The original documents are located in Box 2, folder "Aircraft Noise (9)" of the James M. Cannon Files at the Gerald R. Ford Presidential Library.

OFFICE OF THE GENERAL COUNSEL
DEPARTMENT OF TRANSPORTATION
WASHINGTON, D.C. 20590

September 13, 1976

NOTE FOR: Honorable James M. Cannon
Assistant to the President
for Domestic Affairs

Secretary Coleman has asked that we provide you with the latest draft of the proposed Aviation Noise and Aircraft Replacement Policy, which you discussed with the President on Saturday. A copy is enclosed. It still needs editing and proofreading, but the substance is fairly well settled. A copy of the Secretary's July 2 memorandum to the President on financing alternatives is also enclosed. The Deputy General Counsel, Donald T. Bliss, or I will be pleased to deal with any questions you or your staff may have. We can both be reached on 426-4702.

Gregory Wolfe

Gregory Wolfe
Environmental Counsel

Enclosures

AVIATION NOISE AND AIRCRAFT REPLACEMENT POLICY

September 9, 1976

INDEX

I. INTRODUCTION

Aircraft noise is a significant annoyance for six to seven million Americans. The problem is particularly serious at some of the major airports, such as those in New York, Los Angeles, Boston, Atlanta and Chicago. It represents, moreover, a significant or potential problem for residents living near many other airports across the nation, and as air travel increases noise will become a serious problem at some of these other airports as well.

The aircraft noise issue became increasingly important in the early 1960s as airlines introduced jet aircraft to their fleets, 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, noise was soon recognized as a major constraint on the further development of the commercial aviation network, and action was taken to address it. The engine manufacturers and the federal government both engaged in extensive research into quieting jet engines. In 1968, Congress gave the FAA the responsibility to regulate aircraft design and equipment for noise reduction purposes, and the FAA then embarked upon a long-term program of controlling aircraft noise at its source. A regulation promulgated in 1969 set standards for turbojet aircraft of new design; a 1973 amendment extended the same standard to all new aircraft of older design. The third step in the source noise control program, a regulation requiring modification of jet aircraft already in the fleet, the so-called "retrofit" rule, has been the subject of two major FAA rulemaking proposals, the latest being a notice of proposed rulemaking

published in 1974 and a similar EPA proposal published in 1975. The FAA proposal came to fruition after considerable study and analysis in January of this year, when the Federal Aviation Administrator submitted a proposal and supporting materials to the Secretary of Transportation for the consultation required under the Noise Control Act of 1972.

Intensive review of those proposals in the Department of Transportation, with the support of the FAA, led to a far-ranging analysis of the aircraft noise problem, alternative methods of dealing with it, and the economic consequences of imposing a retrofit rule. The scope of the noise problem, the interrelationship and special responsibilities of the many parties concerned with it, and the general confusion and uncertainty prevalent in the area have led us to conclude that the federal government needs to address the overall noise problem in a more comprehensive way than through simple promulgation of a new regulation. The result has been the development of this policy statement, which is intended to analyze the aircraft noise abatement problem and the several means of addressing it, explain the legal framework within which it must be considered, and delineate the shared responsibilities of those who must act to alleviate it.

We do not start with a clean slate; while much work has already been done in the area of aircraft noise, much remains to be accomplished. We also must deal with an existing system with diverse elements and responsibilities. The courts have established legal responsibilities for noise, and the Congress has

assigned the task of dealing with it to several agencies. The historical development of a national air carrier and airport system, and the often complex division of authority between the federal, state and local governments also limit and complicate the actions available to us. They all must be taken into account in devising a strategy to abate aircraft noise. Debate over noise regulation has been under way for a number of years now; in addition to the technical facts of the matter, many ingrained misunderstandings must be addressed and dealt with forthrightly in order to assure that the public can understand what is and what is not achievable by the cooperative efforts of governments and industry. Finally, our efforts to abate noise must be consistent with broader national economic, environmental, and transportation policies. There can be no doubt, however, that aircraft noise must be abated. This policy statement attempts to take all these factors into account in proposing a coordinated approach to the problem.

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 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 attainable and with the financing that will be required to make this possible. Several essential elements of this policy will be presented to the Congress for enactment and we will all benefit from the public discussion that accompanies that process.

We have also set forth what we believe to be the proper responsibilities of the airport proprietors, air carriers and other aircraft operators, aeronautical manufacturers, state and local governments, and the private citizen. The full benefit of a proposed federal plan of action is contingent upon complementary action by these other participants. Their 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 takes action to reduce cumulative noise exposure by controlling the source of noise, so must local governments and airport proprietors undertake consistent actions to acquire land and assure compatible land use in the areas surrounding the airport in order to limit severe noise exposure to areas within the airport boundaries and to minimize the impact of noise beyond those boundaries.

As the federal government takes steps to reduce the source of aircraft noise to levels that are "technologically practicable" and "economically

reasonable," vast responsibilities still rest with the airport proprietors, airport users and local government, with, in some instances, Federal financial support and advice. Those who anticipate a complete federal solution to the aircraft noise problem will be disappointed. The primary obligation to address the airport noise problem always has been and must remain a local responsibility. As the aircraft source levels decrease, this responsibility will be more manageable, and amenable to better planning and control at the local level.

II. SUMMARY OF THE POLICY

At the heart of the policy are two major action plans, one for the federal government and one for the air carrier industry, that with the cooperation of the other parties can lead to substantial noise reductions over the next eight to ten years. In summary, they are as follows:

A. Federal Action Plan

1. Source Noise Regulation

Currently Operating Aircraft

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

747s within six years;

pure jets (720s, early DC-8s and 707s) within six years;

727s, 737s, DC-9s, BAC 1-11s within six years; and

other 707s, DC-8s, CV-990s within eight years.

One-third of the two- and three-engine aircraft (727, 737, DC-9, BAC 1-11) will be exempt from the rule. These time periods will start to run on the date of enactment of legislation necessary to ensure adequate financing, as discussed below. If such legislation is not enacted, additional time may be necessary to enable aircraft owners to meet this requirement, but in any event full compliance will be required by 1987.

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 four years, aircraft flown by carriers of other countries will be required to meet Part 36 noise levels at the end of six additional years. During the initial four years, aircraft operated by foreign carriers and the proportion of the fleets of U.S. air 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 December 1, 1976, 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 all subsonic aircraft type certificated after the effective date of the regulation. We expect that aircraft certificated prior to that date would not be required to meet those standards at some later date.

Supersonic Aircraft

Using information that is now available on a continuing basis from the Concorde demonstration, the FAA will, within thirty days after the conclusion of the sixteen month demonstration periods, 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 nearly concluded the process of evaluating a number of proposals for aircraft operating noise abatement procedures. These

include minimum altitude rules, approach procedures and departure procedures. At the conclusion of this analysis, the FAA will take appropriate regulatory action that will maximize, through practical procedures, the noise reduction benefits of new aircraft and retrofitted aircraft, consistent with the highest degree of safety. FAA will complete rulemaking on approach operating procedures within 3 months and on takeoff procedures within 9 months.

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 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.

The Administration, 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 new airport development, federal financing will be conditional on

effective noise abatement planning and that all reasonable steps are 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. Federal funding for airport expansion and improvement will require documentation of measures that the proprietor is taking to reduce noise impacts.

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 promote further relief from excessive aircraft noise, the FAA is today promulgating an Airport Noise Policy, designed 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. 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 may request noise abatement plans from airport operators both as a condition for major airport development grants and as justification for the imposition of use restrictions, such as curfews or scheduling and equipment restrictions. The FAA will advise airport operators whether proposed use restrictions present an undue burden on interstate or foreign commerce, and in certain instances, seek adjudication of the constitutional issues involved].

B. Air Carrier Action Plan

1. Aircraft Replacement

Under the federal rule described above, unless the older, noisier four-engine jets using the JT3D and similar engines (707s, DC-8s, CV-990s) are modified to meet Part 36 noise levels, 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 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. To enable the carriers to replace these older noisier aircraft with the more efficient, quieter types of the next generation, the Department proposes the following financing mechanism that places no new financial burden on the flying public.

The Congress will be asked to establish a new Aircraft Replacement Fund under the control of the Secretary of Transportation. Financing of this Fund would be accomplished by one or the other of following options, whichever the Congress finds more desirable:

(1) For a ten year period, two percentage points of both the present eight percent passenger ticket tax and the present five percent cargo waybill tax will be deposited in a new Aircraft Replacement Fund; or

(2) The CAB would be asked to authorize an across-the-board, two percent surcharge on domestic and overseas passenger tickets and freight waybills to be collected by the carriers and subsequently deposited in the Aircraft Replacement Fund. Concurrently, the present federal air passenger ticket and freight waybill taxes would be reduced from eight to six percent and from five to three percent, respectively.

Thus, regardless of which financing option is adopted, it is clear that

this program will not result in any increase in cost to the passenger or shipper.

Each carrier would be accorded "entitlements" to the monies in the Fund in proportion to its total system passenger and cargo revenue. The entitlement formula (based on each U.S. carrier's total system revenue - both domestic and international) would differ from the contribution formula (based only on a ticket tax or surcharge on domestic flights excluding international depending on the type financing chosen). Because of the difference in the formula, the American carriers with international routes will receive more than they put into the fund. The reasons for the difference in formulas are the impossibility of imposing the 2% surcharge on international flights without an international agreement, the need for American carriers with international routes to participate in the noise reduction program, and the fact that the major U.S. flag carriers have a substantial number of noisy aircraft and would be placed at a competitive disadvantage as other U.S. carriers seek international routes. To base the entitlement formula strictly on domestic and overseas revenue would deny the American carriers with significant international route segments access with other American carriers to the benefits of the proposed financing program.

Air carriers could apply to the Secretary, certifying that their proposed aircraft purchases were in direct furtherance of this Aviation Noise and Aircraft Replacement Policy, and that conventional financing of at least two thirds of the purchase price had been arranged. Upon receipt of thi certification, the Secretary would be authorized to make payment

from the Fund directly to the aircraft manufacturer of not more than one-third the cost of replacement of aircraft that do not meet the Part 36 noise levels, provided that the purchase of new aircraft with these funds does not result in any increase in capacity, that is, about as many seats will be retired as are added by the replacement aircraft purchased with these funds. Moreover, purchasers of the replaced aircraft would be put on notice that they may not be flown in the United States unless they were modified to meet Part 36 standards.

Under either financing arrangement air fares would remain constant; there will not be any increased cost to the consumer from the imposition of the surcharge, and over the long term, the consumer will benefit from the use of new technologies, with greater operating efficiencies and lower fuel costs. In addition, payment of the costs of retrofitting two- and three-engine aircraft, which have long useful lives remaining, will be authorized from the Aircraft Replacement Fund, but carriers that do not need to use their full entitlement for replacement of four-engine aircraft will be encouraged to use it for replacement of two- and three-engine aircraft in lieu of retrofitting them.

C. Local Actions

While these two action plans 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 local authorities should take. For airport proprietors, there is a separate Airport Noise Policy designed to encourage them to develop agressive noise abatement programs for their airports.

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 aircraft 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.

In adidtion, state and local governments with jurisdiction over property adjacent to airports must take action of their own, preferably in cooperation with 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 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 insultation 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.

III. STATEMENT OF THE PROBLEMS

Aircraft noise is a serious annoyance for many residents around airports in the United States today. It is a local problem, varying substantially among airport communities depending on the air service provided, the type and frequency of operations, the airport design and geographical arrangement, the mix of equipment and route patterns, the numbers of people who live nearby and their reaction to aircraft noise, and the general compatibility of land use in the surrounding areas. Aircraft noise is also a national problem because a significant portion of the American people are affected by it and because its source is regulated by the federal government. That noise source is, of course, the individual airplane which is certificated by the federal government for use both nationally and internationally, and is flown throughout the nation and to foreign countries over a complex interrelated network of routes approved by the Civil Aeronautics Board and under safety regulations promulgated by the FAA.

In determining what action can and should be taken at the federal and local levels and in the private sector to reduce further the adverse effect of excessive aircraft noise, it is essential to understand fully the nature of this multidimensional 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. Finally we will consider the financial condition of the airlines and the impact of proposed actions on the aerospace industry.

A. The Noise Problem

1. Technical Framework

Because people react differently, it is extremely difficult to derive a simple mathematical formula that accurately represents human reaction to noise annoyance. For example, it remains uncertain how people in reacting to aircraft noise balance the number of aircraft noise events against the noise levels of those individual

events. To help measure, quantify and understand the effect of noise on people, there has been a proliferation of approaches, the abbreviations of which threaten to challenge the supremacy of the federal bureaucracy in this regard. Rational public discourse is not greatly aided by the debate among psychoacoustic experts expressed in terms of dB, dBA, dBD, PNL, EPNdB, EPNL, SEL, SENEL, CNR, NEF, CNEL, ASDS, Ldn, and Leq. In explaining this decision, we have relied primarily on the two most common measurements of noise: noise generated by a single event (measured in EPNdB, usually at the Part 36 measuring points) or cumulative noise exposure (measured in Noise Exposure Forecast or NEF).

