjustly discriminatory or creates an undue burden on interstate or foreign air commerce.

D. Air Carrier Action Plan

1. Aircraft Compliance

Under the federal rule described above, the older, noisier four-engine jets using the JT3D and similar engines (707s, DC-8s, CV-990s) must be modified to meet Part 36 noise levels or they must be retired from operation within eight years. Many of the four-engine jets are old and relatively inefficient to operate. After weighing the advantages of modification and replacement, the Secretary of Transportation and the Administrator of the Federal Aviation Administration have concluded that it would be in the public interest if most of these aircraft were replaced by new airplanes, particularly by new airplanes that incorporate new technologies currently under development. Replacement would reduce further noise and pollution emissions levels. In addition, replacement would increase energy efficiency, accelerate introduction of advanced safety and design technologies, increase employment opportunities, improve service for the air traveller, and improve prospects for exports by the American aerospace industry.

2. Financing

To ensure that the air carriers can meet the new aircraft noise standards within the deadlines established by regulation, President Ford directed me, as Secretary of Transportation, to hold a public hearing on December 1, 1976, to determine whether any additional financing arrangements may be necessary. Further details on this hearing and the issues to be addressed are set forth in separate documentation.

E. Local Actions

While federal action will form the basis of our program, substantial local action will be necessary to complement the noise reduction actions of the federal government and air carriers. Since a federal program would be significantly less effective without commensurate local actions, we have delineated those actions we believe local authorities should take.

The FAA will encourage airport proprietors, who are legally responsible for the effect of aircraft noise on the surrounding community, to assess their particular noise problem and, where local authorities determine that there is a significant problem, to develop an action plan to reduce the impact of noise. That action plan should include a program to ensure maximum land use compatibility with airport operations both by the acquisition of easements or other rights in the use of land or airspace and by encouraging local governments to adopt and enforce zoning or other land use controls. It should also address other actions that may be taken, such as the establishment of a formal noise abatement runway system, control of ground operations, and preferential arrival and departure routes. The proprietor may wish to propose to the FAA special landing and takeoff procedures to deal with any unique conditions around his airport.

In addition, state and local governments with jurisdiction over property adjacent to airports must take action of their own, preferably in cooperation with the local airport proprietor. State and local governments are directly and uniquely responsible for ensuring that land use planning and zoning and land development activities in areas surrounding airports are consistent with the objective of ensuring land use that is compatible with present and projected aircraft noise exposure in the area. Construction standards for new buildings should ensure appropriate insulation from aircraft noise, and programs to insulate existing public and residential buildings should be advanced where needed.

State and local governments also should require that appropriate notice of airport noise exposure be provided to the purchasers of real estate and to prospective residents in areas near airports to ensure awareness of the nature of the airport environs.

F. Concluding Note

With realistic public appreciation for the complexity of the task to be performed and with full and open communication and cooperation among the participants, the actions that each of us take separately pursuant to this policy will contribute toward significant and recognizable progress in the reduction of the adverse effect of aircraft noise on airport neighbors.

PART TWO

ANALYSIS OF THE NOISE PROBLEM, LEGAL FRAMEWORK,
AND DESCRIPTION OF THE FEDERAL ACTION PROGRAM

I. STATEMENT OF THE PROBLEM

In determining what action can and should be taken at the federal and local levels and in the private sector to reduce the adverse effect of excessive aircraft noise, a full understanding of this multidimensional problem is essential. In this part, we will explain the underlying rationale that supports the conclusions set forth in our Aviation Noise Abatement Policy and the federal action program to implement it. In describing the noise problem, we will explain first the technical framework for measuring the noise problem, how it affects people and how they react to it, how many people are subjected to excessive noise and where they live, and how actions to reduce noise affect interstate commerce. Because progress in noise reduction is heavily dependent upon the financial ability of airlines to modify or replace their old, noisy airplanes and on the ability of manufacturers to design, produce, and sell less noisy airplanes, we also will consider the financial condition of the airlines and the impact of proposed actions on the aerospace industry.

The responsibilities of federal and local governments, airport proprietors, and industry in responding to the noise problem are defined in large measure by statutory and case law. Accordingly, the legal framework set forth in this part establishes the foundation upon which the federal program must be constructed. Finally, the federal response summarized in this policy is described in greater detail in terms of the precise nature of the noise problem it is designed to address and the financial and technological constraints within which progress must be made.

A. The Noise Problem

1. How Noise is Described

People's reactions to noise differ widely. It is difficult, therefore, to derive a simple mathematical formula that accurately represents human reaction to noise annoyance. For example, it remains uncertain whether people, in reacting to aircraft noise, are more annoyed by the number of aircraft noise events or the noise levels of individual events. To help measure, quantify and understand the effects of noise on people, there has been a proliferation of approaches, the acronyms of which threaten to challenge the supremacy of the federal bureaucracy in this regard. Rational public discourse is not greatly aided by a debate over the relative merits of expressing noise impact in terms of dB, dBA, dBD, PNL, EPNL, EPNdB, SEL, SENEL, CNR, NEF, CNEL, ASDS, Ldn, and Leq. In this policy statement, we have relied primarily on the two most common measurements of noise: noise generated by a single event (expressed in EPNdB, usually at the Part 36 measuring points) and cumulative noise exposure (expressed in Noise Exposure Forecast or NEF).

Human response to single-event jet aircraft noise is best represented in terms of Effective Perceived Noise Level, expressed in units of EPNdB. This unit of perceived noise takes into account the actual sound energy received by a listener, the ear's response to that sound energy, the added annoyance of any pure tones or "screeches" in the noise, and the duration of the noise. In any discussion of aircraft noise abatement, a key consideration is the difference in noise level which a listener is able to perceive and find meaningful, in terms of both the single event and the cumulative exposure. Few humans can detect differences between single events of aircraft noise of less than about 5 EPNdB. However, an increase of 10 EPNdB is usually perceived as a doubling in loudness.

The Part 36 measuring points are standardized locations from which aircraft noise is measured for certification purposes. Such measurements are specified at three points: one under the approach path,* one under the takeoff path,** and one to the side of the runway at the point of maximum noise during takeoff.*** Although the Part 36 values do not give a complete picture of the total noise impact at an airport, they do provide a standardized method of measuring aircraft noise, and are useful in comparing noise levels of different aircraft.

In general, if noise events, such as aircraft flyovers, are infrequent, the peak noise level of the individual events will probably determine individual reactions to that noise. If the noise events are relatively continuous or repetitive, however, the total noise "dose" or cumulative noise exposure becomes a more important factor in people's reactions to aircraft noise. Noise Exposure Forecast (NEF) provides a measure of the total aircraft-generated noise energy received at locations near an airport during a typical 24-hour period. The NEF value at a given point near an airport is calculated by summing the noise energy received at that point from all of the aircraft operating into and out of that airport during a day, with an added penalty for nighttime noise (flights after 10 p.m.). Points of equal NEF value are then joined to form contours of equal noise exposure. Calculation of these values requires knowledge of the number and type of aircraft operating, the noise characteristics of each aircraft, the flight paths they follow, the time of day they fly, and the manner in which they are operated (for example, power settings during takeoff and landing).

* One nautical mile from the runway threshold.

** 3.5 nautical miles from the start of the takeoff roll.

*** 0.35 nautical miles to the side of the runway for four-engine aircraft, 0.25 nautical miles for two- and three-engine aircraft.

The NEF procedure has been developed over the last decade for land use planning around airports as the number of jet aircraft has increased and their noise has become more of an annoyance. It is particularly meaningful in measuring the overall impact that residents around busy airports might experience, and research into human reaction to aircraft noise indicates that cumulative noise exposure is the most useful measure of public reaction to aircraft noise.*

*References for Cumulative Measure Support

1. Tracor Inc.: Community Reaction to Airport Noise - Vol. I, NASA CR 1761, Vol. II NASA CR 111 316, September 1970.
2. Connor, William and Patterson, Harrold: Community Reaction to Aircraft Noise Around Smaller City Airports. NAS CR 2104, 1972.
3. Galloway, W. and Bishop, D.E.: Noise Exposure Forecasts: Evolution, Evaluation, Extensions and Land Use Interpretations. FAA Report No. FAA-NO-70-9, August 1970.
4. McKennell, A.C.: Aircraft Noise Annoyance Around London (Heathrow) Airport. S.S. 337, Central Office of Information, 1963.
5. MIL Research Ltd.: Second Survey of Aircraft Noise Annoyance Around London (Heathrow) Airport. Office of Population Censuses and Surveys, Social Surveys Division. HMSO (London), 1971.

In assessing community reaction to aircraft noise exposure, the following interpretations of NEF values are often used:

Less than NEF 30	Essentially no complaints expected; noise may interfere with community activities.
NEF 30 to NEF 40	Individuals may complain; group action possible.
Greater than NEF 40	Repeated vigorous complaints expected; group action probable.

A reduction of one NEF unit is equivalent to a reduction of about two percent in the number of people highly annoyed and equal to a reduction of about 14 percent in the area exposed to the same level of noise exposure.* A difference in noise level below 5 EPNdB may not be significant as a single event, but if there are frequent occurrences the cumulative effect of that difference may be substantial, and the change in NEF value would reflect this.

The NEF method has been adopted by the Department of Housing and Urban Development. It will not guarantee mortgages on properties within NEF 40 and normally considers properties within NEF 30 unacceptable. NEF and other descriptors of cumulative noise exposure** are useful in determining the effect of federal noise control activity on airport communities and in commensurate local land use development and planning.

* The relationship between NEF reduction and land area reduction is logarithmic - i.e., a 50 percent reduction in land area is approximately equivalent to a 4.5 NEF unit reduction, while a 25 percent reduction in land area is approximately equal to a 2.0 NEF unit reduction.

** The Environmental Protection Agency has recommended that cumulative noise exposure be expressed by a measure called Day/Night Average Noise Level (Ldn). The equivalent values are:

$$\text{NEF 30} = \text{Ldn 65}; \text{NEF 40} = \text{Ldn 75}$$

2. How Noise Affects People

Aircraft noise disturbs the normal activities of airport neighbors--their conversation, sleep, and relaxation--and degrades their quality of life. Depending on the use of land contiguous to an airport, noise may also affect education, health services, and other public activities.

Although there may be indirect and subtle social and psychological harms, aircraft noise is predominantly an annoyance problem. It does not present any direct physical health danger to the vast majority of people exposed.

3. Whom Does Noise Affect and Where Do They Live

Approximately six million U.S. citizens currently reside on 900,000 acres of land exposed to levels of aircraft noise that create a significant annoyance for most residents.* Of this number, approximately 600,000 citizens reside within areas that are severely impacted by aircraft noise; that is, areas in excess of NEF 40.

The subjective reactions of individuals to aircraft noise vary substantially.** These differences become increasingly apparent in the comparison of noise problems surrounding specific airports, taking into consideration the number and kind of local complaints about noise, the political pressures on the airport operator to take unilateral action to restrict use of the airport, and the environmental and social contexts--climate, lifestyles, community concern--in which noise is perceived.

* Over NEF 30.

** The 1973 Annual Housing Survey conducted by the Bureau of the Census for the Department of Housing and Urban Development, indicated that of those surveyed:

20.2 percent experienced noise from airplane activity in the vicinity of their home. Of those experiencing noise, 34.2 percent considered the noise to be disturbing, harmful or dangerous; 6.3 percent felt airplane noise to be so objectionable that the household would like to move from the neighborhood.

In some communities, people's reaction to aircraft noise is increasingly being expressed in the courtroom where homeowners are receiving awards for nuisance and for diminution of property value (inverse condemnation). Over the past five years, airport proprietors have paid out over \$25,000,000 in legal judgments or settlements in noise-related suits and have spent over \$3,000,000 in legal fees, expert testimony and similar defense efforts.

The absence of lawsuits in some severely impacted areas and the recent occurrence of the most significant court precedents cause some observers to consider the pending suits to be merely the "tip of the iceberg," with substantial potential liabilities yet to arise. Others consider the concentration of lawsuits in certain areas to be an indication of the diversity in community response to aircraft noise, concluding that noise is not yet perceived as a substantial problem around many airports.

Partly as a reaction to such lawsuits, some airport proprietors have acquired substantial residential areas near their boundaries. The largest such programs have been undertaken by Seattle-Tacoma International and Los Angeles International Airports. Los Angeles alone has spent over \$130 million to purchase private residences and plans to spend \$21 million on sound-proofing schools and other public buildings near the airport.

Because the magnitude of the noise problem at any particular airport is a function of many factors, there is not any single criterion that defines a "noisy" airport. Depending on which criteria are used, the number of airports that are categorized as: "noisy", "noise sensitive", "noise problem", or "impacted by excessive noise", will vary. For example, the Air Transport Association (ATA) has identified 26 airports as "noise sensitive." On the other hand, the Airport Operators Council International has indicated that all airports receiving jet air carrier service now are or soon will be "noise impacted." By any definition, however, it is clear that an acute noise problem exists at many airports located in metropolitan areas.

Based on an analysis of citizen and Congressional complaints, the imposition of airport use restrictions, litigation and the number of people affected, the FAA has identified 100 airports where noise is in varying degrees an issue. A 1974 DOT study

of 23 major U.S. airports identified eight airports that have neighboring populations of over 25,000 residing within the NEF 40 contour (extremely serious problem), and 13 airports with at least 100,000 residing within the NEF 30 contours (considerable annoyance).* For the 23 airports surveyed, five million people live within NEF 30 and a half a million within NEF 40. Clearly the vast majority of people exposed to serious levels of noise live near the major metropolitan airports.** The following chart tabulates the number of people exposed to serious aircraft noise within the NEF 30 and 40 contours around the 23 airports included in DOT's study.

* These airports, in the order of the number of people affected, are: LaGuardia, O'Hare, Kennedy, Newark, Boston, Los Angeles, Miami, Denver, Cleveland, San Francisco, Seattle, Buffalo, and St. Louis.

** "Airport Noise Reduction Forecast," Report DOT-TST-75-3, October 1974.

EXTENT OF NOISE PROBLEM AT 23 MAJOR AIRPORTS

Airport	1972 Number of People ** (1000)		Court- suits	Restrictions
	NEF 30	NEF 40		
1. *Atlanta	99.8	27.0	Yes	
2. *Boston	431.3	32	Yes	
3. *Buffalo	113.8	9.7		
4. Chicago-Midway	38.5	1.8		
5. *Chicago-O'Hare	771.7	66.6		
6. Cleveland	128.7	11.2		
7. *Denver	180.3	28.3		
8. Dulles	3.5	0		
9. *J.F. Kennedy	507.3	111.5		
10. *LaGuardia	1057.0	17.1		
11. *Los Angeles	292.4	51.1	Yes	
12. *Miami	260.0	29.7	Yes	
13. *Minneapolis-St. Paul	96.7	8.8	Yes	Yes
14. *Newark	431.9	27.5		
15. New Orleans	32.5	8.9	Yes	
16. Philadelphia	76.9	0.3		
17. *Phoenix	20.5	6.2		
18. Portland	1.2	0.3	Yes	Yes
19. *San Diego	77.3	24.0	Yes	
20. *San Francisco	124.1	11.4		
21. *Seattle	123.2	17.3	Yes	Yes
22. St. Louis	100.0	8.5	Yes	
23. *Washington National	24.4	2.0	Yes	Yes
<u>TOTAL</u>	5.0M	0.5M		
All other airports	1.1M	.1M		
<u>GRAND TOTAL</u>	6.1M	0.6M		

* Identified by Air Transport Association as being "noise sensitive."
Other airports on the current ATA list but not included in the study are: Detroit, Honolulu, Memphis, Las Vegas, Tampa, Ft. Lauderdale, San Juan, Oakland, and San Jose.

