United States General Accounting Office

GAO

Report to Congressional Requesters

July 1991

AVIATION NOISE

Costs of Phasing Out Noisy Aircraft

GAO/RCED-91-128

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-239410

July 2, 1991

The Honorable James L. Oberstar
Chairman, Subcommittee on Aviation
Committee on Public Works and Transportation
House of Representatives

The Honorable Bruce F. Vento
House of Representatives

Air traffic has nearly doubled in the last decade, and airports have come under growing pressure to reduce the noise impact that airport operations have on neighboring communities. Many airports have responded to this pressure by adopting a variety of noise restrictions, including restrictions on the types of aircraft that may use the various airports and the times at which they may operate. In September 1990 we testified on the costs of phasing out older, relatively noisy aircraft and on how these costs would be affected by the independent adoption of noise restrictions by airports.[1] In November 1990 the Airport Noise and Capacity Act of 1990 (ANCA) was enacted. This act phases out the noisiest jets currently in use (called "Stage 2" jets) by the year 2000 and limits the discretion of airports to adopt their own noise restrictions.[2] In response to your request, this report describes the likely effects of ANCA on the costs to the airline industry of aviation noise restrictions.

Results in Brief

Prior to the passage of ANCA, we conducted a survey that showed that, in the absence of a federally mandated phaseout of Stage 2 aircraft, many airports expected to adopt their own noise restrictions. We testified that the airlines believed that the resulting "patchwork quilt" of restrictions was likely to result in a de facto phaseout of Stage 2 aircraft by the year 2000, but that this approach to a phaseout would impose growing costs on the nation's airline industry compared with a more uniform phaseout mandated by federal policy.

ANCA is likely to produce a more orderly phaseout of Stage 2 aircraft, giving airlines a long-term compliance schedule that will allow them to plan the conversion of their fleets to meet the more stringent "Stage 3" standards, thus probably reducing the costs of phasing out Stage 2 aircraft by the year 2000. ANCA should discourage airports from adopting

[1] Aviation Noise: A National Policy Is Needed (GAO/T-RCED-90-112, Sept. 27, 1990).

[2] The phaseout applies only to civil aircraft weighing over 75,000 pounds.

their own noise restrictions, both because the federal phaseout reduces the need for independent airport action and because the act restricts somewhat the airports' discretion to adopt their own restrictions. The act will thus reduce the inefficiencies involved in scheduling aircraft to comply with different noise restrictions at different airports. A more uniform national schedule also means that airlines may have to phase out Stage 2 aircraft earlier on some routes where airport restrictions would not have been adopted. In some cases, the national schedule may also restrict the ability of local communities to achieve as much noise reduction as they might have desired.

While ANCA reduces the discretion of airports to adopt noise restrictions, it does not eliminate that discretion. As a result, the patchwork quilt costs described in our testimony are likely to be smaller but may still be significant. Because the extent to which airports will proceed with their own noise restrictions is uncertain, we cannot quantify how much the costs of phasing out Stage 2 aircraft will be changed.

We estimate that, in the absence of any additional airport restrictions, phasing out Stage 2 aircraft by the year 2000 will cost about $2 billion, if each airline adopts the lowest cost method of meeting the required Stage 3 standards.[3] This cost would rise to almost $5 billion if all Stage 2 aircraft were replaced rather than retrofitted with hushkits or new engines. Under certain conditions, ANCA gives the Secretary of Transportation discretion to waive compliance with the Stage 2 phaseout until the end of 2003 for up to 15 percent of each airline's fleet. If the Secretary grants such waivers, we estimate that costs to the airline industry will be reduced by as much as $100 million because airlines will not have to make expenditures to replace or retrofit aircraft as soon. The burden of aircraft noise borne by those living near airports, on the other hand, would of course be reduced more slowly.

Background

The widespread introduction of jet aircraft in the 1960s considerably increased aircraft noise, as did the growth in airline traffic after the industry was deregulated in 1978. As a result, numerous airports developed noise control programs. Most of the nation's 140 predominantly jet airports require aircraft to use certain operating procedures to reduce

[3]The lowest cost method could include either replacing the aircraft with a new Stage 3 aircraft, replacing the aircraft's engines with new engines meeting Stage 3 standards, or modifying the aircraft by installing noise reduction technology (commonly referred to as "hushkits"). The lowest cost method for any particular aircraft depends on the aircraft's age, how intensively it is used, and the costs of hushkits, new engines, and replacement aircraft for that particular aircraft type.

noise exposure. Most airports also use land-use controls imposed by local governments to prevent the use of adjacent land for housing or other purposes incompatible with aircraft noise. Twenty-four of these airports also reduce noise by restricting the operations of certain kinds of relatively noisy aircraft.

The federal government has also acted to reduce aviation noise. Under 49 U.S.C. app. sect. 1431, the Federal Aviation Administration (FAA) has issued regulations defining three classes of aircraft in terms of their noise levels. Aircraft certified before 1969 that do not meet the noise standards issued in that year are classified as Stage 1 aircraft (e.g., early model Boeing 707s and DC-8s). Aircraft meeting the 1969 standards (e.g., most Boeing 727s and DC-9s) are known as Stage 2 aircraft. Aircraft complying with the more stringent standards issued in 1977 (e.g., Boeing 757s and MD-80s) are classified as Stage 3 aircraft.

While the newer aircraft were quieter, the long life of a jet aircraft made the transition to a quieter aircraft fleet a slow process. To accelerate this process, FAA issued a new rule in 1976 requiring that all Stage 1 aircraft be phased out by 1985. This was to be done either by replacing these aircraft with new Stage 2 aircraft or by retrofitting the old Stage 1 aircraft with hushkits that would allow them to meet Stage 2 standards. The phaseout of Stage 1 aircraft was delayed because airlines were slow in placing orders to have their aircraft replaced or retrofitted. As a result, the last Stage 1 aircraft were not retired until the end of 1987.

While all aircraft designs certified after March 3, 1977, have had to meet Stage 3 standards, older Stage 2 designs continued to be manufactured until 1988. As a result, Stage 2 aircraft, which typically are assumed to have a 30-year life, are still widely used and, according to FAA, comprised 54 percent of U.S. carriers' fleets as of November 1990. FAA had forecast in 1989 that Stage 2 aircraft would still make up about 2 percent of the U.S. fleet in the year 2010 in the absence of any further restrictions on Stage 2 aircraft use.

In the absence of further federal requirements to reduce aviation noise, many airports acted on their own to reduce noise levels. Most of these restrictions affected only Stage 2 aircraft (requiring, for example, that no more than a certain percentage of an airline's operations at an airport could be Stage 2). Some restrictions, however, affected Stage 3 operations as well. Some airports banned night operations altogether, whether Stage 2 or Stage 3. Others limited the number of daytime

Stage 3 operations or required that only the quietest of Stage 3 aircraft could use the airport.

On November 5, 1990, the President signed the Omnibus Budget Reconciliation Act of 1990, which incorporated as subtitle D of title IX the Airport Noise and Capacity Act of 1990. The new legislation sets the end of 1999 as a phaseout date for large Stage 2 aircraft, except that waivers can, under some circumstances, be granted at the discretion of the Secretary of Transportation for up to 15 percent of an airline's fleet, allowing those aircraft to be phased out as late as the end of 2003. The act directs the Secretary to establish a compliance schedule for carriers to follow in phasing out their Stage 2 aircraft.

The act, with certain limited exceptions, also requires that any new restrictions on the use of Stage 3 aircraft adopted by airports be approved by the Secretary unless the aircraft operators voluntarily agree to the restrictions. Airports may adopt restrictions on the use of Stage 2 aircraft without the Secretary's approval, but the airport must provide notice and an opportunity for public comment and must also conduct a cost-benefit analysis of the proposed rules that considers alternative noise control strategies. Existing restrictions may remain in effect, and Stage 2 restrictions proposed before October 1, 1990, may go into effect without complying with the notice-and-comment and cost-benefit analysis requirements of the act.

On February 28, 1991, FAA issued a notice of proposed rulemaking proposing regulations to implement ANCA. FAA plans to issue final rules implementing the act by July 1, 1991.

Finally, the act directs the Secretary to establish a national aviation noise policy and to make recommendations to the Congress on the need for

- changes in the rights of airports to adopt noise restrictions,
- changes in the rights of those affected by aviation noise to sue,
- changes in how noise impacts are considered in the federal regulation of airspace,
- changes in federal noise mitigation programs, and
- incentives or requirements for appropriate zoning restrictions near airports.

ANCA Will Allow a More Orderly Transition to a Stage 3 Fleet

Prior to the passage of ANCA, many airports reported that they planned to ban Stage 2 aircraft. The uncoordinated adoption of such bans was likely to result in inefficient use of the nation's commercial aircraft. Passage of ANCA may discourage some airports from adopting Stage 2 bans, but the prospect of waivers until the year 2003 may encourage airports to go forward with such bans. We expect that airports that had planned to phase out Stage 2 aircraft before 2000 will go forward with these plans.