Human response to a single-event aircraft noise is best represented for jet airplanes in terms of Effective Perceived Noise Level 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. A key consideration in deciding how to abate aircraft noise is the difference in noise level that is perceptible and meaningful to the listener, both in terms of the single event and the

cumulative exposure. Most human beings cannot usually detect differences between single events of aircraft noise of much less than about 5 EPNdB. However, an increase of 10 EPNdB is perceived as a doubling in the perceived loudness.

The Part 36 measuring points are locations from which the noise of a particular aircraft is measured. They give the noise levels of an aircraft at those 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 figures do not give an accurate picture of total noise impact at an airport, they do provide a standardized method of measuring aircraft noise for certification purposes and are very useful in indicating the comparative noise levels of individual aircraft.

In general, if noise events, such as aircraft flyovers, are infrequent, the peak noise level of the individual events will affect individual

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* 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.

reactions to that noise. If the noise events are relatively continuous or repetitive, the total noise "dose" or cumulative noise exposure becomes a more important factor in people's reactions to aircraft noise. NF 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. 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).

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. The NEF descriptor is particularly meaningful in measuring the overall impact that residents around busy airports might experience from the mix of equipment, time of day, and frequency of flights serving

a particular airport. Research into human reaction to aircraft noise has indicated that a cumulative noise exposure is the most useful measure of public reaction to aircraft noise.

Using the NEF concept of 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.

Expressed in NEF, a decrease of one NEF unit is equivalent to a reduction of 2 percent in the number of people highly annoyed and equal to a reduction of about 14 percent in the area exposed.** 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.

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* The Environmental Protection Agency has recommended that cumulative noise exposure be expressed by a measure called Day/Night Noise Level (Ldn). The equivalent values are:
NEF 30 = Ldn 65; NEF 40 = Ldn 75

** 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 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.

2. How Noise Affects People

Aircraft noise disturbs the normal activities of airport neighbors - their conversation, sleep, and relaxation - and lowers 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. It does not present any direct physical health danger to the vast majority of people.

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.**

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

There is wide diversity in community response to aircraft noise, and individuals' subjective reactions vary substantially. These differences can be detected by reviewing the noise problem 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 the use of the airport, and the environmental and social context - climate, lifestyles, community concern - in which noise is perceived.

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 operators 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 untapped. 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 perceived to be 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 already spent over $130 million to purchase private residences and plans to spend $21 million on soundproofing 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 some airports located in metropolitan areas, including New York, Boston, Los Angeles, Atlanta, Miami, San Diego, Chicago, San Francisco, Cleveland, Seattle and Buffalo.

Based on an analysis of complaints, the imposition of use restrictions and the number of people affected, the FAA has identified 100 airports where noise is a problem. A 1974 DOT study of 23 major U.S. airports identified eight airports that have neighboring populations of over 25,000 within the NEF 40 contour (extremely serious problem), and 13 airports with at least 100,000 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 chart below 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. The asterisks indicate airports that are also on the ATA's most sensitive list.***

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* 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.

*** Other airports on the current ATA list but not included in the study are: Detroit, Honolulu, Memphis, Las Vegas, Tampa, Baltimore, Ft. Lauderdale, San Juan, Salt Lake City, Oakland, Louisville, San Jose, Albuquerque, Ontario, and Palm Springs.

	Airport	1972 Number of People ** (1000) NEF 30	NEF 40	Court-suits	Restric-tions
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
	TOTAL	5.0M	0.5M		
	All other airports	1.1M	.1M		
	GRAND TOTAL	6.1M	0.6M		

* Identified by Air Transport Association as being "noise sensitive"

** Estimated from 1970 Census data

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

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* 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.

Although complete curfews would eliminate the noise problem at night, they would also increase the problem during daytime hours, to which night traffic would be shifted. Moreover, curfews at the large, medium and small hubs could have very serious effects. At New York City, for example:

- 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 impact 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.

- Passenger movements that would be affected by a New York and nationwide curfew cited above amounted to 5 percent and 13 percent, respectively, of the daily total. Much of the night passenger travel makes use of the reduced night coach fare structure.

To adjust to curfews, a substantial number of operations might have to be shifted to earlier hours, which could result in congestion and delays. In addition, 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 system.

Unless federal action is initiated, the problem of airport noise will remain, and with increasing operations, will be exacerbated. At the end of 1975, only 494 of the 2,148 jet airplanes in the United States air carrier fleet, about 23 percent, complied with the noise standards of Part 36. Of those 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.*

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* The aircraft currently operating that do not meet Part 36, and an FAA projection of the non-Part 36 aircraft that will remain in commercial service in 1984 are set forth on page 58.

There has been definite progress to date in aviation noise control technology and its application as a result of the efforts and actions of the federal government. Since 1970, 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. But because of airport capacity and 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, will more than offset the reduction in noise levels resulting from the attrition of the older airplanes.

B. The Financial Problem

1. Ability of Airlines to Finance Aircraft Replacement

In recent years some major airlines experienced difficulty in obtaining the financing necessary for equipment and other plant needs; occasionally, they were short of the working capital they

need to continue operations. From 1970 to 1975, the trunk carriers spent $14.6 billion on capital needs, of which $8.7 billion was for aircraft, equipment and property, and $1.7 billion for leases of aircraft and engines. Most of the remainder went for debt payment. The sources of this financing were mainly depreciation ($5.7 billion) and long term debt ($4 billion), with earnings contributing only about $400 million. Equity issues were insignificant, and low earnings and the high proportion of debt led the carriers to finance new aircraft acquisitions through leasing. Also as a consequence of their poor earnings record, traditional sources of debt financing have been shut off to some carriers. Insurance companies and banks were unwilling or unable to make further commitments to some carriers and have stated publicly that, until the airlines' financial situation is sufficiently improved, new loans will not be forthcoming. In difficult times, carriers have also drawn down funds under revolving credit arrangements for use as working capital.

1974 and 1975 were particularly difficult periods for the industry. The sudden and substantial increase in fuel prices that began in 1974, accompanied by inflation in other cost categories, made it

necessary for the carriers to raise fares. This coincided, unfortunately, with the economic recession of 1974-75 when traffic was already declining, and drove traffic levels even lower. The airlines' problems were exacerbated by the existing economic regulatory system with its highly inflexible rules and artifical restrictions. The airlines were denied the pricing and management freedom to cope with their problems available to other industries.

To overcome these problems, the Administration recently submitted the Aviation Act of 1975, which would remove many of the economic regulatory restraints that presently frustrate the industry. Extensive hearings have been held on this bill, and prospects for enactment of significant reform are good. In addition, the financial performance of the airline industry has been showing some improvement since the end of the recession, and prospects for increased earnings over the next few years are good. Traffic growth is expected to resume, but at a long-term rate about equal to GNP growth, in contrast to more rapid rates of growth in the past. The airlines have few new aircraft on order, so traffic growth will have to be accommodated generally through increases in aircraft productivity. Thus, new capital needs until about 1980 will be low, load factors will increase, and earnings should be fairly stable at a relatively high level.

Beginning in the first half of the 1980s, however, traffic growth will strain fleet capacity and airlines will need substantial amounts of new capital to replace aging aircraft and meet capacity requirements for traffic growth. From 1976 to the end of 1985, we estimate that the trunk carriers will need between 700 and 800 new aircraft, and will require, according to estimates by financial and government analysts, from $22 to $30 billion for their purchase. Total capital needs will include about $6 billion for debt repayment and other uses. A median estimate of capital needs would therefore be $32 billion ($26 billion--the middle of the $22 to $30 billion range for aircraft purchases--plus the $6 billion). Depreciation and sales of used aircraft could be expected to generate about $15 billion in internal funds, leaving $17 billion to be financed through earnings and external sources. If earings in the period were to total as much as $6 billion (which would require a 9 percent return on equity, instead of the 2.8 percent return of the last five years), external financing needs would be $11 billion, and the airlines would probably be able to obtain this financing from conventional financial sources. The following table shows these estimates:

Possible Sources and Uses of Funds
1976-1985
(Billions of dollars)

Uses of Funds	
Property, Plant and Equipment	$26
Debt Repayment and Other	6
	$32
Sources of Funds	
Depreciation	$12
Sales of Used Aircraft	3
	$15
Amount to be funded through earnings and external sources	$17
Earnings Needed	6
External financing requirement	$11

Meeting these capital needs in this manner, however, will probably not be possible, if the needed earnings are not achieved by the industry. As indicated, such a 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 a prolonged recession, substantial increases in fuel or other costs, or other events which would materially affect the ability of the industry to earn a 9 percent return on equity.*

* Individual carriers with greater than average financing needs and lower than average ability to meet them will have even greater difficulty in obtaining needed funds.

The amount of investment required to meet the proposed noise regulations, which will be over and above the normal investment needs cited above, cannot be precisely determined at this time, as they depend on which aircraft the carriers will choose to replace and which they will choose to retrofit. If all noisy aircraft were retrofitted, the cost in today's dollars would range from approximately $870 million to $1.6 billion. Allowing for fleet attrition, replacement of 200 to 275 707s and DC-8s, and retrofit of remaining noisy aircraft in the fleet (including 75 DC-8s), the total cost may range from $4.4 to $6 billion. If all 707s and DC-8s remaining in the fleet are replaced, the cost would range from $5.5 to $7 billion.

In order to enable the accelerated replacement of these noisy aircraft in the time frame established by federal regulation, the trunk carriers' capital requirement during the ten-year period would be increased by $5.6 to $7.7 billion, assuming retrofit of 75 of the noisy DC-8s, an increase of 17 to 28 percent over and above the normal investment needs discussed above. Without the federal requirement, these capital costs would be spread out over a longer period of time. An incremental requirement of this magnitude is beyond the ability of the industry to finance over the next eight to ten years, since substantial capital requirements otherwise anticipated for the early 1980s will almost certainly absorb the carriers' total financing capability. The passage of the proposed Aviation Act of 1975 will create an atmosphere more conducive to financing, but many of the reforms will not begin to take effect until the 1980s. The bill was carefully phased to allow for a needed transition.

2. The Aerospace Industry

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 to meet the new economic, operating and environmental constraints dictated by rising labor costs, energy shortages, and changing market demands.

In past programs to produce a new aircraft, American manufacturers have had enough pre-production sales to U.S. airlines to provide a solid base for financing front-end costs and assure a near break-even position without foreign sales. This is no longer the case because of the financial condition of some of the U.S. airlines. Although the domestic airlines now need to purchase aircraft and will with increasing urgency need new aircraft for replacement of older, inefficient jets and for expansion to meet market growth, they are buying existing in-production aircraft in small numbers. Aircraft that are available now to replace four-engine jets are either improperly sized for the markets (e.g., 727s, 747s or DC-10s), or foreign aircraft such as the A-300-B, whose servicing back-up in the U.S. is uncertain. Replacement of the older four-engine aircraft is taking place today, even though the U.S. airlines would probably 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.

In view of the situation of the United States air carriers, the foreign market for aircraft sales is more important to the U.S. manufacturers today than it was one generation of aircraft ago, and will become even more important in the future. The air travel market in the United States is relatively mature with traffic growing slowly today, only a percent or so faster than GNP. In contrast, the air travel market in Europe and Japan is still in a stage of rapid growth, and the market in non-industrial nations, while just beginning to stir, has great potential. Therefore, between 1975 and 1985, we estimate that domestic requirements will account for about half of the total market of $100 billion (current dollars). International requirements will account for the other half.

In the past, commercial aviation has used technologies developed by military and aerospace research. This flow of technology is changing. In the last 10-15 years the technologies of military aerospace programs, even those that include aircraft procurement, have diverged quite sharply from those of commercial aircraft programs, although generic technologies, such as electronic control systems and composite structures, are first tested in military applications and then applied in commercial aviation. Federal aerospace research and development outlays as a percent of total national defense outlays and NASA outlays have declined about 30 percent over the last fifteen

years. Since 1968 (a peak period of aerospace industry activity), federal outlays in actual dollars for aerospace products and services have declined by about one-quarter.

At the same time, foreign aircraft manufacturers, particularly in France and England, but also in Germany and Japan, have been growing in size and competitiveness. Foreign governments are subsidizing the high-risk front-end development costs for their commercial aircraft manufacturers, making European aircraft relatively less expensive for the manufacturers to develop than a new generation U.S. aircraft. Moreover, the products of the European manufacturers, which used to compare unfavorably with competing U.S. aircraft, are now competitive in operating costs and performance to American aircraft. The A-300-B Airbus, produced by a German-French consortium, is a good medium-range airplane in the 250 seat category, and may prove competitive with American-made aircraft. Further increasing the problem, some major foreign airlines, such as British Airways, Air France, Lufthansa, formerly steady customers of American manufacturers, are being directed by their governments to buy aircraft from the European manufacturing consortiums. If the United States does not again produce clearly superior aircraft, that trend will continue.

