Airport Noise: Legal Developments and Economic Alternatives

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INTRODUCTION

Noise has been defined as unwanted sound.¹ The ongoing debate over airport noise, heightened by the 1977 Concorde controversy, illustrates just how unwanted sound may be. This Article examines federal and local efforts to reduce airport noise and judicial interpretations of noise legislation. It concludes that the federal regulatory approach to airport noise abatement is inefficient and proposes an alternative approach based on economic principles.

The Article first describes potential health hazards of noise and examines the magnitude of the airport noise problem. It shows that over eight million Americans live in areas near airports where noise levels are disruptive and possibly harmful.

The second part of the Article analyzes judicial developments. An early case, *Griggs v. County of Allegheny*,² holds the airport proprietor liable in inverse condemnation for a taking of property due to airport noise. Subsequent cases hold that federal legislation has not preempted

². 369 U.S. 84 (1962).
the proprietor's right to control noise through restrictions on airport use that are nondiscriminatory and do not interfere with federal control of aircraft in flight. In practice, this leaves the proprietor with little power to restrict airport use to control noise.

Parts III and IV of the Article describe national noise control legislation and Federal Aviation Agency (FAA) implementation of these laws. Although Congress had given the FAA broad authority to regulate airport noise, the FAA has focused almost exclusively on aircraft noise emissions. In 1969 it set minimum noise standards that all new aircraft must meet and, in 1976, issued a rule requiring older noncomplying aircraft to be retrofitted to meet those standards.

The last part examines the retrofit rule and concludes that the uniform retrofit requirement is inefficient. It proposes instead a fee system that would charge the airlines for use of noisy planes at airports with noise problems. Thus the airlines would retrofit only when it was economically justified and would be induced to route nonretrofitted planes to airports without significant noise problems. At the same time, airport proprietors would gain revenues for noise abatement projects.

I
THE SEVERITY OF THE AIRPORT NOISE PROBLEM

A. Health Effects

As anyone who has lived near or visited an airport can attest, aircraft noise can seriously interfere with sleep, speech, and normal community activity. Noise levels near major airports often reach eighty to ninety decibels. Noise levels of eighty-seven decibels require that two people in conversation shout to be heard. Although the FAA has long


4. In this Article, "decibels" refers to decibels measured on the A scale (dBA). This is simply one of several measures that may be used to describe the human response to a single noise event.

5. Although the FAA has long
considered the problem to be largely one of annoyance, a growing body of research suggests that aircraft noise may cause significant physiological and psychological harm. While not conclusive, the research findings give cause for concern.

Loss of hearing is the best documented health effect of long exposure to high intensity noise. The degree of danger to humans depends upon the frequency, duration, and continuity of the sound. Given these and other variables, estimates vary as to the maximum noise level at which hearing damage can be avoided. It is generally assumed that noise levels below sixty to eighty decibels will cause no hearing loss. Some studies and noise regulations place the maximum noise level that may be considered safe as high as eighty-five to ninety decibels. The Environmental Protection Agency (EPA), however, recommends not more than seventy decibels to protect the ninety-sixth percentile of the population against permanent hearing loss. Because noise levels near major airports often reach eighty to ninety decibels, long-term exposure to airport noise creates a danger of hearing damage to some individuals.

Studies have also linked airport noise to an increased incidence of birth defects. Researchers theorize that noise causes stress to pregnant women, which in turn harms the fetus. A Japanese study showed that babies born to mothers living near Osaka Airport weighed less than babies from quieter neighboring areas. The incidence of low birth weight babies increased as the noise level increased. A British study found a higher rate of still-births in Hounslow, a noisy district near

8. NOISE CONTROL GUIDE, supra note 7, at 9.
9. Id. at 8.
10. Id. at 9.
11. Id.
13. Birth Defects Linked to Airport Noise, 19 MED. WORLD NEWS 84 (1978) [hereinafter cited as Birth Defects]. The findings of a recent industrial study also suggest that noise has stress effects. Two Rhesus monkeys were exposed over a nine month period to the noise that an industrial worker would experience. Measurements before and after the nine months showed that hearing was not significantly altered. Blood pressure, however, increased from average to extreme values and remained high even after cessation of the noise. See E. Peterson, D. Janis, J. Augenstein, R. Seifert, & H. Bromley, Long Term Noise Exposure and Cardiovascular Function in Monkeys (synopsis of unpublished, undated study by the National Institute of Health).
15. Id.
Heathrow Airport, than elsewhere in the London area. Similarly, a study of the area near Los Angeles International Airport showed a higher incidence of birth defects there than in the country as a whole. Among the defects reported were failure of brain development, defects in the formation of the spinal column, abdominal hernia, and, more commonly, cleft lip and cleft palate. These defects occurred at a rate of 1,183 to 1,190 per 100,000 births among babies in the airport area, whereas the average rate for the rest of Los Angeles County was 737 to 868 per 100,000 births.

In addition to hearing loss and possible birth defects, airport noise may cause an increase in the death rate in communities near major airports. A recent study found that the death rate in neighborhoods directly beneath the landing pattern of Los Angeles International Airport and within three miles of the airport was nineteen per cent higher than that in neighborhoods six miles from the airport. It also showed that in 1971 and 1972 persons living near the airport suffered more deaths from stroke, heart disease, and cirrhosis of the liver than did persons living farther away.

There is also evidence that airport noise affects mental health. A 1969 British study found a higher incidence of psychiatric hospital admissions among people living in noisy areas near Heathrow Airport than among residents of quieter areas. A 1971 British study found that nervous breakdowns were thirty-one per cent more common in the areas around Heathrow than in a control area. Similarly, a Los Angeles study showed a higher incidence of mental hospital admissions in the area around Los Angeles International Airport than in a control area. Although these studies are not conclusive, they suggest that airport noise adversely affects the health, as well as the quality of life, of

18. Birth Defects, supra note 13, at 84.
19. Jones & Tauscher, supra note 16, at 11. A range of average rates of birth defects is reported because the study was divided into sub-groups.
20. Id. The authors of the study caution that the evidence is suggestive but not conclusive, since increased pollution levels near airports is another plausible explanation for the higher incidence of birth defects. In their view, however, airport noise levels should not be allowed to increase until further research on health effects is conducted.
22. Id. at col. 3.
23. Id.
persons living near airports.27

B. The Magnitude of the Problem

Airports are often located in densely populated areas where many people are affected by the daily noise. A consultant to the FAA has developed a system28 providing a descriptive measure of the impacts of aircraft noise on a community.29 The Noise Exposure Forecast (NEF) is a contour map drawn around an airport to delineate ambient noise levels.30 Each contour corresponds to an NEF number that represents the cumulative effect of aircraft noise on the community.31 The NEF number is adjusted for the type of aircraft, the flight patterns, and the number of flights affecting an area at different times during the day.32

In 1975 an estimated six million people in the United States lived in areas where the NEF value is between thirty and forty.33 The FAA

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27. Congress evidently feels that there is some cause for concern about the health effects of noise. In 1978 it directed the EPA to study the psychological and physiological impacts of noise on humans and animals. 42 U.S.C.A. § 4913(b)(1) (West Supp. 1979).
29. NOISE POLICY, supra note 6, at 15.
31. Id.
32. The NEF scale takes into account the following factors: (1) the ambient noise level of the area without aircraft noise (aircraft noise has less impact on people in a noisy urban area than in a quiet residential area); (2) the number of aircraft flyovers; (3) the time of the occurrence of the noise (nighttime noise has a greater effect than daytime noise); (4) the duration of the noise; and (5) an EPNL measure of the noise event. To develop a noise exposure forecast, data for these factors are obtained at numerous locations around an airport and a noise exposure value is calculated for each location. Points with the same noise exposure value are connected, forming noise exposure contours. Id. at 1117-18.
33. Id. at 97 (statement of Frederick Meister, Associate Administrator, FAA); S. REP. No. 976, 95th Cong., 2d Sess. 3 (1978).