In September 1990 we testified on the results of our survey of 140 airports on their plans to adopt their own noise restrictions. The results of this survey are reported in appendixes II and III. The survey showed that only 1 airport planned to ban the use of Stage 2 aircraft before 1995 (in addition to the 3 airports that have already done so), but that 34 additional airports were "very likely" to ban the use of Stage 2 aircraft by 2000. These 34 airports include 12 of the 29 largest airports. The survey results indicated that bans on Stage 2 aircraft were particularly likely to occur in the Northeast and on the West Coast and to a lesser extent in the Midwest.

We also reported that the independent, uncoordinated adoption of noise restrictions by airports, often referred to as a patchwork quilt style of regulation, was likely to impose costs on airlines. These costs occur because individual airport restrictions may require the use of a Stage 3 aircraft even if the only available Stage 3 aircraft is too large to serve the route efficiently. Moreover, nighttime restrictions on Stage 2 aircraft might also prevent an evening flight of such an aircraft from landing if it is delayed, thus causing it to be diverted to another airport. We concluded that these inefficiencies would be reduced if the Congress or the Department of Transportation (DOT) established a national schedule for phasing out Stage 2 aircraft that would require more uniform noise requirements at different airports. More uniform requirements would reduce scheduling problems because an airline could satisfy noise requirements on the basis of its overall fleet composition, and not have to worry about the noise characteristics of aircraft scheduled to fly into any particular airport.

ANCA Should Reduce Patchwork Quilt Inefficiencies

The Airport Noise and Capacity Act should reduce, but not eliminate, the growth in inefficiencies associated with patchwork quilt regulations. First, the provisions of ANCA are likely to discourage airports from adopting their own noise restrictions. ANCA requires that any new Stage 3 restrictions not voluntarily agreed to by aircraft operators be

approved by the Secretary of Transportation. The Secretary is directed to approve such restrictions only if there has been an adequate opportunity for public comment and if the Secretary finds that the restrictions (1) are reasonable, nonarbitrary, and nondiscriminatory; (2) do not create an undue burden on interstate or foreign commerce or on the national aviation system; (3) are consistent with maintaining safe and efficient use of the navigable airspace; and (4) are not in conflict with any federal statute or regulation. Since some proposed Stage 3 restrictions will probably not pass this test, the new law is likely to discourage new Stage 3 restrictions.

Stage 2 restrictions do not need to be approved by the Secretary, but the act does require that airports conduct cost-benefit analyses and provide an opportunity for public comment on such restrictions. Because these requirements increase the burden on airports of adopting Stage 2 restrictions, it is likely that fewer airports will adopt their own restrictions. In some cases, the cost of preparing a cost-benefit analysis may discourage airports from even proposing restrictions. In other cases, the public comments and analysis may turn up new facts that persuade the airport that the noise restrictions are inadvisable.

Second, ANCA may discourage airports from adopting their own noise restrictions by reducing the need for such restrictions. Since the act requires the phaseout of Stage 2 aircraft anyway, airport officials may feel that they do not need to adopt their own noise restrictions. ANCA's waiver provision, allowing the Secretary to waive compliance for up to 15 percent of each airline's fleet until the end of 2003, limits this effect, however. If airport officials believe that this waiver provision will be exercised, they may feel that they need to adopt their own noise restrictions to ensure that Stage 2 aircraft will not be used at their airports after 1999.

To the extent that ANCA discourages adoption of individual airport noise restrictions, airlines should be able to plan the phaseout of Stage 2 aircraft with greater certainty and achieve a more orderly and efficient transition to a Stage 3 fleet.

Some Patchwork Quilt Inefficiencies Will Remain

While ANCA is likely, for the reasons stated above, to reduce the patchwork quilt inefficiencies that otherwise would have occurred, it will not eliminate these inefficiencies entirely. ANCA has a "grandfather clause" that allows any existing noise restrictions to remain in effect. While the act gives the Secretary of Transportation authority to disapprove new

airport restrictions on Stage 3 aircraft not voluntarily accepted by all aircraft operators, the Secretary may choose to approve these restrictions. Moreover, under ANCA the Secretary does not receive any additional authority to limit restrictions on large Stage 2 aircraft. As long as airports comply with the notice-and-comment and cost-benefit requirements for these restrictions, they are free to adopt them on their own initiative. These provisions of ANCA could cause these patchwork quilt costs to continue to be significant.

The significance of these patchwork quilt costs depends largely on the extent to which airports go forward with plans to adopt their own restrictions on Stage 2 aircraft. We contacted officials at several airports that have plans to adopt their own noise restrictions. None of these officials expected that ANCA would slow the pace at which their airports would implement their own restrictions. Airports that have not yet announced plans for noise restrictions, however, may delay such plans as a result of the passage of ANCA. The extent to which ANCA affects the costs of phasing out Stage 2 aircraft depends on how many airports adopt their own noise restrictions. While ANCA does not prevent airports from adopting their own noise restrictions, it does discourage them from doing so; thus these costs are likely to be reduced.

Exercise of the Secretary's Waiver Authority Would Save the Airline Industry Between $100 Million and $300 Million

ANCA calls for phasing out large Stage 2 aircraft by December 31, 1999. Under certain conditions, however, the Secretary of Transportation can authorize a waiver extending the date on which an air carrier must comply with this requirement to December 31, 2003. To be eligible to apply for a waiver, an air carrier must have an 85-percent Stage 3 fleet by July 1, 1999, and a firm commitment to convert the remainder of its fleet to Stage 3 noise levels by December 31, 2003. Officials of 4 of the 11 airlines we talked to said they intend to convert to all Stage 3 aircraft by December 31, 1999, irrespective of federal requirements, in order to modernize their aircraft and improve their competitive position.

According to aircraft and hushkit manufacturers, enough production capability exists for air carriers with Stage 2 aircraft to replace them with Stage 3 aircraft by December 31, 1999. However, aviation officials generally believe that the financial health of an air carrier and the age of its fleet will ultimately determine whether it invests in new aircraft or retrofits its Stage 2 aircraft with re-engine or hushkit technologies. For those air carriers unable to afford to replace their Stage 2 aircraft with newer and more expensive Stage 3 aircraft, hushkit and re-engine modification programs are available.

We evaluated four cost studies of a Stage 2 aircraft ban, reporting widely varying cost estimates. The differing estimates were caused by differences in a number of key assumptions. We concluded that the cost of the Stage 2 ban to the airline industry, assuming no additional airport restrictions, will probably be between $2 billion and $5 billion. Our cost estimate is $4.6 billion when each aircraft is replaced with new Stage 3 aircraft. (See app. IV.) When the owners choose the least costly option—purchasing new aircraft, installing sound reduction equipment (hushkits), or installing new engines—the cost estimate decreases to $2.1 billion.[4] If compliance with Stage 3 standards is waived for 15 percent of the fleet until the end of 2003, air carriers would save $0.3 billion (if all aircraft are replaced) or $0.1 billion (if aircraft are either replaced or retrofitted).

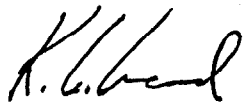
As agreed with your offices, we did not obtain formal agency comments on this report. However, DOT officials provided informal oral comments on a draft of this report. They said that the assumptions on aircraft life span made in our cost analysis were longer than they thought appropriate, and that ANCA gives more discretion to airports (in adopting Stage 2 restrictions) and less discretion to the Secretary (in granting waivers) than we implied. They also had a number of technical corrections. We made several minor changes to the report to ensure its accuracy.

Our work was carried out between August 1989 and November 1990 in accordance with generally accepted government auditing standards. Details on our objectives, scope, and methodology are presented in appendix I.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the appropriate congressional committees, the Secretary of Transportation, the Administrator of FAA, the Director of the Office of Management and Budget, and other interested parties.

[4]According to FAA, hushkits are modifications to aircraft engines that reduce noise by techniques such as redesigning the air inlets, installing sound absorbent chambers, and increasing the nozzle area. Hushkits only reduce engine noise and do not offer any performance savings.

Major contributors to this report are listed in appendix V. If I can be of any further assistance, please contact me at (202) 275-1000.



Kenneth M. Mead
Director, Transportation Issues

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Abbreviations

ANCA	Airport Noise and Capacity Act of 1990
CNEL	Community Noise Equivalent Level
DOT	Department of Transportation
FAA	Federal Aviation Administration
GAO	General Accounting Office
GNP	gross national product
ICAO	International Civil Aviation Organization
LCC	Leeper, Cambridge & Campbell, Inc.
Ldn	day-night level

Objectives, Scope, and Methodology

The Chairman of the House Subcommittee on Aviation, Committee on Public Works and Transportation, and Representative Bruce F. Vento asked GAO to examine the economic impact of noise abatement measures on the aviation industry. Specifically, we agreed to

- determine how quickly airports were adopting noise restrictions, and how widely noise restrictions were expected to be adopted in the future;
- determine what costs are imposed on airlines and on other airports by the uncoordinated imposition of airport noise restrictions;
- determine the feasibility and cost of phasing out Stage 2 aircraft by the year 2000; and
- discuss how these costs are likely to be affected by the passage of the Airport Noise and Capacity Act of 1990.