Timing is a critical element if American manufacturers are to compete with other manufacturers for new aircraft markets. Unless the

American manufacturers can produce a new aircraft soon, it is unrealistic to expect that U.S. aircraft manufacturers will hold either their technological or world aircraft market share leads.

The consequences of such a blow to the United States manufacturers would be serious. The aircraft manufacturing industry has been, since the 1930s, an increasingly vital part of our national economy. It is a key element of our rapid technological growth; commercial aircraft sales are our second largest export in dollar terms, about $2.4 billion in 1975. Aerospace employment totals almost one million and contains many of the nation's most expert and sophisticated scientists, engineers and technicians. The industry is an important resource of skilled people and ideas for the entire economy.

Thus, the economic situation of the air carriers has an impact on other segments of the national economy that should be taken into account as we undertake a noise abatement program. How the carriers choose to comply with our noise rules can have long-range effects on the competitiveness of our national aerospace manufacturing industry.

IV. LEGAL FRAMEWORK

A. Legal Responsibilities of the Federal Government

The principal aviation responsibilities assigned to the Federal Aviation Administration, 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:

> In the exercise of his power and duties under this Act the Secretary of Transportation shall consider the following, among other things, as being in the public interest:
>
> (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; . . .
>
> (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), provides 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 constitution 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.

With the introduction of turbojet powered aircraft into commercial service in the 1960s, it became obvious that aircraft noise, already a major source of annoyance and public concern, was also becoming a constraint on the continuing development of civil aeronautics and the air transportation system of the United States. Out of concern for both the public welfare and the future of the system, the federal government in 1968,

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* 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 159.

sought -- and Congress granted -- broad authority to regulate aircraft design, equipment, and operation 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 manufacturered 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. The last step remains.

Part 36 is commonly misunderstood. Many believe that it established a federal standard of acceptable noise emissions. It did not. Part 36 set basically the quietest uniform standard possible, taking into account safety, economic reasonability, and technological feasibility. Many think it is a standard that all American aircraft must meet. It is not. Part 36 has to date been applicable only to newly manufactured aircraft

and is not applicable to two- and three-engine 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-aid grants for airport construction and development. Through its decisions whether to fund particular projects, the FAA has been able to a degree to assure 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 both in terms of percentage of project costs and the types of projects eligible for federal aid.

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* See p. 74 infra

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 are 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 have long been preempted by the federal assumption of authority in the area from prohibiting or regulating overflight for any purposes. That principle was extended 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 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 assure 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 responsibility 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, 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.

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 recognize 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 the extent to which Constitutional limitations would prevent some of the restrictions that have been imposed or proposed by proprietors in recent years remains unclear.

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. 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 inteference 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 same powers described in paragraph 2.

V. THE PROGRAM

Within the legal principles set forth above, this section explains in greater detail the program we intend to implement and our reasons for adopting it.

A. Quieting the Air Carrier Fleet

1. Federal Regulation of Existing Aircraft

It is clear that federal action is required to ensure compliance with 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. Thepurchasers 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 there are important differences among the airplanes that do not meet Part 36, it is useful to consider them separately.

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 constitute the noisiest single events (10 to 12 EPNdB over Part 36). They are perceived to be twice as loud as the new wide-body aircraft. They are particularly significant contributors to the overall noise level at the major airports with the most serious noise problems (i.e., Kennedy, Los Angeles, Miami).

Replacement or modification of these older four-engine jets must be given high priority. The retrofit solution to this problem lies in the addition of quiet nacelles, using sound absorbing material (SAM), which can reduce 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 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 depart 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.*

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

Airplane Type	Number of Operations	Percent	Percent Meeting Part 36 Noise Standards
707/DC8	2225	10	0
747	411	2	46
DC10/L1011	1340	6	100
727	9208	41	26
737/DC9/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 reduction in noise levels from retrofit is not as significant for single events as it is for the JT3Ds. A complete retrofit, including both engine and nacelle treatment (SAM) would lower significantly the noise level on approach.* We estimate that the cost of retrofitting all of these airplanes will be about $255 million in 1976 dollars. This is substantially less expensive than replacing them. Moreover, most of these airplanes have a long remaining useful life.

At busy airports, the constant repetition of these limited noise differences adds up to significant annoyance for many people. We have concluded that the pervasiveness of the two- and three-engine aircraft at noise-sensitive airports makes it essential that they be required to meet Part 36 noise levels in order to reduce the cumulative noise exposure contours around these airports.

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-

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* Noise data taken during typical line operations at airports in the New York area showed that 727-200 aircraft with full retrofit treatment operated at 6.5 EPNdB lower levels on approach than did 727-200 aircraft without retrofit.

engine aircraft alone. By requiring that both the two- and three- and the four-engine aircraft meet Part 36 noise levels, we will realize an average reduction of 2 NEF units at the 25 largest air carrier airports at the time compliance is completed, compared to a reduction of only .5 NEF units if only the four-engine jets were phased out or required to comply. Additionally, many more 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, 75 percent of the airports in the country would not receive any noise benefit and 85 percent would not receive any significant benefits.

Because these airplanes are not substantially noisier than the Part 36 limits as a single event, and because there are many airports where they could be used without creating significant noise problems, we have concluded that up to one-third of each air carrier's fleet need not meet Part 36 if they are used at air carrier airports that do not have a substantial noise problem.

There are also about 50 early 747s that do not meet Part 36 noise levels. Economics clearly make retrofit the most feasible alternative for these aircraft, which have a long remaining useful life, and a retrofit kit for these aircraft has been developed and produced.

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.	96.	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

Cost

One of our major considerations has been the cost of alternate means by which the airlines could meet the Part 36 noise levels. Our analysis of the airlines' capital costs of compliance follows.

The following table shows the FAA estimates of the number of noisy aircraft by type in the current fleet and the number anticipated to be in service at the end of 1984, with unit retrofit costs:

Type of Aircraft	Current Noisy Fleet as of End of 1975	Fleet at the End of 1984	Unit Retrofit Cost (1976 Dollars) ($000)
727	590	540	$ 225
737	157	140	300
DC-9	297	271	255
BAC 1-11	30	-	-
Total, 2 & 3 Engine	1,074	951	-
747	53	50	$ 250
DC-8 & 707	523	275-350	1,200-2,600
Convair	4	-	-
Total	1,654	1,276-1,351	-

It should be noted that the industry's cost estimates for retrofit of the four-engine jets are substantially greater. Boeing representatives have stated that the cost of retrofitting a 707 could start at $2.5 million and rise to $4.5 million if there are few orders. Douglas representatives have estimated the cost of retrofitting the DC-8 at $3.5 million.

We estimate the total cost of retrofit in 1976 dollars for each aircraft type, assuming all aircraft are retrofitted, to be as follows:

- $255 million for approximately 1,100 two- and three-engine aircraft.

- From $600 million to $1.3 billion for the approximately 500 four-engine aircraft other than 747s. A reasonable estimate of retrofit cost, assuming a substantial number of four-engine aircraft were retrofitted, would be from $1.2 million to $2.5 million per aircraft. The higher unit cost, as compared to the two- and three-engine retrofit, is a function of the greater difficulty of retrofitting these planes, the larger number of engines per aircraft, and the smaller total number of planes involved.

- The 50 747s would cost approximately $13 million to retrofit.

If four-engine aircraft are replaced, we estimated the cost of noise abatement to be:

- $400 to $450 million in 1976 dollars for retrofit of approximately 950 two- and three-engine aircraft, 50 747s, and approximately 75 four-engines that may be economical to retrofit.

- From $4.0 to $5.5 billion in 1976 dollars for accelerated replacement of the other 200 to 275 noisy four-engines expected to be in fleet after 1984.

- If the airlines choose to retrofit none of the narrow-bodied four-engine aircraft, then the cost of replacement increases to a range of from $5.5 billion to $7 billion in 1976 dollars.

Cost-Benefit Analysis

Despite the arguments that the variables and projections are uncertain, cost-benefit analysis is a useful tool to compare means of reducing aircraft noise. The analysis performed by the FAA indicates that replacement of all JT3D aircraft and retrofit of two-thirds of the JT8D aircraft will yield positive net benefits of $179 million to the airlines (in terms of present value, 1976 dollars if a 10 percent discount is used), whereas altering the scenarios by retrofitting the JT3D aircraft instead would cost them $259 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 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, as much as 30 percent for the new-technology models, compared to a fuel penalty of 1 to 2 percent with retrofit, resulting in a cost savings of over $1 billion during the program period or a reduction of 8 percent of the total jet fuel consumption of commercial aircraft.

- Replacement would also provide aircraft that will meet the new rigorous air pollutant emissions standards effective in 1979.

- Replacement would strengthen the aerospace industry, providing the ability 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 contributed more the the U.S. balance of payments than any other commodity except agricultural products. Foreign operators own over 500 JT3D airplanes for which there are not replacements sized for the markets being served. Most of these airplanes are ready to be replaced if a properly sized replacement were available.

- Replacement would provide many more jobs - each billion dollars in aircraft sales results in 60,000 job years generated.

- Replacement would offer to the carriers the advantage of more economic aircraft confugurations and range, as well as advanced technologies, including super critical aerodynamic concepts in wing airport and body design, lighter propulsion systems, improved safety from inflight control, and new metric materials. With enactment of the Aviation Act, 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 the four-engine aircraft are replaced with a new technology aircraft.

Time Frame

If some combination of replacement and retrofit is advantageous in bringing current airplanes into compliance with the noise standards of Part 36, what then is a reasonable time frame to require such action?

In establishing a deadline, the FAA has 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, 737s, and DC-9s, six to seven years to complete the 707s, and possibly as long as nine years to complete the DC-8s.*

*

Airplane	From Production Decision to First Kit Delivery	Production Rate Ship Sets Per Month	Number of Airplanes to be Retrofit** FAA Estimate	ATA Estimate
707	28 mos	22	235	222
DC8	36 mos	8.5	156	160
727	18 mos	38	609	562
737	18 mos	10	82	126
DC9	22 mos	15	315	323
747	12 mos	5	48	45

** Assuming none is retired and replaced, 1982 fleet estimate. FAA estimate November 1975, ATA estimate May 1976.

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 34 months, respectively, to design and certify 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 routine 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 the subsonic jet airplanes in domestic and overseas* service with maximum gross takeoff weight in excess of 75,000 lbs., that do not meet the present Federal Aviation Regulations Part 36 noise levels, except for one-third of the two- and three-engine aircraft. Those aircraft that must comply must meet those noise levels or be retired from the fleet in accordance with the following schedule:

747s within six years;
pure jets (early 720s, DC-8s and 707s) within six years;
727s, 737s, DC-9s, BAC 1-11s within six years; and
other 707s, DC-8s, CV-700s within eight years.

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* "Overseas" service is defined to include flights to U.S. territories outside continental United States.

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 the date of enactment of legislation necessary to ensure adequate financing. If such legislation is not enacted, full compliance will be required by 1987.

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 , the ICAO equivalent of Part 36. In the event that agreement is not reached within four years, then all airplanes operated by foreign carriers will be required to meet the noise level standards of Part 36 (Annex 16 for foreign manufactured airplanes) during the six year period thereafter at a rate of one-sixth of their fleet operating into the United States each year. The requirements applied to U.S. international flag carriers will not be any more stringent than those applied to foreign air carriers. Where U.S. air carriers serve both domestic and foreign routes, the international requirement will be applied only for that percentage of total operations that are in international sevice. These requirements may be superseded by agree-ment reached through ICAO, in which the United States concurs and which does not discriminate against U.S. carriers.

B. Financing Mechanism

If the carriers are to quiet their fleets in the optimal manner, they must not be constrained by inadequate financing. As stated above, the total cost of retrofitting the two- and three-engine jets and replacing the four-engine jets is estimated to be $5 to $8 billion. The cost is unevenly distributed among the carriers, falling most heavily on those that own most of the four-engine jets. For the reasons set forth in this statement, it is unlikely that those carriers with most of the four-engine jets could obtain funds to replace them in the accelerated time frame the government will rquire. Their financial problems are, moreover, worsened by the pricing system of the CAB, which bases rates on industry-wide historical costs and thereby does not provide for costs the will arise in the future.

In lifht of these considerations, we have reviewed various means by which the financing of the aircraft replacement program could be facilitated and have weighed the alternatives 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 money must be made available to enable the carriers to replace their existing four-engine jets with a new generation aricraft but not so much money as to encourage the purcahse of excess capacity. Third, federal involvement in any financing mechanism should be such that we do not disturb the mechanism of the private capital markets unduly. Fourth, the cost of transportation to the passenger and shipper should not be increased, if at all. After examining many alternatives, we have decided to support the following plan:

An Aircraft Replacement Fund would be established under the control of the SEcretary of Transportation. Financing of this Fund would be accomplished by one or the other of following options, whichever the Congress finds more desirable:

(1) For a ten year period, two percentage points of both the present eight percent passenger ticket tax and the present five percent cargo waybill tax will be deposited in a new Aircraft Replacement Fund; or

(2) The CAB would be asked to authorize an across-the-board two percent surcharge on domestic and overseas passenger tickets and freight waybills to be collected by the carriers and subsequently deposited in the Aircraft Replacement Fund. Concurrently, the present federal air passenger ticket and freight waybill taxes would be reduced from eight to six percent and from five to three percent, respectively.