** Estimated from 1970 Census data

In response to public opposition to noise, some airports have imposed or are considering various use restrictions.* These measures include curfews, restrictions on the use of certain equipment, and limitations on operations. Such restrictions may have a substantial effect on interstate commerce and on the air navigation system.

* Major examples of completed or proposed actions by airport owners to reduce noise levels by restricting the use of the airport are:

- . Night Time Operating Restrictions - Lindbergh Field in San Diego, California; Pearl Harbor, Oahu; Washington National
- . Total Jet Ban - Santa Monica Municipal Airport, California; Watertown Municipal Airport, Wisconsin
- . Exclude non-Part 36 Jet Aircraft - Los Angeles International, Logan International, Boston
- . Limit Number of Aircraft Operations - Stewart Airport, N.Y.
- . Exclude Particular Types of Aircraft - Los Angeles International and Logan International have prohibited SSTs, JFK International is considering a similar ban
- . Limit number of nighttime operations - Minneapolis-St. Paul
- . Operational Noise Limits - JFK International
- . Displaced Threshold - Logan International and many others
- . Noise Preferential Runways - Atlanta, Miami, Tampa, San Juan, Boston-Logan, Hartford-Bradley, O'Hare, Midway, Cleveland Hopkins, Detroit-Wayne County, Minneapolis-St. Paul, Moisant-New Orleans, Denver, Pittsburgh, LaGuardia, Newark, Los Angeles, San Francisco and others.

In some of the above cases, the restrictions have been developed voluntarily through operator/users agreements, while in others they have been imposed unilaterally by the airport proprietor.

Curfews at large, medium and small hubs could have very serious effects. New York City is an illustration:

- . Air cargo shipments by weight remain at a relatively constant level for 24 hours at Newark and Kennedy. Accordingly, restrictions on night operations would severely disrupt freight shipment and handling. During May 1974, 37 percent of the total New York air cargo was transported between 10 p.m. and 7 a.m. local time. With a nationwide curfew applying to the same time period, the foreclosure of freight traffic to New York would extend to the hours during which 49 percent of the New York cargo moves.
- . A curfew's impact on mail shipments would also be significant. The movement of mail between 10 p.m. and 7 a.m. at New York amounted to 23 percent of the daily air transported mail for the sample studied. A nationwide curfew would curtail flights for the hours in which 35 percent of the New York mail moves.
- . Five to 13 percent of all passenger movements would be affected by similar New York and nationwide curfews. Much of the night passenger travel makes use of the reduced night coach fare structure enabling those with less financial resources to travel by air.

Other disbenefits are also likely if curfews are widely adopted. A substantial number of airplane operations might have to be shifted to earlier hours, which, while eliminating noise at night, would result in congestion and delays and an increase in the noise exposure during daylight and evening hours. Airlines would require more aircraft, more expensively operated, to overcome positioning problems if even one or two major hubs were curfewed. Time zone differences would cause additional scheduling problems. A curfew at O'Hare, for example, would cause a major restructuring of most of the domestic air transportation system.

4. The Source of Aircraft Noise: Composition of the Fleet

Some have argued that normal attrition will eventually take care of the aircraft noise problem, as the older, noisier planes are phased out of the fleet. The evidence indicates, however, that unless federal action is taken, the problem of airport noise will remain and, with increasing operations occurring at more airports, will be exacerbated. At the end of 1975, only 494 of the 2,148 jet airplanes in the U.S. air carrier fleet (about 23 percent) complied with the noise levels of Part 36. It bears repeating that the 77 percent of the fleet that exceed Part 36 levels were not required to meet those standards since they were produced prior to the effective date

of Part 36. Of the 1,654 aircraft in the fleet that do not meet Part 36 noise levels, 523 or 30 percent are the noisiest, four-engine models (Boeing 707s and 720s, Douglas DC-8s). Assuming normal attrition, the FAA projects that in 1990 48 percent of the air carrier fleet still will not meet Part 36.*

Since 1972, there has been a reduction in cumulative aircraft noise exposure around airports due in part to the introduction of new quieter jet aircraft and in part to the slowed rate of increase in passenger growth. Because of forecasted aviation growth, the airport noise problem is expected to increase in the future despite the introduction of quieter aircraft. Between 1975 and 1990, annual air carrier operations are estimated to increase from 10 million to 16 million, creating additional noise exposure that, without federal action, could more than offset the reduction in noise levels resulting from the replacement of the older airplanes by newer, quieter models. The major reason why progress in the replacement of older airplanes has been slow is the financial condition of the air carrier industry, to which we now turn.

* Details concerning the aircraft currently operating that do not meet Part 36 noise levels and an FAA projection of the non-Part 36 aircraft that will remain in commercial service in 1984 is set forth in the Environmental Impact Statement issued in conjunction with the Part 36 compliance regulation.

B. The Financial Problem

1. Ability of Airlines to Finance Aircraft Replacement

As older noisier airplanes are modified or replaced with new planes that meet or better Part 36 standards, the cumulative noise exposure around major airports will be reduced. The degree and speed with which this occurs depends upon the financial capability of the air carriers to modify or replace their older airplanes. Since additional noise reduction and other benefits accrue from replacement rather than retrofit of these planes, replacement appears to be a more desirable goal. But since replacement requires a much greater capital outlay than retrofit, the forecasted economic environment for the airline industry becomes doubly important.

In recent years many major airlines have experienced very serious difficulty in obtaining from private capital markets the financing necessary for equipment and other needs. Some have found themselves short even of working capital to continue operations. Between 1970 and 1975, the trunk carriers spent \$14.6 billion on capital needs: \$8.7 billion for aircraft, equipment and property; \$1.7 billion for leases of aircraft and engines; and most of the rest for debt service. The sources of this financing were mainly depreciation (\$5 billion to \$7 billion) and new long term debt (\$4 billion), with earnings contributing only about \$400 million. Equity financing was insignificant in this period, and low earnings and existing high debt levels forced some carriers to lease rather than purchase new aircraft. In addition, because of their recent earnings records, conventional sources of debt financing also have been effectively foreclosed to some carriers. Insurance companies and banks have been unwilling or unable to make further financing commitments and in recent months have stated publicly that, until the airlines' financial situation is sufficiently improved, new loans will not be forthcoming. In this financially strained economic environment, some carriers have been forced to resort to existing revolving credit arrangements to raise working capital.

The 1974/1975 period was particularly difficult for the industry. The sudden and substantial increase in fuel prices that began in 1974, accompanied by inflation in other cost categories, forced carriers to raise fares sharply. This coincided, unfortunately,

with the economic recession of 1974-75 when demand was already softening, and traffic levels were driven down even further. Moreover, many airlines in the late 1960s had purchased equipment to meet a predicted demand growth that never occurred, leaving them for a time with substantial excess capacity. The airlines' financial problems were exacerbated by the existing economic regulatory system which does not normally allow for timely fare increases, and denies airlines the pricing and management freedom available to other industries.

The airline industry's financial performance has been showing steady improvement since the end of the recession, however, and prospects for increased earnings over the next few years are good. Traffic growth is expected to resume, though at a long-term rate about equal to GNP growth, in contrast to more rapid growth rates in the past. Since, at present, the airlines have relatively few new aircraft on order, any near term traffic growth will be accommodated largely through increases in aircraft productivity. Load factors are likely to increase, earnings should remain fairly stable at a relatively high level, and new capital needs should be relatively modest until 1980.

After 1980, however, traffic growth will begin to press against the fleet's capacity, and airlines will begin to require new capital to finance the replacement of aging aircraft and to meet the growth demand. Leaving aside the new noise requirements, the Department estimates that between 1976 and 1985 the trunk carriers will need from 700 to 800 new aircraft and will require between \$22 and \$30 billion dollars to finance this acquisition (based on estimates by Government and private sector financial analysts). About \$6 billion will be needed for debt repayment and other uses. A mid-range estimate of total capital needs, therefore, would be \$32 billion.

Depreciation and sales of used aircraft can be expected to generate about \$15 billion of this amount, leaving \$17 billion to be financed through earnings and external sources. If earnings in the period were to rise to \$6 billion which implies a 9 percent return on equity, as contrasted with the average 2.8 percent return of the past five years, external financing needs would be \$11 billion. The airlines would probably be able to obtain this financing from conventional financial sources. The following table summarizes these estimates:

Sources and Uses of Funds (Mid-range Estimate)

<u>Uses of Funds:</u>	<u>(\$ Billions)</u>
Property, Plant and Equipment	\$26
Debt Repayment and Other	<u>6</u>
	\$32
<u>Source of Funds:</u>	
Depreciation and Sales of Used Aircraft	<u>\$15</u>
<u>Amount Required from Earnings and External Sources</u>	\$17
Earnings Assumption	<u>6</u>
<u>External Financing Requirement</u>	<u>\$11</u>

It is unlikely that capital needs can be met in this manner, however, if the industry does not achieve \$6 billion in earnings by the end of 1985. As indicated, this level of earnings implies an average annual return on equity three times as large as that earned over the last five years. It also assumes no unexpected negative developments, such as another recession or substantial new increases in fuel or other costs. These or other events would materially reduce the ability of the industry to earn a 9 percent return on equity.*

Under one scenario for meeting the new noise abatement regulation schedule, the "regular" 707s and DC-8s are retired and replaced with a new technology airplane and the stretched DC-8s and the remainder of the noncomplying fleet are retrofitted. This would increase the trunk carriers' capital requirements to 1985 by between \$5.5 and \$7.6 billion, an increase of 20 to 27 percent more than the amount required as discussed above. An incremental capital requirement of this magnitude would appear to be clearly beyond the industry's ability to finance, given the other financing burdens they will face in the early 1980s.

* It must be noted that the above estimates of financial needs and sources are predicated on industry-wide estimates. Carriers that are in relatively inferior financial position will have greater difficulty in obtaining needed funds than will other carriers.

We believe passage of regulatory reform bill (the proposed Aviation Act of 1977) to be reintroduced by the Administration in early 1977 will help the airlines with their overall financing problem. If the carriers had been operating under the regulatory environment envisioned in the proposed legislation they would not face major difficulty in adjusting prices to anticipate needed capital investment requirements and in obtaining the needed financing for the rule. Under the cost-based guidelines now used by the Civil Aeronautics Board in evaluating requests for fare increases, the capital outlay for new equipment, about a third of which is made before the aircraft is delivered, cannot be recovered through fare increases until the aircraft is delivered and in operation. Thus if today's economic regulatory environment continues, it may be impossible for the industry to commit to the manufacturers the substantial amount of cash necessary to get a new technology aircraft into production and delivered soon enough to replace the DC-8/707 fleet by the end of 1984.* Complicating the problem is the fact that a number of carriers are significantly weaker than others and it is these carriers who are the owners of large numbers of noisy aircraft and thus face some of the largest financing requirements.

It is clear that over the period in which the noisy aircraft must be modified or replaced, timely passage of the Aviation Act of 1977 should make a large difference in the carriers' ability to finance new aircraft purchases. However, this very desirable change in regulatory policy would not go into effect for at least a year, and if, as expected, its provisions are phased to allow amply time for adjustment to the new operating environment, its full effect will not be felt for several years.

2. The Aerospace Industry

Lasting noise reduction benefits will be achieved with newer, quieter technology, but a major new aircraft has not been developed in the United States for almost 10 years. In that time, important design and technological advances have been made -- many specifically intended to meet the new economic, operating, and environmental constraints dictated by rising labor costs, energy shortages, environmental requirements, and changing market demands.

* A large number of firm orders from U.S. air carriers are required by manufacturers before they can start production of a new aircraft. The cost of developing the new aircraft alone is put at \$500 million to \$1 billion.

In past programs to develop a new aircraft, American manufacturers have had enough preproduction sales to U.S. airlines to provide a solid base for financing front-end costs and to insure a near break-even position without foreign sales. This is not the case today, largely because of the financial condition of several of the largest U.S. airlines, which traditionally have led the way with new purchases. Although the carriers gradually are replacing their older inefficient jets, they are doing so with existing model aircraft, and these only in small numbers. The aircraft available now to replace four-engine jets are improperly sized for some markets (e.g., 727s, 747s L-1011s, or DC-10s). Most U.S. airlines would prefer to wait for a family of new, higher technology aircraft, if it were probable that these airplanes would be available within a few years.

Moreover, the public interest is served by the substantial and long term noise benefits available from new technology aircraft. The new technologies that will be utilized in meeting the stricter FAA noise regulations for new aircraft types to be promulgated by next March will bring about an average reduction of 12 to 16 EPNdB from the noise levels of the 707. The accelerated introduction of these quieter replacement planes offers obvious advantages.

Although we are concerned primarily in this policy statement with reducing the impact of aircraft noise, it would be myopic, if not negligent, for us to overlook opportunities for achieving other important national objectives as well. Consequently, we have considered, in addition to the noise benefits accruing from replacement of four-engine aircraft, the energy conservation benefits of improved fuel efficiency, the increasing importance of aeronautical exports to our aviation industry, the declining role of aerospace research and development as a percentage of national defense and NASA outlays, the stimulation of employment in the aerospace and related industries, and the advantages to the consumer of more advanced design and lower operating costs.

How the carriers choose to comply with our noise rules will have long range effects on the development of U.S. technology, employment, the viability and competitiveness of national aerospace industry, and the long term noise benefits that are to be realized. The sum of total benefits, however, mandates a careful assessment of the relative merits of retrofit or replacement by new technologies.

II. LEGAL FRAMEWORK

A. Legal Responsibilities of the Federal Government

The principal aviation responsibilities assigned to the Federal Aviation Administrator, and since 1966 to the Secretary of Transportation, under the Federal Aviation Act of 1958, as amended, concern safety and the promotion of air commerce. The basic national policies intended to guide our actions under the Federal Aviation Act are set forth in section 103, 49 U.S.C. 1303, which provides public interest standards, including:

- (a) The regulation of air commerce in such manner as to best promote its development and safety and fulfill the requirements of national defense;
- (b) The promotion, encouragement, and development of civil aeronautics;
- (c) The control of the use of the navigable airspace of the United States and the regulation of both civil and military operations in such airspace in the interest of the safety and efficiency of both; and
- (e) The development and operation of a common system of air traffic control and navigation for both military and civil aircraft.

To achieve these statutory purposes, sections 307(a) and (c) of the Federal Aviation Act, 49 U.S.C. 1348(a), (c), provide extensive and plenary authority to the FAA concerning use and management of the navigable airspace and air traffic control. The FAA has exercised this authority by promulgating wide-ranging and comprehensive federal regulations on the use of navigable airspace and air traffic control.* Similarly the FAA has exercised its aviation safety authority, including the certification of airmen, aircraft, air carriers, air agencies, and airports under Title VI of the Federal Aviation Act, section 601 *et seq.*, 49 U.S.C. 1402 *et seq.*, by extensive federal regulatory action.** In legal terms the federal government, through this exercise of its constitutional and statutory powers, has preempted the areas of airspace use and management, air traffic control and aviation safety. The legal doctrine of preemption, which flows from the Supremacy Clause of the Constitution, is essentially that state and local authorities do not have legal power to act in an area which already is subject to comprehensive federal regulation.

* See 14 C.F.R. Parts 71, 73, 75, 91, 93, 95 and 97.