We limited the scope of our analysis to noise caused by large jet aircraft (over 75,000 pounds). We focused our analysis on the issues raised by phasing out Stage 2 aircraft. We did not directly address issues raised by proposals to adopt a "Stage 3.5" standard that would require phasing out the noisier Stage 3 aircraft.

To determine how quickly airports had adopted and were likely to adopt their own noise restrictions, we surveyed the 140 predominantly jet airports in the United States and asked them what their current noise restrictions were (and whether they had been adopted in the last five years), the restrictions they expected to adopt by 1995, and the restrictions they expected to adopt by 2000. We collected responses from 138 of these airports, including all 29 large airports, all 41 medium-sized airports, and 68 of 70 small airports, for a response rate of 98.6 percent.[1] These 138 airports were responsible for 95 percent of all passengers boarding flights in 1988, the most recent year for which data were available at the time of our audit work. Our survey was conducted in May 1990.

To determine what costs are imposed on airlines by uncoordinated airport noise restrictions, we interviewed officials at 10 passenger airlines and a major cargo airline. In our airport survey, we asked about the effect of restrictions at one airport on conditions at other airports. After our survey had been completed and ANCA had been passed, we called

[1] FAA defines airport size categories on the basis of the total number of passengers enplaned in a city and its surrounding standard metropolitan statistical area as a percentage of the total of all passengers throughout the United States. A large hub enplanes at least 1 percent of the passengers, a medium hub enplanes 0.25 percent to 0.99 percent of the passengers, and a small hub or non-hub enplanes less than 0.25 percent of the passengers.

back several airports that had previously announced planned noise restrictions to determine how the passage of ANCA would affect their plans.

To determine the feasibility of the aircraft and airline industries' meeting the 2000 phaseout date, we interviewed officials of 11 airlines as well as of aircraft and hushkit manufacturers. To determine the costs of phasing out Stage 2 aircraft by 2000, we reviewed four studies on this question. We then developed our own cost estimate using the methodology of one of these studies (carried out by the Federal Aviation Administration), but using our own assumptions.

Our review was carried out between August 1989 and November 1990 in accordance with generally accepted government auditing standards.

Summary of Survey Results

Prior to the passage of the Airport Noise and Capacity Act of 1990 (ANCA), 24 predominantly jet airports had adopted aircraft use restrictions to reduce aircraft noise. Sixteen of these airports ban all Stage 2 aircraft at night, while three ban Stage 2 aircraft at any time. Fourteen airports reported that they were at least somewhat likely to ban all Stage 2 aircraft between 1990 and 1995, while 78 airports said they were at least somewhat likely to do so by 2000. As discussed in the letter, these plans may be affected by the passage of ANCA.

Of the 138 airports responding to our survey, 125 have a noise control program. However, most of these airports (101 out of 125) rely entirely on operating procedures and/or land-use controls. Only 24 restrict the use of particular aircraft. Ninety-five of these airports had imposed or strengthened their noise control programs during the past 5 years, including all 24 of the airports that restrict aircraft use.

Of the 24 airports with aircraft use restrictions, 19 restrict aircraft at night. Of these, 16 ban all Stage 2 aircraft at night, while 3 limit such use. Fifteen airports have adopted these restrictions since 1985. Nine airports limit Stage 2 operations during the day; all these restrictions have been adopted since 1985. Seven airports impose other kinds of limits on aircraft noise levels (including "noise budgets," which limit the total noise each airline's operations at the airport can cause); six of these airports have adopted their restrictions since 1985. Finally, three airports have restrictions, all adopted since 1985, allowing only Stage 3 aircraft. Of the 24 airports with use restrictions, 9 are large, 7 are medium-sized, and 8 are small. Of the nine large airports, five ban use of Stage 2 aircraft at night, three more limit Stage 2 operations at night, two limit daytime Stage 2 operations, and four have other kinds of noise limits. None of the large airports bans Stage 2 aircraft altogether.

Thirteen of these 24 airports indicated they are very likely to strengthen restrictions over the next 5 years, while 6 are somewhat likely to do so. For the 114 airports that do not currently have aircraft use restrictions, 13 airports (including 4 large ones) are very likely to establish such restrictions during the next 5 years and 22 airports are somewhat likely to do so. Of the 13, 7 are very likely to adopt nighttime Stage 2 bans, 6 are very likely to adopt daytime Stage 2 limits, and 1 is very likely to adopt a total Stage 2 ban.

By the year 2000, considerably more airports expect to have banned Stage 2 aircraft. Thirty-four are very likely to ban Stage 2, while 43 are somewhat likely to do so. Combined with the 4 airports that already ban

Stage 2 aircraft or expect to do so by 1995, 81 of the 138 airports in our survey are at least somewhat likely to have banned Stage 2 by 2000, while 38 are very likely to have done so. The 38 airports include 12 large airports. An additional eight large airports are somewhat likely to adopt Stage 2 bans. The 20 large airports that are very likely or somewhat likely to have banned Stage 2 by 2000 were responsible for 46 percent of U.S. passenger boardings in 1988.

The most stringent aircraft use restrictions, both existing and proposed, are found in the Northeast and on the West Coast. Of the 19 airports that currently impose nighttime restrictions on Stage 2 or Stage 3 aircraft, 6 are located in the Northeast, 9 on the West Coast, and 2 each in the Midwest and Southeast. Airports planning to adopt such restrictions are similarly located. Airports that plan to move toward an all-Stage-3 environment are also located in the Northeast and on the West Coast. Our survey results indicate that by the year 2000 over 75 percent of passenger boardings in the Northeast and on the West Coast will very likely be at airports that require all Stage 3 aircraft. Airports in the Mountain States and in the Southwest are least likely to become all-Stage-3 airports by the year 2000.

Airport Noise Telephone Survey

Note: Sample size: 140 airports—29 large (L), 41 medium (M), 70 small (S). Number surveyed (N): 138—29 large, 41 medium, 68 small.

Introduction

The Congress is trying to determine whether restrictions on aircraft use and operations have increased over the last 5 years because of noise considerations. We would also like to know your views on the impact that noise restrictions have on your airport and what plans for noise control you might have under consideration.

GAO pledges that your answers to this interview will remain confidential. In other words, we will only present answers to this telephone survey as a group so that no airport can be individually identified as to its answers. The interview is voluntary and if there is any question you do not want to answer, simply say so and the interview will move on to the next question.

Respondents	Total (N = 138)
Noise control officer	**21**
Airport director or manager	**56**
Assistant director or manager	**10**
Other	**51**

1. I'd like to ask a general question about how sensitive your airport is to noise. By sensitive, we mean that your airport feels pressure to address noise control in response to community concerns over noise. Generally speaking, would you say your airport is very sensitive, moderately sensitive, somewhat sensitive, or not very sensitive to noise? (Check only one answer.)

	L	M	S	Total (N = 138)
Very sensitive	16	19	16	**51**
Moderately sensitive	10	15	19	**44**
Somewhat sensitive	2	5	16	**23**
Not very sensitive	1	2	17	**20**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Section I: Noise Restrictions

I'd like to ask a series of questions about three methods that airports use to control noise. The three methods are requirements for operating procedures, land-use controls, and aircraft use restrictions, including any noise level restrictions that affect aircraft use.

2. The first method is requirements for operating procedures. Examples of this would include runway procedures, flight path procedures, required rates of climb, and shifting operations to reliever airports. Do you currently have any requirements for operating procedures that your airport uses to control noise? (Check only one answer.)

	L	M	S	Total (N = 138)
Yes	26	33	38	**97**
No (Go to question 5.)	3	8	29	**40**
Don't know (Go to question 5.)	0	0	0	**0**
Not determined/refused to answer (Go to question 5.)	0	0	1	**1**

3. Did your airport impose or strengthen any of these requirements over the last 5 years—that is, since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 97)
Yes	13	17	21	**51**
No	13	16	17	**46**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

4. How likely is it that your airport will strengthen or add more requirements for operating procedures to control noise over the next 5 years—that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 97)
Very likely	9	17	17	**43**
Somewhat likely	7	12	11	**30**
Not very likely	9	4	10	**23**
Don't know	1	0	0	**1**
Not determined/refused to answer	0	0	0	**0**

Please skip to question 6.