Participating carriers would be entitled to a share of the Aircraft Replacement Fund in the proportion that their respective total system revenues bare to the total system revenues of all the carriers. Air carriers could apply to the Secretary certifying that their proposed aircraft purchases were in direct furtherance of this Aviation Noise and Aircraft Replacement Policy, and that conventional financing of at least two thirds of the purchase price had been arranged. Upon receipt of this certification, the Secretary would be authorized to make payment from the Fund directly to the aircraft manufacturer of not more than one-third the cost of replacement of aircraft that do not meet the Part 36 noise levels.

Revenues from the Fund could not be used to purchase more capacity than was being replaced, and the replaced aircraft could not be flown in the United States unless suitably modified. Any balances remaining in the after program objectives have been achieved would be deposited in the Airport and Airways Trust Fund and dedicated to noise control purposes (including land acquisitions and easements). Payment of the cost of retrofitting two- and three-engine airplanes ($350 million) would also be authorized from the Aircraft Replacement Fund.

It is anticipated that about $3 billion in inflated dollars would flow into the Aircraft Replacement Fund over the 10 years. This amount would finance approximately one-half of the cost, roughly $6.4 billion, of replacing some 200 to 275 of the 707s and DC-8s that would otherwise be in airline service at the end of 1984, the

earliest date by which the noise standards for four-engine aircraft must be met. The $3 billion is about 10 to 15 percent of the industry-wide capital requirements for this period.

Either financing mechanism, temporary adjustment to the Airport and Airways Trust Fund, or a reduction of the taxes feeding that fund accompanied by a special surcharge on passengers and shippers, places the burden of complying with the noise regulation on passengers and shippers, the users of air service. Neither financing mechanism, however, increases the cost of air transportation.

Either financing mechanism will provide, in ten years, a steady stream of cast totaling at least $3 billion. Additionally, the small redistribution of revenues (about 15 percent) supplies more funds to those carriers with the most four-engine jets. This redistribution is necessary because of the difficulty of imposing the surcharge on international aviation without an international agreement. Even without such an agreement, U.S. flag carriers should participate in the replacement program in order to achieve the desired noise reduction benefit and to avoid being placed at a competitive disadvantage with domestic carriers that are seeking new international routes. Without this arrangement, the U.S. flag carriers with the most four-engine aircraft would be proportionally disadvantaged. Moreover, the redistribution of revenues away from carriers that do not need the funds will help prevent the purchase of excess capacity. These features should enable the carriers to place orders for a new design aircraft. But, because the fund would

supply only a fraction of the money that the carriers will need to replace aircraft in the 1980s, we do not believe that it unduly interferes with private capital markets or encourages excess capacity. With better prospects for long-term sales, the manufacturers will commit sooner to new design aircraft that will save fuel and reduce noise better than the other alternatives.

As of June 30, 1976, the Airport and Airway Trust Fund had a cash on hand balance of $2,550 billion and an uncommitted balance of $1,255 billion. Estimated airway user tax revenues flowing into the Trust Fund over the period 1977-1980 are almost equivalent to the authorized program levels financed from the Trust Fund over the same period. Because of the significant interest earnings which the Fund receives from the investment of its large cash balances, the Trust Fund balances should continue to grow at a rate in excess of $200 million per year through 1980. In fact, if airway user taxes are unchanged through 1980 and all program funded from the Trust Fund are continued at the full authorized levels, the cash on hand balance would grow to approximately $3.5 billion and the uncommitted balanced would reach about $2.1 billion by the end of fiscal year 1980. If all TRust Fund programs remain fully funded, but the passenger ticket tax and freight waybill tax were to be reduced by 2% each effective June 1, 1977, these balances would be only about $350 million less at the ned of fiscal year 1980 than they are today.

C. Protecting the Airport Environment

There are over 13,000 public airports are 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.

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* 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.

The variety of airports in the United States demonstrates that the full extent of the noise problem associated with airport operations cannot be generalized. The problem must be approached on an airport-by-airport basis, and all levels of government and the private sector should perform within that framework.

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 decisionmaking 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 investment in source noise reduction 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 having 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 often does not have zoning authority, the proprietor is the local party in the best position to assess the need for it and to press the responsible officials into action. Appropriate action does extend, in some instances, to acquisition of land itself.

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 promote and secure land use that is compatible with present and projected aircraft noise exposure in the area. They should work closely with airport operators 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 a reasonable set of assumptions about the shrinkage in NEF contours that will occur as a result of the federal action.

State and local governments also should 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.

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 in the 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.

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

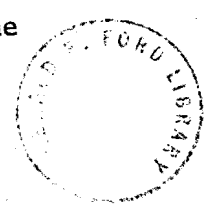
Federal Assistance for Airport Noise Abatement Planning

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 or otherwise provided for. 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 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 implemented by the FAA by applying the foregoing principles. Under the Airport and Airway Development Act, assurances have been and will be required of airport proprietors who request and receive federal funds, that action is taken to implement compatible land use controls around airports.

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 suppressing 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 today 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.

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* For example, in a January 23, 1968, interim report on the national airport system, the Aviation Subcommittee of the House Committee on Interstate Commerce wrote:

> Jet aircraft noise at the Nation's airports has become increasingly annoying to persons living around the airports. The noise problem affects airport and runway locations, the flight patterns in and out of airports, and the total amount of airport development cost. The federal government's role in the effort to alleviate airport noise has thus far been limited to the expenditure of substantial sums of money for research and development of a quieter jet aircraft engine, noise abatement procedures, and compatible land-use planning.
>
> The subcommittee does not believe the problems relating to airport noise should be interwined with the question of airport financing.

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 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. All proposals to make airport noise planning mandatory or condition ADAP funding, or the imposition of use restrictions on the preparation of a plan, were rejected because we have not had sufficient experience with noise abatement planning to be confident that such a requirement would not result in wasteful and unnecessary planning by many airports that either do not have serious noise problems or 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 incentive 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.

The objective of this policy is to promote a planning process through which the airport operator 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.

Although FAA will not prescribe 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 plans prepared under this policy should be to develop noise reduction techniques which 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.

In developing an airport noise control plan, the airport operator 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; and

(4) establishment of landing fees based on aircraft noise emission characteristics related to 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 for FAA 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;

(7) displaced runway threshold; and

(8) pilot training for noise abatement.

e. Actions an airport proprietor can implement, after providing an opportunity 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 - e.g., banning all jets or all non-Part 36 jets; and

(d) any combination of the above.

The existence, operation and development of an airport provides a service to and is interrelated with both the local community and the 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 the 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 endeavor to 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 at the conslusion of 18 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 plan 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 widespread disruption throughout them. With the general federal interest in the free flow of interstate and foreign commerce, the constitutional duty to regulate it, the constitutional principle that states and local entities may not impose undue burdens even where Congress has not acted, and the specific FAA responsibility for regulating the entire 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 be inclined to 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, it 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 impose a use restriction, by contrast, rests with the airport proprietor. We encourage airport proprietors to consult and review such proposals with all the air carriers and other airport users. 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 should apprise the Federal Aviation Administrator of their decision to impose an airport use restriction. If possible, such notification should be made a reasonable time in advance of the date the restriction is to be imposed. 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 his decision to adopt 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.

Cooperation with this review program 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 operators 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 curae 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. In such cases, the United States may institute or support litigation challenging an unacceptable use restriction.

D. 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 proposes to reduce the Part 36 noise levels for future design aircraft (NPRM 75-37 issued October 29, 1975). 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.

Using information available 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 with effectively complement the reduction of aircraft noise emissions. For example, operational controls

that apply reduced thrust settings near the ground will augment the noise reduction achieved through retrofitting because with the sound absorbing material or "quiet nacelle" retrofitting of JT3D and JT8D aircraft the noise reduction achieved becomes more effective at lower thrust levels.

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 substnatial 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, there are two standardized operational procedures under consideration by the FAA that particularly complement retrofitted aircraft. One procedure is for takeoff and another for approach. The EPA has previously proposed and the FAA has under analysis 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^{o}) during the early stages of approach, followed by stabilization of the aircraft on the normal 3^{o} glide slope for final approach and touchdown. During the steeper portion of the approach, the aircraft

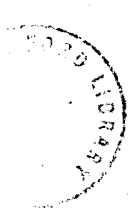
is higher from the ground and requires less engine power, thus achieving noise reductions at more distant points on the approach pattern. This procedure has been criticized considerably by the airlines and pilots as inherently unsafe. An alternative approach procedure entails the use of the minimum certificated flap-setting, which reduces aerodynamic drag and consequently requires less engine thrust, thereby reducing engine noise. It is a promising alternative to the two-segment concept. The FAA will promulgate final regulations on approach procedures within three months.

Several opinions exist regarding the best noise abatement departure procedure following liftoff of civil aircraft. The FAA currently recommends in Advisory Circular 91-39 (January 18, 1974) a procedure, generally used by members of the ATA, that incorporates a reduction in an engine power at an altitude of 1500 feet above ground level after takeoff with subsequent acceleration and climb at "normal climb power" after passing through 3000 feet. Northwest Airlines regularly uses a different departure procedure, in which the airplane is accelerated at normal climb power at an early stage in the climb-out followed by a larger power reduction than with the Advisory Circular procedure. Both procedures have merit, depending on the location of noise sensitive areas beneath the departure path. Regulatory action will be completed within nine months.

Different departure procedures may have noise reduction advantages under different conditions and at different locations. Selection of the optimum departure procedure is best determined for individual airports, considering the orientation of runways, local geographic configurations, and the locations of noise sensitive areas. Such selection, whether initiated or recommended by airplane operators, airport proprietors, or anyone else, must of course be approved by the FAA, after consideration of factors of flight safety, air traffic control and airspace management.

Similarly, restrictions on minimum altitudes are also an FAA actions that must be determined by considerations of flight safety and air traffic control, rather than exclusively by noise abatement considerations. Over noise sensitive land areas, however, noise benefits are and will continue to be weighed in tailoring local operating procedures. The FAA is presently in the process of evaluating various proposals for aircraft operating noise abatement procedures to determine whether they are 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.

It must be clearly understood that, although much can be gained by operational procedures, they are <u>not</u> alternatives to reducing noise at the source by replacing or retrofitting the noisier airplanes



and by imposing stricter noise requirements on new-design aircraft. Noise abatement operational procedures can complement source noise reductions to achieve maximum noise reduction benefits.

3. Federal Research and Development Technology

As is the case with most fields of technology, continuing research and development on aircraft 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 in the aircraft's engines by two major sources; first the external turbulent jet exhaust and second, 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 models 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 absorbtive 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, shows potential for further reductions in engine noise levels through better designs of the internal compressors and more efficient mixing of exhaust streams. Additionally, decreased aircraft weight through the use of composite materials, more efficient wing designs, and more effective control surfaces (flaps, spoilers, etc.) require less engine thrust for safe flight, thereby providing further noise reductions. In summary, the technology for use in the next generation of commercial airplanes should provide a four to eight decibel reduction below current noise standards.

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.

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.

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

E. Private Sector Responsibility: Carriers, Travelers, Airport Neighbors

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 should 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 and flight paths 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 be taken to minimize its effect on people. Recognizing that individual and community responses to aircraft noise differ substantially and that for some individuals, reduced level of noise 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.

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

JUL 2 1976

MEMORANDUM FOR THE PRESIDENT
The White House

Subject: Aviation Program

The Administration has a unique opportunity to propose an innovative aviation program managed by the private sector to reduce airport noise, stimulate private financing of new aircraft, increase employment in the depressed aeronautical manufacturing industry, advance aircraft technology, and preserve the American share of the world aircraft market which is now being challenged by the Europeans.

The Department of Transportation submitted to the Office of Management and Budget on June 1 a proposed Aviation Noise Policy Statement. This Noise Policy placed the primary responsibility on the airport proprietors and state and local governments to take action to reduce airport noise by locating airports outside populated areas, by assuring compatible land use and zoning, and by acquiring land around airports. The policy further clarifies the responsibility of the federal government to reduce aircraft noise at its source both by promulgating noise standards for new airplanes and by bringing the 75% of the existing fleet that does not now comply with federal noise standards into compliance within eight years. This policy statement is currently in the process of interagency review. I urge that the statement be approved, with certain refinements.