The following chart shows the number of people living in NEF 30 and NEF 40 contours at selected airports in 1972.

<table>
<thead>
<tr>
<th>Airport</th>
<th>NEF 40</th>
<th>Number of People</th>
<th>NEF 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston</td>
<td>32,000</td>
<td>431,300</td>
<td></td>
</tr>
<tr>
<td>Kennedy</td>
<td>111,500</td>
<td>507,300</td>
<td></td>
</tr>
<tr>
<td>La Guardia</td>
<td>17,100</td>
<td>1,057,000</td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>51,100</td>
<td>292,400</td>
<td></td>
</tr>
<tr>
<td>Newark</td>
<td>27,500</td>
<td>431,900</td>
<td></td>
</tr>
<tr>
<td>O'Hare</td>
<td>66,600</td>
<td>771,700</td>
<td></td>
</tr>
<tr>
<td>Portland</td>
<td>300</td>
<td>1,200</td>
<td></td>
</tr>
<tr>
<td>San Francisco</td>
<td>11,400</td>
<td>124,100</td>
<td></td>
</tr>
</tbody>
</table>

Source: NOISE POLICY, supra note 6, at 20.

A house that experiences 200 daytime flyovers—one every 4 1/2 minutes from 7:00 a.m. to 10:00 p.m.—reading 80 decibels outdoors, is within an NEF 30 contour. Similarly, daytime flights at 77 decibels every 4 1/2 minutes, plus nighttime flights at 77 decibels every 22 1/2 minutes, create a noise environment measuring 30 on the NEF scale. See 1975-1976
considers NEF 30 to represent a "moderate" noise effect. The Department of Housing and Urban Development (HUD), when considering home purchase loans, normally considers properties within NEF 30 zones to be unacceptable. An estimated 600,000 people live in areas of NEF 40 or greater, which the FAA considers undesirable for residential areas. HUD will not approve a VA or an FHA loan to buy a house in these areas. Social science surveys show that sixty percent or more of the people living in these areas claim that the noise is intolerable, highly annoying, or unacceptable.

NEF 30 and NEF 40 contours can extend quite far from an airport. For example, the NEF 40 areas extend more than five miles from the ends of the runways at John F. Kennedy International Airport in New York. The FAA has estimated that in 1975, 1500 square miles of land, valued at sixty billion dollars, were within contours with NEF values greater than 30. An estimated fifteen square miles, valued at five billion dollars, were within NEF contours greater than 40.

There is no clear agreement on where to draw the line between acceptable and unacceptable noise levels. Although the FAA has not

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House Aviation Hearings, supra note 4, at 1075 (material taken from Kryter, Aircraft Noise, unpublished paper, Sensory Science Research Center (1976)). Although aircraft noise is measured outdoors, the adverse effects of noise on people are attributable primarily to indoor noise levels. A house attenuation factor of 15 decibels is the average year-round noise reduction over outdoor levels. During periods when doors and windows are open, the attenuation of outdoor noise is usually less than 15 decibels and complaints about aircraft noise tend to be greater. Id. at 1076-77.

34. 1975-1976 House Aviation Hearings, supra note 4, at 97.
35. Noise Policy, supra note 6, at 16.
36. 1975-1976 House Aviation Hearings, supra note 4, at 97 (statement of Fredrick Meister, Associate Administrator, FAA). NEF 40 corresponds to 200 daytime flights reading 90 decibels or 200 daytime flights plus 20 nighttime flights reading 87 decibels. See id. at 1074-75. To better understand the difference between NEF 30 and NEF 40 contours, it is helpful to know that the ear perceives a 10 decibel increase (for example from 77 to 87 decibels) as a doubling of loudness. Noise Policy, supra note 6, at 14.
38. See Noise Policy, supra note 6, at 16.
40. This is partly because there are over 900 flights each day at the airport. Id. at 1064 (statement of Paul N. Borsky, Professor, Columbia University, School of Public Health). Also, jet aircraft create high noise levels on the ground for several miles after takeoff. For example, the 707, one of the noisiest commercial jets now in use, creates 87 decibels (100 EPNdB) on the ground as far as 10 miles from takeoff. By contrast, the DC-10 creates 100 EPNdB on the ground only as far as 3.8 miles from takeoff. 1977 House Environment, Energy, and Nat. Resources Hearings, supra note 3, at 619 (statement of David W. Davis, Executive Director, Mass. Port Authority).
41. S. REP. No. 976, 95th Cong., 2d Sess. 3 (1978). The land values are based on 3.3 people per housing unit and $33,000 per housing unit (1975 dollars). Presumably the units are devalued because of their proximity to the airport and would be worth substantially more without the noise.
42. Id.
officially declared any NEF level to be unacceptable,\textsuperscript{43} guidelines promulgated by HUD\textsuperscript{44} and the State of California\textsuperscript{45} reflect policies that aircraft noise in residential areas should not exceed NEF 30. The EPA has suggested that general health and well-being in residential areas can be safeguarded only at NEF 20.\textsuperscript{46} However this debate is resolved, it is clear that a large number of people live in areas where aircraft noise is disruptive and may be a health hazard.

II

LOCAL LIABILITY AND FEDERAL PREEMPTION

Regulating noises pollution traditionally has been a local concern.\textsuperscript{47} Noise affects only people near its source, and unlike air or water pollution it dissipates quickly, leaving no residual pollutants. Yet the extraordinary growth of the airline industry has created an airport noise problem of national dimensions. Extensive federal involvement in air traffic regulation and the highly technological features of aircraft noise have put many aspects of a solution beyond local control. Judicial decisions in airport noise cases reflect a tension that has developed between local airport proprietors and the Federal Government over control of airport noise policy. Moreover, the courts have played a significant role in policy development by establishing liability rules and by identifying the limits of both local power and federal preemption of noise regulation. A thorough analysis of legal precedent is thus essential to understanding airport noise policy, as well as the incentives for, and obstacles to, policy change.

A. Liability of Local Proprietors

In \textit{Griggs v. County of Allegheny}\textsuperscript{48} the Supreme Court decided that a local governmental airport proprietor is required to compensate those


In 1971 airport operators opposed FAA adoption of the NEF as an official guideline, arguing that courts might use such a declaration to determine that land in unacceptable NEF areas has been unconstitutionally taken. N.Y. Times, Oct. 12, 1971, at 1, col. 6.

\textsuperscript{44} U.S. DEP'T OF HOUSING & URBAN DEV., NOISE ABATEMENT STANDARDS, CIRCULAR No. 1390.2, app. 1 (1971).

The HUD guidelines for noise environment standards for HUD projects categorize NEF levels less than 30 as acceptable, from 30 to 40 as discretionary, and greater than 40 as unacceptable.

\textsuperscript{45} 21 CAL. ADMIN. CODE § 5012 (May 26, 1979). The California guidelines, although expressed in decibels, are comparable to NEF 30. 1975-1976 \textit{House Aviation Hearings}, supra note 4, at 1077 (material taken from K. Kryter, Aircraft Noise, unpublished paper, Sensory Science Research Center (1976)).

\textsuperscript{46} Id.

\textsuperscript{47} City of Burbank v. Lockheed Air Terminal, 411 U.S. 624, 643 (1973) (Rehnquist, J., dissenting).

\textsuperscript{48} 369 U.S. 84 (1962).
whose property is “taken” for public use as a result of airport noise.\textsuperscript{49} Although an earlier decision had allowed recovery in inverse condemnation for a taking caused by airport noise,\textsuperscript{50} the \textit{Griggs} case was the first to place the burden of liability squarely on the airport proprietor and not the Federal Government.\textsuperscript{51} The Court held that the proprietor was liable because it had the responsibility to purchase the land and air easements necessary to prevent damage from airport noise.