5. How likely is it that your airport will establish any requirements for operating procedures to control noise over the next 5 years—that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 41)
Very likely	1	2	3	**6**
Somewhat likely	0	2	9	**11**
Not very likely	2	4	18	**24**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

6. The second method of noise control that we'd like to ask about is land-use controls. Examples of this would include land acquisition, soundproofing residential homes, or zoning. These land-use controls might be imposed through state or local government rather than directly by the airport. Does your airport presently employ any land-use controls to control noise? (Check only one answer.)

	L	M	S	Total (N = 138)
Yes	23	29	48	**100**
No (Go to question 9.)	6	12	20	**38**
Don't know (Go to question 9.)	0	0	0	**0**
Not determined/refused to answer (Go to question 9.)	0	0	0	**0**

7. Were any of these land-use controls imposed or strengthened in the last 5 years—that is, since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 100)
Yes	17	22	33	**72**
No	6	7	14	**27**
Don't know	0	0	1	**1**
Not determined/refused to answer	0	0	0	**0**

8. How likely is it that any land-use controls will be added or strengthened over the next 5 years—that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 100)
Very likely	11	18	24	**53**
Somewhat likely	6	7	17	**30**
Not very likely	6	4	7	**17**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Skip to question 10.

9. How likely is it that your airport would begin using any land-use controls to control noise over the next 5 years—that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 38)
Very likely	0	6	8	**14**
Somewhat likely	2	1	4	**7**
Not very likely	4	5	8	**17**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

10. The third method of noise control that we'd like to ask about is aircraft use restrictions, including any noise level restrictions that affect which aircraft can be used. Examples of this would include limits on numbers of Stage 2 aircraft, fleet mix requirements, limits on noise levels, and noise budgets. Does your airport have any such aircraft use restrictions that you use to control noise? (Check only one answer.)

	L	M	S	Total (N = 138)
Yes	9	7	8	**24**
No (Go to question 13.)	20	34	60	**114**
Don't know (Go to question 13.)	0	0	0	**0**
Not determined/refused to answer (Go to question 13.)	0	0	0	**0**

11. Did your airport impose or strengthen any of these aircraft use restrictions in the last 5 years—that is, since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 24)
Yes	9	7	8	**24**
No	0	0	0	**0**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

12. How likely is it that any aircraft use restrictions will be added or strengthened to control noise over the next 5 years–that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 24)
Very likely	6	3	4	**13**
Somewhat likely	2	2	2	**6**
Not very likely	1	2	2	**5**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Please skip to question 14.

13. How likely is it that your airport would establish any aircraft use restrictions to control noise over the next 5 years–that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 114)
Very likely	4	5	4	**13**
Somewhat likely	4	12	6	**22**
Not very likely	12	17	50	**79**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

All-Stage-3 Requirement

Next, I'll be asking more specific questions about present and future aircraft use restrictions at your airport. We realize that some restrictions are mandatory and others are included in voluntary agreements. Please tell us about both types of restrictions as we ask this series of questions. For each restriction you mention, we will ask whether the restriction is voluntary or mandatory.

14. Some airports presently limit all scheduled operations, both day and night, to Stage 3 aircraft only. I'd like to know about your airport's present and future plans relating to this type of restriction. Does your airport currently have requirements that result in your airport being an all-Stage-3 airport?

(If respondent needs definition:) **Stage 3 aircraft are the newer, more quiet aircraft. These include the Boeing 747, 757, 767, 737-300, and 737-400; also the DC-8-70, DC-10, MD-80s and 90s; the BAE-146; the L-1011; and the Airbus 300 and 310. (Check only one answer.)**

	L	M	S	Total (N = 138)
Yes	0	2	1	**3**
No (Go to question 17.)	29	39	67	**135**
Don't know (Go to question 17.)	0	0	0	**0**
Not determined/refused to answer (Go to question 17.)	0	0	0	**0**

15. Is that a voluntary restriction or a mandatory restriction? (Check only one answer.)

	L	M	S	Total (N = 3)
Voluntary	0	0	0	**0**
Mandatory	0	2	1	**3**
Some voluntary/ some mandatory	0	0	0	**0**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

16. Did your airport implement these restrictions that limit all operations to Stage 3 in the last 5 years—that is, since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 3)
Yes	0	2	1	**3**
No	0	0	0	**0**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Please skip to section IV.

17. How likely is it that your airport will require all-Stage-3 operations by December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 135)
Very likely (Go to question 19.)	0	1	0	**1**
Somewhat likely	3	3	7	**13**
Not very likely	26	35	60	**121**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

18. How likely is it that your airport will require all-Stage-3 operations by December 31, 1999? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 122)
Yes	3	0	0	**3**
No (Go to question 27.)	21	36	62	**119**
Don't know (Go to question 27.)	0	0	0	**0**
Not determined/refused to answer (Go to question 27.)	0	0	0	**0**

25. Is that a voluntary restriction or a mandatory restriction? (Check only one answer.)

	L	M	S	Total (N = 3)
Voluntary	0	0	0	**0**
Mandatory	3	0	0	**3**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

26. Did your airport impose or strengthen that restriction since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 3)
Yes	3	0	0	**3**
No	0	0	0	**0**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Please skip to question 28.

27. How likely is it that your airport would establish requirements for certain numbers or percent of Stage 3 nighttime operations at your airport over the next 5 years—that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

21. Is that a voluntary restriction or a mandatory restriction? (Check only one answer.)

	L	M	S	Total (N = 13)
Voluntary	1	2	3	**6**
Mandatory	4	1	2	**7**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

22. Did your airport impose that restriction since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 13)
Yes	3	2	4	**9**
No	2	1	1	**4**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Skip to question 28.

23. How likely is it that your airport would prohibit all Stage 2 aircraft from using your airport at night between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 122)
Very likely	6	1	0	**7**
Somewhat likely	2	10	6	**18**
Not very likely	16	25	56	**97**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Requirements for Nighttime Stage 3 Operations

24. Does your airport currently have any requirements that a certain number or percent of operations be performed with Stage 3 aircraft at your airport at night? (Check only one answer.)

	L	M	S	Total (N = 6)
Yes	2	2	2	**6**
No	0	0	0	**0**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Please skip to question 32.

31. How likely is it that your airport would establish requirements for certain numbers or percent of Stage 3 daytime operations at your airport over the next 5 years—that is, between now and December 31, 1994? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 129)
Very likely	5	1	0	**6**
Somewhat likely	5	4	8	**17**
Not very likely	17	32	57	**106**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Limits on Noise Levels

32. Some airports have limits on noise levels or use noise budgets to encourage the use of Stage 3 aircraft. Does your airport currently have any such noise level restrictions that encourage air carriers to maximize their use of Stage 3 aircraft? (Check only one answer.)

	L	M	S	Total (N = 135)
Yes	4	2	1	**7**
No (Go to question 35.)	25	37	66	**128**
Don't know (Go to question 35.)	0	0	0	**0**
Not determined/refused to answer (Go to question 35.)	0	0	0	**0**

33. Is that a voluntary restriction or a mandatory restriction? (Check only one answer.)

	L	M	S	Total (N = 119)
Very likely	3	4	0	**7**
Somewhat likely	5	10	13	**28**
Not very likely	13	21	49	**83**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	1	0	**1**

Requirements for Stage 3 Daytime Operations

28. Does your airport currently have any requirements that a certain number or percent of operations be performed with Stage 3 aircraft at your airport during the day? (Check only one answer.)

	L	M	S	Total (N = 135)
Yes	2	2	2	**6**
No (Go to question 31.)	27	37	65	**129**
Don't know (Go to question 31.)	0	0	0	**0**
Not determined/refused to answer (Go to question 31.)	0	0	0	**0**

29. Is that a voluntary restriction or a mandatory restriction? (Check only one answer.)

	L	M	S	Total (N = 6)
Voluntary	0	1	2	**3**
Mandatory	2	1	0	**3**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

30. Did your airport impose or strengthen that restriction since January 1, 1985? (Check only one answer.)

that is, since January 1, 1985--and consider the airports both in your area and across the nation. Do you believe that existing aircraft use restrictions by other airports have caused your airport to have higher levels of noise, lower levels of noise, or would you say that they have not affected your airport? (Check only one answer.)

	L	M	S	Total (N = 135)
Higher	6	9	8	**23**
Lower (Go to question 45.)	4	8	12	**24**
Has not affected (Go to section III.)	19	20	45	**84**
Don't know (Go to section III.)	0	1	2	**3**
Not determined/refused to answer (Go to section III.)	0	1	0	**1**

37. Would you say much higher or just somewhat higher? (Check only one answer.)

	L	M	S	Total (N = 23)
Much higher	1	2	2	**5**
Somewhat higher	5	7	6	**18**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

38. In the previous question, you indicated that your airport receives more noise due to the aircraft use restrictions at other airports. I'd like to read a series of statements that describe possible effects at your airport from this extra noise. For each statement I read, please tell me whether it is very true, somewhat true, or not true at all.