Bringing the current aircraft fleet into compliance with federal noise standards will require special financing arrangements. The Department of Transportation recommends that airlines be permitted to collect a 2% surcharge on airline tickets for domestic flights for ten years and use these funds primarily as down payments for the replacement of the oldest, noisiest four engine jets in the commercial fleet. 1/ The

1/ A 2% surcharge on domestic tickets for a ten year period would raise about $3 billion, which is almost one-half of the cost of replacing those old noisy four engine airplanes that would remain in the fleet at the end of 1984, the date when full compliance with federal noise standards would be required. If, after further analysis within the Administration, we reach agreement that this objective may be achieved with less financing, then we could reduce the number of years or the surcharge percentage. Several options along these lines are described in the attachments.

carriers, not the federal government, would operate the fund, and they would have maximum flexibility in determining how to use the funds. At the same time the surcharge is imposed, the domestic passenger ticket tax collected for the Airport Trust Fund would be reduced by 2%. Other collections for the Trust Fund would remain the same. The Trust has accumulated a surplus that now exceeds $1 billion. If the ticket tax continues to be levied at its present rate, the surplus will exceed $2 billion by 1980, assuming full funding of all current authorizations. Although we would prefer to broaden the uses of the Trust Fund to include maintenance of the air traffic system, Congress has permitted this only to a limited extent. Eventually, the surplus will either become a target for unjustified spending proposals or the tax will be reduced. Of course, the moment the tax is reduced, the airlines probably would apply to the CAB to increase their fares by a like amount, but it is doubtful that the CAB would permit the increase, and if it does, there would be no direction as to how the increase is spent. I believe that this proposal is sound public policy because it prevents an increase in the cost of air travel while dedicating resources to the attainment of important national objectives. It is also my judgment that Congress will accept an Administration proposal to reduce the ticket tax by 2% to 3%.

We recommend further that the Administration seek legislation to authorize the expenditure of an additional $350 million from the existing Trust Fund surplus to quiet some of the newer two and three engine airplanes. The Congress will then have the opportunity to consider whether the retrofit of the newer airplanes with sound absorbent material provides sufficient noise reduction to be worth the cost. 2/

I would like to highlight for you some of the advantages of this program:

Minimum Federal Involvement: Use of a surcharge collected and managed by the carriers with CAB approval avoids direct and continuing federal involvement in private sector capital investment decisions.

2/ Alternatively, we could include the cost of retrofitting these two and three engine planes in the CAB-approved fund that would be used for aircraft replacement and avoid the need to seek specific legislation to authorize the expenditure of trust funds.

- The financial burden will be placed on airline users rather than on the general public.

- A surcharge avoids use of general federal revenues.

- The airlines collect the surcharge, determine the distribution formula, and decide whether they prefer to replace or retrofit airplanes.

New Technology: Stimulating private financing for aircraft replacement will provide the estimated $1 billion needed for Boeing to develop the 7X7 and $500-$800 million for McDonnell-Douglas to build to DCX200. A new generation of U.S. manufactured airplanes is presently stalled at the design stage because U.S. air carriers have not been able to finance new airplanes.

Employment: Aircraft replacement will generate jobs in the aerospace and related industries.

- An accelerated replacement program by the airlines that generates about $12 billion dollars in aircraft sales, including sales abroad, would create over 240,000 jobs in the aerospace and related industries.

- Aircraft orders could reverse the heavy unemployment of the scientists and engineers in the commercial jet manufacturing industry.

- Immediate aircraft replacement would prevent a major shift of jobs to European countries whose manufacturers have captured a larger share of the aircraft market.

Exports: Accelerated production of these airplanes will help American manufacturers remain competitive in the world market.

- Aerospace products have been, in recent years, an important export of the United States, equaling 7% of the total in 1974. Twenty-seven percent of 1974 U.S. aerospace sales in 1974 were exported.

- European governments are now subsidizing their aerospace industries. (France's 5 year plan for 1971-75 contained a $220 million annual subsidy for its aerospace industry).

- European aerospace manufacturers are beginning to produce aircraft, for example, the A-300-B, that will take sales away from U.S. manufacturers if U.S. companies do not produce new aircraft soon.

Energy: Production of a new generation of planes will promote energy conservation by improving fuel efficiency about 30% over the older four engine planes.

Better Air Service: New generation airplanes are more cost efficient to the airlines.

- New technology airplanes will be more efficient to the carriers than the older aircraft in terms of seats, range and operational characteristics (easier maintenance, increased reliability of systems).

- Improved air service would be achieved without a significant increase in cost to users since DOT, as part of its proposal, requests a 2% reduction in the ticket tax collected for the Airport Trust Fund.

Noise Reduction: Affirmative federal action to reduce aircraft noise by the early retirement of the noisiest, oldest four engine jets (about 500 B-707s, DC-8s) and the retrofit of some of the newer two and three engine jets (B-727, B-737, DC-9) is necessary.

- New aircraft containing new noise control technology would reduce by more than two-thirds the land area and number of people presently impacted by noise problems for six million Americans, helping to forestall increasing damage suits against airports.

- Proliferation of curfews and other airport use restrictions that increasingly threaten to interfere with interstate commerce and disrupt the air traffic system will be deterred.

Air Quality: New airplanes will comply with engine pollution standards to be in effect in 1979.

I believe this proposal offers you an opportunity to address affirmatively a number of serious environmental, energy, transportation, export promotion and employment problems with minimal federal involvement and maximum private sector flexibility. If you approve the concept generally, I hope to work closely with my colleagues in the Cabinet to refine and improve the proposal to enable you to announce it as soon as possible.

William T. Coleman, Jr.

Enclosures:

Preferred financing proposal

Alternative financing proposals

Backup paper on financing aircraft noise reduction

DEPARTMENT OF TRANSPORTATION

AVIATION NOISE FINANCING

DOT recommends a financing plan with the following key elements:

1. CAB would be asked to approve, and the Executive Branch would support (perhaps with an expression of Congressional desire), an across the board surcharge for 10 years of 2% on domestic passenger tickets and freight waybills. The airlines would be required to deposit the revenues from the surcharge in an Aircraft Replacement Fund.

Effect:

About $3 billion (in inflated dollars) would flow into the Aircraft Replacement Fund over 10 years. This amount would finance approximately one-half of the cost (roughly $6.4 billion) of some 200 to 275 of the B-707s and DC-8s that would otherwise be in airline service at the end of 1984, when the noise standard applies to those aircraft.*

2. The Aircraft Replacement Fund would be managed by intercarrier agreement under which each carrier would have entitlements to the Fund in proportion to its total system passenger and cargo revenue.

Effect:

Administration of the Fund by the airlines would minimize federal involvement.

3. The federal air passenger ticket and freight waybill taxes would be reduced from 8% to 6%, and from 5% to 3%, respectively.

* The amount of $3 billion to be collected through the surcharge has been chosen because it is the sum that commercial banks have indicated to the airline industry would be required to induce their participation in financing an early aircraft replacement program. DOT is, however, conducting an analysis to ascertain whether some lesser amount might induce the participation of the financial community. Upon completion of that analysis the recommendation as to the duration of the 2% surcharge will be adjusted so that the collection will yield the amount deemed necessary.

I believe this proposal offers you an opportunity to address affirmatively a number of serious environmental, energy, transportation, export promotion and employment problems with minimal federal involvement and maximum private sector flexibility. If you approve the concept generally, I hope to work closely with my colleagues in the Cabinet to refine and improve the proposal to enable you to announce it as soon as possible.

Bill

William T. Coleman, Jr.

Enclosures:

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Effect:

The lower user taxes flowing into the Airport and Airway Trust Fund would cover all outlays chargeable to the Fund under the ADAP bill. (An amendment would be needed to permit the use of uncommitted balances ($1.4 billion) to finance the full annual authorizations included in the ADAP Act.)

Once the pending ADAP bill is enacted without a tax reduction, unused Trust Fund balances would grow rapidly (to $1.7 billion by 1979) and become a target for tax reductions or unjustified spending proposals.

From a national interest point of view, the use of these excess revenues to help meet environmental and broad economic objectives is a sound and defensible policy alternative.

4. Any balances remaining in the Fund after program objectives have been achieved would be deposited in the Airport and Airway Trust Fund and dedicated to noise control purposes (including land acquisitions and easements).

5. The cost of retrofitting two and three engine airplanes will be paid from the Airport and Airway Trust Fund.

Effect:

About $350 million (inflated dollars) will be taken from the Trust Fund for retrofit.

Attachments:

1. Effect of Aircraft Replacement Fund on carriers' finances.
2. Estimated Aircraft Replacement Fund revenues, 1977-1986.
3. (A&B) -- Impact on airport/airway fund of lower tax rates.

ALTERNATIVE OPTIONS FOR AVIATION NOISE FINANCING

The following options might be considered as alternatives to DOT proposal to facilitate replacement and retrofit of aircraft that do not comply with the FAA noise standards:

Option #1

1. CAB would be encouraged through an expression of legislative intent to permit an environmental surcharge of 2% on domestic passenger tickets and freight waybills for 5 years. Revenues from the surcharge would be placed in an escrow fund to be used primarily for replacement of 4 engine aircraft.

Effect:

About $1.4 billion would be provided for the replacement fund over 5 years.

2. The replacement fund would be managed by the airlines under an inter-carrier agreement.

Effect:

Administration of the replacement fund by the carriers would keep federal involvement to a minimum.

3. The replacement fund would be disbursed as follows:

- - 50% would be distributed in cash to the participating airlines in proportion to the surcharges each contributes to the fund;

- - 50% would be used as a loan guarantee fund with the

entitlement of each participating carrier computed on the basis of its total system revenues. Loan guarantees would be authorized up to three times the amount of each airline's entitlement.

Effect:

About $1.4 billion in cash would be available to carriers.

Use of a loan guarantee fund enables carriers to obtain financing for new airplanes.

4. Any unused balance in the loan guarantee fund after all loans have been paid off will be placed in the Airport and Airways Trust Fund.

5. The tax on passenger tickets and freight waybills collected for the Airport and Airways Trust Fund would be reduced by 2% for 5 years.

Effect:

A reduction in the ticket tax to balance the surcharge prevents the cost of air transportation from increasing.

6. Appropriations would be authorized from the Airport and Airways Trust Fund to pay the cost of retrofitting those non-FAR 36 aircraft which the airlines elect to retain in domestic service, rather than replace or retire them.

Effect:

The cost of retrofitting 2/3 engine airplanes is estimated to be about $350 million (in inflated dollars). If the airlines choose to retrofit the approximately 75 four-engine aircraft which may be economic to retrofit

then the cost would increase by $225 million.

Option #2

1. The CAB would be encouraged to approve a 2% surcharge for 7 years on carriers' domestic passenger tickets and freight waybills. Revenues from the surcharge would go into a replacement fund.

Effect:

About $2 billion in revenues, 30% of the approximately $6.4 billion needed to replace 4 engine airplanes would flow into the replacement fund.

2. The replacement fund, managed by the airlines under an inter-carrier agreement, would be distributed according to the amount each carrier contributes.

Effect:

Administration of the fund by carriers minimizes federal involvement.

Funds could be used for purchase of any type of new aircraft.

There would not be any cross subsidy or pooling of funds.

3. International carriers and the portion of a domestic carrier's airplanes used in international service (determined by the proportion its international revenues bear to total revenues) are exempt from the domestic standard and do not participate in the domestic Aircraft Replacement Fund.

Effect:

About one-third of TWA's and almost all of Pan Am's fleet would be exempted. The exempt portion of an American carrier's fleet would come within the international fund (6 below).

4. Any balance in the replacement fund at the end of the 7 year period would be placed in the Airport and Airways Trust Fund.

5. The tax on passenger tickets and freight waybills collected for the Airport and Airways Trust would be reduced by 2% for 7 years.

Effect:

A reduction in the ticket tax that corresponds to the surcharge will not increase the cost of air transportation.

6. A surcharge on all international tickets and waybills would be collected to facilitate replacement of 4 engine airplanes in international service for both domestic and foreign carriers. A distribution formula would be worked out through ICAO.

Effect:

Separation of domestic and international operations prevents uneven treatment of either domestic or foreign carriers.

7. Appropriations would be authorized from the uncommitted balance ($1.4 billion) in Airport and Airways Trust Fund to pay for retrofit of 2/3 engine airplanes.

Option #3

1. Require the carriers to submit a plan within 6 months after a noise rule takes effect stating the number of airplanes they intend to retrofit and the number they intend to replace.

Effect:

The FAA, airframe manufacturers, and airlines will know the estimated demand for retrofit kits and new airplanes and can estimate the costs.

2. An escrow fund would be created and would receive moneys from two sources:

- - the $1.4 billion surplus in the Airport and Airways Trust Fund;

- - a 1% surcharge approved by the CAB to be levied on domestic passenger tickets and freight waybills.

Effect:

About $2 billion would be placed in the fund in 5 years. Of this amount, $1.4 billion would be available immediately to be used for replacement.

The carriers would decide how they would meet the noise requirements.