** See 14 C.F.R. Parts 21 through 43, 61 through 67, 91, 121 through 149.

Because of the increasing public concern about aircraft noise that accompanied the introduction of turbojet powered aircraft into commercial service in the 1960s and the constraints such concern posed for the continuing development of civil aeronautics and the air transportation system of the United States, the federal government in 1968 sought - and Congress granted -- broad authority to regulate aircraft for the purposes of noise abatement. Section 611 of the Federal Aviation Act, 49 U.S.C. 1431, constitutes the basic authority for federal regulation of aircraft noise. In 1972, displaying some dissatisfaction with the FAA's methodical regulatory practice under section 611, the Congress amended that statute in two important respects. To the original statement of purpose -- "to afford present and future relief from aircraft noise and sonic boom" -- it added consideration of "protection to the public health and welfare." It also added the Environmental Protection Agency (EPA) to the rulemaking process. Section 611 now requires the FAA to publish EPA proposed regulations as a notice of proposed rulemaking. Within a reasonable time of that publication, if the FAA does not adopt an EPA proposal as a final rule after notice and comment, it is obliged to publish an explanation for not doing so in the Federal Register.

Whether considering a rule it proposes on its own initiative or in response to the EPA, the FAA is required by section 611(d) to consider whether a proposed aircraft noise rule is consistent with the highest degree of safety in air commerce and air transportation, economically reasonable, technologically practicable and appropriate for the particular type of aircraft.

The FAA acted promptly in implementing section 611. On November 18, 1969, it promulgated the first aircraft noise regulations, Federal Aviation Regulations, Part 36, 14 C.F.R. 36, which set a limit on noise emissions of large aircraft of new design. It reflected the technological development of the high-bypass ratio type engine, and was initially applied to the Lockheed 1011, the Boeing 747, and the McDonnell-Douglas DC-10. The Part 36 preamble announced a basic policy on source noise reduction and a logically phased strategy of bringing it about. The Part 36 standard would serve as the basic standard for aircraft engine noise and was initially applicable to new types of aircraft. As soon as the technology had been demonstrated, the standard was to be extended to all newly manufactured aircraft of already certificated types. Ultimately, the preamble indicated, when technology was available the standard would be extended to aircraft already manufactured and operating. The last step would require modification or replacement of all aircraft in the fleet which did not meet the Part 36 noise levels. The first two steps have already been accomplished. This third step is being taken now.

Part 36 is commonly misunderstood. Many believe that it established a federal standard of acceptable noise emissions. It did not. Part 36 basically established the quietest uniform standard then possible, taking into account safety, economic reasonableness and technological feasibility. Many think it is a standard that all American aircraft must meet. It is not. Part 36 to date has been applicable only to newly manufactured aircraft and is not applicable to aircraft manufactured before 1973. Nearly eighty percent of the present fleet is not obliged to and does not meet the Part 36 standard. Many think that it is an operating rule -- that is, that planes that do not meet it in daily operations may not fly. It is not. Part 36 applies to aircraft at the time of their manufacture, and does not apply at all to foreign-manufactured aircraft operated by foreign carriers.*

In addition to its regulatory authority over aircraft safety and noise, the FAA has long administered a program of federal grants-in-aid for airport construction and development. Through its decisions on whether to fund particular projects, the FAA has been able, to a degree, to insure that new airports or runways will be selected with noise impacts in mind. That indirect authority was measurably strengthened when in 1970 the Airport and Airway Development Act expanded and revised the FAA's grant-in-aid program for airport development and added environmental considerations to project approval criteria. 1976 Amendments to the 1970 Act have increased funding levels and provided new authority to share in the costs of certain noise abatement activities, but the ability of the FAA to provide financial assistance remains limited in terms of both percentage of project costs and the types of projects eligible for federal aid.

B. Legal Responsibilities of State and Local Governments

While the federal government's exclusive statutory responsibility for noise abatement through regulation of flight operations and aircraft design is broad, the noise abatement responsibilities of state and local governments through exercise of their basic police powers are circumscribed. The scope of their authority has been most clearly described in negative terms, arising from litigation over their rights to act.

The chief restrictions on state and local police powers arise from the exclusive federal control over the management of airspace. Local authorities long have been preempted by the federal assumption of authority in the area from prohibiting or regulating overflight for any purposes. That principle was found in 1973 to include any exercise of police power relating to aircraft operations in City of Burbank v. Lockheed Air Terminal, 411 U.S. 624 (1973). In the Burbank

* Annex 16 to the Chicago Convention provides an international noise certification standard.

case, the Supreme Court struck down a curfew imposed by the City in the exercise of its police power. The Court's reliance on the legislative history of section 611 and the 1972 amendments to it indicate that other types of police power regulation, such as restrictions on the type of aircraft using a particular airport, are equally proscribed. The Court, however, specifically excluded consideration of the rights of an airport operator from its decision.

There remains a critical role for local authorities in protecting their citizens from unwanted aircraft noise, principally through their powers of land use control. Control of land use around airports to insure that only compatible development may occur in noise-impacted areas is a key tool in limiting the number of citizens exposed to noise impacts, and it remains exclusively in the control of state and local governments. Occasionally, it is a power enjoyed by individual airport operators; some operators are municipal governments that can impose appropriate land use controls through zoning and other authority. But even where municipal governments themselves are operators, the noise impacts of their airports often occur in areas outside their jurisdiction. Other police power measures, such as requirements that noise impacts be revealed in real estate transactions, are also available to them. Finally, local governments have legal authority to take noise impacts into account in their own activities, such as their choice of location and design for new schools, hospitals, or other public facilities, as well as sewers, highways and other basic infrastructure services that influence land development.

C. Legal Responsibilities of Airport Proprietors

The responsibilities of state and local governments as airport proprietors are far less restricted. Under the Supreme Court decision in Griggs v. Allegheny County, 369 U.S. 84 (1962), proprietors are liable for aircraft noise damages resulting from operations from their airport. The proprietor, the court reasoned, planned the location of the airport, the direction and length of the runways, and has the ability to acquire more land around the airport. From this control flows the liability, based on the constitutional requirement of just compensation for property taken for a public purpose. The Court concluded: "Respondent in designing the Greater Pittsburgh Airport had to acquire some private property. Our conclusion is that by constitutional standards it did not acquire enough." The role of the proprietor described by the Court remains the same today.

But the proprietor's responsibilities do not end there. A three-judge district court observed in Air Transport Association v. Crotti, 389 F. Supp. 58 (N.D. Cal., 1975):

"It is now firmly established that the airport proprietor is responsible for the consequences which attend his operation of a public airport; his right to control the use of the airport, is a necessary concomitant, whether it be directed by state police power or by his own initiative.... That correlating right of proprietorship control is recognized and exempted from judicially declared federal preemption by footnote 14 [of the Burbank opinion]. Manifestly, such proprietary control necessarily includes the basic right to determine the type of air service a given airport proprietor wants its facilities to provide, as well as the type of aircraft to utilize those facilities...."

The Crotti case upheld in part a California airport noise statute imposing noise abatement duties on airport proprietors and established the principle that a state statute could reach proprietors that are governmental agencies and hence arms of the state. The Burbank preemption rule thus has not extended to proprietors, except with respect to regulations that actually affect the flight of aircraft. The portion of the California statute struck down by the court provided for criminal sanctions against the operator of an aircraft that exceed a single-event noise standard on takeoff or landing, a clear interference with the FAA's control over flight operations in the navigable airspace.

The Crotti principle has recently been upheld in National Aviation v. City of Hayward, No. C-75-2279 RFP (N.D. Cal., July 13, 1976), a case in which an air freight company sought to enjoin a curfew on noisier aircraft imposed at the municipally owned Hayward Air Terminal in California. The court addressed squarely the legal issue of the rights of a proprietor and found that the curfew had not been preempted:

[T]his court cannot, in light of the clear Congressional statement that the amendments to the Federal Aviation Act were not designed to and would not prevent airport proprietors from excluding any aircraft on the basis of noise considerations, make the same findings [as the Burbank Court] with respect to regulations adopted by municipal airport proprietors..." Slip opinion, 14, citing S. Rep. No. 1353, 90th Cong., 2d Sess., 6-7.

The court went on to indicate that the FAA had the authority to preempt such proprietor regulation, although it had not yet exercised it. The court also found that the ordinance, which required some of the plaintiff's aircraft to use another airport between 11 p.m. and 7 a.m., had an effect on interstate commerce, but that the effect was:

"...incidental at best and clearly not excessive when weighed against the legitimate and concededly laudable goal of controlling the noise levels at the Hayward Air Terminal during late evening and morning hours." Slip opinion, 19.

The power thus left to the proprietor - to control what types of aircraft use its airports, to impose curfews or other use restrictions, and, subject to FAA approval, to regulate runway use and flight paths, is not unlimited. Though not preempted, the proprietor is subject to two important Constitutional restrictions. He first may not take any action that imposes an undue burden on interstate or foreign commerce and, second may not unjustly discriminate between different categories of airport users.

These limitations on the proprietor's control over the use of the airport have not been addressed by the Supreme Court, and it remains unclear the extent to which Constitutional limitations would prevent some of the restrictions that have been imposed or proposed by proprietors in recent years.

Our concept of the legal framework underlying this policy statement is that proprietors retain the flexibility to impose such restrictions if they do not violate any Constitutional proscription. We have been urged to undertake - and have considered carefully and rejected - full and complete federal preemption of the field of aviation noise abatement. In our judgment the control and reduction of airport noise must remain a shared responsibility among airport proprietors, users, and governments.

The legal framework with respect to noise may be summarized as follows:

1. The federal government has preempted the areas of airspace use and management, air traffic control, safety and the regulation of aircraft noise at its source. The federal government also has substantial power to influence airport development through its administration of the Airport and Airway Development Program.
2. Other powers and authorities to control airport noise rest with the airport proprietor - including the power to select an airport site, acquire land, assure compatible land use, and control airport design, scheduling and operations - subject only to Constitutional prohibitions against creation of an undue burden on interstate and foreign commerce, unjust discrimination, and interference with exclusive federal regulatory responsibilities over safety and airspace management.
3. State and local governments may protect their citizens through land use controls and other police power measures not affecting aircraft operations. In addition, to the extent they are airport proprietors, they have the powers described in paragraph 2.

III. THE FEDERAL RESPONSE

Consistent with the legal principles set forth above, this section explains in greater detail the program we intend to implement and our reasons for adopting it.* The cornerstone of the federal program is the requirement that airplanes comply with Part 36 noise standards within six to eight years. This policy clarifies the relative responsibilities of all participants in achieving reduced aircraft noise exposure. The way in which the air carriers meet this requirement for particular types of aircraft will have substantial implications not only for noise reduction but also for other national objectives - energy conservation, employment, and export promotion - as well. Moreover, the effectiveness of any resource commitment which may be required to meet this standard is contingent upon complementary action by airport proprietors and local government, actions that will be encouraged with federal financial assistance, other incentives, grant conditions and technical assistance. Complementary federal action includes noise abatement procedures, research and development and stricter noise standards for new technologies. The complete comprehensive strategy to bring about substantially reduced noise impact on residential populations is set forth in the following federal action program.

A. Quieting the Air Carrier Fleet

1. Federal Regulation of Existing Aircraft

Federal action is required to ensure that commercial aircraft meet Part 36 noise levels within the next decade. The normal incentives of the private marketplace do not operate to achieve optimal noise reduction. Noise is an "external cost" of providing certain goods and services. In the case of aircraft noise, the recipient of the noise -- such as the resident under the flight path -- is most often not a party to the market transactions (e.g., the purchase and sale of aircraft and of aircraft passenger tickets) that result in the noise that affects him. The purchasers of aircraft service -- the aviation passengers -- are not necessarily the recipients of the aircraft noise, and therefore the provider of that service (the airline) does not have a normal market incentive to reduce noise. Because the market place does not compensate airport neighbors for noise damages, they may seek redress from the courts. However, law suits are an expensive, time consuming and uneven way of dealing with the problem, and damage payments may drain away scarce resources that could be applied to reducing noise impact.

Because there are important differences among the airplanes that do not meet Part 36, it is useful to consider them separately.

* The projections set forth in this document are based on the best available data. We realize it is subject to continuing refinement and improvement.

A significant problem is posed by the older, four-engine models (707s, 720s, DC-8s) in the current fleet. These aircraft are, for the most part, powered by JT3D turbofan engines and impose the most severe noise insult on airport neighbors because they cause the noisiest single events (10 to 12 EPNdB over Part 36). They are perceived to be at least twice as loud as the new wide-body aircraft. They are particularly significant contributors to the overall noise level at major airports having serious noise problems.

Replacement or acoustic modification (retrofit) of these older four-engine jets must be given high priority. Acoustic modification or retrofit consists of the addition of quiet nacelles using sound absorbing material (SAM) that reduces significantly the noise levels of these four-engine aircraft to at least the Part 36 noise levels. This approach, however, is subject to the availability of retrofit kits and, has been shown to be somewhat fuel inefficient. Because of the environmental benefits of replacement, discussed below, retirement of most of these older aircraft is clearly preferable.

The older two- and three-engine aircraft (727s, 737s, DC-9s, BAC 1-11s, mainly powered by JT8D turbofan engines) are not as noisy on single events. But, because they are medium and short-range models, they take off and land more than four times as often per day as the long-range four-engine models. Since they are also more pervasive in our domestic system, they account for most of the air carrier operations (80 percent) nationwide.*

* Scheduled Air Carrier Jet Operations**
Average Daily, 1975

Airplane Type	Number of Operations	Percent	Percent Meeting Part 36 Noise Standards
707/DC-8	2225	10	0
747	411	2	54
DC-10/L-1011	1340	6	100
727	9208	41	26
737/DC-9/BAC 1-11	9334	41	8
Total	22518	100	21

** An operation is a takeoff or a landing.

Although the technology to retrofit these JT8D aircraft is available, the resulting reductions in noise levels is not as large as the reductions for the JT3Ds. A modified JT8D airplane is significantly quieter than an unmodified JT8D airplane, especially on approach.* We estimate that the cost of retrofitting all of these airplanes will be about \$223 million in 1976 dollars. Since most of these airplanes have a long remaining useful life, we anticipate that they will be modified rather than replaced.

Because of their larger numbers, more frequent operation, and more widespread use, the cumulative effect of reducing the noise of these JT8D aircraft is greater than that for the four-engine aircraft alone. By requiring that both the two- and three- and the four-engine aircraft meet Part 36 noise levels, we will realize significantly greater reduction at the 25 largest air carrier airports at the time compliance is completed. Additionally, many more air carrier airports would benefit from quieting of the two- and three-engine airplanes. Without including the two- and three-engine jets, which constitute 70 percent of that part of the operating fleet that does not meet Part 36 and which account for 80 percent of the air carrier operations nationwide, 75 percent of the air carrier airports in the country would not receive any noise benefit and 85 percent would not receive any significant benefits.

There are also about 50 early 747s that do not meet Part 36 noise levels. Economics clearly make retrofit the logical alternative for these aircraft, which have a long remaining useful life, and a retrofit kit for modification of these aircraft has been included in later production versions of the 747.

* Noise measurements taken during routine airline operations at airports in the New York City area showed that 727-200 aircraft with SAM retrofit treatment operated at 6.5 PNdB (estimated from dBD measurements) lower levels on approach than did 727-200 aircraft without retrofit.

The following table illustrates the comparative reductions expressed in EPNdB of the retrofit of those airplanes that do not meet FAR 36.