39. The first statement is: "We are getting more Stage 2 operations because of noise restrictions at other airports." Would you say that is very true, somewhat true, or not true at all? (Check only one answer.)

	L	M	S	Total (N = 7)
Voluntary	1	0	0	**1**
Mandatory	3	2	1	**6**
Some voluntary/ some mandatory	0	0	0	**0**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

34. Did your airport impose or strengthen that restriction since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 7)
Yes	3	2	1	**6**
No	1	0	0	**1**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Skip to section II.

35. Over the next 5 years—that is between now and December 31, 1994—how likely is it that your airport would establish limits on noise levels that encourage the operation of Stage 3 aircraft? Would you say it is very likely, somewhat likely, or not very likely? (Check only one answer.)

	L	M	S	Total (N = 128)
Very likely	3	1	3	**7**
Somewhat likely	4	13	12	**29**
Not very likely	18	23	51	**92**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Section II: Noise Burden From Other Airports

36. The next series of questions in our survey is about the effects that aircraft use restrictions at one airport have on noise levels at another airport. We are trying to find out if airports think their noise levels have changed over the last 5 years because of aircraft use restrictions at other airports. Please consider the last 5 years—

	L	M	S	Total (N = 22)
Very true	0	0	0	**0**
Somewhat true	1	2	1	**4**
Not true at all	4	7	7	**18**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

43. The next statement is: "The extra noise is forcing us to come up with more aircraft use restrictions of our own." Would you say that is very true, somewhat true, or not true at all?

	L	M	S	Total (N = 22)
Very true	2	1	0	**3**
Somewhat true	1	6	5	**12**
Not true at all	2	2	3	**7**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

44. The next statement is: "The extra noise has caused an increase in the number of noise complaints we receive." Would you say that is very true, somewhat true, or not true at all? (Check only one answer.)

	L	M	S	Total (N = 22)
Very true	2	5	2	**9**
Somewhat true	1	4	3	**8**
Not true at all	2	0	2	**4**
Don't know	0	0	1	**1**
Not determined/refused to answer	0	0	0	**0**

Please skip to section III.

45. Would you say much lower or just somewhat lower? (Check only one answer.)

	L	M	S	Total (N = 23)
Very true	2	2	2	**6**
Somewhat true	3	7	6	**16**
Not true at all (Go to section III.)	0	0	0	**0**
Don't know (Go to section III.)	1	0	0	**1**
Not determined/refused to answer (Go to section III.)	0	0	0	**0**

40. The next statement is: "Airlines are replacing Stage 3 operations with Stage 2 operations at our airport." Would you say that is very true, somewhat true, or not true at all? (Check only one answer.)

	L	M	S	Total (N = 22)
Very true	2	0	0	**2**
Somewhat true	1	5	2	**8**
Not true at all	2	4	6	**12**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

41. The next statement is: "The extra noise is not a problem for our airport." Would you say that is very true, somewhat true, or not true at all? (Check only one answer.)

	L	M	S	Total (N = 22)
Very true	0	1	1	**2**
Somewhat true	2	1	1	**4**
Not true at all	3	7	6	**16**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

42. The next statement is: "The extra noise has increased the revenues our airport receives." Would you say that is very true, somewhat true, or not true at all? (Check only one answer.)

48. The next item is: number of cities served from your airport. Do you think this service has been affected by changes in noise rules at other airports? (Check only one answer.)

	L	M	S	Total (N = 135)
Yes	3	6	2	**11**
No (Go to question 50.)	26	32	64	**122**
Don't know (Go to question 50.)	0	0	1	**1**
Not determined/refused to answer (Go to question 50.)	0	1	0	**1**

49. Would you say this service has increased, decreased, or remained the same overall? (Check only one answer.)

	L	M	S	Total (N = 11)
Increased	0	2	0	**2**
About the same	0	0	0	**0**
Decreased	3	4	2	**9**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

50. The next item is: proportion of Stage 3 operations at your airport. Do you think this service has been affected by changes in noise rules at other airports? (Check only one answer.)

	L	M	S	Total (N = 135)
Yes	11	21	22	**54**
No (Go to question 52.)	16	18	45	**79**
Don't know (Go to question 52.)	1	0	0	**1**
Not determined/refused to answer (Go to question 52.)	1	0	0	**1**

51. Would you say this service has increased, decreased, or remained the same overall? (Check only one answer.)

	L	M	S	Total (N = 24)
Much lower	0	2	4	**6**
Somewhat lower	4	5	8	**17**
Don't know	0	1	0	**1**
Not determined/refused to answer	0	0	0	**0**

Section III: Changes in Airline Service

Now I have a new series of questions. We are trying to find out whether changes in noise control rules at some airports are affecting airline service received at other airports. I'd like for you to think about changes in airline service at your airport over the last 5 years—that is, since January 1, 1985. For each type of service I mention, please tell me whether or not you think that service was affected by changes in noise control rules at other airports. If you do think it was affected, I have a followup question on whether it increased or decreased.

46. The first type of service is: number of flights per week at your airport. Do you think this service has been affected by changes in noise rules at other airports? (Check only one answer.)

	L	M	S	Total (N = 135)
Yes	0	6	4	**10**
No (Go to question 48.)	29	33	63	**125**
Don't know (Go to question 48.)	0	0	0	**0**
Not determined/refused to answer (Go to question 48.)	0	0	0	**0**

47. Would you say this service has increased, decreased, or remained the same overall? (Check only one answer.)

	L	M	S	Total (N = 10)
Increased	0	4	0	**4**
About the same	0	0	1	**1**
Decreased	0	2	3	**5**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

54. Please think about the number of complaints that your airport has received over the last year. We'd like to know how the number of complaints inside the 65 Ldn contour compared with the area outside the 65 Ldn contour. Was the proportion of complaints inside the 65 Ldn more, less, or about the same as the proportion outside the 65 Ldn contour? (Check only one answer.)

	L	M	S	Total (N = 138)
More	9	18	11	**38**
About the same	6	8	29	**43**
Less	13	14	22	**49**
Don't know	0	0	3	**3**
Not determined/refused to answer	1	1	3	**5**

55. Could you give me a rough estimate of the number of people who live within the 65 Ldn contour associated with your airport? (Check only one answer.)

	L	M	S	Total (N = 138)
Yes	27	37	58	**122**
No (Go to question 57.)	2	1	7	**10**
Don't know (Go to question 57.)	0	3	3	**6**
Not determined/refused to answer (Go to question 58.)	0	0	0	**0**

56. What is that number, please?

Range of response: 0 to 462,000 people.

Please skip to question 58.

57. Would you be able to look up that number if someone called you back later? (Check only one answer.)

	L	M	S	Total (N = 16)
Yes	2	4	5	**11**
No	0	0	5	**5**

	L	M	S	Total (N = 54)
Increased	6	18	17	**41**
About the same	0	0	1	**1**
Decreased	5	3	2	**10**
Don't know	0	0	2	**2**
Not determined/refused to answer	0	0	0	**0**

52. The next item is: amount of non-stop service between your airport and other destinations. Do you think this service has been affected by changes in noise rules at other airports? (Check only one answer.)

	L	M	S	Total (N = 135)
Yes	1	5	4	**10**
No (Go to section IV.)	28	34	61	**123**
Don't know (Go to section IV.)	0	0	2	**2**
Not determined/refused to answer (Go to section IV.)	0	0	0	**0**

53. Would you say this service has increased, decreased, or remained the same overall? (Check only one answer.)

	L	M	S	Total (N = 10)
Increased	0	4	1	**5**
About the same	0	0	0	**0**
Decreased	1	1	3	**5**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Section IV: Noise Complaints and Noise Measures

In the next series of questions, we will be asking about noise complaints and measures of noise levels. The FAA uses Ldn (day-night level) 65 decibels as a threshold for assessing the impact of noise. We will refer to this level as 65 Ldn. The area surrounding the airport that is subject to this much noise is considered the 65 Ldn contour.

	L	M	S	Total (N = 138)
Major factor	18	24	25	**67**
Minor factor	10	10	19	**39**
Not a factor	1	6	24	**31**
Don't know	0	1	0	**1**
Not determined/refused to answer	0	0	0	**0**

61. The next item is: litigation against your airport. Has that been a major factor, a minor factor, or not a factor in making noise control decisions at your airport since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 138)
Major factor	5	7	5	**17**
Minor factor	16	10	5	**31**
Not a factor	8	24	58	**90**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

62. The next item is: state or local government concerns. Has that been a major factor, a minor factor, or not a factor in making noise control decisions at your airport since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 138)
Major factor	14	16	15	**45**
Minor factor	10	12	24	**46**
Not a factor	5	13	29	**47**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

63. The next item is: agreements between your airport and the community. Has that been a major factor, a minor factor, or not a factor in making noise control decisions at your airport since January 1, 1985? (Check only one answer.)