Petitioner Griggs brought an eminent domain proceeding against Allegheny County, proprietor of the Allegheny Airport. He claimed that low flights from the airport interfered so substantially with the use of his property that it had been taken. Planes passed over his house regularly at altitudes between thirty and 300 feet on takeoff and fifty-three and 153 feet on landing. The noise, vibrations, and fear of a possible crash made the Griggs family nervous, interfered with conversation, and prevented sleep. As a result, plaintiff and his family were forced to move from their home.\textsuperscript{52} The trial court found that the county had taken an air easement over Griggs’ land, and that it owed him $12,690 in compensation.\textsuperscript{53} The Supreme Court of Pennsylvania reversed, holding that the county could not be held liable because it did not own or operate the offending aircraft. Without deciding the taking question, the court suggested that the airlines were the proper defendants, although the airlines could not be liable in inverse condemnation.\textsuperscript{54} The United States Supreme Court reversed, holding the airport proprietor liable for the taking of an air easement.

\textsuperscript{49} The fifth amendment to the United States Constitution prohibits the taking of private property for public use without just compensation. This prohibition is made applicable to state and local governments by the fourteenth amendment. \textit{See generally} L. TRIBE, \textit{AMERICAN CONSTITUTIONAL LAW} 456-65 (1978).

\textsuperscript{50} United States v. Causby, 328 U.S. 256 (1946).

\textsuperscript{51} In United States v. Causby, \textit{id.}, the Court held that the Federal Government must compensate for a taking of property by airport noise. In that case, however, the Federal Government was proprietor of the airport and owner of the offending aircraft. \textit{See text accompanying note 63 infra.}

The court of appeals in Allegheny Airlines, Inc. v. Village of Cedarhurst, 238 F.2d 812 (2d Cir. 1956), suggested that the Federal Government, because it regulates flight patterns, might be held liable for a property taking. It rejected, on the facts, an argument that the federally mandated flight patterns resulted in a taking of property, and therefore did not reach the issue of federal liability where a taking does occur.

In City of Newark v. Eastern Airlines, 159 F. Supp. 750 (D.N.J. 1958), where plaintiffs had sued the airlines for noise damage on a nuisance theory, the court did not rule out airline liability. It held only that plaintiffs had not sustained their burden of proof against the defendant airlines.

\textsuperscript{52} 369 U.S. at 87.


\textsuperscript{54} \textit{Id.} at 416, 168 A.2d at 127. In suggesting that the airlines were the proper defendants, the court relied on United States v. Causby, 328 U.S. 256 (1946). In that case the Court held the Federal Government, as owner and operator of the airport and as lessee of the airport, liable for a taking.
Justice Douglas, writing for the majority, reasoned that the proprietor had designed and constructed the airport and had determined what property interests, including air space easements, were needed. The proprietor, therefore, had taken the easement in the constitutional sense. The Court rejected a claim that the Federal Government had taken the easement through its role in planning and funding airport construction. Examining the relevant legislation, the Court concluded that Congress saw the proprietor as responsible for acquiring the easement.

The majority also dismissed an argument, urged by the dissent, that the Federal Government had taken the easement through its control over the navigable airspace. Although Congress has defined navigable airspace to include the airspace needed to ensure safe landing and take-off, the Court held that this alone was insufficient to constitute a taking.

The *Griggs* rule could be a powerful incentive for airport owners to take steps to control aircraft noise, despite the fact that earlier cases interpreting the United States Constitution found takings by aircraft

55. 369 U.S. at 89.
56. *Id.* at 85-86, 89. Funding was provided pursuant to the Federal Airport Act, Pub. L. No. 79-377, ch. 251, 60 Stat. 170 (1946) (current version in Airport and Airway Development Act of 1970, 49 U.S.C. § 1711-1730 (1976)). This Act established a comprehensive program of air commerce regulation, including provisions for planning, construction, and partial funding of airport facilities. Airport plans were subject to Civil Aeronautics Board (now FAA) approval, and were to be disapproved if the airport had not given assurance that it would obtain good title to all landing space. *Id.* § 9, 60 Stat. 175 (repealed 1970). Among the costs that the Federal Government would partially reimburse were those for land acquisition, including airspace easements. *Id.* § 13(2), 60 Stat. 177 (repealed 1970).

Justice Black dissented in *Griggs*, arguing that federal financing was part of a plan to induce local participation in the development of a national air transportation system. He considered local liability unfair and feared it would deter participation in the plan. 369 U.S. at 94.

59. 369 U.S. at 91-93 (Black, J., dissenting).
60. *Id.* at 88-89.
61. *Id.*
62. Fiscal liability is not, of course, the only incentive to reduce noise. For example, the City of Boston obtained an injunction against the Massachusetts Port Authority, halting construction of two new runways because of noise problems around Logan airport. 1975-1976 House Aviation Hearings, supra note 4, at 508-09 (statement of William Mooney, Director of Aviation, Mass. Port Authority). *Griggs* addressed the question of liability in inverse condemnation for a taking of property due to aircraft noise. Inverse condemnation is probably the property owner's most effective theory of recovery for aircraft noise damage. See Note, *Shifting Aircraft Noise Liability to the Federal Government*, 61 U. Va. L. Rev. 1299, 1306 n.32 (1975) [hereinafter cited as *Shifting Aircraft Noise*], for references on the limited possibility of recovery for aircraft noise damage on nuisance or trespass theories.
flights only in extreme circumstances. In the leading case of *United States v. Causby*, a chicken farmer sued the United States claiming that his property had been taken by frequent army aircraft flights over his property. The flights passed sixty-seven feet over his house, sixty-three feet above his barn, and eighteen feet above the highest tree on his property. The resulting noise frightened the plaintiff and his family, and the bright lights prevented their sleep. Their chicken business was destroyed when many chickens died of fright. The Court discussed two factors in holding that the property had been taken: flights over private land must be so low or so frequent that they are a direct and immediate interference with the enjoyment and use of the land, and damage must be substantial.

Lower courts have applied the *Causby* analysis narrowly. In *Batten v. United States*, for example, the court ruled that a taking occurs only when aircraft physically invade the property's airspace. In *Batten* property owners were unable to recover damages for noise and vibrations caused by military jet aircraft that did not invade the plaintiff's airspace directly and did not render the property uninhabitable.

Perhaps as a result of the narrow relief afforded under federal law, many airport noise suits are brought under state constitutions, which may provide a more expansive definition of taking. In *Aaron v. City of Los Angeles*, for example, plaintiffs were residential property owners living near the Los Angeles International Airport (LAX). They claimed that the market value of their homes had been reduced and thus taken by the noise of jet aircraft taking off and landing at LAX. The court of appeal upheld their damage award, ruling that there is a taking under California law if there is a measurable reduction in market value resulting from the operation of the airport in such a manner that the noise from aircraft using the airport causes a substantial interference with the use and enjoyment of the property, and the interference is sufficiently direct and sufficiently peculiar that the owner, if uncompensated, would pay more than his proper share to the public undertaking.

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*see* Greater Westchester Homeowners Ass'n v. City of Los Angeles, 26 Cal. 3d 86, 603 P.2d 1329, 160 Cal. Rptr. 733 (1979) (discussed in text accompanying notes 72-76 infra).

63. 328 U.S. 256 (1946).

64. *See id.* at 266.


66. Since most airport proprietors are political subdivisions of state government, property owners can sue them under their state constitution. *Shifting Aircraft Noise, supra* note 62, at 1306 n.33. For example, see cases cited in note 67 infra.


69. *Id.* at 484, 115 Cal. Rptr. at 170.
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The court did not require physical invasion of the property's airspace. It reasoned that since aircraft noise is capable of accurate measurement, there is no reason to distinguish noise invasion from aircraft invasion. The trial judge apparently relied on the NEF system to identify the properties that had been taken.\textsuperscript{70}

The Aaron court held the city, as owner of the airport, liable for the damage under the Griggs rule and granted the city an easement in the air space above and near plaintiffs' homes.\textsuperscript{71} The easement, however, was expressly limited to the current level of aircraft use, leaving open the possibility of further liability if increased use of the easement results in additional taking. The airport proprietor, because of its initial responsibility for airport design and land acquisition, was held responsible for the consequences of the growth of the aviation industry.