3. Disburse the funds as follows:

- - Estimate the retrofit costs and set the amount necessary to meet them aside;

- - Allocate the funds remaining after retrofit equally among the airplanes to be replaced.

Effect:

The total cost of retrofit ($350 million in current dollars) would be covered.

About $1.6 billion, approximately 25% of the amount needed to replace 4-engine airplanes (roughly $6.4 billion), would be available for that purpose.

ATTACHMENT 1

EFFECT OF AIRCRAFT REPLACEMENT FUND ON CARRIERS FINANCES -

CARRIER CONTRIBUTION AND ENTITLEMENT
(Dollars in millions)

Carrier	Contribution (2% Passenger & Waybill Surcharge- 10 Years, 1977-1986)	Number of Non-Complying 707's & DC-8's	Total Entitlement 1/	Entitlement less Contribution
Trunk				
American	$ 424.8	91	$ 377	$ (47.8)
Braniff	119.8	11	124	4.2
Continental	132.5	5	112	(20.5)
Delta	384.0	34	299	(85.0)
Eastern	357.1	-	342	(15.1)
National	83.2	-	75	(8.2)
Northwest	162.3	10	171	8.7
Pan American	28.7	79	353	324.3
Trans World	319.4	90	379	59.6
United	598.3	100	469	(129.3)
Western	126.2	23	109	(17.2)
Total Trunk	$ 2736.2	443	$ 2810	$ 73.8
Local Service				
Allegheny	$ 103.5	-	$ 80	$ (23.5)
Frontier	41.2	-	37	(4.2)
North Central	39.6	-	34	(5.6)
Ozark	31.5	-	28	(3.5)
Piedmont	35.9	-	28	(7.9)
Air West	44.0	-	38	(6.0)
Southern	26.3	-	25	(1.3)
Texas International	15.8	-	17	1.2
Total Local Service	$ 337.8	-	$ 287	$ (50.8)

1/ Total entitlement is determined by distributing the funds collected among carriers, on the basis of the proportion that each carrier's system revenues bear to the total of all revenues collected by the carriers.

Carrier	Contribution (2% Passenger & Waybill Surcharge- 10 Years, 1977-1986)	Number of Non-Complying 707's & DC-8's	Total Entitlement	Entitlement less Contribution
Cargo				
Flying Tiger	31.1	16	8	(23.1)
Seaboard	17.4	11	46	28.6
Airlift	4.5	5	24	19.5
Total Cargo	$53.0	32	78	25.0
Other				
Supplemental Carriers	48.2	31	92	43.8
Intrastate Carriers	125.5	-	42	(83.5)
Hawaiian	14.8	-	11	(3.8)
Aloha	11.5	-	7	(4.5)
Total Other	$200.0	31	152	(48.0)
TOTAL	$3327.0	495	3327.0	- 0 -
Other Carriers[2/]		17		
TOTAL		523		

2/ Includes commercial operators and flying clubs. Revenue contribution and entitlements for these carriers are not provided due to lack of revenue data.

Attachment 2

REVENUE COLLECTIONS - AIRCRAFT REPLACEMENT FUND

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Ten Year Total
AIRCRAFT REPLACEMENT FUND											
2 Ticket Surcharge	224	244	258	271	284	303	322	341	360	377	2484
2% Waybill Surcharge	22	26	28	32	36	38	38	40	40	42	342
Total	246	270	206	303	320	341	360	381	400	419	3327

5/27/76

CASE A. EXISTING TAX STRUCTURE, LATEST CONFEREE COMPROMISE ON ADAP & MAINTENANCE

(In $ Millions)

	1976	TQ	1977	1978	1979	1980	1981
Beginning Uncommitted Balance	889	1269	1378	1520	1693	1892	2105
Plus Trust Fund Revenues	969	254	1046	1128	1205	1268	1338
Subtotal	1858	1523	2424	2648	2898	3160	3443
Less: ADAP	412	103	525	555	590	625	
Maintenance	-	-	250	275	300	325	
F&E	250	62	250	250	250	250	
RE&D	68	18	77	85	90	95	
Subtotal	1128	1340	1322	1483	1668	1865	
Plus Estimated Interest *	141	38	198	210	224	240	
Ending Uncommitted Balance	1269	1378	1520	1693	1892	2105	

* Interest for FY 1976 and the transition quarter is as shown in the FY 1977 Budget; interest thereafter is calculated at 8% of average cash balance.

Beginning Cash Balance	2013	2393	2502	2644	2817	3016	3229
Plus Revenues Less Expenses	239	71	-56	-37	-25	-27	
Ending Cash Balance	2252	2464	2446	2607	2792	2989	
Average Cash Balance			(2474)	(2625)	(2804)	(3002)	
Interest	141	38	198	210	224	240	
Balance Carried Forward	2393	2502	2644	2817	3016	3229	

CASE. B. 6% PASSENGER TICKET TAX, 3% WAYBILL TAX, LATEST CONFEREE COMPROMISE ON ADAP & MAINTENANCE

(In $ Millions)

	1976	TQ	1977	1978	1979	1980	1981
Beginning Uncommitted Balance	889	1269	1378	1276	1165	1038	884
Plus Trust Fund Revenues	969	254	811	874	932	981	1035
Subtotal	1858	1523	2189	2150	2097	2019	1919
Less: ADAP	412	103	525	555	590	625	
Maintenance	-	-	250	275	300	325	
F&E	250	62	250	250	250	250	
RE&D	68	18	77	85	90	95	
Subtotal	1128	1340	1087	985	867	724	
Plus Estimated Interest *	141	38	189	180	171	160	
Ending Uncommitted Balance	1269	1378	1276	1165	1038	884	

* Interest for FY 1976 and the transition quarter is as shown in the FY 1977 Budget; interest thereafter is calculated at 8% of average cash balance.

Beginning Cash Balance	2013	2393	2502	2400	2289	2162	2008
Plus Revenues Less Expenses	239	71	-291	-291	-298	-314	
Ending Cash Balance	2252	2464	2211	2109	1991	1848	
Average Cash Balance			(2351)	(2254)	(2140)	(2005)	
Interest	141	38	189	180	171	160	
Balance Carried Forward	2393	2502	2400	2289	2162	2008	

7/2/76

BACKUP PAPER ON FINANCING AIRCRAFT NOISE REDUCTION

I. INTRODUCTION

- There are four parts to the aircraft noise problem:
  - -- One, an unacceptably high level of noise at major U.S. airports, and the resultant pressure for a responsible Federal Government noise-reduction program.
  - -- Two, the inability of much of the airline industry to obtain conventional financing to undertake a noise reduction program.
  - -- Three, the present unavailability of new-generation aircraft as suitable replacements under the program.
  - -- Four, declining employment in the U.S. aerospace industry, and threatening encroachment of government subsidized foreign competition on the U.S. share of the world aerospace market.

II. DEFINITION OF THE PROBLEM

A. The National Airport Noise Problem

- Aircraft noise has become a serious problem at seven key U.S. airports and a considerable irritation and annoyance at about one hundred more, derogating the quality of life for 6 to 7 million citizens. Pressure from airport operators and consumer groups compel action by the Federal Government in order to avoid:
  - -- Curfews at major airports, which would interfere with air commerce and disrupt our national air system by delaying mail and cargo, and requiring expensive and difficult repositioning and rescheduling of aircraft.
  - -- Billions of dollars in potential law suits and/or land acquisitions.
  - -- Federal preemption of local restrictions and the resultant Federal liability for claims against local airport operators.
- To correct the noise problem, DOT proposes issuance of a regulation requiring operators of the aircraft not meeting FAR 36 standards to comply with these standards within a 6- to 8-year period, depending on aircraft type, by retiring and replacing them except in the case of newer aircraft for which noise retrofit is being sought.

- There are 2,148 jet aircraft in the U.S. commercial fleet today. Of these, 77 percent, or 1,654 planes, exceed FAR 36 standards. These consist of approximately 500 1960-vintage four-engine aircraft, 1,100 more recent two- and three-engine aircraft, and 50 early 747's. Relatively few of the noisy aircraft are found in the fleets of the all-cargo and supplemental carriers. The majority are owned by the trunk carriers; four trunks--American, Pan Am, TWA, and United--account for nearly two-thirds.

- If all 1,654 noisy aircraft were retrofitted, the cost in today's dollars would range from approximately $870 million to $1.6 billion:

  -- $255 million for the 1,100 two- and three-engine aircraft (at an average cost of over $200,000 per aircraft).

  -- From $600 million to $1.3 billion for the approximately 500 four-engines (not including the 747's). The cost of these kits--which have not yet been developed--is estimated to range from $1.2 million to $4.5 million, depending on certain assumptions, the most important of which is the number of aircraft to be retrofitted. A reasonable estimate, assuming all four-engines were retrofitted, would be from $1.2 million to $2.5 million per aircraft. The higher unit cost, as compared to the two- and three-engine retrofit, is a function of the greater difficulty of retrofitting these planes, the larger number of engines, and the smaller numbers of planes involved.

  -- The 50 747's would cost approximately $13 million to retrofit.

- Retrofit is conceded to increase operating costs for most narrow-bodied four-engine aircraft, and it is expected the airlines will choose to replace rather than retrofit these aircraft. The kits are expensive and would add nothing to the useful life of the planes. The airlines have indicated it would be economically preferable to replace almost all with a quieter, more efficient aircraft, if one were available, contingent upon obtaining the necessary financing.

- Not all the four-engine aircraft in the fleet today will be in the fleet at the end of 1984. But not all will have been retired either. Between now and then, it is expected that the airlines will purchase on the order of 700 additional aircraft* to meet

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* Projecting the composition of individual carrier fleets and the total U.S. fleet 8 years into the future is a difficult, complicated exercise, requiring considerable amounts of judgment as to carrier decisions, as well as quantitative data. The figures included in this paper are preliminary and may be revised; however, the relationships and the ranges are firmly established and can be used with reasonable confidence.

anticipated traffic growth and to replace worn out, uneconomic aircraft (additional requirements resulting from Federal noise reduction policies not included). Several points central to the program should be noted here:

-- The airlines are not expected to need a significant number of new aircraft before 1980 or 1981. Existing aircraft, combined with orders currently on the books and supplemented only slightly by additional purchases, should handle projected traffic increases until then. In addition, because of their poor financial condition, some carriers will find it difficult to obtain financing for new equipment. For this and other reasons, the carriers can be expected to postpone replacement orders until they become absolutely necessary.

-- On the other hand, to meet the 1984 noise regulation with a new technology aircraft, the airlines would have to place firm orders for such aircraft in the next 12 to 18 months. Thus, there is a gap of from 2 to 3 years between the investment decision the airlines would make in the normal course of events--absent a noise regulation--and the accelerated decision they must make to comply with the noise reduction program.

-- Many of the noisy four-engine aircraft currently in the fleet will be retired under the airlines' anticipated schedule. But more than half--between 275 and 350--are expected to be still in the fleet by the end of 1984 (as cargo and charter aircraft, if not in passenger scheduled service). Most of these planes are, or soon will be, fully depreciated. However, the expense of retrofitting them, with kits ranging from $1.2 million to $4.5 million, would make continued operation in most cases uneconomic.

The cost of a realistic and economic program to meet the noise reduction requirement by 1984 has been estimated as follows:

-- $400 to $450 million (in 1976 dollars) for retrofit of approximately 950 two- and three-engine aircraft, 50 747's, and approximately 75 four-engines that may be economical to retrofit.

-- From $4.0 to $5.5 billion (in 1976 dollars) for accelerated replacement of the other 200 to 275 noisy four-engines expected to be in the fleet after 1984.

-- If the airlines choose to retrofit none of the narrow-bodied four-engine aircraft then the cost of replacement

increases to a range of from $5.5 billion to $7 billion (in 1976 dollars).

B. The Financial Situation of the Trunk Airline Industry* (Detail in Appendix A).

- Although the national interest quite clearly compels a noise reduction program, the financial condition of the trunk airline industry, and in particular of certain companies within the industry, calls into serious doubt the industry's ability to finance such a program through conventional means.

- In the normal course of events, the airline industry will have to raise on the order of $25 billion to $30 billion (in inflated dollars) between now and 1985 in order to purchase an estimated 700 new aircraft that will be made necessary by traffic growth and obsolescence of existing aircraft, to repay debt, and for other miscellaneous capital expenditures.

- As is well known, the air carriers have had almost 10 years of very lean earnings (since 1967 an average pre-tax profit margin of 2.5 percent and ROI of 5.7 percent). There seems little doubt that for the last year or so (principally as a result of the 1974-75 economic recession combined with rapidly escalating costs) the industry's collective ability to finance any major capital acquisitions has been at an extreme low point, both in terms of its own history and as compared to other industries.