Aircraft	Condition	FAR 36 Limit	Non-Retrofit	Full Retrofit
707-320B	Takeoff	103.7	113.0	102.2
	Approach	106.3	116.8	104.0
	Sideline	106.3	102.1	99.0
DC-8-61	Takeoff	103.5	114.0	103.5
	Approach	106.2	115.0	106.0
	Sideline	106.2	103.0	99.0
727-200	Takeoff	99.0	101.2	97.5
	Approach	104.4	108.2	102.6
	Sideline	104.4	100.4	99.9
737-200	Takeoff	95.8	92.0	92.0
	Approach	103.1	109.0	102.0
	Sideline	103.1	103.0	103.0
DC-9	Takeoff	96.0	96.0	95.0
	Approach	103.2	107.0	99.1
	Sideline	103.2	102.0	101.0
747-100	Takeoff	108.0	115.0	107.0
	Approach	108.0	113.6	107.0
	Sideline	108.0	101.9	99.0

The following table provides an estimate of the numbers of airplanes to be modified acoustically or replaced. Also included are what the associated capital costs of retrofit would be if the turbofan-powered 707s and DC-8s are not retired or replaced earlier than they otherwise would have been as a result of the new federal regulation.

Airplane Type	Number to be modified	Average Cost (million \$)	Total Cost (million \$)	1975 Present Value (million \$)
727	454	.225	102	60
737 & DC-9	448	.27	121	71
747	45	.25	11	6
707 & DC-8	270	1.2	324	159
TOTAL	1217		558	296

These costs are in constant 1975 dollars, and do not include any tax benefits or changes in operating costs. The present values were computed using a 10% discount rate before inflation. If changes in operating costs are also included, the 1975 present value costs increase to a total of \$440 million. These operating cost increases are primarily the result of the increased fuel inefficiency of modified 707s and DC-8s and include the cost of an additional 320 million gallons of fuel which would be consumed by these airplanes.

2. Economic Benefits from a Mixed Replacement and Modification Program

Despite the arguments that the variables and projections are uncertain, cost-benefit analysis is a useful tool to compare means of reducing aircraft noise. Our analysis indicates that replacement of all JT3D aircraft and acoustic modification of the JT8D aircraft will yield positive net benefits of \$350 million to the airlines* whereas altering the scenario by retrofitting the JT3D airplanes instead would cost them \$440 million. The primary reasons for these differences are varying fuel consumption and maintenance costs.

A replacement program also produces many benefits that are difficult to calculate, but which would be significant.

- The noise benefit from replacing these jets with new aircraft or new technology will range from a 12 to 16 EPNdB improvement over current 707/720 and DC-8 airplanes.
- Replacement would offer substantial advantages in increased fuel efficiency over the 707/720 and DC-8, 20 percent with currently-available replacement models, and as much as 30 percent for the new-technology airplanes compared to a fuel penalty of approximately one percent for modified 707 and DC-8 airplanes.
- Replacement would provide aircraft that will meet the new, rigorous air pollutant emissions standards effective in 1979.

* See the FAA benefit-cost study published as an attachment to the Final Environmental Impact Statement issued November 17, 1976.

Replacement would strengthen the aerospace industry, stimulating the purchase orders to begin manufacture of aircraft of new design, which the airframe manufacturers cannot undertake now because of the lack of firm orders from their customers.

Replacement would contribute to the development of aviation technologies for export. Aerospace products have been second only to agricultural products as the nation's leading exports. Foreign operators own over 500 JT3D airplanes for which U.S. replacements sized for many of the markets being served are not now available. Most of these airplanes would be replaced if a properly sized replacement were available.

Replacement would provide many more jobs - each billion dollars in aircraft sales generates 60,000 job-years directly or indirectly in aerospace or related industries.

Replacement would offer to the carriers the advantage of more economic aircraft configurations resulting from the application of advanced technologies. These include new aerodynamic concepts, lighter propulsion systems, improved safety from inflight control systems, and new structural materials. With enactment of regulatory reform, many of these economies would be reflected in the fares.

In light of these benefits, we believe that it would be economically preferable for the Nation if most of the four-engine aircraft are replaced with new technology aircraft.

3. Time Frame

Since some combination of replacement and retrofit is advantageous in bringing current airplanes into compliance with the noise standards of Part 36, we have considered what would be a reasonable time frame to require such action.

In establishing a deadline, we have been concerned with the length of time needed to develop, certificate, produce, and install retrofit kits for those airplanes for which the operators decide that retrofit is best. The manufacturers have indicated that it will take six years to complete retrofit of the 747s,

727s, 737, and DC-9s, six to eight years to complete the 707s and DC-8s, including kit production* and installation time.

Retrofit kits are currently certificated and ready for installation for the two- and three-engine aircraft and the 747s, and are being installed on those aircraft that are currently in production. It may take 28 months and 36 months, respectively, to design and certificate kits for the 707s and DC-8s, with fabrication and installation time to follow. Thus, time to fabricate the required number of kits, and to install them during refurbishment periods for fleet aircraft must govern the mandatory compliance periods. Given these considerations, we have concluded that aircraft should be required to meet Part 36 noise levels within certain time periods.

The Federal Aviation Administration will promulgate a rule requiring that subsonic jet airplanes in domestic** service with maximum weight in excess of 75,000 lbs., that do not meet the present Federal Aviation Regulations Part 36 noise levels, must meet those noise levels or be retired from the fleet within six to eight years in accordance with the phased-in schedule set forth on pages 5-6 of this policy statement.

These time periods, which are established on the basis of the time it would take to complete the development, production, and installation of retrofit kits for most of the existing fleet, will start to run on January 1, 1977. These time periods are also adequate to enable the development of new technologies for replacement of older, four-engine aircraft if adequate financing is available. Measures imposed by other jurisdictions that would require more accelerated compliance with Part 36 requirements would conflict with the purpose of this federal regulation.

Airplane	From Production Decision to First Kit Delivery	Production Rate Ship Sets Per Month
707	2-1/3 yrs	22
DC-8	3 yrs	8.5
727	1-1/2 yrs	38
737	1-1/2 yrs	10
DC-9	1-3/4 yrs	15
747	1 yr	5

** Domestic service as used here includes flights to U.S. territories outside continental United States, generally classified as "overseas".

4. International Air Carriers

The United States will seek early agreement through the International Civil Aviation Organization (ICAO) on noise standards and an international schedule for compliance with Annex 16 or Part 36. In the event that agreement is not reached within three years, from January 1, 1977, then regulatory action will be taken to require all airplanes operated by all international operators to meet the noise level standards of Part 36 or Annex 16 during the five-year period thereafter at a phased rate of compliance similar to that established for domestic operations. The ultimate requirements applied to U.S. international flag carriers will not be any more stringent than those applied to foreign air carriers, because it would place the U.S. international flag carriers at a competitive disadvantage if they had to comply with the noise standards sooner than their foreign competition. Where U.S. air carriers serve both domestic and foreign routes, the delayed international requirements will be applied only for that percentage of total operations that are in international service. These requirements may be superseded by agreement reached through ICAO, in which the United States concurs and which does not discriminate against U.S. carriers.

B. Financing Mechanism

President Ford has instructed the Department of Transportation to promulgate rules to require that all aircraft in domestic service meet noise standards within eight years. He indicated at that time that he would again urge the Congress to enact his aviation regulatory reform measure to create an improved economic climate for the airline industry that would enable it to comply with these standards. He further directed the Secretary to begin public hearings promptly to assess whether additional financing assistance, if any, may be necessary to guarantee compliance with these standards within eight years.

At the public hearing, scheduled for December 1, 1976, we must first consider whether any financing arrangements at all are necessary. If there is persuasive evidence and documentation that such assistance is necessary, alternative financing proposals must be weighed against certain goals.

First, we would prefer that the costs of noise abatement be borne by users of air transportation, passengers and shippers. Any shift of that burden to the general public must be avoided. Second, enough financing must be available to enable the carriers to replace a significant portion of their noisy four-engine jets with a new generation

airplane but not so much financing as to encourage the purchase of excess capacity. Third, federal involvement in any financing mechanism should be limited and not disturb unduly the mechanism of the private capital markets, nor unreasonably constrain the flexibility of air carrier management in determining how to comply with the noise regulation. Fourth, the cost of transportation to the passenger and shipper should not be increased. Fifth, assuming the enactment of aviation regulatory reform, we should consider both the need for additional financing in the improved aviation economic environment that will emerge and the consistency of any proposal with a less regulated aviation system. Finally, we should consider and assess the additional benefits to the public that would accrue from a replacement program, and the accelerated production of new technology airplanes, and determine whether these benefits outweigh the cost of such a program.

To address these issues and hear recommendations from concerned parties, a public hearing will be conducted on aviation noise financing on December 1, 1976.

C. Additional Federal Action

1. Source Regulation for Future Aircraft

The development of jet engine noise source technology since the high-bypass ratio engine was first produced will allow further reduction of noise emissions from aircraft designed in the future. Therefore, FAA proposed to reduce the Part 36 noise levels for future design aircraft in NPRM 75-37 issued October 29, 1975. While recognizing that the full benefit of such a rule will not be felt until the next generation of aircraft enter regular service in substantial numbers, the FAA will soon complete its consideration of new, lower noise standards for future design aircraft. These standards will require that recent advances in noise suppression technology be employed if they are practicable, economically reasonable, and appropriate for the particular type of aircraft. These regulations would be applicable to all newly designed subsonic aircraft type certificated after the effective date of the regulation. The FAA plans to issue these regulations by March 1, 1977.

On September 30, 1976, the EPA submitted a proposed regulation to FAA on the subject of source regulation for future design aircraft. That proposal has been published by FAA as a notice of proposed rulemaking (41 F.R. 47358) and a public hearing will be held on December 14, 1976. The only difference between the FAA regulatory proposal and that of EPA is in the establishment of noise levels for aircraft designed for the 1980-1985 time period and beyond 1985 as well. While these EPA proposals are

being considered, the FAA believes it is important and prudent to establish lower noise levels for future designed aircraft and continue to analyze the technological developments to determine if even further reduced noise levels can be established.

In addition, the FAA is working through the International Civil Aviation Organization to obtain international agreement on noise standards which would make internationally established standards virtually identical to United States noise standards. This proposal was presented for public comment in the Federal Register on October 28, 1976, as NPRM 75-37C. Both of these important proposals and the comments received on them will be thoroughly considered and carefully analyzed before final action is taken.

The FAA has already established noise standards on the subject of noise produced by propeller driven airplanes. In developing those standards, the FAA received a number of suggestions from the EPA which were adopted and incorporated into the final rule. These included the use of six rather than four noise certification test overflights and the use of longer standard takeoff distances in calculating performance corrections. These suggested improvements were submitted to FAA in the course of FAA's rulemaking action on this subject and were subsequently included as part of a formal EPA noise regulatory proposal submitted to FAA. The proposed disposition of the EPA regulatory proposal has been forwarded by FAA to the EPA for consultation pursuant to the provisions of the Noise Control Act. The time for this consultation has been extended by FAA at the request of the EPA and therefore the FAA is deferring its final action on this proposal at this time at the request of the EPA.

Using information being acquired on a continuing basis from the Concorde demonstration, the FAA will act consistent with the statutory requirements to promulgate a noise rule applicable to supersonic aircraft not later than thirty days after the conclusion of the 16-month demonstration periods.

2. Aircraft Operating Procedures

Operational procedures for the control of aircraft departures and arrivals at airports can effectively complement the reduction of aircraft source noise emissions. For example, operational controls that apply reduced thrust settings near the ground augment the noise reduction achieved through retrofitting because with the sound absorbing material or "quiet nacelle" modification of the JT3D and JT8D aircraft the noise reduction achieved becomes more effective at lower thrust levels. It must be clearly understood that, although much can be gained by operational procedures, they are not alternatives to reducing noise at the source by replacing or retrofitting the noisier airplanes.

Many air traffic and airspace management operational procedures are now used at particular airports to meet their particular needs. For some airports, normal approach paths cover substantial residential populations (Los Angeles); others are particularly sensitive to takeoffs (Miami). Where possible, approach paths are designed to avoid residential neighborhoods. At some airports, steep climbs are used on takeoff over water areas so that aircraft will be higher than they would be otherwise when they reach inhabited areas. Where aircraft must climb over residential areas, they often do so with reduced power in order to minimize excessive noise from greater engine thrust.

In addition to these measures, which are used at many airports, two standardized operational procedures have been under consideration by the FAA. One EPA approach proposal involved the development and implementation of the use of a two-segment landing approach path for aircraft. Briefly, that procedure entails the use of a steeper glide slope (e.g., 5 to 6°) during the early stages of approach, followed by stabilization of the aircraft on the normal 3° glide slope for final approach and touchdown. During the steeper portion of the approach, the aircraft is higher from the ground and requires less engine power, thus achieving noise reductions at more distance points from the airport on the approach pattern. However, this would not provide significant noise relief to persons living close to an airport and could exacerbate their problem since there would probably be an increase in power required as the aircraft changes configuration from the steeper glide slope to the reduced glide slope. Additionally, this procedure has an inherent safety problem related to the impact of aircraft wake vortices on aircraft flying a standard 3° approach behind an aircraft utilizing a two-segment approach. Finally, this two-segment approach procedure could be applied at a limited number of airports because of limited equipment availability.

The second standardized approach procedure involves the use of minimum certificated flaps. This procedure was developed by FAA to abate airplane noise and then proposed by EPA as a regulatory action. Through the use of minimum certificated flaps during approach, aerodynamic drag is reduced, whereby less engine thrust is required. This has multiple advantages because reduced thrust results not only in a fuel saving but also a reduction in the source noise of the airplane over the entire approach phase, thereby providing a noise reduction along the entire approach path. Moreover, it is a procedure which can provide noise benefits at all rather than a limited number of airports. Because it is a stabilized approach procedure, it reduces cockpit workload in that no transition is required

from a 6° to a 3° glide slope and the inherent potential wake vortex problem a serious safety problem for following aircraft of is eliminated. Final regulations and procedures on a noise abatement approach procedure will be issued by FAA by January 1, 1977.

Several opinions exist regarding the best noise abatement departure procedure following takeoff. The FAA requires that turbine-powered and large aircraft climb as rapidly as possible to 1500 feet above the ground. This procedure provides some noise relief by getting the noise source - the airplane - away from populated areas as rapidly as possible. FAA is in the process of evaluating different departure procedures which could be implemented after the 1500 foot altitude is reached. The issue is complicated by the fact that airports are unique in terms of their surrounding geography and adjacent land use. This means that there may be no single optimum noise abatement departure procedure.

The FAA currently recommends, in Advisory Circular 91-39, (January 18, 1974) a procedure that incorporates a reduction in engine power from takeoff thrust to normal climb power at an altitude of 1500 feet above ground level after takeoff with subsequent acceleration and climb after passing through 3000 feet by changing the deck angle and retracting the flaps. This procedure is generally used by scheduled air carriers. Northwest Airlines regularly uses a somewhat different departure procedure, in which the airplane is accelerated at takeoff power with an accompanying reduction in the deck angle and flap retraction followed by a larger power reduction than with the Advisory Circular procedure. Both procedures have merit in that both provide noise relief by reducing source noise through a reduction in engine power. The degree of perceived noise, however, depends on the location of noise sensitive areas beneath the departure path and the altitude and engine power of the airplane over those areas. The FAA expects to complete regulatory action on this subject by January 1, 1978.

Another operational rule under consideration involves possible restrictions on minimum altitudes in terminal areas by keeping airplanes high. Such restrictions would reduce the noise impact on the ground by maximizing the distance between the airplane and persons on the ground. This has been the FAA "Keep-'Em High" Program. A proposal on this subject to convert it from an air traffic management program to a regulatory requirement was submitted to the FAA by the EPA and was published in the Federal Register on January 6, 1975, as NPRM 75-40.