More recently, the California Supreme Court affirmed a judgment holding the airport proprietor liable in damages for personal injury caused by aircraft noise. In Greater Westchester Homeowners v. City of Los Angeles,\textsuperscript{72} plaintiffs sued the city of Los Angeles as the owner of LAX in inverse condemnation for property damage and on a nuisance theory for personal injury.\textsuperscript{73} The court rejected federal preemption and statutory preclusion arguments on the nuisance claim. It reasoned that since the airport owners had planned the airport expansion creating the nuisance, they should be held liable for the damage.\textsuperscript{74} It held that statutes authorizing or regulating airports and aircraft flights do not create a legislative sanction for their maintenance as a nuisance.\textsuperscript{75} The opinion is unclear on whether a nuisance claim would be successful without an accompanying cause of action in inverse condemnation.\textsuperscript{76} Even if it

\textsuperscript{70} Id. at 476, 115 Cal. Rptr. at 165. Proprietors had earlier opposed FAA adoption of the NEF system fearing that it might be used in exactly this way. N.Y. Times, Oct. 12, 1971, at 1, col. 6.

\textsuperscript{71} 40 Cal. App. 3d at 476, 115 Cal. Rptr. at 165.

\textsuperscript{72} 26 Cal. 3d 86, 603 P.2d 1329, 160 Cal. Rptr. 733 (1979).

\textsuperscript{73} In support of their nuisance claim, the plaintiffs alleged interference with communication, sleep, study, and use of the outdoor portions of their properties. The trial court found that the plaintiffs had established an actionable nuisance, giving rise to damages for annoyance, discomfort, inconvenience, and mental and emotional distress. Id. at 92, 603 P.2d at 1329, 160 Cal. Rptr. at 734. The nuisance and inverse condemnation claims were tried separately and awards were also granted on the inverse condemnation claim. Id.

\textsuperscript{74} Id. at 98-100, 603 P.2d at 1334-36, 160 Cal. Rptr. at 738-39.

\textsuperscript{75} Id. at 100-02, 603 P.2d at 1336-37, 160 Cal. Rptr. at 739-41.

\textsuperscript{76} Compare Greater Westchester with San Diego Unified Port Dist. v. Superior Court, 67 Cal. App. 3d 361, 136 Cal. Rptr. 557, cert. denied sub nom., Britt v. San Diego Unified Port Dist., 434 U.S. 859 (1977). The San Diego court denied recovery from the airport owner for noise damage from aircraft in flight because the proprietor had no control over aircraft in flight. The court held that flights complying with federal aviation laws could not be classified as negligent, nuisances, or trespasses. San Diego is distinguishable from Greater Westchester because the damage in San Diego was attributed solely to the aircraft in flight, which is under exclusive federal control. By contrast, the damage in Greater Westchester
would not, however, the nuisance theory of recovery could greatly expand the proprietor’s liability.

It is difficult to estimate accurately the financial burden that potential nuisance and condemnation liability places on proprietors as there have been few cases litigated to date compared to the number of potential plaintiffs. In Aaron, the court determined that the noise had caused reductions in property values ranging from $400 to $6,000, with an average loss of $1,000. In Greater Westchester, the court awarded $86,000 for the nuisance damages to forty-one plaintiffs belonging to fifteen families, or a little over $2,000 per person.

In addition to post-trial awards, airport proprietors may be incurring substantial costs through pre-trial settlements and land acquisition programs. In a 1977 membership survey, the Airport Operators Council International found that airports in the United States had spent $229 million in the prior seven years to acquire land in noise-impacted areas. In addition, the Council survey indicated that lawsuits pending against airports created a potential liability in the hundreds of millions of dollars. The U.S. Department of Transportation has estimated that between 1970 and 1975 airport proprietors paid over twenty-five million dollars in legal judgments and settlements and over three million dollars defending aircraft noise suits. In 1976 Los Angeles alone had spent over $130 million to purchase private residences damaged by aircraft noise and planned to spend twenty-one million dollars on sound-proofing for schools near the airport.

It is evident, then, that inverse condemnation and nuisance claims create a substantial liability for airport proprietors. The six million people living in NEF 30 areas and the 600,000 people living in NEF 40 areas are all potential plaintiffs in future suits. The Department of

was attributed to airport expansion and runway design, factors that are within the proprietor’s control.

77. 40 Cal. App. 3d at 476, 115 Cal. Rptr. at 165.
78. 26 Cal. 3d at 92, 603 P.2d at 1331, 160 Cal. Rptr. at 734.
79. Data compiled by the Airport Operators Council International suggest that many claims are settled by land acquisition before trial. 1975-1976 House Aviation Subcomm. Hearings, supra note 4, at 557-59 (statement of J. Donald Reilly, Executive Vice President, AOCI).
81. Id.
82. Noise Policy, supra note 6, at 18.
83. Id.
84. Id.
Transportation, in its 1976 Aviation Noise Abatement Policy, observed that "[t]he 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' . . . ."  

B. Federal Preemption and Federal Control

Liability in Griggs was predicated on the theory that airport owners can avoid unconstitutional takings by designing their facilities properly and by acquiring the necessary easements in advance. Many commentators have argued that this rationale is outdated since proprietors are not able to control airport noise damage. The unforeseen expansion of the aviation industry has vastly increased the noise problem. Airports are more heavily used than ever before, and jet aircraft create more noise than did propeller aircraft. Land easements that avoided noise damage at the time airports were built are no longer adequate, and land acquisition at current property values is extremely expensive. The EPA has estimated that it would cost twenty-one to thirty-five billion dollars to buy all property affected by airport noise. Moreover, land acquisition may not be politically feasible when it would require relocation of residents from their neighborhoods. For example, complete acquisition of noise-affected land around John F. Kennedy International Airport in New York would require relocation of 50,000 people.

Preventive land use strategies such as zoning are of little use to proprietors where there is already significant development around an airport. Even where zoning could minimize future harm, there are institutional obstacles to its use. The airport owner may not be the zoning authority for the entire area; it may have to deal with several local governments to achieve a comprehensive plan. Moreover, since some courts have held that restrictive zoning around airports constitutes a

by persons who acquire the affected property after Feb. 19, 1980 and have actual or constructive knowledge of the noise exposure map of the area. Those persons can recover only if they show that, subsequent to their acquisition of the property, there was a significant change in airport operations that resulted in additional noise.

86. Noise Policy, supra note 6, at 18.
87. See, e.g., Berger, You Know I Can't Hear You When the Planes are Flying, 4 Urb. Law. 1 (1972); Cassel, Local Regulation of Aircraft to Reduce Noise: Santa Clara Tests the Limits of Burbank, 15 Neb. L. Rev. 494, 495 (1979); Lesser, The Aircraft Noise Problem: Federal Power but Local Liability, 3 Urb. Law. 175 (1971); Shifting Aircraft Noise, supra note 62.
88. Shifting Aircraft Noise, supra note 62, at 1308.
89. 1975-1976 House Aviation Hearings, supra note 4, at 492-95 (statement of Clifton Moore). These are 1973 dollars, so the cost would be even greater today.
90. Id.
91. Shifting Aircraft Noise, supra note 62, at 1311, 1312.
taking of property, proprietors may still be faced with the cost of purchasing land. Although sound-proofing buildings may reduce some noise damage, it is extremely costly. Thus, many airport owners have turned to operational controls on planes using the airport as a method of abating aircraft noise.