- Fortunately, the resurging economy is bringing the industry out of its doldrums and positive earnings are in sight for the next several years. The size of the existing fleet, with the addition of current orders, is sufficient to make the need for new aircraft investments relatively low through the period from 1976 to 1979. By the time substantial new aircraft capacity is needed, it seems likely that the industry will have redeveloped adequate financial strength to fund it. (This assumes no extraordinary financing needs and the help of regulatory reform.)

- However, the realistic noise reduction program would add $5.6 to $7.7 billion (in inflated dollars) to the industry's capital requirement, which clearly constitutes an extraordinary financing

* The focus of attention in this paper is on the financial condition of the trunk air carrier industry because the majority of the noisy aircraft, and virtually all of the noisy four-engine aircraft which should be replaced, are concentrated therein. Any financing options considered by either the industry or the government must of course take into account the fact that there are noisy aircraft owned by companies outside the trunk airline industry.

need.* Capital needs would increase by 19 to 31 percent, from which the airlines would derive no direct traffic or revenue increases, and only slight capacity increases. An incremental requirement of this magnitude is beyond the near-term ability of the industry to finance in any normal fashion, since both the debt and equity markets have been foreclosed effectively for several years.**

- Yet, to obtain delivery of new generation aircraft in time to comply with the regulation by 1984, the airline industry would have to accelerate its replacement schedule and make firm purchase commitments within the next 12 to 18 months. The industry very simply is not in adequate financial condition to make such commitments. It will begin to do so eventually, but too late to obtain the economically and environmentally efficient aircraft desired for the noise reduction program, to generate the jobs needed now in the aerospace industry, and to counter the competitive threat of new-technology foreign aircraft.***

- Compounding the problem greatly is the financial condition of certain individual carriers within the industry. The use of aggregate data to analyze the ability of an industry to meet a specific financial need is often misleading. Individual companies, possessing a specialized knowledge of their own situation, can find ways around financial barriers that seem insurmountable to the industry analyst. In this case, however, the reverse is true. Several of the financially weakest carriers in the industry are also the owners of large numbers of

* Assumes the combination of replacement and retrofit discussed earlier, with a 5 percent annual inflation rate and using 1982 prices. Excludes those four-engine aircraft possessed by other than the trunk airlines.

**In hearings on the Aviation Act, the heads of several banks and insurance companies, the industry's traditional institutional lenders, testified that they did not anticipate making further loans to any carriers, and advised that capital formation was, and would continue to be, a critical problem for the industry.

***An additional consideration is the potential impact of some approaches that have been proposed for dealing with the industry's re-equipment problem. Frank Borman, the CEO of Eastern Airlines, has recommended, for example, that the industry conduct a design competition, select a single new aircraft, and then agree to purchase that aircraft only. The consequences of such an approach for the competitive structure of the aerospace industry are serious.

noisy aircraft, and will face some of the largest requirements for funds with which to replace those aircraft.

- TWA, for example, has had an extremely difficult time remaining solvent over the past year and a half. In fact, having asked for and been refused Federal subsidy, it has avoided bankruptcy only through extraordinary efforts on the part of management and acquiescence on the part of its lenders. TWA's problems will not vanish overnight. Even though it will approach breakeven in 1976, and should see a return to profitability in 1977, the company is a few years away from being an effective competitor for funds in the capital marketplace.* Yet by 1985, TWA probably will require from $2 to $3 billion in capital (in inflated dollars) merely to stay competitive and remain in business. The added cost of achieving noise reduction goals (that is, of replacing before 1985 those aircraft that would otherwise remain in its fleet) could increase TWA's capital needs by as much as $1.5 to 2.0 billion (in inflated dollars) between now and then. Present projections say it is highly unlikely that TWA could finance independently such a tremendously increased capital requirement.

- Two of the other carriers strongly impacted by the noise regulation, Pan Am and American, also have had financial difficulties recently and would face similar problems in financing the purchase of replacement aircraft. Pan Am's capital requirements in the 1976 to 1984 period could increase on the order of $1 billion (from around $2 billion to as much as $3 billion), as would American's (from around $3 billion to around $4 billion).

C. <u>The Need for a New-Generation Aircraft</u> (Detail in Appendix B).

- No major new aircraft has been developed in the United States for almost 10 years. In that time important design and technological advances have been made -- many specifically to meet the new economic, operating, and environmental constraints dictated by rising labor costs, energy shortages, and changing market demands.

* TWA's recent announcement that it plans to sell 2 million shares of common stock should not be construed as a sign of ability to compete in the capital marketplace. The company quite clearly has been forced into the sale by financial exigencies and as a result will suffer a serious dilution to its equity base. The shares will sell at a current market price of around $13 as compared to a book value of $21. Something like 15 percent of the company will thus be sold for approximately $25 million, or the price of one 747.

Although the technology exists, the present inability of the U.S. airline industry to finance a new generation of aircraft prevents the manufacturers from moving beyond the design stage. It is clearly in the national interest, however, and in the interest of the air traveler and the airline industry, to take advantage of of such gains:

-- Greater noise reduction: A new technology aircraft would sound about three times quieter than a nonretrofitted 707, and twice as quiet as a retrofitted 707.

-- Greater fuel efficiency: In the period from 1981 (when the first new-technology aircraft would be introduced under the accelerated-replacement program) until 1986 (when all new-technology replacement aircraft would be delivered) the total savings in jet fuel is estimated to amount to about 2.5 billion gallons.

-- Productivity: Measured against existing aircraft, a new-technology aircraft would offer greater payload for its size and weight, would be more reliable and more easily maintained, and would cost less to operate and less to acquire per unit of productivity.

D. The Declining Prospects of the U.S. Aerospace Industry (Detail in Appendix B).

The United States achieved its prominence in the world aerospace market because of its technical superiority; most important civil aviation advances historically have been made in U.S. products. But lack of orders for a new plane has virtually stalled technical development since the widebody jets were introduced. Newer foreign aircraft such as the A-300-B show the potential for meeting certain market demands which current U.S. products cannot (i.e. efficient operation over short-medium range routes). This, combined with declines in U.S. Government outlays for aircraft and engines, has already had serious consequences for U.S. airframe and engine manufacturers, a major source of employment and export sales. Since 1968:

-- Real industry sales have declined 37 percent.

-- Employment has declined 37 percent.

-- Aerospace exports as a percent of GNP have declined 42 percent.

-- Each $30 million lost in sales translates into a loss of 1,000 full time jobs and $15.5 million in payroll.

While the U.S. industry shrinks in real terms, foreign aerospace manufacturers -- spurred by Government subsidy -- are growing larger, more capable technologically, and more agressive. It is conceded that the U.S. cannot continue to hold its present 80 percent market share (of world civil aircraft in operation). The question of how large a share European and other foreign manufacturers take will depend in part on how long U.S. production of a new aircraft is delayed. A 2- to 3-year acceleration of the present timetable could be very important in that it would allow U.S. manufacturers to produce a new generation of planes when U.S. airlines will need them and when new foreign products will be on the market.

APPENDIX A

FINANCIAL CONDITION OF THE TRUNK AIRLINE INDUSTRY

- The ability of the airline industry to finance equipment replacement depends, as it would in any other industry, on its ability to generate funds internally (through depreciation and earnings) and/or externally (from the equity market and/or debt market). Table 1, following, projects sources and uses for the 1977-1984 period, using the specified economic and traffic assumptions.

1. Internal Sources

- As the table shows, depreciation will yield a total of $10.0 billion through 1984. Aircraft sales will yield only about $400 million, leaving the airlines $18.7 billion short of their total needs of $29.1 billion. This amount must be met through earnings, new loans, leases, or new equity financing. The cost of a realistic noise reduction program would increase the total need for funds by the end of 1984 by around 23 percent, to $36 billion and would increase the deficit by around 36 percent, to $25 billion.*

- Industry earnings are projected to range from $.3 to $.5 billion in 1976-1977 to $.6 to $.7 billion toward the end of the period,** and could total about $5 billion, which would leave a financing need of $13.7 billion, or about $21 billion when noise reduction costs are taken into account. This "gap" must be met through external sources -- the equity market and/or the debt market.

2. External Sources

- Because of the airlines' poor earnings record for the past 10 years (see Table 2) both the equity and debt markets have been effectively foreclosed to them for some time. Airline stocks have not been a recommended buy for much of this period, and are not being recommended as an investment for the future, except for possible short-term

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* Assumes the cost of the replacement/retrofit program is in the middle of the $5.6 to $7.7 billion range.

** To earn $.5 billion, the industry would have to achieve about 9 percent to 10 percent ROI at current investment levels. Since 1967, ROI for the domestic trunks plus Pan American has ranged from a high of 8.5 percent to a low of 2.1 percent, averaging only 5.7 percent.

gains in the next six months.* At present, airline stocks stand at approximately 60 percent of their 1967 value (versus 120 percent for the Dow-Jones Average).

- The major source of airline debt financing through the 1960's--traditionally the large insurance companies--has been closed for six years. Under New York law, New York insurance companies are forbidden to make further loans. In a statement submitted to the House Public Works and Transportation Committee George Jenkins, Chairman of Metropolitan Life Insurance, said: ". . . we feel confident that Metropolitan will lose no money on its current airline investments as they run off, but under present conditions, no new money will be loaned." Before lenders will commit new debt capital, Jenkins added, "(they) will require a sound equity base and good profits . . ."

- The DOT is confident that the proposed Aviation Act of 1976 will return the Aviation industry to long-term profitability and eliminate the capital expenditure problem of the future. However, no remedy is seen for the problem of funding the capital decisions that must be made now in order to achieve a quieter and more fuel efficient fleet by the end of 1984. Airline earnings are the key to both internal and external funds generation, but as the foregoing data makes clear even a high level of earnings will not insure that the industry will be able to finance the $5.6 to $7.7 billion needed for the noise reduction program through normal means.

3. Problem Carriers

- The financing problems anticipated for the industry will be concentrated heavily in major carriers, which have the most four-engine aircraft in their fleet and consequently the greatest retrofit burden, particularly American, TWA, and Pan Am. As shown in Table 3, these three carriers have together accounted for a large portion of the industry's losses over the last five years and, with the possible exception of American, have relatively undesirable debt burdens. Further, as shown in Table 4, American and TWA, (presuming that they could obtain the debt financing they would need,) under the burden of the noise reduction program would have debt/equity ratios of ov 4 and 5.7 respectively, while Pan Am's would be near 2. These carriers are likely to have great difficulty in raising the capital that would be required by the noise regulation.

* A potential exception to this statement is the pending TWA issue of 2 million shares of stock. As explained in the text, the need for such an issue is created by TWA's poor financial situation and at the expected price of the sale will seriously dilute the company's equity base.

TABLE 1

PROJECTED USES AND SOURCES OF FUNDS
U.S. TRUNK AIR CARRIERS
1977, 1980 AND 1984

(Current Dollars in Billions)

Uses of Funds	1977	1980	1984	1977-1984
Property & Equipment	$1.2B	$1.6B	$5.7B	$24.4B
Debt Repayment	.5	.5	.4	3.6
Dividends & Other	.3	.6	.1	1.1
Total Uses	$2.0B	$2.7B	$6.2B	$29.1B
Sources of Funds				
Depreciation	1.1	1.1	1.6	10.0
Sales of Aircraft	.1	.0	.1	.4
Total Sources	1.2	1.1	1.7	10.4
Uses Less Internal Sources	$ .8B	$1.6B	$4.5B	$18.7B

NOTE: The following growth rates are assumed in the projections:

Real GNP	3.7%
Inflation	5.1%
RPM's	
Domestic	6.5%
International	5.3%
System	6.2%

TABLE 2

SELECTED FINANCIAL DATA FOR TRUNK CARRIER INDUSTRY
(System Operations, Including Pan Am)
1967-1975

(Dollars in millions)

	Operating Revenue	Pre-Tax Profit	Pre-Tax Profit Margin	Return on Investment 1/
1967	$6,117	$638	10.4%	8.5%
1968	6,902	411	5.6	6.1
1969	7,765	247	3.2	4.6
1970	8,131	(154)	(1.9)	1.8
1971	8,811	55	0.6	3.7
1972	9,783	266	2.8	6.0
1973	10,905	287	2.6	5.6
1974	12,865	447	3.5	6.8
1975	13,374	(121)	(-)	2.8
9 Yr. Total	$84,653	$2,076	2.5%	NA

1/ Return element includes net income and interest on long term debt.