The design of each terminal area air traffic pattern is carefully constructed to meet the particular characteristics of the airport or airports encompassed within that terminal area. The runway configuration of the airport, character of the surrounding terrain,

proximity of other airports, the requirements to avoid when possible low altitude flight over communities when arriving or departing the airport, are among the many considerations that must be made in designing terminal area procedures. It is not feasible to develop a single rule that would be applicable to all terminal areas for all airports. Regulations, which are relatively difficult to change, could have a severe and far-reaching impact on the air traffic system in the flexibility required to adjust air traffic procedures to compensate for weather changes, traffic congestion and safety considerations. Regulatory action in this area would be unduly restrictive without achieving significant improvements in aircraft noise abatement since the proposed rules were not significantly different from the existing air traffic management program and would have adverse energy and economic impacts through increased flight time and increased fuel consumption.

The FAA concurs with the objective of the EPA proposed regulations, specifically to reduce the noise exposure on the ground. Through recent FAA studies of ways to improve the efficiency of the air traffic control system to conserve fuel, a new procedure has been developed which improves safety through reduced low altitude flying time, standardizes high performance aircraft arrival procedures, equalizes the arrival delays through regulating the traffic flow, and provides for departures to climb to cruise altitude unrestricted. These new procedures will soon be made final in an FAA Order on Local-Flow Traffic Management. The Order will apply to all airports where high performance aircraft operate. The existing "Keep-'Em-High" Order will be phased out as the provisions of the new Order are implemented. A substantial noise benefit can be realized through the implementation of the Local-Flow Traffic Management Order over those benefits achievable under the FAA "Keep-'Em-High" program or the EPA proposed minimum altitude regulatory proposal.

All of these operational procedures designed to provide noise relief have been the subject of a number of discussions with the EPA and have been the subject of formal consultation between the FAA, the EPA and the Secretary of Transportation. That consultation process has been completed and the FAA has taken final action to implement these operational procedures.

3. Federal Research and Development Technology

As is the case with most fields of technology, continuing research and development on aircraft noise is necessary to insure that advances in the state-of-the-art are available for each successive

generation of aircraft. Historically, there has been a ten-year lag in the aircraft industry between demonstration of new technology in the laboratory and the appearance of that technology in commercial airplanes. For example, the present generation of quieter wide-body airplanes, such as the 747, DC-10 and L-1011, which began to enter commercial service in 1970, applied quieter technology of the high-bypass ratio engine developed about 1960. Similarly, more advanced engine quieting technology, which is being developed today, cannot realistically be expected to enter commercial service for at least five to six years.

Aircraft noise is generated primarily by two major sources in the engines: the external turbulent jet exhaust and the internal compressors and combustion process. High-bypass ratio engines, such as the Pratt and Whitney JT9D, the General Electric CF-6 and the Rolls Royce RB-211 now used on the 747, L-1011 and DC-10 aircraft, reduce the primary jet exhaust velocity and thus reduce its noise. At the same time, improved sound absorbing materials in the nacelle surrounding the engine absorb much of the internal noise produced by the compressors and the combustion process. Current technology in new engines, such as the Pratt and Whitney JT10D, and the General Electric CFM56, show potential for further reductions in engine noise levels through improved designs of the internal compressors which, if combined with more efficient wing design, and more effective control surfaces (flaps, spoilers, etc.) will require less engine thrust for safe flight, thereby providing further noise reductions.

It is expected that the technology for use in the next generation of commercial airplanes should provide further significant reductions below current noise standards. These will be evaluated carefully in considering both the applicability and scheduling of lower level requirements, such as proposed in NPRM 76-22.

A recent NASA analysis* has shown quite clearly that substantial long-term (through the year 2000) reductions in noise, fuel consumption, and aircraft emissions are achievable through the development and introduction of more advanced technology than that currently available. Realization of potential advantages through the extensive use of composite materials to reduce airframe weight, stability augmentation to reduce drag, and improved performance of advanced-technology engines such as the prop-fan will depend on the research and development necessary to demonstrate these factors. Such features can become available for service in the late 1980s, assuring continuing progress in aircraft quieting along with fuel economy, cleaner operation, and greater productivity.

* "Cost/Benefit Tradeoffs for Reducing the Energy Consumption of Commercial Air Transportation," NASA CR-137877, June 1976.

The federal government will continue to sponsor and support aviation research and development, in cooperation with the aviation industry. As engine noise levels are reduced, the aerodynamic noise from airflow over and around the airframe itself and its necessary appendages, especially at low altitudes, when flaps and landing gear are extended, may become the major approach noise source. Research on this noise source to determine how it may best be reduced is now underway and will continue.

D. Protecting the Airport Environment

There are over 13,000 public airports operated in the United States today and they vary considerably in size, proximity to populated areas and function as well as in the type and volume of operations. For example, only about 500 airports are fully certificated* by the FAA, while another 500 have limited certificates. Only 437 airports have an FAA air traffic control tower. American airports are also the busiest in the world; 84 airports have a total of over 200,000 annual operations,** while 160 airports have 150,000 or more annual operations. Busy airports are not only found in the larger metropolitan areas; while 244 airports have 100,000 or more annual operations, of these only 151 are located in large or medium hubs.*** Most of these operations are general aviation; only the top ranked 24 airports each have 100,000 or more annual air carrier operations.

The variety of airports in the United States demonstrates that an airport noise reduction strategy cannot be completely generalized. The problem must be approached on an airport-by-airport basis, and all levels of government and the private sector should act with the recognition that solutions to the noise problem must be designed to meet the needs of a particular airport environment.

* Under section 612 of the Federal Aviation Act, 49 U.S.C. 1432, the FAA issues operating certificates to airports served by Civil Aeronautics Board certificated air carriers that the FAA finds "properly and adequately equipped and able to conduct a safe operation."

** An operation is a takeoff or a landing; a flight thus consists of two operations, one takeoff and one landing.

*** A "hub" is defined by the FAA as a city in a standard metropolitan statistical area, as defined by the Bureau of the Census, requiring air service.

1. The Airport Proprietor's Responsibility

Substantial benefits will be achieved through federal actions to abate source noise and control operational flight procedure and airspace, but much of the noise problem is airport-specific and must be addressed by individual proprietors. Noise impact at any airport is in part due to local decisions on airport location, continuation of airport operations on a particular site, the layout and size of and airport and the purchase of buffer areas for noise abatement purposes. It is local decision-making that permits residential development near an airport. For these reasons, the Supreme Court concluded that proprietors are liable for aircraft noise damages. In addition, airport proprietors, particularly those that are public agencies, generally encourage more service to their airports in Civil Aeronautics Board route proceedings.

The need for local action is apparent. Without effective land use planning, the implementation of land use plans and zoning, the benefits achievable from federal source noise reduction requirements could be greatly reduced. Where land use controls have not been imposed, the need for substantial airport land acquisition has increased, and as aircraft operations increase, the need for land acquisition as well as its cost will rise unless source noise levels are reduced.

The airport proprietor is closest to the noise problem, with the best understanding of both local conditions, needs and desires, and the requirements of the air carriers and others that use his airport. The proprietor must weigh the costs the airport and the community must pay for failure to act, and consider those costs against any economic penalties that may result from a decision to limit the use of the airport through curfews or other restrictions for noise abatement purposes.

FAA officials have and will continue to work with and assist airport operators and representatives of communities affected by airport noise to encourage the development of compatible land use controls. What constitutes appropriate land use control action depends on the proprietor's jurisdiction to control or influence land use. This, of course, varies with airport location. Almost all airport proprietors, however, are public agencies with a voice in the affairs and decisions of their respective communities. In some instances they have land use control jurisdiction and are required to document how they will exercise it before receiving federal airport development funds. In other instances, where they lack such direct control,

before receiving federal airport development funds they are required to demonstrate that they have used their best efforts to assure proper zoning or the implementation of other appropriate land use controls near the airport and will continue to do so. Although the airport proprietor may not have zoning authority, he is often the local party in the best position to assess the need for it and to press the responsible officials into action.

2. State and Local Government Responsibility

State and local governments are directly and uniquely responsible for ensuring that land use planning, zoning, and land development activities in areas surrounding airports is compatible with present and projected aircraft noise exposure in the area. They should work closely with airport proprietors in planning actions to be taken in confining serious aircraft noise exposure to within the airport boundary and reducing the number of people seriously affected by airport noise.

State and local governments should support airport land use acquisition programs developed by airport proprietors. As federal noise source regulations shrink the contours of cumulative noise exposure, local governments concurrently should develop complementary land use plans preventing residential development and other incompatible land use in areas adjacent to the airport. Now that the federal government has defined a program extending the application of Part 36 standards, the local authorities will be able to plan effectively on the basis of a reasonable set of assumptions about the shrinkage in noise contours that will occur as a result of the federal action.

State and local governmental agencies can improve the insulation of housing, schools, community facilities, institutions providing health services and public buildings in areas exposed to serious airport noise. To date, such action would have been prohibitively costly. To achieve a 3 to 7 dBA reduction in the level of noise heard inside buildings by insulation would currently cost \$1.9 billion nationwide, while a reduction of 8 to 12 dBA would cost \$3.8 billion, and a reduction of 13 to 16 dBA would cost \$7.2 billion. Given a federal program to require compliance with Part 36, a housing insulation program becomes more manageable and far less expensive. State and local governments should therefore develop appropriate programs to insulate public buildings and to finance insulation by private residents. In this regard, the Department is under a mandate in the Airport

and Airway Development Act of 1976 to study the feasibility, practicality, and cost of insulating schools, hospitals, and public health facilities near airports and report legislative recommendations by July 1977. Local regulations should require proper insulation in the construction of new buildings and insulation of public and residential buildings. State and local governments should help finance the sound insulation of schools, hospitals, libraries, and other noise-sensitive public buildings.

Where appropriate, state and local governments should consider the development of new airport sites so that dense population areas will not be exposed to excessive noise and develop the necessary ground transportation to make them accessible. They should also require that notice of airport noise exposure be given to the purchasers of real estate and to prospective residents in areas near airports so that they will be aware of the problem. Finally, they should support improvements at existing airports which would help reduce the noise impact on surrounding communities.

3. Federal Support for Airport Proprietor and Local Government Noise Abatement Activities

The FAA has long encouraged planning to assure not only that airports will be adequate to provide the service required in the future but that prospective noise impacts are evaluated and minimized. In the past this FAA policy has been implemented through three principal methods involving the Airport Development Aid Program (ADAP).

First, under section 16 of the Airport and Airway Development Act, the Secretary may approve a project only if he is satisfied that it is "reasonably consistent" with the plans of planning agencies for the development of the area in which the airport is located. A project may not be approved unless "fair consideration has been given to the interest of communities in or near where the project may be located." The Act further declares as national policy that the projects involving airport location, runway location or a major runway extension shall "provide for the protection and enhancement of the natural resources and the quality of environment of the Nation," and provides that when an airport or runway location or major runway extension will have adverse environmental effect, it may not be approved unless "no feasible and prudent alternative exists and that all possible steps have been taken to minimize such adverse effect." In addition, section 18(4) of that Act provides that among the conditions precedent to project approval are:

appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft.

While the FAA does not and, in our judgment, should not have the power to control land use around airports throughout the United States, the grant of federal funds for airport development has been and will continue to be conditioned on the application of the foregoing principles.

Second, the FAA has awarded ADAP funds for the development of airport Master Plans. These plans contain an environmental analysis and planning elements to assure that the airport's noise impact is kept to a minimum.

Third, the recent Airport and Airway Development Act Amendments of 1976 (P.L. 94-353) authorize for the first time the use of federal airport development funds on projects designed to achieve noise relief. Specifically, section 11 of the Act now authorizes federal financing of land acquisition to insure compatibility with airport noise levels and the acquisition of noise suppression equipment. We will also seek an amendment of that Act which would authorize the use of ADAP funds for the purchase of noise monitoring equipment.

For the most part, these provisions have led the FAA to concentrate on noise abatement efforts in the context of capital investment. Less attention and financial commitment has been devoted by the federal government to the development by airport proprietors of broader and more comprehensive noise abatement plans. The increase in public concern about the airport noise problem now requires that affirmative federal action be taken beyond the evaluation of airport construction projects. Therefore, FAA is initiating a pilot project to encourage the preparation of comprehensive noise abatement plans by airport proprietors through the planning grant program of the Airport and Airway Development Act.

In formulating this policy to provide a financial incentive for airport noise abatement planning, FAA gave consideration to other alternatives including (1) requiring preparation of such plans by all airports certificated under section 612 of the Federal Aviation Act; (2) requiring the preparation of such plans by the busiest airports in the United States (for example, the top 100

airports by the number of operations); (3) requiring preparation of such plans as a prerequisite to imposition of an airport use restriction by FAA-certificated airports; (4) requiring preparation of such plans as a condition of awarding ADAP funds; and (5) encouraging preparation of such plans and review by FAA without providing federal financial support for this purpose. Although we are still open to further suggestions and comments, these proposals to make airport noise planning mandatory, or a condition of ADAP funding, or a prerequisite to the imposition of use restrictions by an airport proprietor were not adopted at this time because we have not had sufficient experience with this type of noise abatement planning by many airports that either may not have serious noise problems or may have already performed a comparable analysis*. Moreover, we strongly believe that airport proprietors have the incentives, the capacity, and the responsibility to undertake comprehensive noise abatement planning when it is needed, without detailed and duplicative federal oversight. We strongly urge them to do so. We will support them in this effort and provide technical and financial assistance where possible.

The FAA pilot comprehensive noise abatement planning program will have the following elements. Each year, to the extent that funds are available, FAA will award grants for not more than 25 plans on the basis of criteria including the quality of the proposal, the gravity of the noise problem afflicting the applicant airport and the likelihood that the development of such a plan will lead to the implementation of practicable noise abatement techniques of general value and applicability.

The objective of this policy is to promote a planning process through which the airport proprietor can examine and analyze the noise impact created by the operation of his airport as well as the costs and benefits associated with various selected alternative noise reduction techniques, individually and/or in combination. FAA personnel will support and cooperate with this effort through consideration of actions which they can take to reduce noise impacts.

Although FAA has not prescribed particular performance requirements for noise abatement plans funded under this program, the goal of the airport noise planning process should be to eliminate insofar as possible severe aircraft noise exposure and to reduce as much as possible significant aircraft noise exposure in communities adjacent to airports. The objective of airport noise

* In reaching this conclusion, the FAA considered public comments received in response to the July 9, 1975, notice (40 F.R. 28844) and testimony at public hearings held in 25 cities throughout the nation on Airport Noise Policy.

plans prepared under this policy should be to develop noise reduction techniques which, to the maximum extent feasible, confine severe aircraft noise exposure levels, levels of 40 NEF or more, to areas included within the airport's boundary. For areas adjacent to an airport exposed to significant aircraft noise levels of 30 NEF or more, the objective of the airport noise plan should be to develop noise reduction techniques that to the extent possible would confine the area exposed to this level of noise to the airport boundary or land actually being used or which can reasonably be expected to be used in a way compatible with these noise levels.

The Environmental Protection Agency was provided draft copies of this Policy Statement, and a number of informal discussions were held on the FAA's proposed airport policy as it was being developed. The EPA has advised FAA that it considers the FAA's policy a step forward in this area, although it believes further steps are necessary. On October 26, 1976, EPA proposed a regulation under section 611 of the Federal Aviation Act that would require all airports in the United States serving certificated air carriers to develop airport noise abatement plans by July 1979. These plans, developed according to a common methodology and with extensive public participation, would be submitted to the FAA. Unless disapproved by the FAA, each plan would become a part of the airport's operating certificate issued under section 612 of the Act. The EPA proposal, like ours, has as its objective the bringing together of all interested parties with their respective authorities and obligations, thereby facilitating the creation of an agreed-upon abatement plan especially suited to the individual airport location. The EPA proposal has been sent to the Federal Register for publication, and will be the subject of public hearings on January 17 and 18, 1977. On the basis of these hearings and other analysis, the FAA will determine what revisions of the airport policy enunciated in this document are necessary, if any.