Extensive federal involvement in airport operating procedures, however, limits the options of the airport owner in imposing operational controls to reduce noise. For example, the FAA can restrict the owner’s operational control by placing conditions on construction grants. Under the Airports and Airways Development Act, and its predecessor, the Federal Airport Act, a grant recipient must agree that “the airport . . . will be available for public use on fair and reasonable terms and without unjust discrimination.” This restriction can interfere with noise reduction plans. For example, in 1969 the FAA successfully opposed a night curfew that the San Diego airport wanted to impose, claiming that it would violate grant agreements that required the operator to run the airport twenty-four hours a day. In 1971, because of a severe noise problem in surrounding residential communities, the city of Santa Monica attempted to close its municipal airport, which serves only general aviation and not commercial airlines. Claiming that the airport was an indispensable link in the southern California air travel network, the FAA refused to consent to the closing, forcing the airport to remain open to comply with Santa Monica’s contractual obligations to the Federal Government.

An even more significant limitation on proprietary control of airport noise is the exclusive system of federal regulation of aviation. Under the amended Federal Aviation Act of 1958 the Secretary of Transportation has broad responsibility to ensure aviation safety and promote air commerce. The Act specifically gives the FAA responsibility for air traffic control and authority to regulate the use and management of the navigable airspace. The FAA has exercised this authority by issuing comprehensive air traffic regulations that effectively preempt state control of aircraft flight through the navigable air-

92. See cases cited in id. at 1311 n.54.
93. The FAA has estimated that it would cost $1.9 billion nationwide to reduce noise three to seven decibels inside buildings through insulation, $3.8 billion to reduce noise eight to 12 decibels and $7.2 billion to reduce noise 13 to 16 decibels. NOISE POLICY, supra note 6, at 51.
94. See text accompanying notes 111-70 infra.
97. Id. at 25.
100. See 14 C.F.R. pts. 71, 73, 75, 77, 91, 93, 95, 97 (1979).
The theory of federal preemption was first applied to invalidate a local noise control ordinance in 1966 in Allegheny Airlines, Inc. v. Village of Cedarhurst. The court of appeals in Cedarhurst struck down an ordinance prohibiting flights less than 1,000 feet over the town. It ruled that the FAA had complete control of the navigable airspace, both above and below 1,000 feet, and that local ordinances interfering with this control were invalid. The crucial question for airport owners, then, was whether they retained residual authority to restrict airport use.

The preemption issue was complicated when Congress amended the Federal Aviation Act to give the FAA authority to issue regulations to protect the public from aircraft noise. The FAA subsequently issued regulations setting noise emission standards for new aircraft, but emphasized that "the noise limits specified . . . are not intended to substitute federally determined noise levels for those more restrictive limits determined to be necessary by individual airport proprietors in response to the locally determined desire for quiet." The regulation stated that "no determination is made . . . that these noise levels are or should be acceptable for operation at, into, or out of any airport." These statements reflect the FAA's reluctance to assert control over noise abatement activities—a reluctance that may stem in part from a desire to avoid reversal of Griggs and consequent federal liability for airport noise damage.

102. 238 F.2d 812 (2d Cir. 1956).
103. Id. at 815. Cedarhurst had conceded preemption, but argued that federal control did not extend below 1,000 feet.
104. Id.

Despite this reluctance, the FAA has frequently opposed proprietary actions on preemption grounds because of their impact on the national transportation system. Berger, supra note 87, at 27-30. The FAA filed amicus curiae briefs in Lockheed Air Terminal v.
The Supreme Court had an opportunity to rule on the preemption question in 1972, but it left the issue of proprietary controls unresolved. In *City of Burbank v. Lockheed Air Terminal*¹¹¹ the Court invalidated, under the supremacy clause, a municipal zoning ordinance that set a late-night curfew at the privately owned Burbank Airport. Justice Douglas, writing for the majority, used broad preemption language, emphasizing the federal role in aircraft noise abatement under the Noise Control Act of 1972.¹¹² Relying on the legislative history¹¹³ and “the pervasive nature of the scheme of federal regulation of aircraft noise,” the majority concluded that state police power controls were preempted.¹¹⁴ The majority expressed concern over the cumulative effect of local operational controls on the national air travel network. If many municipalities were to regulate takeoffs and landings, the Court reasoned, they could interfere with the FAA control of air traffic, causing scheduling problems and impairing air safety.¹¹⁵

Despite this broad language, the decision invalidated municipal regulations only when the municipality is not the airport proprietor. The Court reserved the question of what regulatory powers a municipality might retain as the airport owner: “Authority that a municipality may have as a landlord is not necessarily congruent with its police power. We do not consider here what limits, if any, apply to a municipality as a proprietor.”¹¹⁶ This statement left the preemption issue unresolved since virtually all United States airports, except Burbank,¹¹⁷ are government owned.¹¹⁸

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¹¹³ 411 U.S. at 634-39. Support in the legislative history for the majority’s position is weak. It cited a letter written by the Secretary of Transportation in 1968, stating that the Federal Government had preempted noise regulation of aircraft in flight, and public statements by Senator Tunney, Congressman Staggers, and President Nixon indicating that the Noise Control Act aimed for exclusive federal control. *Id.* at 635-38.

¹¹⁴ “The Act reaffirms and reinforces the conclusion that the FAA, now in conjunction with the EPA, has full control over aircraft noise, pre-empting state and local control.” *Id.* at 633.

¹¹⁵ This concern was clearly prospective, as the regulation in question had a limited impact. The curfew did not apply to emergency flights, and it effectively prohibited only one scheduled commercial flight each week plus a few private flights by corporate executives. *Id.* at 654.

¹¹⁶ *Id.* at 635 n.14.

¹¹⁷ Burbank is now publicly owned. See text accompanying note 165 infra.

¹¹⁸ 411 U.S. at 635 n.14. For an interesting discussion of the Federal Government’s
Justice Rehnquist's dissent examined the legislative history of the Act carefully. Starting from the propositions that noise control is a traditionally local concern and that it can be preempted only by express congressional intent, he argued that Congress intended to preempt only the regulation of aircraft in flight.\(^\text{119}\) Finding that the existing federal-state relationship, acknowledged by the majority to be unchanged,\(^\text{120}\) had been established by section 611 of the Federal Aviation Act,\(^\text{121}\) he argued that since section 611 was enacted to deal only with federal regulation of aircraft noise emissions, it should not be read as preempting all forms of airport noise regulation.\(^\text{122}\) Justice Rehnquist cited the legislative history of section 611 to show that Congress recognized operational controls as a valid method to reduce noise, but that it did not intend the Act to address them.\(^\text{123}\) The Senate Report, he observed, explicitly stated that section 611 allowed airport owners to control noise by denying use of their airports, as long as the exclusion was nondiscriminatory.\(^\text{124}\) The dissent concluded that the legislative history of the 1958 Federal Aviation Act, its 1968 amendments, and the 1972 Noise Control Act showed an affirmative congressional intent to allow local noise regulation.\(^\text{125}\) Finding no basis for distinguishing between proprietors and nonproprietors, Justice Rehnquist would have permitted the nonproprietor city to regulate airport noise.\(^\text{126}\)

Lower federal courts and state courts have interpreted \textit{Burbank} to allow proprietary controls. In \textit{Air Transport Association of America v. Crotti},\(^\text{127}\) the court declined to apply the \textit{Burbank} rule to a municipality acting as airport owner. \textit{Crotti} involved a preemption challenge to California's aircraft and airport noise standards adopted in 1970.\(^\text{128}\) The regulations at issue had two parts. The first, Single Event Noise Exposure Level (SENEL), set noise limits for individual aircraft in flight.\(^\text{129}\) The second, Community Noise Equivalent Level (CNEL), es-