Source: CAB Form 41/TPI-32 Reports

TABLE 3

SELECTED FINANCIAL DATA FOR TRUNK CARRIERS (Including Pan Am) 1971 TO 1975

Carriers with Large Numbers of 4-Engine Aircraft	Operating Revenues ($ Millions)	Net Income (Loss) ($ Millions)	Profit (Loss) Margin (Percent)	Debt as a Proportion of Total Capitalization (Percent)
Trans World	$ 7,679.9	$ (24.5)	(0.3)%	73.0%
American	7,583.5	(39.5)	(0.5)	45.4
United	9,681.2	155.6	1.6	48.2
Pan American	7,169.1	(233.9)	(3.3)	75.9
Others				
Eastern	6,629.2	(65.1)	(1.0)	68.2
Delta	5,502.5	268.8	4.9	44.8
Braniff	2,281.3	93.1	4.1	57.7
Western	2,113.4	74.5	3.5	43.8
Northwest	2,984.8	203.5	6.8	28.3
Continental	2,081.4	21.3	1.0	71.7
National	1,821.1	82.3	4.5	46.7

1/ Trunk Air Carriers - System Operations, December 31, 1975

TABLE 4

PROJECTIONS OF DEBT EQUITY RATIOS,
SELECTED TRUNK CARRIERS, 1976, 1989, AND 1984
(Dollars in Billions)

AIRLINE	ANTICIPATED CAPITAL EXPENDITURES (1977-1984)	LONG TERM DEBT/ EQUITY 1/			ADDITIONAL REPLACEMENT CAPITAL REQUIRED BY 1984 2/	DEBT/EQUITY RATIO INCLUDING REPLACEMENT FINANCING (1984)
		1976	1980	1984		
American	$3-3.5	.78	.47	2.3	$1.2	4.4
Pan Am	1.8	3.0	1.7	.74	1.0	2.17
TWA	$2-.3	3.0	2.2	2.8	1.5-2.0	5.77
United	4.2	1.1	.56	.34	2.0	1.52
Industry	$27.1	1.3	.74	.98	5.6-7.7	1.78

SOURCE: Alliance One Institutional Services and TPI-32

1/ Assumes borrowings for capital needs without respect to carriers ability to obtain financing.

2/ Based on number of four-engine aircraft remaining in fleet after 1984, with replacements (including spares) valued at a 1982 cost of $27 million each.

APPENDIX B

ADVANTAGES OF ACCELERATED DEVELOPMENT OF NEW TECHNOLOGY AIRCRAFT

1. Greater Noise Reduction

- A new-technology replacement aircraft would be far quieter than the quietest existing aircraft. The gain achievable is illustrated in Figure 1, which outlines the area exposed, on a single event, to a noise level equal to or greater than 90 EPNdB--roughly equivalent to the sound of a busy downtown street.

  -- The 90 EPNdB contour of the 707/DC-8 aircraft (technology of the 1950's) extends more than 20 miles beyond the brake release point of takeoff and roughly nine miles prior to the touchdown point on landing.

  -- The DC-10, employing the late 1960's technology CF-6 engine, is able to confine the 90 EPNdB contour to a much smaller area, equivalent to the over-water area south of Logan International. It is significantly quieter than a SAM retrofitted 727, which meets FAR 36 standards.

  -- Further important noise reduction advances are reflected in the noise contour of a new Tri-jet which has double layer acoustical linings, and the 1970's technology CFM-56 or JT10D engines with new design fan and turbine stages. Those engines are expected to be available for use in new aircraft.

2. Productivity, Operating and Safety Gains

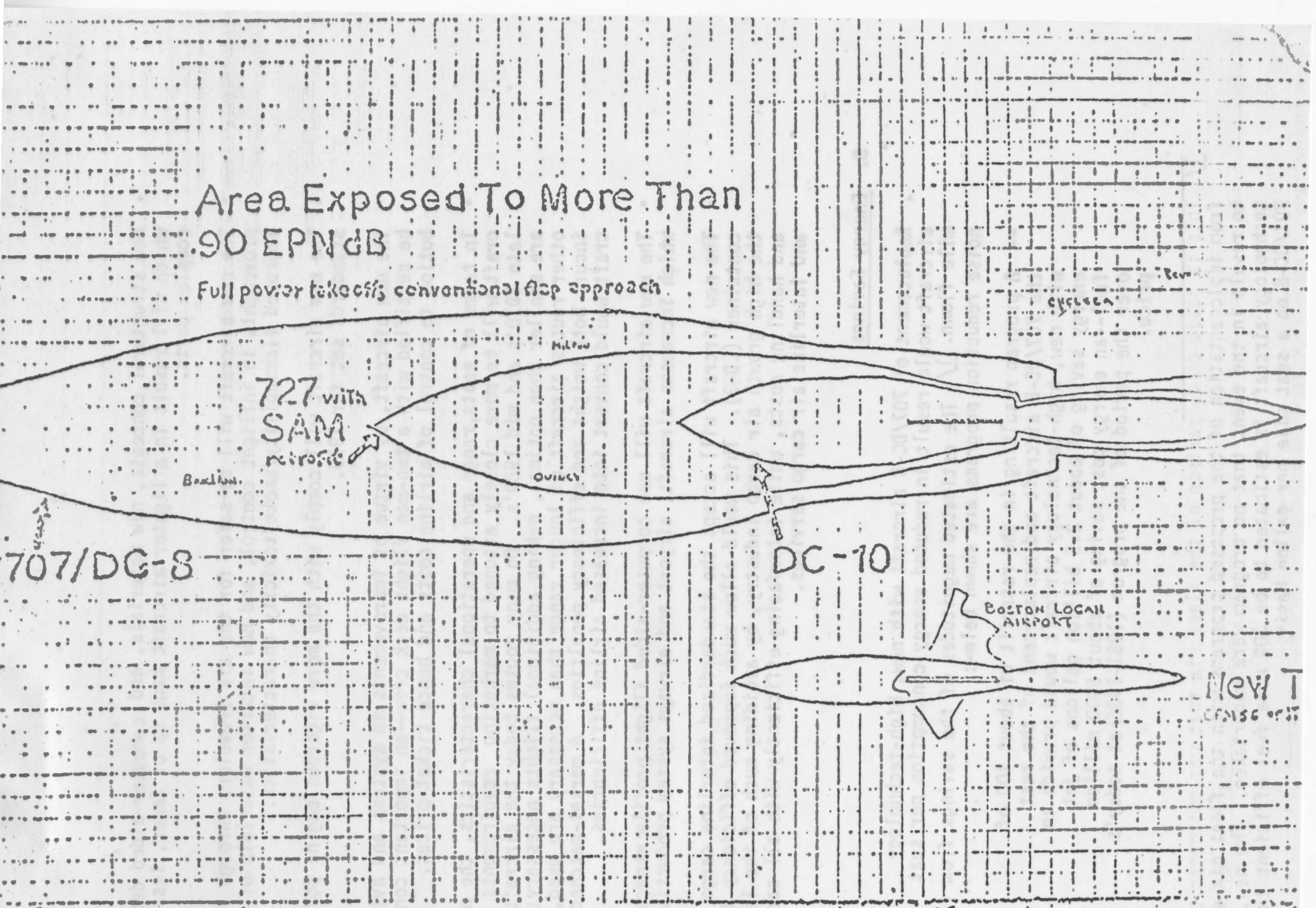
- Technological advances possible today will result in a new aircraft with greater payload for its size and weight--an aircraft that is more reliable, more easily maintained, costs less to operate, and costs less to acquire per unit of productivity. These benefits accrue to the public, the air traveler, and the airlines.

- Greater efficiencies are achieved through such technological advances as:

  -- Supercritical aerodynamics concepts in wing airfoil and body design, which can yield a lighter and more efficient aircraft.

  -- Lighter, more aerodynamic propulsion system and more efficient engines and nacelles.

  -- Digital electronics for avionics systems and in-flight control to avoid engine abuse, improve navigation and approach precision, provide increased reliability, maintainability, safety and fuel efficiencies.


Area Exposed To More Than
90 EPNdB
Full power takeoff; conventional flap approach
727 with
SAM
retrofit
707/DC-8
DC-10
BOSTON LOGAN
AIRPORT

- New structural concepts, new materials, and computer-aided designs which will result in a lighter aircraft made up of fewer, less complex parts.

- The new aircraft will be safer for the air traveler, through improvements in inflight control, and new interior materials of much improved flammability/smoke/toxicity characteristics.

- The new aircraft will comply with the more rigorous engine pollutant standards set for 1979.

- The new aircraft, by virtue of improvements in systems and avionics, wi be certified with a two-man flight deck crew--an important contribution to control of airline costs and hence ticket prices.

- In terms of seats, range and operational characteristics, the new aircraft will be more closely attuned to marketing requirements of the late 1970's and mid 1980's. On many routes today the aircraft used are smaller than optimal, making additional flights necessary; on other routes aircraft of longer range than necessary are used, which incurs both weight and efficiency penalties. A market-matched aircraft would convert into increased airline efficiencies.

- The new aircraft will use computer-aided flight profile management, which increases aircraft, airport and airways system productivity.

- The new aircraft will accept the standardized interline cargo container (LD-3). This would allow much improved efficiency in the high growth air cargo industry, by avoiding much of the labor and handling costs, while interfacing efficiently with all-cargo and interline air cargo services.

3. Energy Savings

- Replacement of 707/DC-8 aircraft with new, high-technology aircraft would result in reduced energy consumption per seat mile flown. 1/ The estimated magnitudes of the savings from various noise reduction programs are shown below:

  -- A program resulting in the retrofit of about 100 of the 707/DC-8 aircraft and replacement of the rest with new, high-technology aircraft would provide an energy saving of about 2.5 billion gallons of jet fuel--an energy cost saving of about $900 million over the period of the program (1981-1986) at today's price.

1/ This is based on comparison of the fleet mix that was estimated to result from implementation of the proposed programs with the fleet mix estimated to result in the event that no program were undertaken. The new, high-technology aircraft is estimated to be 30% more fuel efficient than a 707/DC-8 on a seat mile per gallon basis.

-- A program resulting in the replacement of all 707/DC-8 aircraft with new, high-technology aircraft would provide an energy saving of about 2.8 billion gallons--a cost saving of over $1 billion over the program period.

-- A program resulting in the retrofit of all 707/DC-8 aircraft would impose an additional energy requirement of about 220 million gallons over the program period.

-- It should also be noted that retrofit of the 727/737/DC-9 aircraft would not cause a measurable change in the energy requirement of the commercial aircraft fleet.

-- The annual energy saving of the program would in 1986 amount to about 8% of the total jet fuel consumption of the commercial aircraft fleet.

4. Positive Impact on the U.S. Aerospace Industry

- The 2- to 3-year gap between expected development and accelerated development of a new-generation aircraft is significant for the national interest in general, but could be crucial for the U.S. aerospace industry. Lacking a market for a new plane -- and thus the opportunity to put their drawing-board technology to work -- the U.S. manufacturers already have lost some of the technological advantage they have always enjoyed over foreign competition.

- A potentially more critical loss is U.S. share of the world aerospace market. If delivery of a new aircraft is delayed to 1985, as appears likely absent the spur of a realistic noise reduction program, foreign competition -- with newer products to offer -- may secure their hold on a major share of the world market, and the U.S. industry may decline to a level from which it cannot easily recover.*

- The economic impact on the aerospace industry and on the U.S. economy in general would be enormous. With sales of $28 billion, and employment of around 950 thousand, the industry has been a major factor in the U.S. economy for nearly the last quarter century. Since 1968, however -- as a result of the problems of its client industry, the U.S. airlines, and a reduction in military purchases -- aerospace has experienced a very sharp decline:

  -- Direct employment has declined 37 percent.

  -- Industry payroll as a percent of all manufacturing payroll has declined 30 percent.

* The domestic market is also at issue. In the absence of a new U.S. 180-to-200 passenger aircraft, U.S. airlines are looking at such foreign aircraft as the French-made A-300-B, which already developed is substantially cheaper -- though less efficient -- than a new generation U.S. aircraft would be.

-- As a percent of GNP, aerospace industry sales have declined 42 percent.

-- Real aerospace industry sales have declined 37 percent.

- As the real domestic and military markets have declined, U.S. manufacturers have grown heavily dependent on foreign markets for sales of civil aircraft. Since 1968 civil aircraft exports as a percentage of total civil aircraft sales have almost doubled. U.S. airframe and engine manufacturers have turned more and more to consortiums with European firms, both to share developmental costs and to ensure continued access to European markets. However, the consequent sharing of production will further erode U.S. aerospace employment.*

- Anxious to reduce U.S. dominance of the lucrative aerospace market, foreign governments have become increasingly protective of their own aerospace industries and markets, and increasingly aggressive about penetrating other markets, forming alliances where necessary to do so (the French and German combined forces to produce the successful A-300-B). Thus, while the U.S. aerospace industry has been declining in real terms, European and other foreign governments have been subsidizing expansion of their own aerospace industries, and threaten to encroach on both the U.S. and world markets. A loss of only 5 percent of present U.S. sales to foreign competition would result in a loss of 47,000 jobs and $729 million in payroll.

- Assuming that past relationships hold true, the proposed program would accelerate by 2 to 3 years the rehiring of about 25,000 aerospace workers at a payroll of about $400 million a year.

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* An important consideration here is the effect erosion would have on the structure of the U.S. aerospace industry. The competition between the three major manufacturers has helped to establish and maintain U.S. technological superiority. If a sizable share of the world market is lost to foreign competition, one and possibly two manufacturers could suffer seriously.