In developing an airport noise control plan, the airport proprietor may wish to consider the following categories of action:

- a. Actions that the airport proprietor can implement directly:
 - (1) location of engine run-up areas;
 - (2) time when engine run-up for maintenance can be done;
 - (3) establishment of landing fees based on aircraft noise emission characteristics or time of day.

airports by the number of operations); (3) requiring preparation of such plans as a prerequisite to imposition of an airport use restriction by FAA-certificated airports; (4) requiring preparation of such plans as a condition of awarding ADAP funds; and (5) encouraging preparation of such plans and review by FAA without providing federal financial support for this purpose. Although we are still open to further suggestions and comments, these proposals to make airport noise planning mandatory, or a condition of ADAP funding, or a prerequisite to the imposition of use restrictions by an airport proprietor were not adopted at this time because we have not had sufficient experience with this type of noise abatement planning by many airports that either may not have serious noise problems or may have already performed a comparable analysis*. Moreover, we strongly believe that airport proprietors have the incentives, the capacity, and the responsibility to undertake comprehensive noise abatement planning when it is needed, without detailed and duplicative federal oversight. We strongly urge them to do so. We will support them in this effort and provide technical and financial assistance where possible.

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 - (2) time when engine run-up for maintenance can be done;
 - (3) establishment of landing fees based on aircraft noise emission characteristics or time of day.

- b. Actions that the airport proprietor can implement directly if he has authority, or propose to other appropriate local authorities:
- (1) plan and control of land use adjacent to the airport by zoning or other appropriate land use controls, such as utility expenditures and the issuance of building permits;
 - (2) enact building codes which require housing and public buildings in the vicinity of airports to be appropriately insulated; and
 - (3) require appropriate notice of airport noise to the purchasers of real estate and prospective residents in areas near airports.
- c. Actions that the airport proprietor can implement directly in conjunction with other appropriate local authorities and with financial assistance from the FAA, where appropriate:
- (1) acquire land to insure its use for purposes compatible with airport operations;
 - (2) acquire interests in land, such as easements or air rights, to insure its use for purposes compatible with airport operations;
 - (3) acquire noise suppressing equipment, construction of physical barriers, and landscape for the purpose of reducing the impact of aircraft noise; and
 - (4) undertake airport development, such as new runways or extended runways, that would shift noise away from populated areas or reduce the noise impact over presently impacted areas.
- d. Actions that the airport proprietor can propose to FAA for implementation at a specific airport as operational noise control procedures:
- (1) a preferential runway use system;
 - (2) preferential approach and departure flight tracks;
 - (3) a priority runway use system;
 - (4) a rotational runway use system;

- (5) flight operational procedures such as thrust reduction or maximum climb on takeoff;
 - (6) higher glide slope angles and glide slope intercept altitudes on approach; and
 - (7) displaced runway threshold.
- e. Actions an airport proprietor can establish, after providing an opportunity to airport users, the general public and to FAA to review and advise:
- (1) restrictions on the use of or operations at the airport in a particular time period or by aircraft type, such as:
 - (a) limiting the number of operations per day or year;
 - (b) prohibiting operations at certain hours - curfews;
 - (c) prohibiting operation by a particular type or class of aircraft; and
 - (2) any combination of the above.
- f. Actions an airport proprietor can propose to an airline:
- (1) Shifting operations to neighboring airports.
 - (2) Rescheduling of operations by aircraft type or time of day.

The existence, operation and development of an airport provides a service to and is interrelated with both the local community and airport users. These are also the parties who would be most directly affected by the airport operator's noise control plan. We therefore consider it vital that these parties have the opportunity to take part in the planning process. As a condition of FAA noise abatement planning grants, the airport proprietor will be required to provide for reasonable public notice of the plan and provide an opportunity for public participation in the development of the proposed plan. Public notice should describe the plan, the actions proposed, the reasons why these actions are proposed, alternative courses of action considered and why these alternatives were rejected. The FAA also encourages other means of involving the public, both formal and informal, to ensure meaningful public participation in the process.

The FAA will maintain communications with all airports involved in noise abatement planning -- whether or not FAA-funded -- and provide technical advice on the current state-of-the-art in airport noise reduction planning methods that have been successfully used throughout the country. This will include technical information regarding noise reduction and land use planning and guidance on procedures that airports may choose to consider in developing their plans. The FAA and other federal agencies, such as the Department of Housing and Urban Development and the Environmental Protection Agency, may suggest technical methodologies and criteria for land use compatibility that airports and affected local units of government may choose to utilize in their noise reduction planning. Federally funded model noise abatement plans will be monitored and evaluated. Information about successful noise abatement techniques will be disseminated by the FAA to all interested airport proprietors. The FAA will evaluate the model noise abatement planning program as well as the EPA proposal of October 26, 1976, to the FAA and the public comments on it at the conclusion of twenty-four months in order to determine whether broader noise abatement planning requirements should be encouraged or required.

4. FAA Review of Proprietary Use Restrictions

While the airport proprietor is best situated to judge the local noise problem and to determine how to respond to it, he is not always in the best position to judge the impact of his noise reduction proposal on the national and international air transportation systems. Because of the intricacy of those systems, use restrictions at a single airport could, under certain circumstances, cause wide-spread disruption throughout those systems. Pursuant to the general federal interest in the free flow of interstate and foreign commerce, the constitutional principle that states and local entities may not impose undue burdens even where Congress or federal agencies have not acted, and the specific FAA responsibility for regulating the air navigation system, the federal government has the obligation to assure that airport proprietor actions to meet local needs do not conflict with national and international purposes. The proprietor's obligations to refrain from imposing an undue burden on interstate or foreign commerce or discriminating unjustly, and to avoid potential conflicts with the FAA's control of airspace and air traffic, are not difficult to articulate as matters of principle but very difficult to apply to a given factual situation.

As noted above in the discussion of FAA's program to fund airport noise abatement plans, airport proprietors may propose so-called "use restrictions" or "operating procedures" as the

solution to an aircraft noise problem. Operating procedures, by their very nature, require implementation by the FAA. Indeed, the FAA, on its own initiative, has investigated and applied a number of operating procedures aimed at noise abatement, and has several others under consideration. In the future, where an airport proprietor proposes operating procedures to the FAA as a means of achieving noise relief, the FAA will review them to determine if they may be implemented without creating a safety hazard or significantly affecting the efficient use and management of the navigable airspace. If they are acceptable, the FAA will adopt and take appropriate steps to implement them.

The decision to propose a use restriction rests initially with the airport proprietor. It is expected that airport proprietors will consult and review such proposals with all the air carriers, other airport users and the FAA before any use restrictions are established. Here it is the role of the FAA to review those use restriction proposals and provide advice to the airport proprietor on his proposed actions. By this advice, the FAA will attempt to ensure that uncoordinated and unilateral restrictions at various individual airports do not work separately or in combination to create an undue burden on interstate or foreign commerce, unjustly discriminate or conflict with FAA's statutory regulatory authority.

For these reasons, all airport proprietors serving scheduled air carriers should apprise the Federal Aviation Administrator of their proposal to impose an airport use restriction. Such notification should be made a reasonable time in advance of the date the restriction is to go into effect. In all cases, notification of a proprietary use restriction should occur after and be accompanied by a detailed description of the alternative noise reduction techniques the proprietor has considered and the reasons supporting the adoption of the restriction in question instead of any other alternatives. The FAA will review all such use limitations submitted, advise the airport proprietor if it believes the limitation in question is or is not unjustly discriminatory or detrimental to the national air transportation system.

This review procedure is vital to the maintenance of harmonious relations between airport operators, air carriers and the FAA. By giving the FAA timely notification of use restrictions, supported by a thorough analysis of the alternative courses that have been considered, airport proprietors can assure FAA support, which may be necessary to administer the restriction in question successfully and which will prove valuable in any litigation which may ensue. If litigation over use restrictions does occur, the FAA will in appropriate cases ask the Justice Department to intervene or file amicus curiae in support of use

restrictions it considers valid. On the other hand, an airport proprietor that imposes a use restriction without analyzing alternatives and consulting with FAA cannot expect FAA to provide expert advice or to support its policies. The FAA will not endorse any proposed use restriction that has not had prior review, including public and airport user review as well as FAA review, nor will it recognize as valid any such restrictions that as a result of FAA review are considered to be unjustly discriminatory or a significant disruption of the air transportation system of the United States. In the latter case, the United States may institute or support litigation challenging an unacceptable use restriction.

E. Private Sector Responsibility

Air Carriers are responsible for assuring that the required portion of their operating fleets meet Part 36 noise levels within the time period required by federal regulations. Within that period it is also the carriers' responsibility to assure that an efficient and effective noise reduction plan is established that covers the retirement or retrofit of aircraft not meeting Part 36 as well as the operation of those aircraft in a manner designed to minimize their impact on noise sensitive communities. To this end, air carriers should attempt to schedule the operations of noncomplying airplanes into airports that do not have noise problems.

Air carriers can enter into agreements with airport operators to minimize the impact of aircraft noise through limitations on aircraft use. These agreements, in certain cases, will be subject to FAA review and advice. The carriers should also fly their airplanes on schedules utilizing appropriate noise abatement operating procedures designed to minimize noise impacts.

Air travelers generally should bear the cost of noise reduction, consistent with sound economic principle and federal policy of internalizing the adverse environmental consequences in the price of a service or product.

Residents and prospective residents in areas surrounding airports should seek to understand the noise problem and what steps can reasonably be taken to minimize its effect on people. Recognizing that individual and community responses to aircraft noise differ substantially and that for some individuals, the reduced level of noise resulting from the implementation of this policy may not eliminate the annoyance or irritation. Prospective residents considering moving into airport and noise impacted areas should be aware of the effect of noise on their quality of life.

CONCLUSION

Aircraft noise abatement is a complex and controversial issue. In the wealth of information about the subject and midst the labyrinth of jurisdictional responsibilities, there are a few simple thoughts that should not be forgotten. In a society in which we are making rapid strides to improve the quality of life for all of our people, the continuing annoyance and irritation of excessive aircraft noise is an unwarranted intrusion upon the lives of some six million Americans. The federal government remains committed to taking all technologically feasible and economically reasonable actions to reduce excessive aircraft noise at its source and, working with airport proprietors, to reduce its impact on people.

It is clear, however, that the only successful attack that can be launched on this problem is one that involves the cooperative participation of all levels of government--state, federal and local--as well as airport operators, air carriers, aeronautical manufacturers, and airport neighbors. Only if each of these parties performs all the functions for which it is uniquely suited will we achieve significant and lasting progress in reducing both the number of people exposed to serious levels of aircraft noise and the severity of noise exposure for each and every American.

Although federal action to reduce the noise levels of operating aircraft has been long in coming, we hope that the time has enabled us to develop a policy which will work and will result in less noise exposure over the longer term as well as provide immediate relief. By the actions set forth in this policy, including those directed by the President, we are exercising those federal responsibilities that the Congress has required of us. We have set forth a federal action plan for the future so that other essential parties in the noise reduction effort can take complementary action and make their plans with a clear understanding of what the federal government has done and intends to do. Finally, we have set forth what we believe to be the responsibilities of other parties--airport operators, industry and local government--since the effectiveness of the federal action we take today is contingent on what these other parties do.

We thus invite these other parties to consult with us about their plans and proposals, to suggest innovative ways of meeting the noise problem in their communities, and to tell us how we can do our job more effectively. In turn, we will not hesitate to advise local governments and airport proprietors that they must exercise control over land use development and acquire additional land around airports to ensure that the national objective of confining severe aircraft noise to within the airport boundary is achieved. Nor will we hesitate to inform the air carriers and aeronautical manufacturers what this policy requires of them.

Working together, in the spirit of close cooperation and open communication, we will bring about quieter skies for all American citizens.

DEPARTMENT OF TRANSPORTATION

Office of the Secretary

FINANCING OF AIRCRAFT NOISE
REDUCTION REQUIREMENTS

Statement of Issues for Public Hearing

The purpose of this Notice is to publish a statement of issues to be addressed at a December 1, 1976, public hearing on carrier financing of aircraft noise reduction requirements. A Notice announcing that hearing was published in the Federal Register of November 2, 1976 (41 FR 48164).

On October 21, 1976, President Ford advised the Administrator of the Federal Aviation Administration (FAA) and the Secretary of Transportation that, after considering their proposal and the views of other interested parties, including the Environmental Protection Agency (EPA), he had accepted the recommendation that action be taken to extend the noise standards of Federal Aviation Regulations, 14 CFR Part 36, to certain domestic commercial turbojet airplanes within six years and the remainder within eight years. He directed that the FAA promulgate its Part 36 compliance rule not later than January 1, 1977, and that international negotiations be undertaken to bring about a similar international standard.

Those aircraft that do not comply with Part 36, about 1,650 as of the end of 1975, will consequently have to be modified or, alternatively, retired from the domestic fleet and presumably replaced with aircraft that meet the standards.



In 1975, President Ford proposed aviation regulatory reform to make airline service more competitive, which, in turn, will strengthen the financial condition of the airlines by providing greater pricing and management flexibility. We believe that prompt enactment of aviation regulatory reform will dramatically improve the carriers' financial picture and enable them to generate sufficient capital to meet future noise standards.

As replacement with new aircraft rather than modification of the older planes requires a much larger capital outlay, very real questions exist as to the ability of many aircraft owners and operators to finance the purchase of new aircraft, should this be the desired course. To shed more light on the potential financial problem, President Ford also directed the Secretary to hold hearings on the financing aspects of implementing the new regulation, which, as noted above, will be held in Washington on December 1, 1976. This notice and the issuance of the Aviation Noise Abatement Policy does not directly or indirectly imply that the Administration has taken a position with respect to the need for special financial assistance to enable to the carriers to meet the requirements of the noise regulation. Consideration of that issue is the purpose of the hearing.

I - MAJOR ISSUES

The following list of issues is not intended to be exhaustive and respondents should feel free to address any other issues they find appropriate.

A. Whether there is a need for special financing provisions to enable aircraft operators to meet the deadlines stipulated in the new standard.

-The likely difference in fleet composition each year, from now to the end of 1984, with and without the new regulation. (Carriers should identify the number of aircraft not meeting the new standard.)

-The costs that should be attributed to compliance with the new regulation. What are the anticipated costs of modification and replacement for each type of noncomplying aircraft? Should the cost of compliance include both modification and replacement of aircraft, and should it include replacement of aircraft that would have been replaced without the new noise regulation?

-The number of noisy aircraft that could be replaced by each carrier without special financial assistance.

-The extent to which change in the air carriers' regulatory environment, in particular the introduction of more flexible fare and rate provisions through the enactment of aviation regulatory reform will affect the need for special financing assistance.

B. Whether it is desirable to meet the noise standards by replacing some or all 707s and DC-8s with new technology aircraft rather than by modification. DOT assumes that modification is the more

economical course for most two- and three-engine aircraft and for the early 747s. DOT, however, invites the views of interested persons on this issue as well as whether the national interest would be better served by replacement rather than modification of the 707s and DC-8s. Some of the major considerations bearing on these issues include:

-The cost of replacement versus the cost of modification.

-The noise reduction achievable by modification compared to that achievable by replacement, by either currently available aircraft or by aircraft now in the design stage.

-Any benefits or detriments that could be realized under a replacement program, with respect to overall efficiency in airline operations, employment opportunities in the aerospace and related industries, energy conservation resulting from improved fuel efficiency, aircraft technological advancement, the advantage to the domestic aerospace and related industries, and export opportunities in the world market for aviation products.