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\(^{119}\) 411 U.S. at 651-52.
\(^{120}\) \textit{Id.} at 634.
\(^{122}\) 411 U.S. at 650-51.
\(^{125}\) 411 U.S. at 653.
\(^{126}\) \textit{Id.} at 651-52.
\(^{128}\) 21 CAL. ADMIN. CODE §§ 5000-5080.5 (May 25, 1979).
\(^{129}\) \textit{Id.} §§ 5030-5035 (repealed 1979).
tablished a system of measuring ambient community noise levels and prohibited incompatible land use, such as housing, within high noise impact areas after 1985.¹³⁰ The regulations authorized use of a wide range of operational controls to reduce ambient noise levels, including reducing flight frequencies, "discouraging" noisy aircraft from using the airport, "encouraging" use of the least disruptive approach paths, and planning runway schedules to minimize noise impacts.¹³¹

_Crotti_ invalidated the SENEL regulations as an improper interference with federal control of the air space and of aircraft in flight.¹³² The CNEL regulations were upheld, however, on the ground that they did not encroach on a preempted area. The court relied on the legislative history of section 611 of the Federal Aviation Act and on the _Burbank_ distinction between proprietors and nonproprietors to conclude that airport proprietors must have the power to control the use of the airport if they are to be held liable for noise damage.¹³³ The court declined to consider, however, what limitations, if any, might apply to proprietary controls in practice, leaving open the possibility that individual proprietary controls might be invalidated as arbitrary and unreasonable, an abuse of police power, or an unreasonable burden on interstate and foreign commerce.¹³⁴

Applying the _Crotti_ principle, a federal district court upheld a late-night curfew at the municipally owned Hayward airport in _National Aviation v. City of Hayward_.¹³⁵ Recognizing that its decision would undercut the national uniformity rationale in _Burbank_, the court nevertheless found that the legislative history of the Noise Control Act showed a controlling congressional intent to allow proprietors to exclude aircraft on the basis of noise considerations.¹³⁶ The court tied the congressional purpose in retaining proprietary controls directly to the _Griggs_ rule.¹³⁷ It observed that Congress had clearly intended that proprietors retain power to control noise levels as long as they are responsible under _Griggs_ for obtaining noise easements.¹³⁸

In addition to the preemption challenge, plaintiffs in _Hayward_ challenged the curfew on commerce clause grounds.¹³⁹ The court

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¹³⁰. _Id_ §§ 5010-5025, 5045-5080.5.
¹³¹. _Id_ § 5011.
¹³². 389 F. Supp. at 62. A SENEL ordinance was recently upheld, however, in Santa Monica Airport Ass'n v. City of Santa Monica, No. 77-2852-IH (C.D. Cal. Sept. 10, 1979). See note 163 infra.
¹³³. 389 F. Supp. at 63-64.
¹³⁴. _Id_ at 65.
¹³⁶. _Id_ at 423-24.
¹³⁷. See text accompanying notes 48-61 _supra_.
¹³⁸. 418 F. Supp. at 424.
¹³⁹. The commerce clause issue was also raised in _Burbank_ in the lower courts. The federal district court ruled that the ban at issue violated both the commerce clause and the
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found no commerce clause violation, stating that the curfew was enacted in response to a valid local concern and that it did not discriminate against interstate commerce. Moreover, it held that the curfew met a more stringent balancing of interests test. When weighed against the legitimate local goal of noise control, the curfew’s burden on interstate commerce was not excessive. In so ruling, the court dismissed as mere speculation the Burbank majority’s concern for the cumulative effect of curfews. Each proprietary ordinance, it reasoned, must be evaluated individually. Thus Hayward promised proprietors substantial latitude in controlling noise through airport use restrictions.

Limits on permissible proprietary controls were spelled out by the Second Circuit in British Airways Board v. Port Authority of New York. There the court ruled that restrictions must be “reasonable, nonarbitrary and non-discriminatory.” The case arose during the 1976 dispute over experimental Concorde service into New York’s Kennedy Airport. Secretary of Transportation Coleman, despite a departmental finding that the Concorde would add to the airport noise


140. 418 F. Supp. at 427.
141. Id.
142. Id.
143. Id. at 427-28. It may appear that Crotti and Hayward have undermined the Burbank rule, at least in California, since virtually all United States airports are publicly owned. (Even Burbank is now owned by the cities of Glendale, Pasadena, and Burbank). However, many airports are located within the boundaries of nonowner municipalities. The Burbank rule prevents municipalities and state governments from imposing noise controls on airports they do not own, see, e.g., San Diego Unified Port Dist. v. Gianturco, 457 F. Supp. 283 (S.D. Cal. 1978), leaving the proprietor as the only local authority with power to regulate noise levels. See generally Donin, British Airways v. Port Authority: Its Impact on Aircraft Noise Regulation, 43 J. AIR L. & COM. 691, 719 (1977). In San Diego, for example, the state was prohibited from requiring the San Diego airport to extend an existing night flight curfew, on the grounds that the state was not the proprietor. 457 F. Supp. at 283.

144. Significantly, however, the Hayward airport is very small; a curfew would have little impact on national air traffic. The outcome might be quite different at a larger airport.
145. 558 F.2d 75 (2d Cir. 1977).
146. Id. at 84.
had authorized a sixteen-month trial period of Concorde service. Four flights a day were to land at Kennedy in New York City and two at Dulles International Airport in Washington, D.C. subject to a 10 p.m. to 7 a.m. curfew. The New York Port Authority, however, banned the Concorde from Kennedy. Although the plane met the airport’s existing noise limit, the Authority argued that the limit did not provide adequate protection against the special characteristics of the Concorde’s noise, particularly its low frequency and vast geographic spread.

The district court granted an injunction against the Concorde ban because Secretary Coleman had preempted the proprietor’s right to restrict airport use when he authorized the trial period. The court of appeals reversed, finding no preemption. Relying on the legislative history to the Noise Control Act of 1972, it found a congressional intent to allow proprietary regulation of airport noise levels. An amicus brief filed by the United States supported the argument that the Secretary did not intend to preempt the Port Authority’s powers. The court cautioned, however, that the proprietor’s power to regulate airport noise, both under the statutory scheme and under the Constitution, could be exercised only in a reasonable and nondiscriminatory manner. Exclusion of aircraft on any other basis, it reasoned, would frustrate the federal regulatory scheme and unconstitutionally burden air commerce.

On remand, the district court again invalidated the Concorde ban, this time because it was discriminatory. It held that the aircraft met the Port Authority’s noise limit and therefore could not be selectively excluded from Kennedy. The court of appeals affirmed.

Perhaps in response to the uncertainty created by preemption decisions, the FAA in 1976 proposed to work cooperatively with airport owners in the planning and implementation of airport use restric-

148. 1975-1976 House Aviation Hearings, supra note 4, at 612-20 (material taken from U.S. Dep’t of Transportation, The Secretary’s Decision on Concorde Supersonic Transport). Although the Concorde was quieter than the 707 on landing, it was 50% louder than the 707 and twice as loud as the 747 on takeoff. The Concorde also extended the geographic area affected by noise. On takeoff, it subjected 47.6 square miles of land to 100 EPNdB of noise. Comparable figures for the 707 and 747 are 7.49 square miles and 2.91 square miles respectively. Id. at 615-16. Four Concorde flights per day would add 2,000 people to NEF 40 contours at Kennedy Airport. Id. at 617. In addition, the low frequency sounds of the Concorde would cause some vibration within residences. Id. at 612.
149. 558 F.2d at 81.
150. Id.
152. 558 F.2d 75 (2d Cir. 1977).
153. Id. at 82, 84.
154. Id. at 84.
156. 564 F.2d 1002 (2d Cir. 1977).
Although the proposal states that the Federal Government has preempted the fields of airspace use and management, air traffic control, safety, and the regulation of aircraft noise at the source, it further states that airport owners retain authority to reduce noise by controlling airport scheduling and operations. This authority is limited, however. Controls that create an undue burden on interstate commerce, unjustly discriminate against different categories of airport users, or conflict with federal regulations in preempted areas are prohibited. To avoid conflict in the use of operational controls, the FAA strongly urges proprietors to consult with the FAA before imposing a curfew, banning certain classes of aircraft, or limiting the number of flights into the airport. In return, the FAA will provide technical assistance and support in implementation. If litigation occurs over a restriction that the FAA considers valid, it will ask the Department of Justice to intervene or to file a brief as amicus curiae in support of the proprietor.