58. While FAA uses the 65 Ldn contour as a criterion for the impact of noise, others support the use of different measures. What noise measure do you think is necessary to eliminate most of your complaints? Would you say it is 65 Ldn, 60 Ldn, 55 Ldn, or something else? (Check only one answer.)

	L	M	S	Total (N = 138)
65 Ldn	7	17	32	**56**
60 Ldn	1	6	8	**15**
55 Ldn	4	5	10	**19**
Something else (Go to question 59.)	10	5	5	**20**
65 CNEL	1	1	1	**3**
None	2	5	8	**15**
Don't know	2	2	2	**6**
Not determined/refused to answer	2	0	2	**4**

Please skip to section V.

59. What is that, please?

	(N = 20)
Single event	8
Below 55 Ldn	3
Other	9

Section V: Noise Control Decisions

In this next set of questions, I'm going to read a list of items. For each item I read, I want you to consider how much of a factor it has been in making decisions about noise control over the last 5 years. For each one, please tell me whether that item was a major factor, a minor factor, or not a factor in making noise control decisions at your airport since January 1, 1985.

60. The first one is: noise complaints. Has that been a major factor, a minor factor, or not a factor in making noise control decisions at your airport since January 1, 1985? (Check only one answer.)

66. The first element is: Stage 2 aircraft are banned by December 31, 2004. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	20	21	28	**69**
Support somewhat	2	11	17	**30**
Uncertain	0	3	11	**14**
Oppose somewhat	4	1	7	**12**
Oppose strongly	3	5	5	**13**
Not determined/refused to answer	0	0	0	**0**

67. The next element is: Stage 2 aircraft are banned by December 31, 1999. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	23	25	29	**77**
Support somewhat	2	8	17	**27**
Uncertain	1	4	7	**12**
Oppose somewhat	2	4	11	**17**
Oppose strongly	1	0	4	**5**
Not determined/refused to answer	0	0	0	**0**

68. The next element is: no local rules allowed that are stricter than federal rules. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

	L	M	S	Total (N = 138)
Major factor	12	15	10	**37**
Minor factor	8	12	13	**33**
Not a factor	9	14	45	**68**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

64. The next item is: federal guidance under FAA's Part 150 program. Has that been a major factor, a minor factor, or not a factor in making noise control decisions at your airport since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 138)
Major factor	11	21	23	**55**
Minor factor	6	9	21	**36**
Not a factor	12	11	24	**47**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

65. The next item is: results of economic analysis conducted by your airport. Has that been a major factor, a minor factor, or not a factor in making noise control decisions at your airport since January 1, 1985? (Check only one answer.)

	L	M	S	Total (N = 138)
Major factor	5	6	9	**20**
Minor factor	11	15	15	**41**
Not a factor	13	20	44	**77**
Don't know	0	0	0	**0**
Not determined/refused to answer	0	0	0	**0**

Section VI: National Noise Policy Elements

In this last set of questions, I'm going to read a list of possible elements for a national noise policy. I'll ask whether you support or oppose each element.

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	1	11	24	**36**
Support somewhat	8	7	19	**34**
Uncertain	5	5	3	**13**
Oppose somewhat	7	3	11	**21**
Oppose strongly	7	14	11	**32**
Not determined/refused to answer	1	1	0	**2**

71. The next element is: existing restrictions are permitted to remain in effect. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	19	16	25	**60**
Support somewhat	4	12	22	**38**
Uncertain	2	7	8	**17**
Oppose somewhat	2	2	7	**11**
Oppose strongly	2	4	5	**11**
Not determined/refused to answer	0	0	1	**1**

72. The next element is: restrictions already scheduled for the future are also allowed to remain in effect. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	6	13	22	**41**
Support somewhat	3	9	9	**21**
Uncertain	3	2	5	**10**
Oppose somewhat	2	9	9	**20**
Oppose strongly	15	8	23	**46**
Not determined/refused to answer	0	0	0	**0**

69. The next element is: the federal government assumes liability for damages due to noise complaints. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	16	29	34	**79**
Support somewhat	7	6	13	**26**
Uncertain	4	2	7	**13**
Oppose somewhat	1	2	7	**10**
Oppose strongly	1	2	6	**9**
Not determined/refused to answer	0	0	1	**1**

70. The next element is: airports that are not sensitive to noise are exempt from policy. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

	L	M	S	Total (N = 138)
Yes	26	37	54	**117**
No	1	1	2	**4**
Uncertain	2	2	12	**16**
Not determined/refused to answer	0	1	0	**1**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	13	14	17	**44**
Support somewhat	8	5	25	**38**
Uncertain	3	7	11	**21**
Oppose somewhat	3	9	11	**23**
Oppose strongly	2	4	4	**10**
Not determined/refused to answer	0	2	0	**2**

73. The next element is: more Part 150 funds are made available to airports. Would you support or oppose that element for a federal noise policy, or are you uncertain? (Check only one answer.)

(If response is "support":) **Would you say you strongly support or support somewhat?**

(If response is "oppose":) **Would you say you strongly oppose or oppose somewhat?**

	L	M	S	Total (N = 138)
Support strongly	20	31	49	**100**
Support somewhat	4	5	14	**23**
Uncertain	3	2	3	**8**
Oppose somewhat	2	1	0	**3**
Oppose strongly	0	2	2	**4**
Not determined/refused to answer	0	0	0	**0**

74. We asked you about several possible elements for a national noise policy and now we would like to get your reaction to the need for a national noise policy. Please tell me whether or not you believe there is a need for a national noise policy or would you say you are uncertain? (Check only one answer.)

To illustrate differences in the studies, we selected a "base case" scenario for comparison purposes. The base case scenario is the cost of a Stage 2 ban in the year 2000.[2] Varying methodologies and assumptions determine the differences in cost estimates for the base case, which are reported in table IV.1. This table also shows the range of estimates reported in each study.

Table IV.1: Study Results

Constant dollars in millions[a]

	FAA	American Airlines	AVMARK	LCC
Base case cost[b]	$2,725	$3,140	$59,574	$15,900
Range of costs[c]				
High	5,657	3,140	59,574	15,900
Low	17	530	22,500	15,900

[a]FAA and LCC report their estimates in 1988 dollars while American Airlines and AVMARK report their estimates in 1989 dollars.

[b]The base case scenario is a year 2000 ban on Stage 2 aircraft. The estimates for FAA and American Airlines assumed a 30-year expected aircraft life, while the AVMARK and LCC studies implicitly assumed an indefinite expected aircraft life. The LCC estimate is for cargo aircraft only, while the other estimates include passenger aircraft.

[c]By varying the principal assumptions in their analyses, the study authors produced a range of costs.

Different Methodologies Affect the Range of Cost Estimates

The FAA and American Airlines studies each assumed the cost associated with a Stage 2 ban to be the incremental cost of retiring an aircraft early, minus any savings associated with operating new, more efficient replacement aircraft. For example, if an aircraft had to be replaced one year before it would normally be replaced, the cost attributable to the ban would be the interest cost of borrowing the capital one year earlier than would have normally occurred, minus the discounted value of savings in operating and maintenance costs by substituting a new aircraft for an older one. From an economic perspective, it is appropriate to consider only the incremental cost of earlier retirement.

While it is appropriate to attribute only the incremental cost of early retirement to the ban, the FAA and American Airlines methodologies rely on an implicit assumption about the value of aircraft that are to be retired early. In principle, the cost of early retirement is the interest cost of incurring the capital cost early plus the value of the remaining undepreciated capital embodied in the used aircraft that cannot be recovered by selling the aircraft. The FAA and American Airlines studies

[2]The different estimates considered a variety of ban dates, varying from 1995 to 2010.

Analysis of Costs of Phasing Out Stage 2 Aircraft

The Airport Noise and Capacity Act of 1990 (ANCA) calls for the complete phaseout of Stage 2 aircraft by the year 2000, although the Secretary of Transportation may issue waivers for up to 15 percent of the airlines' fleets until the end of 2003. Various industry groups studied the impact of a mandatory phaseout and developed widely varying cost estimates. GAO evaluated four studies of the financial impact of a ban on Stage 2 aircraft and also developed its own cost estimate. These studies used widely varying methodologies and assumptions, and as a result their estimates of the costs of phasing out Stage 2 aircraft varied widely, ranging from $17 million to $59.6 billion. However, our analysis indicates that these costs are likely to fall between $2 billion and $5 billion in 1990 dollars, depending upon whether airlines replace or retrofit their existing Stage 2 fleets.