-The long-run and the short-run economic and financial implications for the consumer, the industry, and government of following any specific course of action.

-The advisability of limiting the application of funds to be provided under any special financing arrangement to purchase of new generation aircraft.

C. What specific financing arrangements, should any be found necessary, are most desirable.

-Should a financing mechanism involve the Government, or should it be administered by the private sector?

-How can arrangements proposed by or involving the federal government be designed to limit its involvement in decisions that should be made in the private sector? How much of the cost of compliance should be financed? How large an initial commitment is needed to enable manufacturers to begin production of a more efficient aircraft, and of this amount how much should a special financing provision contribute? What are the normal financial requirements (such as down payment or collateral) imposed by leading institutions on the airlines for purchase of aircraft and how might these affect the carriers' ability to finance replacement aircraft? Should the fund cover only replacement costs or modification costs as well? Where should the funds come from and how should they be disbursed? Do certain carriers need special consideration, or should all carriers be treated equally? Should the government, the airlines or some other party be the principal administrator of these special financing arrangements? Under what conditions should the existing ticket and waybill taxes be reduced and by how much?

D. Whether foreign flag air carriers should be included in a financing program.

-Should foreign flag carriers be made eligible for inclusion in any special financing provision, either immediately or at such time as the standards become applicable to them?

II - MATTERS BEARING ON THE ISSUES

A. Timing

A major purpose of the hearing is to help determine whether financing arrangements may be necessary to ensure that all U.S. carriers meet the standards in a timely fashion, and, if so, what those arrangements should be. As stated above, the enactment of the Aviation Regulatory Reform Act may solve the financial problem.

The joint FAA/DOT Aviation Noise Abatement Policy issued November 18, 1976 sets forth the compliance schedules for various types of aircraft. These schedules, established on the basis of what is technologically practicable and economically reasonable, are as follow:

<u>Aircraft Class Affected</u>	<u>Within Four Years (Before 1/1/81)</u>	<u>Within Six Years (Before 1/1/83)</u>	<u>Within Eight Years (Before 1/1/85)</u>
o 4-engine airplanes with bypass ratio less than 2, including pure jets (707, DC-8).	25% Compliance	50% Compliance	100% Compliance
o 4-engine airplanes with bypass ratio greater than 2 (747s).	50% Compliance	100% Compliance	
o 2- and 3-engine airplanes	50% Compliance	100% Compliance	

B. Retrofit Compared to Retirement and Replacement

The least costly way to meet the noise standards, insofar as capital outlays alone are concerned, is through modification of the aircraft engine and engine nacelles. "Retrofit" with sound absorbing material is an achievable modification that will allow compliance with Part 36 standards, and this method will probably be used when aircraft are to be modified. For some aircraft, however, particularly narrow-bodied four-engine aircraft, it appears that in the long run replacement would be more economical.

Aircraft equipped with JT3D (or JT4A) engines are the noisiest in the fleet, and it is clearly in the national interest that they be subject to the new noise regulations. They are also, however, the oldest jets in the fleet, their operating costs increase as they age, and many have already exceeded the normal lifetime of aircraft in commercial service. Retrofit would impose an operating cost penalty and would not extend their physical life. In addition, retrofit for these aircraft is quite expensive (\$1.2 to \$2.6 million or more for each aircraft, depending on the number of retrofit kits to be produced) because of the number of engines (four versus two or three) and the extent of the modification.^{1/} For these reasons, replacement rather than retrofit might be the more desirable alternative for these four-engine aircraft, with the possible exception of stretched DC-8s.

^{1/} Two- and three-engine aircraft with JT8D engines do not require as much modification to meet the noise standards.

Other important benefits would accrue from the early replacement of older four-engine jets. These benefits are summarized below. The cost benefit analysis accompanying the Final Environmental Impact Statement provides a more extensive discussion and assessment.

- Replacement with new technology aircraft, as opposed to retrofit or replacement by current models, will result in a quieter aircraft fleet. New technology replacement aircraft would be far quieter than the quietest existing aircraft, which in turn are substantially less noisy than retrofitted aircraft.
- Replacement would offer substantial fuel efficiency advantages over the 707/720 and DC-8. Currently available replacement models are 20 percent more efficient, while new technology models would offer as much as a 30 percent improvement. These compare to a possible fuel penalty of about 1 percent with retrofit, an important consideration in light of the high national priority assigned to energy conservation.
- Replacement would give carriers a more economic and efficient aircraft. The application of advanced concepts in a new technology aircraft, including the incorporation of super critical aerodynamic features in wing design, lighter propulsion systems, improved flight control, and new high-bypass ratio engines, will result in more efficient and safe operation, as well as reduced noise emission.

- Replacement would strengthen the aerospace industry, increase employment, and contribute to the development of technologically advanced aviation products for export.

C. Cost of Compliance with the New Regulation

The Department's estimate of the costs of retrofitting each type of aircraft are shown in the following table:

<u>Aircraft Type</u>	<u>Retrofit Cost Per Aircraft (\$000)</u>	
	<u>1976 Dollars</u>	<u>1982 Dollars^{2/}</u>
727	\$225	\$302
737	300	402
DC-9	255	342
747	250	335
DC-8, 707, 720	1,200 - 2,600	1,608 - 3,484

The unit cost of new technology aircraft having a capacity of 180-200 seats has been estimated at \$20 million in 1976 dollars and \$26.8 in inflated (1982) dollars. It is assumed that the aircraft not meeting the noise standard will be replaced on a one-for-one basis.

The total cost of meeting the new noise requirements will depend not only on the cost of retrofit kits and their installation, but on the number of aircraft to be retrofitted and replaced. Table I following shows DOT's estimates of total costs under various assumptions as to the number of aircraft to be retrofitted and the number to be replaced with a new technology aircraft. The lowest cost alternative

^{2/} 1982 dollars calculated on a 5 percent annual inflation rate from 1976. The year 1982 was taken as the median year of the period in which most of the capital expenditures for retrofit and replacement would take place.

(from \$700 million to \$1.5 billion) is for retrofit of all aircraft;^{3/} the highest cost (from \$7.7 billion to \$9.7 billion) is for replacement of all narrow-body, non-complying four-engine aircraft. The third alternative, which probably represents the most realistic case,^{4/} would cost the airlines from \$5.8 to \$7.9 billion, the range showing the effect of the alternative projections for 707s and DC-8s at the end of 1984. /Table I/

The 1984 fleet count is used in the calculation of costs, as we believe it is reasonable to ascribe to the noise reduction requirement

^{3/} On the basis of this estimate and its analysis of the resulting benefits the FAA has concluded that the cost of a full retrofit program is economically reasonable. The requirement, of course, will be spread over a number of years. See the FAA benefit-cost analysis attached to the Final Environmental Impact Statement on the new Part 36 compliance rule.

^{4/} Retrofit of the approximately 75 stretched DC-8s now in the fleet is considered to be worthwhile.

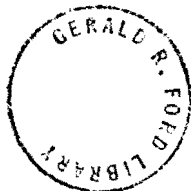
TABLE I

COST OF COMPLIANCE WITH NEW NOISE REGULATIONS BASED ON PROJECTION OF NON-COMPLYING AIRCRAFT AT END OF 1984 (DOLLARS^{1/} IN MILLIONS)

<u>Type of Aircraft</u>	<u>Number of Aircraft Not Meeting FAR-36 Standards</u>	<u>Cost to Retrofit All Noncomplying Aircraft</u>	<u>Cost to Replace All Noncomplying Narrow-Body Four-Engine Jets; Retrofit Remainder of Noncomplying Fleet</u>	<u>Cost to Replace Noncomplying 707s, 720s and "Short" DC-8s; Retrofit Remainder of Noncomplying Fleet^{2/}</u>
727	418	\$126	\$126	\$126
737	145	58	58	58
DC-9	<u>288</u>	<u>98</u>	<u>98</u>	<u>98</u>
Total 2 & 3 Engine	851	\$282	\$282	\$282
747	45	15	15	15
707 and Regular DC-8	200-275	322-958	5,360-7,370	5,360-7,370
Stretched DC-8	<u>75</u>	<u>121-261</u>	<u>2,010</u>	<u>121-261</u>
TOTAL	1,171-1,246	\$740-1,516	\$7,667-9,677	\$5,778-7,928

^{1/} 1982 dollars at 5 percent inflation per year.

^{2/} Including retrofit of the stretched DC-8s.



only those costs which stem from the replacement of the aircraft that would, according to the expected aircraft retirement schedule, still be in the fleet at the deadline date. For purposes of comparison, Table II shows the costs of retrofitting and/or replacing all aircraft in the fleet as of the end of 1975. Table II

D. Ability of Carriers to Finance Retrofit and Replacement

It is the opinion of most industry and government experts that it makes more economic sense to replace rather than retrofit the major part of the 707 and DC-8 fleet. However, given the existing financial circumstances of the airline industry in general and of a few large carriers in particular, a major issue to be addressed is whether the air carriers will be able to finance replacement instead of retrofit in time to meet the deadline established by the new noise regulation.

In recent years many major airlines have experienced very serious difficulty in obtaining from private capital markets the financing necessary for equipment and other needs. Some have found themselves short even of working capital to continue operations. Between 1970 and 1975, the trunk carriers spent \$14.6 billion on capital needs, of which \$8.7 billion was for aircraft, equipment and property; \$1.7 billion for leases of aircraft and engines; and most of the rest for debt service. The sources of this financing were mainly depreciation

TABLE II

COST OF COMPLIANCE WITH NEW NOISE REGULATIONS BASED ON NONCOMPLYING
AIRCRAFT AT END OF 1975 (DOLLARS^{1/} IN MILLIONS)

<u>Type of Aircraft</u>	<u>Number of Aircraft Not Meeting FAR-36 Standards</u>	<u>Cost to Retrofit All Noncomplying Aircraft</u>	<u>Cost to Replace All Noncomplying Narrow-Body Four-Engine Jets; Retrofit Remainder of Noncomplying Fleet</u>	<u>Cost to Replace Noncomplying 707s 720s and "Short" DC-8s; Retrofit Remainder of Noncomplying Fleet^{2/}</u>
727	590	\$178	\$178	\$178
737	157	63	63	63
DC-9	<u>297</u>	<u>102</u>	<u>102</u>	<u>102</u>
Total 2 & 3 Engine	1,044	\$343	\$ 343	\$ 343
747	53	18	18	18
707 and Regular DC-8	448	720-1,561	12,006	12,006
Stretched DC-8	<u>75</u>	<u>121-261</u>	<u>2,010</u>	<u>121-261</u>
TOTAL	1,620	\$1,202-2,183	\$14,377	\$12,488-12,628

^{1/} 1982 dollars, at 5 percent inflation per year.

^{2/} Including retrofit of the stretched DC-8s.

(\$5 billion to \$7 billion) and new long term debt (\$4 billion), with earnings contributing only about \$400 million. Equity financing was insignificant in this period, and low earnings and existing high debt levels forced some carriers to lease rather than purchase new aircraft. In addition, because of their recent earnings records, conventional sources of debt financing have been effectively foreclosed to some carriers. Insurance companies and banks have been unwilling or unable to make further financing commitments and in recent months have stated publicly that until the airlines' financial situation is sufficiently improved new loans will not be forthcoming. In that financially strained economic environment some carriers were forced to resort to existing revolving credit arrangements to raise working capital.

The 1974/1975 period was particularly difficult for the industry. The sudden and substantial increase in fuel prices that began in 1974, accompanied by inflation in other cost categories, forced carriers to raise fares sharply. This coincided, unfortunately, with the economic recession of 1974-75 when demand was already softening, and traffic levels were driven down even further. Moreover, many airlines in the late 1960s had purchased equipment to meet a predicted traffic growth that never occurred, leaving them for a time with substantial excess capacity. The airlines' financial problems were exacerbated by the existing economic regulatory system, which does not normally allow for

timely fare increases, and denies the airlines the pricing and management freedom available to other industries.

The airline industry's financial performance has been showing steady improvement since the end of the recession, however, and prospects for increased earnings over the next few years are good. Traffic growth is expected to resume, though at a long-term rate about equal to GNP growth, in contrast to more rapid growth rates in the past. Since at present the airlines have relatively few new aircraft on order, any near term traffic growth will be accommodated largely through increases in aircraft productivity. Load factors are likely to increase, earnings should remain fairly stable at a relatively high level, and new capital needs should be relatively modest until 1980.

After 1980, however, traffic growth will begin to press against the fleet's capacity, and airlines will begin to require new capital to finance the replacement of aging aircraft and to meet the growth demand. Leaving aside the new noise requirements, the Department estimates that between 1976 and 1985 the trunk carriers will need from 700 to 800 new aircraft and will require between \$22 and \$30 billion dollars to finance this acquisition (based on estimates by Government and private sector financial analysts). About \$6 billion will be needed for debt repayment and other uses. A mid-range estimate of total capital needs, therefore, would be \$32 billion.

Depreciation and sales of used aircraft can be expected to generate about \$15 billion of this amount, leaving \$17 billion to be financed through earnings and external sources. If earnings in the period were to rise to \$6 billion (which implies a 9 percent return on equity, as contrasted with the average 2.8 percent return of the past five years) external financing needs would be \$11 billion. The airlines would probably be able to obtain this financing from conventional financial sources. The following table summarizes these estimates:

Sources and Uses of Funds (Mid-range Estimate)

<u>Uses of Funds:</u>	<u>(\$ Billions)</u>
Property, Plant and Equipment	\$26
Debt Repayment and Other	<u>6</u>
	\$32

Sources of Funds:

Depreciation and Sales of Used Aircraft	<u>\$15</u>
<u>Amount Required from Earnings and External Sources</u>	\$17
Earnings Assumption	<u>6</u>
<u>External Financing Requirement</u>	<u>\$11</u>

It is unlikely that capital needs can be met in this manner, however, if the industry does not achieve \$6 billion in earnings by the end of 1985. As indicated, this level of earnings implies an average annual return on equity three times as large as that earned over the last five years. It also assumes no unexpected negative developments, such as another

recession or substantial new increases in fuel or other costs. These or other events would materially reduce the ability of the industry to earn a 9 percent return on equity.^{5/}

Under one scenario for meeting the new noise abatement regulation schedule, the "regular" 707s and DC-8s are retired and replaced with new technology aircraft, and the stretched DC-8s and the remainder of the noncomplying fleet are retrofitted. This would increase the trunk carriers' capital requirements to 1985 by between \$5.5 and \$7.6 billion, an increase of 20 to 27 percent more than the amount required in the absence of the noise rule, as discussed above. An incremental capital requirement of this magnitude would appear to be clearly beyond the industry's ability to finance, given the other financing burdens it will face in the early 1980s.

The Administration's aviation regulatory reform bill (the Aviation Act of 1975) will be reintroduced by the Administration in early 1977 and when enacted would make it possible for the airlines to modify or replace their non-Part 36 aircraft. If the carriers had been operating under the regulatory environment envisioned in the proposed legislation, they would not face major difficulties in adjusting prices to obtain the needed capital investment requirements and to obtain the needed financing for the rule. Under the cost-based guidelines now used by the Civil Aeronautics Board in evaluating requests for fare increases, however, the capital outlay for new equipment, about a third of which

^{5/} It must be noted that the above estimates of financial needs and sources are predicated on industry-wide estimates. Carriers that are in a relatively inferior financial situation will have greater difficulty in obtaining needed funds than will other carriers.



is made before the aircraft is delivered, cannot be recovered through fare increases until the aircraft is delivered and in operation. Thus in today's economic regulatory environment it is virtually impossible for the industry to commit to the manufacturers the substantial amounts of cash necessary to get a new technology aircraft into production and delivered soon enough to replace the DC-8/707 fleet by the end of 1984.^{6/} Complicating the problem is the fact that a number of carriers are significantly weaker than others. Some of these carriers are the owners of large numbers of noisy aircraft and thus face some of the largest financing requirements.