Despite the potential benefits of its cooperative approach, the FAA policy does not give proprietors complete discretion to use operational controls. The requirement that airport use restrictions be non-discriminatory may seriously impede proprietors' efforts to regulate noise. A recent suit, for example, successfully challenged a total jet ban at Santa Monica airport as discriminatory because some propeller

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157. Noise Policy, supra note 6, at 58-60.
158. Id. at 34.
159. Id.
160. Id. at 58. The policy language is not mandatory. The FAA has not required prior approval, possibly because that would come too close to complete federal control.
161. Id. at 59.
162. It is unclear how the policy will work. The FAA has recently refused to review or support a restriction challenged in San Diego Unified Port Dist. v. Gianturco, 457 F. Supp. 283 (S.D. Cal. 1978). The California Department of Transportation had conditioned a variance from California's noise control standards on a two-hour extension of an existing curfew at the San Diego airport. On petition from the airport owner, the district court issued a preliminary injunction prohibiting the state from enforcing the condition, holding that Burbank precluded a nonproprietor from forcing the airport owner to adopt a curfew. Id. at 295.

The court initially had denied the motion for preliminary injunction, ruling that the Port District should apply to the FAA for a review of the curfew's effect on the air transportation system. Id. at 286. The Port did so, and the results were disappointing. After four months the FAA advised both the airport owner and the Department of Transportation that it had completed its review, but would not respond. Id. at 287. The FAA claims that circumstances in the San Diego case made it an exception to the general success of efforts by the FAA and municipalities to work together; the FAA was concerned that by responding it would have conceded that a court had jurisdiction to order it to review owner controls. Interview with Lynn Ceruzzi, Assistant Chief Counsel, General Legal Services Division of the FAA, in Washington, D.C. (Aug. 22, 1979). This may be an isolated case, because of the court involvement and because the restriction was state-imposed, but it sets an unfortunate precedent.
planes are noisier than some jets.\textsuperscript{163} The United States filed an amicus curiae brief, citing the Concorde case and arguing that "[t]he City of Santa Monica, like the Port Authority, . . . ostensibly for noise abatement purposes, has arbitrarily denied the use of its airport to certain types of aircraft without regard to actual noise levels."\textsuperscript{164}

The most recent challenge to proprietary controls tests the airport owner's right to prevent an airline from increasing the number of flights into an airport. The FAA incorporated into a grant for the purchase of Burbank Airport a provision of state legislation that required cities purchasing airports to establish a noise review procedure.\textsuperscript{165} Accordingly, the Burbank Airport Authority placed a clause in its airline lease agreements providing for review of airline actions that might increase noise at the airport.\textsuperscript{166} When Hughes Airwest announced in early 1979 that it intended to add sixteen flights to Burbank, the airport owners obtained a court order requiring Hughes to seek the airport's permission to add the flights. Hughes complied and the Authority denied permission.\textsuperscript{167} Hughes subsequently filed suit claiming that the review provision is unconstitutional and that the Civil Aeronautics Board (CAB)\textsuperscript{168} had already granted permission for the flights.\textsuperscript{169} Although the FAA worked to avoid a court suit by meeting with the CAB, the airport owners, and the carriers to discuss alterna-

\textsuperscript{163} Santa Monica Airport Ass'n v. City of Santa Monica, No. 77-2852-IH (C.D. Cal. Sept. 10, 1979). The Santa Monica Airport instituted the ban without FAA approval. There were some discussions of alternative measures before litigation began, but no consensus was reached. Telephone interview with Lynn Ceruzzi, Assistant Chief Counsel, FAA (Dec. 20, 1979).

\textsuperscript{164} Brief of the United States of America as Amicus Curiae at 38, Santa Monica Airport Ass'n v. City of Santa Monica, No. 77-2852-IH (C.D. Cal. Sept. 10, 1979). Even though it struck down the jet ban, the court upheld a 100 decibel SENEL ordinance limiting permissible noise emissions from aircraft in flight. See text accompanying notes 127-34 \textit{supra}, discussing a similar ordinance that was invalidated on preemption grounds. Subsequently, the city lowered the SENEL limit to 85 decibels, effectively excluding all jet aircraft from flying over the city. Telephone interview with Lynn Ceruzzi, Assistant Chief Counsel, FAA (Dec. 20, 1979). Plaintiffs in the initial action then obtained an injunction against the revised ordinance on the ground that it unduly burdened interstate commerce. \textit{Id}. The FAA, as of December 1979, had not taken a position on this issue. \textit{Id}. The city, meanwhile, was once again considering closing the airport. \textit{Id}. See text accompanying notes 95-97 \textit{supra}.

\textsuperscript{165} Telephone interview with Lynn Ceruzzi, Assistant Chief Counsel, FAA (Dec. 20, 1979). See text accompanying notes 178-85 \textit{infra} for a discussion of the FAA's authority to condition grants on noise control activity.

\textsuperscript{166} L.A. Daily J., Nov. 12, 1979, at 1, col. 4.

\textsuperscript{167} \textit{Id}.

\textsuperscript{168} See note 234 \textit{infra} for a description of the CAB's role in airline regulation.

tives, negotiations broke down and the suit was filed.¹⁷⁰

Whatever the outcome in Burbank, the airport owner is in a difficult position. Liable for damages from airport noise, the proprietor has little substantive control of the problem and faces continuous uncertainty over the extent to which airport use can be restricted. Other actions that the proprietor might take to reduce noise impacts, specifically land acquisition and soundproofing, are extremely expensive and will not have an immediate effect on noise levels.

Several commentators have urged that the Federal Government, rather than airport proprietors, should be held liable for airport noise damage.¹⁷¹ Federal liability is not the critical issue in alleviating the noise problem,¹⁷² although the Federal Government must play a significant role in airport noise abatement. The next two parts of this Article discuss that role to date, and the final part proposes a program that gives the airlines an incentive to reduce noise.

III
NATIONAL LEGISLATION

While airport proprietors have struggled with the growing noise problem, Congress has passed several bills since 1968 mandating that the FAA regulate aircraft noise. Congress continued through the seventies to investigate the problem and consider legislation that would increase the federal role in airport noise abatement. Major issues in the legislative debates have included the proper roles of the EPA and the FAA and the advisability of federal involvement in local noise control planning. Although the legislation may allow broad regulation of airport noise, including the use of operational and land use controls, in practice the FAA restricts its activity to regulation of aircraft noise emissions.

¹⁷⁰ Telephone interview with Lynn Ceruzzi, Assistant Chief Counsel, FAA (Dec. 20, 1979).
¹⁷¹ See articles cited in note 87 supra.
¹⁷² Without an extensive analysis, there appear to be several reasons that federal liability would actually be undesirable. If damages were paid out of tax revenues, there might be insufficient pressure on the FAA to attack the problem aggressively. The airline industry frequently opposes noise control. See note 203 infra and text accompanying note 301 infra. The FAA, which would presumably retain responsibility for federal noise control activity, might find it difficult to resist the pressures of the industry it regulates. See note 218 infra. On the other hand, airport proprietors, absolved from liability, would have less reason to press the FAA to action. Moreover, plaintiffs would have to sue under the Federal Constitution with its presently restrictive definition of taking. See text accompanying notes 62-65 supra. Recovery in the courts and pressure for settlement out of court could be reduced unless more liberal precedents are established. Finally, the airlines, which create the problem, would bear little of its costs unless specifically taxed. This would be inequitable and inefficient. The airlines and their customers benefit from aircraft noise; they should pay for the damage caused by it, and be given incentives to reduce it.
Congress first mandated federal regulation of aircraft noise in a 1968 amendment to the Federal Aviation Act.\textsuperscript{173} In order to protect "the public from unnecessary aircraft noise," the new section 611 of the Act authorized the FAA to "prescribe and amend standards for the measurement of aircraft noise and sonic boom and ... prescribe and amend such rules and regulations as ... necessary to provide for the control and abatement of aircraft noise and sonic boom."\textsuperscript{174} The FAA was given broad power to regulate aircraft noise,\textsuperscript{175} subject to the requirement that it consider whether proposed standards are "consistent with the highest degree of safety ... in the public interest" and are "economically reasonable, technologically practicable, and appropriate for the particular type of aircraft."\textsuperscript{176} As the latter condition suggests, however, Congress expected the FAA to use its power under this section primarily to set limits on aircraft noise emissions,\textsuperscript{177} rather than to regulate airport operations or local land use activities.