These estimates are determined by the cost of early retirement of Stage 2 aircraft. The wide variation in the estimates of the four studies largely reflects varying assumptions about depreciation methodology, discounting, aircraft life span, and fleet growth. In order to understand the costs more fully, we developed a cost estimate with the methodology and assumptions we found most reasonable. We estimate the cost of a Stage 2 fleet ban in 2000 as $4.6 billion if airlines replace aircraft and $2.1 billion if airlines either retrofit or replace aircraft, whichever is cheaper.

Analysis of Cost Estimates

Four organizations—the Federal Aviation Administration (FAA); American Airlines; AVMARK, Inc.; and Leeper, Cambridge & Campbell, Inc. (LCC)—issued major studies during 1988 and 1989 to determine the cost of a Stage 2 ban.[1] AVMARK is an aviation consulting firm whose clients own and operate commercial aircraft. LCC is a consulting firm whose study was conducted at the request of the Air Freight Association.

Cost Estimates Vary Widely

The American Airlines study focused on the nine major passenger airlines; it did not consider the effect of a ban on smaller carriers or the air cargo industry. The FAA and AVMARK studies focused on the entire U.S. domestic fleet, both passenger and air cargo. LCC's study focused exclusively on the air freight industry.

[1] A fifth study, by the International Civil Aviation Organization (ICAO), did not conduct an original analysis of the U.S. market; it reported the results of the FAA study.

Table IV.2: Principal Assumptions

	FAA	American Airlines	AVMARK	LCC
Methodology of cost estimation	Net present value of early retirement	Net present value of early retirement	Capital cost	Capital cost
Inflation adjustment	Yes	Yes	In most cases	Yes
Assumed real discount rate	6%	9%	0%	6.2%
Expected aircraft life in years	25-35	30	30	Indefinite[a]
Relevant fleet	U.S. domestic jet fleet	Jet fleet of nine major airlines	U.S. domestic jet fleet	Jet fleet of cargo carriers
Current size of relevant fleet (year of estimate)[b]	2,305 (1989)	1,629 (1990)	2,278 (1989)	254 (1987)
Expected relevant fleet size in 2000[c]	4,791	[d]	[d]	1,933
Estimate of hushkit costs	Yes	No	Yes	Yes
Estimate of re-engine costs	No	No	Yes	Yes

[a]LCC assumes that jet aircraft life spans are unknown and may be presumed to be significantly longer than 30 years.

[b]Although FAA and AVMARK fleet estimates differ slightly, the impact on costs is minimal.

[c]A company that buys new (Stage 3) aircraft cannot attribute the cost of the new aircraft to a ban unless that company would have purchased Stage 2 aircraft. In this case, only the difference in the costs may be attributed to the ban. The expected relevant fleet size is extraneous information in all cases except in LCC's study because it attributes the cost of assumed purchases (of new Stage 3 aircraft) to the cost of a ban.

[d]Not applicable.

The wide range of cost estimates in these studies reflects differences in key assumptions concerning the useful life of an aircraft, the discount rate used to compare costs and benefits occurring in different years, the growth rate of the airline industry, and the extent to which airlines can meet Stage 3 standards by installing hushkits or new engines rather than replacing aircraft.

Two of the studies, by LCC and AVMARK, report very high estimated costs. These high cost estimates result from three key assumptions. First, as previously discussed, LCC and (implicitly) AVMARK assume that aircraft have indefinitely long useful lives, so the aircraft would never have to be replaced in the absence of a Stage 2 ban. Second, AVMARK assumes a zero discount rate, so that costs occurring in the distant future are

implicitly assume that the second component—the loss of undepreciated capital—is zero. This assumption is appropriate if the aircraft owners either sell noncomplying aircraft to users who are not affected by the restriction or comply with the restriction by retrofitting.

LCC and AVMARK used different approaches. LCC's study stated that the cost of a ban would be the full capital cost of the replacement aircraft minus any operating and maintenance savings. Although recognizing that aircraft must eventually be replaced, LCC argued that there are no technical reasons why an aircraft cannot be maintained for safe use indefinitely. LCC assumed, in essence, that used aircraft have an indefinitely long economic life and therefore do not depreciate in value. LCC implicitly assumed that old aircraft would never be replaced in the absence of government intervention requiring their replacement. This assumption is not consistent with the fact that older aircraft are constantly being replaced even in the absence of any government requirement, primarily because, as aircraft age, the costs of maintenance and repair become greater than the cost of borrowing the capital to buy a new aircraft. The consequence of LCC's assumption is that any forced retirement should result in the full cost of the replacement aircraft being attributed to the ban.

While AVMARK's study assumed a 30-year aircraft life, that assumption was not incorporated into its cost estimate. Under its methodology, if an aircraft had to be replaced before it was 30 years old—even one year before—then the entire cost of the replacement aircraft was attributed to the ban. Attributing the entire cost of replacement aircraft to the ban resulted in substantially higher cost estimates than those that resulted from the FAA and American Airlines methodologies.

Varying Assumptions Also Affect Cost Estimates

To determine the reason for differences in the cost estimates, we examined how different key assumptions affect the study results. Table IV.2 lists the principal assumptions that caused the differences between the studies. The studies presented a range of estimates reflecting sensitivity analyses to show how their cost estimates could vary with certain changes in assumptions.

removed from an aircraft's useful life by a Stage 2 ban is a major determinant in the total cost of such a ban.

The assumptions about useful life in the four studies varied. The American Airlines study assumed a 30-year useful life while the FAA study assumed a 25- to 35-year useful life. The LCC study did not assign a useful life, arguing that aircraft can be maintained for safe use indefinitely. The AVMARK study, while assigning a 30-year useful life, agreed with the LCC study that aircraft can be maintained indefinitely.

LCC and AVMARK, in suggesting that the technical life of an aircraft is indefinite, do not recognize that an aircraft's economically useful life is definitely limited. The economic life extends only to the point when it becomes cheaper to replace the aircraft with a newer aircraft than to make repairs. The economically useful life of aircraft is likely to become shorter as a result of new and planned FAA airworthiness directives, which will require increasingly frequent and costly maintenance procedures for older aircraft.

Fleet Size Assumptions Can Overstate Costs

LCC assumed a 20-percent annual rate of increase in the cargo fleet through 1992 and a 15-percent annual rate of increase thereafter through the year 2000. If these growth rates actually occurred, the air cargo fleet would grow to 1,933 aircraft by the year 2000. However, several other studies have suggested that rates of growth in the airline industry will be substantially less than those forecast by LCC. The FAA estimates that the entire U.S. fleet will grow at the rate of 1.9 percent annually. The American Airlines study suggests that fleet growth will be only "a few" percent per year, and Boeing Aircraft forecast growth in the air cargo fleet at less than 6 percent per year. LCC's assumption of rapid growth adds appreciably to the cost of a ban as calculated in the LCC study, particularly since LCC attributed the full, undepreciated cost of replacement aircraft to the ban.

We analyzed the impact of LCC's growth assumption by substituting different growth rates. Using a growth rate of 1.9 percent would result in a fleet of 324 aircraft instead of the 1,933 calculated by LCC. The adjusted cost estimate, in present-value terms, would be $2.52 billion rather than $15.0 billion. A growth rate of 6 percent would result in 542 aircraft and an adjusted cost of $4.2 billion.

weighted just as heavily as costs occurring at the present. Third, LCC assumes the growth rate of the air cargo industry will be 15-20 percent per year. When these assumptions are changed to reflect a consensus of expert opinion on aircraft life spans, discount rates, and growth rates, their estimates change to approximately the level of estimates by GAO, FAA, and American Airlines.[3]

Discount Rate Choices Affect Cost Estimates

In their studies, FAA, American Airlines, and LCC discounted future expenditures and cost savings in order to express them in present dollars. This is the accepted practice in analyzing expenditures over time. The FAA, American Airlines, and LCC studies assumed discount rates of 6 percent, 9 percent, and 6.2 percent, respectively. AVMARK did not discount future costs (i.e., they assumed a zero discount rate). These assumptions affect estimated costs since a discount rate that is too low tends to overstate both estimated costs and benefits of replacement, while one that is too high understates both estimates. We assumed that the real discount would equal 7.6 percent, which is the prime lending rate, plus a 1.5 percent risk premium, minus the anticipated rate of inflation as measured by the gross national product (GNP) deflator. We used that rate to recalculate the present value of the costs reported in each study. Table IV.3 illustrates these results. Since AVMARK assumed a zero percent discount rate, this assumption affects their estimate more than the others.

Table IV.3: Costs Adjusted to Present-Value Terms

Dollars in billions

	FAA	American Airlines	AVMARK	LCC
Reported costs	$2.7	$3.1	$59.6	$15.9
Adjusted costs in 1989 dollars	2.7	3.3	43.8	15.0
Difference	$0.0	($0.2)	$15.8	$0.9

Assumptions About Useful Life Also Affect Cost Estimates

Assumptions about an aircraft's useful life are also important in estimating the cost of a Stage 2 aircraft ban. The useful life of an aircraft depends on how intensively it is used. A cargo aircraft, for example, that is flown fewer cycles (one takeoff and landing) per day than a passenger aircraft can be expected to be economically useful for more years. This is a significant variable because the number of years

[3]GAO's estimate is described in detail later in this appendix.