Timely passage of the Aviation Act of 1977 will make a large difference in the carriers' ability to finance new aircraft purchases. However, this very desirable change in regulatory policy may not go into effect for at least a year, and if, as expected, its provisions are phased to allow ample time for adjustment to the new operating environment, its full effect will not be felt for several years.

E. The Importance of a Prompt Start of Production of New Technology Aircraft to the Achievement of the Noise Reduction Goals

If the airlines are to meet the noise reduction goals by replacing noisy aircraft with new technology aircraft, their planned replacement

^{6/} A large number of firm orders from U.S. air carriers is required by manufacturers before they can start production of a new aircraft. The cost of developing the new aircraft alone is put at \$500 million to \$1 billion.

schedules will have to be accelerated and firm purchase commitments will have to be made to the manufacturers by the end of 1977. The Department understands that only with this kind of early commitment can the manufacturers produce the aircraft in 1981 or 1982, and deliver the needed number by the end of 1984. But, as noted previously, the present financial condition of the industry as a whole does not permit it to make this commitment. A special financing arrangement may be necessary to overcome these problems and insure timely delivery of replacement aircraft.

F. Aerospace Benefits Related to the Production of a New Generation Aircraft

A major new air carrier aircraft has not been developed in the United States for almost ten years. Since then, important design and technological advances have been made--many specifically intended to meet the new economic, operating and environmental constraints dictated by rising labor costs, energy shortages, and changing market demands. In the past, American manufacturers have been assured of enough preproduction sales to U.S. airlines to provide solid financing of front-end costs and to insure a near breakeven position without foreign sales. But U.S. airlines are financially unable to make this kind of purchase commitment as present. They are replacing their older, inefficient jets slowly and with existing model aircraft that are less expensive to purchase. There is also the fact that a properly sized U.S.-manufactured

replacement for many markets served by four-engine aircraft is not now available. Thus, while some replacement of older four-engine aircraft is taking place, indications are that many U.S. airlines would prefer to wait for a new, high technology aircraft of U.S. manufacture, if it were available within the next few years.

An early start on the production of a new technology aircraft should enable the U.S. manufacturers to maintain a sizeable share of the world market. The foreign market is far more important to them today than in the past, and it will become even more important in the future. The air travel market in the United States is relatively mature, with traffic now growing more in line with general economic trends, only a percent or so faster than GNP. By contrast, the air travel market in Europe and Japan is still in a stage of rapid growth, and the market in nonindustrial nations, while just beginning to stir, has great potential. It is estimated that between 1975 and 1985, foreign requirements will account for about half of the total market for new aircraft.

While the demand side of the foreign market equation has increased, the supply side has increased also to an even greater extent. Foreign aircraft manufacturers, in France and England particularly, but in Germany and Japan as well, have been growing in size and competitive

ability for some years. Foreign governments generally provide the risky front-end development funds for their commercial aircraft manufacturers, thereby providing foreign aircraft manufacturers with a competitive price edge in price and delivery date over any new generation aircraft produced by private industry in the United States. The quality of foreign aircraft offerings has improved; while previous aircraft models compared unfavorably with U.S. planes, some new foreign aircraft are competitive in both operating costs and performance. As a further complication for U.S. manufacturers, some major foreign airlines--such as British Airways, Air France and Lufthansa, formerly steady customers--are reportedly being directed by their governments to buy aircraft from the government-supported or owned manufacturing consortia. This trend may continue unless the U.S. manufacturers can again offer a clearly superior product in time to meet the demand.

In combination, these developments may constitute a serious threat to continued participation by the U.S. aerospace industry in expanding foreign markets. The consequences of losing these markets, and the technological leadership it has long enjoyed, would be most serious not only to the United States aerospace industry but to a host of other U.S. interests also. The aerospace industry has been, since the 1930's, a vital part of the U.S. economy, an important source of both skilled people and new ideas applicable in other industries. However, employment in the aerospace industry, comprised of many of the nation's

most expert and sophisticated scientists, engineers and technicians, contracted from about 1.5 million in 1968 to about 950,000 in 1975. Production of a new aircraft and consequent increased sales would generate much needed new employment and reverse this trend.

G. Criteria for a Financing Plan

The objective and design of any financing provisions needed to encourage the early introduction of a new generation of air carrier aircraft should be consistent with the following criteria:

- The costs of meeting the noise standards should be borne by industry and the users of air transportation (passenger and shippers) and not the general public.
- Enough financing should be available to enable the carriers to replace jets not meeting Part 36 requirements with new technology aircraft, but not so much as to encourage the purchase of excess capacity.

If not properly designed, a special financing provision could result in carriers acquiring too much capacity, as has happened in other re-equipment cycles. The growth in traffic, however,

and the retirement of noisy aircraft are likely to absorb all capacity additions. Witnesses should give particular attention to this problem in presenting views on appropriate financing mechanisms.

- The involvement or interference of the government in management and financial marketplace decisions should be limited, and the necessary incentives should be created for the industry to meet the noise reduction objectives in an efficient and economical manner.

Any financing plan or government involvement should be designed to avoid rewarding inefficient carriers or "bailing out" a carrier that might otherwise find itself in a difficult financial situation.

- Excessive cross subsidy should be avoided (although some redistribution of income between carriers may have to be accepted).

In the absence of a special financing provision, rates eventually would have to be increased to cover the additional costs of noise compliance. Because fare and rate increases are approved on the basis of increased industry-wide average costs, carriers with relatively heavy requirements for retrofit and replacement would not be fully compensated for the additional costs, while carriers with less than average need would enjoy a windfall. To counter this problem, some financing proposals have included

provisions for the sharing of a small portion of the surcharge revenues through disbursement of the funds according to a set formula responding in part to the widely disparate needs of the carriers. For example, sixty percent of the non-Part 36 aircraft are owned by four of the air carriers. Moreover, because it does not appear appropriate to impose surcharges on international revenues (as discussed in the following section), some carriers such as Pan Am and TWA, with large aircraft financing needs and relatively smaller proportions of domestic revenues, could receive a greater amount than their contribution. Financing plans to be proposed at the hearing may, of course, provide for a redistribution of this kind, but the cross subsidy should be kept within reasonable bounds.

III- COMPARISON OF SELECTED FINANCING OPTIONS

This section discusses several alternative financing provisions. There are many other possible or desirable options that also may be considered. Witnesses or respondents are invited to advance other proposals.

Our primary concern at this hearing is the financing that will be required to meet the noise requirements imposed on U.S. aircraft by replacement as well as retrofit. The question of when internationally operated aircraft must begin complying with the new noise standards has been deferred pending action by the International Civil Aviation

Organization, making the problem of collecting surcharges from and remitting funds to foreign carriers extremely complex. For this reason, we solicit the views of witnesses and respondents on the feasibility of including foreign carriers in the initial plan to be developed within the context of the hearing.

Witnesses should also consider the possibility that the early enactment of regulatory reform will obviate special financing. The airline industry has long been burdened with an outmoded and inflexible regulatory system that has hampered the industry's ability to respond to change, to serve the needs of the public, and to achieve satisfactory earnings levels. The Administration has proposed to reform that regulatory system and to this end submitted the Aviation Act of 1975. The Administration intends to submit an Aviation Act of 1977 which will build upon the principles of our prior bill and other bills submitted.

It appears, however, that regulatory reform might not take effect soon enough to make special financing unnecessary. Early enactment of an act that contains substantial regulatory reform in the areas of pricing, entry and exit would create an environment in which carriers could earn appropriate profits. Such profits would attract the capital needed by the industry, and the airlines could finance the purchase of new aircraft without any special aid. Moreover, cross subsidy would not be involved as it would in some financing options, and the burden of the costs would be on the users of air

transportation. But, although the Congress is likely to enact legislation substantially reforming the regulatory system affecting the airline industry, there is no certainty that it will do so. Moreover, even if legislation is enacted at an early date, it probably would not go into effect for a year or so, which would be too late to enable the carriers to make the needed early commitment to a new aircraft.

Several of the options discussed below involve the uncommitted \$1.5 billion balance in the Airport and Airway Trust Fund (estimated to be some \$2 billion by 1980) or may involve imposition of a surcharge accompanied by a reduction in the passenger ticket and freight waybill taxes that produce revenues for the Fund. A reduction of two percentage points in those taxes would leave the Trust Fund with enough revenues to meet all Airport and Airway Development Program expenditures currently authorized. The first type of financing arrangement noted below would apply the surplus in the Airport and Airway Trust Fund directly to the costs of replacement and/or retrofit. Other financing plans could be accompanied by a reduction in the taxes in the same amount as a surcharge imposed to meet those costs, thus avoiding an overall increase in the cost of air transportation to the consumer. Witnesses are invited to comment on the desirability of this approach.

The following financing alternatives are among those that have been considered by the Department. In evaluating these, or in proposing

any other financing arrangement, respondents or witnesses should consider at a minimum the issues relating to the form of special financing provisions and the criteria set forth above.

Type 1. Funding from Uncommitted Balance in the Airport and Airway Trust Fund

The Administration would seek legislation to allow the use of uncommitted funds in the Airport and Airway Trust Fund. Each airline would be directly reimbursed a fixed percentage of its cost of complying with the noise rule. A reduction in user charge excise taxes probably would not be a part of this plan.

Pros:

- The uncommitted balance in the Airport and Airway Trust Fund (\$1.5 billion) could be applied to the reduction of noise.
- This plan is simpler than those involving special funds, with possibly complicated disbursement formulas and administrative provisions.
- This financing arrangement meets the criterion of putting the burden on the users of air transportation because they provide the revenues for Airport and Airway Trust Fund through user charges.

Cons:

- The uncommitted balance in the Airport and Airway Trust Fund might not be sufficient to achieve fully the goal of replacement by 1984.
- Use of trust fund monies would require substantial government involvement and management.
- Since the payout would not be proportionate to carriers' contribution to the trust fund, there is an element of cross subsidy.
- The overall federal budget is in deficit and thus outlays from the Airport and Airway Trust Fund would increase that deficit, or make it more difficult to bring the federal budget into balance.
- The funds would be expended for purposes not authorized at the time the revenues were collected from the users of air transportation.

Type 2. A surcharge would be imposed on passenger tickets and waybills; there would be a sharing of funds, and disbursement would take place under a formula that would be responsive to the need of the individual carrier.

As an example of this approach, a surcharge on passenger tickets and waybills could be imposed and could be coupled with an equal

reduction in existing passenger and waybill taxes to avoid any increase in the price of air transportation to its users. The plan could be administered by the government, the airlines, or a third party such as an escrow agent. Disbursement to airlines would be accomplished under some formula that would take into account the need of individual carriers. For example, the disbursement formula could be based on system revenues, each carrier being entitled to a share of the funds in proportion to its share of the system (domestic and international passenger and cargo) revenues. Under this formula, carriers with international operations, which generally have the largest number of planes not meeting Part 36 levels and which are among those carriers that may face difficulty in securing sufficient private capital, would gain more than they contribute. The resulting cross subsidy (if found objectionable) could be reduced by calculating the entitlement in such a way that each carrier receives half (or some other proportion) of its contribution, with the rest of the funds prorated according to system revenues. Payments to the carriers could be limited to the entitlement as determined by the retrofit costs and no more than one-third of the cost of replacement. This requirement would discourage the purchase of excess capacity and insure that the carriers have to generate two-thirds of the needed capital from private internal or normal

external financing. Thus it would not support carriers that could not obtain capital from private financial sources. It would also be possible to provide special tax treatment in the use of the funds, in effect deferring taxes rather than reducing them.

Pros:

- The surcharge could be at the level necessary to generate sufficient revenue to stimulate the timely production of a quieter, more efficient new technology aircraft.
- The surcharge places the same burden on each carrier and, with the redistribution feature, equalizes to some degree the impact of the program. Because sixty percent of the nonconforming aircraft are operated by four carriers, some of which are currently facing financial difficulties, some limited equalization seems desirable.
- Users of air transportation would bear the cost burden.
- The financing provision can be designed to limit government involvement in management decisions.
- Cross subsidy can be limited.

Cons:

- Sharing and redistribution of some of the revenues may reduce carrier incentives to achieve a quiet fleet in as efficient a manner as possible. (Access to funds which might not otherwise be available could result in implementing higher cost alternatives of meeting the new noise standard).
- Redistribution of revenues (or cross subsidy) may be inequitable to those carriers that have already taken steps to reduce aircraft noise.
- The reduction of the ticket and waybill taxes would have an adverse effect on the federal budget.

A variation of this type of plan would call for the collection of enough funds to pay each carrier only for its retrofit costs. The carriers could, at their option, apply the retrofit costs to replacement. Such an approach would limit aid to the lowest cost required to achieve compliance.

Another variation of this plan would be to use all or part of the fund to provide loan guarantees. Entitlement to the guarantee could be set according to some formula, as in the case of cash disbursements.

Type 3. A surcharge would be imposed, the revenues would be deposited in an escrow fund, and each carrier's entitlement would be equal to its contribution. Special taxing provisions would be provided.

This plan differs from the previous one in that there is not any redistribution of revenues. The advantages lie primarily in favorable tax treatment, such as deferral of taxes and the targeting of these funds for noise reduction purposes.

Pros:

- Users of air transportation would bear the cost burden.
- The cross subsidy problem is avoided.
- The funds are earmarked and applicable solely to noise reduction purposes.
- Sufficient revenues could be provided to stimulate the timely production of a new generation aircraft.
- Government interference in managerial decisions can be limited.

Cons:

- Entitlements could provide a windfall for carriers without a significant number of noisy aircraft.

- The intended relief would be limited for carriers having little or no tax liability.

Type 4. An aircraft operation charge (pollution tax) would be imposed based on the amount of noise generated by non-Part 36 aircraft operations, weighted by time of day at which the noise occurs.
The revenues would be spent for noise reduction purposes.

Pros:

- The cost of noise reduction would be placed directly on the operators (and ultimately the users) of noisy aircraft.
- The tax would give air carriers maximum incentive to reduce noise as quickly and inexpensively as possible.
- The cross subsidy problem is avoided.

Cons:

- A pollution tax would place further burdens on an industry that is already in poor financial condition, affecting most seriously the financially distressed carriers with relatively large numbers of noisy aircraft.

- Revenues from the tax would probably not be sufficient to stimulate the production of a new generation aircraft in time to meet the new noise standards.
- This type of plan would heavily involve the government in the collection and disbursement of funds.

Type 5. Provide for government loan guarantees for purchase of replacement aircraft.

Pros:

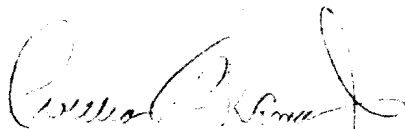
- Would provide some financial incentive for airlines to order and manufacturers to produce a new aircraft.
- This approach is simpler than the surcharge and redistribution type of plan, yet provides funds where they are needed.
- In the absence of defaults on loans, the cost of meeting the standard would be borne by users rather than the general public.

Cons:

- Financially distressed carriers may not qualify for guarantees, assuming the traditional requirement of a showing that they can repay the loan.
- There would be less certainty of meeting the noise reduction compliance deadline if some carriers do not qualify for the guarantees.

- Substantial government oversight would be required and administrative costs would be incurred.
- The plan would constitute a major long-term intrusion on behalf of one industry into what has been traditionally viewed as being in the realm of private sector financing. It would also establish a further precedent for direct federal support to private industry.

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