An alternative estimate is produced when the owner of each type of aircraft adopts the cheapest strategy for each aircraft: either replacement, re-engining, or hushkitting. With this alternative, we estimate that the cost of a Stage 2 ban by the year 2000 would decline to about $2.1 billion. We estimated that 471 aircraft would be replaced prematurely at an average cost of about $0.3 million, and 1,568 aircraft would be retrofitted at an average cost of about $1.2 million. Our analysis found that the oldest and most fuel-intensive Stage 2 aircraft are most likely to be replaced, while newer, less fuel-intensive aircraft are more likely to be brought into Stage 3 compliance by retrofitting.

Our estimates were derived from the FAA model by altering four assumptions; all other FAA assumptions remain unchanged. The four assumptions we changed are as follows:

- We changed FAA's discounting assumption from 6.0 percent to 7.6 percent because we believe this figure best reflects the private opportunity cost of money for the airline industry. This measures the real time-value of money for private industry. By itself, this change increased the cost of a Stage 2 ban by 21 percent. This seemingly surprising result that an increase in the discount rate causes the total cost to increase is a result of the long stream of cost savings produced by owning newer aircraft—especially lower fuel and maintenance costs. The increased discount rate decreases the present value of those savings, thus increasing the net cost of the Stage 2 ban.
- In recognition of the unique characteristics of the freight industry, we attributed a longer expected life to cargo aircraft than to passenger aircraft. LCC suggested a possible aircraft life of 50 years for the cargo fleet. While we considered the likely useful life of cargo aircraft to be less than 50 years, we accepted this estimate as a possible age of cargo fleet retirement. LCC provided us with the number of aircraft owned by the air freight industry by aircraft type. We then determined the total of each type of aircraft owned by the air freight industry and added 25 years of expected life to these aircraft. This change in FAA assumptions increased the cost attributable to a ban by 18 percent.
- FAA proposed an alternative formulation of the model in which all aircraft were hushkitted rather than replaced. GAO examined a variation of this by estimating the cost when the aircraft could either be replaced, re-engined, or hushkitted. We estimated the cost of a ban under a scenario in which the owner of an aircraft could choose between compliance methods. This assumption lowered the estimated cost of a ban by 48 percent when compared with the FAA assumption.

Alternatives to Aircraft Replacement Could Reduce Costs

The majority of the analyses performed assume that airlines would comply with a Stage 2 ban by replacing Stage 2 aircraft with new Stage 3 aircraft. This need not be the case. To the extent that airlines comply with a Stage 2 ban by converting Stage 2 aircraft, rather than by replacing them, the cost of a Stage 2 ban could be significantly reduced. According to AVMARK, American Airlines, and LCC, new narrow-body aircraft currently sell for $25 million to $50 million. However, existing Stage 2 aircraft can be modified to meet Stage 3 requirements by replacing the engines at a cost of approximately $9 million to $11 million per aircraft. Moreover, some existing Stage 2 aircraft may have hushkits installed at a cost of approximately $1 million to $3 million, depending upon the hushkit manufacturers and the aircraft design. FAA estimated the cost of using a hushkit to comply with Stage 3 standards and found that fitting aircraft with hushkits results in a net savings of 41 percent on average, compared with the cost of replacing such aircraft. The net savings are less than the differences in initial cost because hushkits do not produce the fuel and maintenance savings that new aircraft do.

GAO Estimates the Cost to Be $2.1 Billion to $4.6 Billion

In order to examine the consequences of certain assumptions made in the four studies, we derived several additional estimates of a Stage 2 ban. Since we found the basic FAA methodology to be generally acceptable, we derived our estimates by changing certain assumptions in the FAA model.[4]

Assuming that Stage 3 standards would be achieved by replacing noncomplying aircraft, we estimated the cost of a Stage 2 ban in 2000 as about $4.6 billion. This is the cost, in present-value terms and measured in 1990 dollars, of retiring Stage 2 aircraft before they would have been retired in the absence of a Stage 2 ban. It includes replacing 2,039 aircraft at an average cost of premature retirement of about $2.2 million each.[5]

[4]The FAA methodology, which attributes to a ban only the marginal cost of early retirement, more accurately reflects the cost of a ban than a methodology that attributes the entire capital outlay to the ban. We also note that ICAO used the FAA results as part of its estimate of the worldwide costs of a Stage 2 ban.

[5]The cost per aircraft of premature replacement is substantially less than the price of a new aircraft for three reasons: (1) these costs are net of operating and maintenance savings that result from using a new aircraft; (2) these are only the costs of replacing the aircraft prematurely—they deduct replacement costs to the extent that the old aircraft's useful life has been used up; and (3) most of these costs will be incurred several years in the future, and their present value is less than their value at the time they are incurred.

replace retired aircraft and 49.8 percent will allow for U.S. fleet growth. By year-end 2000, in the absence of a Stage 2 ban, the U.S. fleet was projected to be 5,438 jet aircraft, including 897 Stage 2 aircraft and 4,541 Stage 3 aircraft.

The aircraft manufacturers we contacted believe existing production rates can be increased to accommodate replacing the remaining 897 Stage 2 aircraft projected to be in the U.S. fleet at year-end 2000. However, these manufacturers do not believe the Stage 2 aircraft projected to remain in the fleet in 2000 will be replaced, primarily because they will still have some economic life left. They believe that most of these Stage 2 aircraft will be modified with hushkits or re-engined because of the expense to air carriers of replacing them with newer Stage 3 aircraft.

Engine and hushkit manufacturers believe they can produce and install enough new engines and hushkits for Stage 2 aircraft by the year 2000 to allow the entire Stage 2 fleet to achieve Stage 3 standards. They believe their production rates can be increased as the demand for hushkits and new engines increases. Retrofit technology for some types of aircraft has not yet been certified, but FAA expects certification of these technologies within the next few years.

There is a general consensus that economics will drive the strategies employed by various air carriers in complying with Stage 3 standards. Even though replacement and retrofit technology will be available, individual air carriers may not be able to afford it because of their financial condition. The financially stronger air carriers will replace Stage 2 aircraft with new Stage 3 aircraft, while the weaker carriers may have to use the less expensive hushkit or re-engining technologies.

- The FAA estimate assumed that the air cargo fleet would grow at the same rate as the passenger airliner fleet. We accepted the assumption of LCC and Boeing Aircraft that the air cargo fleet would grow at a faster rate than the passenger aircraft fleet. Since the Boeing Aircraft growth rate estimate seemed more consistent with the estimates of other analysts than the LCC estimate, we used that in place of the FAA assumption. We therefore assumed that the passenger fleet would grow at 1.9 percent and that the air cargo fleet would grow at 6 percent.

Taken together, these changes in assumptions result in a cost estimate of a ban by the year 2000 of $4.6 billion or $2.1 billion, depending upon whether airlines replace existing aircraft or adopt a cost minimizing strategy.

Granting Waivers to Carriers Until 2003 Would Reduce Compliance Costs for Airlines

ANCA calls for phasing out Stage 2 aircraft by December 31, 1999. The Secretary of Transportation, under certain conditions, can authorize a waiver extending an air carrier's compliance with this requirement to December 31, 2003. However, to be eligible to apply for a waiver, an air carrier must have an 85-percent Stage 3 fleet by July 1, 1999, and a firm commitment to convert the remainder of its fleet to Stage 3 noise levels by December 31, 2003. Officials of four of the airlines we talked to said they intend to convert to all Stage 3 aircraft by December 31, 1999, irrespective of federal requirements, in order to modernize their aircraft and improve their competitive position.

We calculated what the cost would be for airlines to comply with the Stage 2 phaseout if they were granted waivers for 15 percent of their fleets until the end of 2003. If all Stage 2 aircraft were replaced with Stage 3 aircraft, the cost would be $4.3 billion, a savings of about $300 million from the cost if no waivers were allowed. If each adopted the lowest price method of compliance, either replacement, hushkitting, or re-engining, the cost would be $2.0 billion, a savings of about $100 million from the cost if no waivers were allowed.

Meeting Stage 3 Noise Standards by 2000 Is Feasible

Aircraft, engine, and hushkit manufacturers, given a 10-year lead time, expect to be able to produce or retrofit enough aircraft to allow airlines to achieve Stage 3 standards for their entire fleets by the year 2000. According to McDonnell Douglas, an aircraft manufacturer, the 1989 U.S. fleet totaled 4,010 jet aircraft, of which 2,269 were Stage 2 and 1,741 were Stage 3. Over the period 1989 through 2000, U.S. Stage 3 aircraft deliveries are expected to total 2,870, of which 50.2 percent will

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