Congress took further steps concerning aircraft noise in 1970 when it enacted the Airport and Airway Development Act (AADA).\textsuperscript{178} The AADA succeeded the Federal Airport Act,\textsuperscript{179} which had established a national program of airport construction.\textsuperscript{180} The primary purpose of the AADA is to encourage, through FAA-approved grants, expansion and improvement of the airport system.\textsuperscript{181} It requires the Secretary of Transportation to consider the environmental impacts of a project before approval\textsuperscript{182} and to set mandatory standards for site location and airport layout.\textsuperscript{183} Additionally, the Act requires project applicants to assure the compatibility of surrounding land use "to the extent reason-
able." Thus, while the statute does not expressly list noise as a criterion for land use planning, its general provisions give the FAA flexibility in regulating airport noise. It has not, however, used this power extensively.

In 1972 Congress passed legislation establishing a comprehensive federal anti-noise program. One of the original legislative proposals, sponsored by Senators Edmund Muskie and John Tunney, would have provided an aggressive attack on the aircraft noise problem, giving the lead role in regulating aircraft noise to the EPA and providing for direct involvement of the EPA in local airport noise planning. One draft of the bill would have authorized the EPA to set maximum permissible levels of ambient airport noise and require airports whose noise exceeded the limits to develop noise abatement plans.

The FAA's 1976 Policy Statement evidenced the Administration's reluctance to use this power: "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." Noise Policy, supra note 6, at 54.

In the late seventies, however, the FAA began to use its authority to condition airport construction grants on local noise control activities. For example, in 1978 the FAA conditioned a grant for a runway extension at Kalamazoo, Michigan on the airport's commitment to restrict night use. Telephone interview with Norman Arnold, Office of Planning and Programs, FAA (Dec. 19, 1979). In the same year it made a grant for construction of a new airport in Albequerque, New Mexico, but would not release any money to the city until actions were taken to control land use within the projected NEF 30 zone around the airport.

Id.

In contrast, the Chief Environmental Scientist for the FAA's Office of Environmental Quality characterized the FAA's activities as incremental and admitted that people probably would not notice their effect. The FAA and Aircraft Noise, 4 Nat'l J. 1601 (1972).

In the four years since passage of § 611 as an amendment to the Federal Aviation Act, the FAA had promulgated only one noise regulation, Federal Aviation Regulation (FAR) 36. See 14 C.F.R. § 36.1 (1979). This regulation setting noise emissions standards applied only to new designs for aircraft. It left existing aircraft unregulated and required only that new aircraft use existing technology to reduce noise emissions. Id. See also 1977 House Environment, Energy, and Nat. Resources Hearings, supra note 3, at 31 (statement of Charles Elkins, Deputy Assistant Administrator for Noise Abatement and Control, EPA); see text accompanying notes 237-57 infra.

There were earlier bills. See H.R. 11021, 92d Cong., 2d Sess., 118 Cong. Rec. 6065 (1971). President Nixon had also proposed a noise control program in his 1971 message on the environment. 1971 Public Papers of the Presidents 133-34.


Id. at 8230.
The plans could have included operational and land use controls, as well as other techniques, and would have been subject to the EPA approval for consistency with noise standards.

When the proposal was referred to the Public Works Committee, a controversy arose over the provisions for ambient noise standards and local noise abatement planning. The airline industry opposed the provisions, arguing that local noise control plans could severely disrupt air traffic. Senators Cannon and Magnuson, members of the Commerce Committee, expressed concern that a program of local planning for airport noise would adversely affect the FAA regulatory system. Senator Tunney argued, however, that the provision for the EPA to prescribe ambient noise level standards, based in part on statements proposed by airport operators, was justified by the airport owners' liability for airport noise damage.

There was also controversy over the prominent role given to the EPA. The FAA, the airline industry, and airport owners opposed the EPA's role, asserting that only the FAA was equipped to handle the complex technical matters involved. Because of the FAA's knowledge of the industry and its broad responsibility for air traffic management and safety, it was in many ways the logical agency to regulate airport noise. The EPA itself admitted that it lacked the expertise to set aircraft noise standards, although it favored assuming a watchdog role with the FAA having primary responsibility. Environmentalists contended, however, that the FAA had proven itself unfit for the task by its lax implementation of section 611. They argued that the

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191. *Id.* at 35,394-95. Section 502, pertaining to noise abatement plans, was developed in hearings before the Public Works Committee. *Id.* Ultimately the Committee rejected it, *id.* at 35,393, but Sen. Muskie introduced before the full Senate an amendment to reinsert the requirement that the EPA establish levels of cumulative noise exposure for airport environments. *Id.* at 35,388-89. The amendment, which also was rejected, *id.* at 35,411, would have required the EPA to monitor noise levels at airports and make available to the public data on airports with unacceptable noise levels. *Id.* at 35,388-91.


193. *Id.* at 1600.

194. *Id.*

195. *Id.* at 1596.

196. *Noise Pollution: Hearings before the Subcomm. on Air and Water Pollution of the Senate Comm. on Pub. Works*, 92d Cong., 2d Sess. 412, 414 (1972) (statement of Clifton Von Kann, Senior Vice President, ATA) [hereinafter cited as *1972 Senate Noise Pollution Hearings*].

197. *Id.* at 416, 418 (statement of Donald Reilly, Executive Vice President, AOCI).


199. See note 186 *supra.*
agency responsible for promoting air travel should not be the one regulating aircraft noise.\(^{200}\)

The bill reported out of committee and passed by the Senate\(^{201}\) gave primary responsibility for setting aircraft noise emission standards to the EPA, subject to an FAA veto.\(^{202}\) It did not, however, contain the provisions on ambient noise standards and local noise abatement planning.\(^{203}\)

The bill passed by both the House and the Senate\(^{204}\) was even weaker than the one passed by the Senate.\(^{205}\) The Senate version, in addition to giving regulatory power to the EPA, banned sonic booms over the United States,\(^{206}\) required supersonic aircraft to meet the same takeoff standards that subsonic aircraft must meet,\(^{207}\) and required the Secretary of Transportation to study ways to retrofit existing aircraft with sound absorbant material.\(^{208}\) The bill passed by the House,\(^{209}\) containing none of these provisions, gave regulatory authority to the FAA. In a last minute compromise, a House-Senate conference committee devised provisions for joint FAA-EPA responsibility and deleted the other Senate provisions.\(^{210}\)

200. Noone, supra note 190, at 1596. See also 1972 Senate Noise Pollution Hearings, supra note 196, at 185 (statement of R.L. Hurlburt, Environmental Standards Supervisor, City of Inglewood, Cal.); id. at 373, 375 (statement of Raelyn Littky, Environmental Defense Fund).


202. Id. § 501(a)(2), (b)(1), 118 CONG. REC. at 35,892.

203. See note 191 supra. The ambient noise section was deleted as a result of a combination of interest group pressures and general pressure to approve some form of legislation. Some insiders attributed the deletion to the powerful lobbying of the Airline Transport Association (ATA), a trade association comprised of all major U.S. airlines. Noone, supra note 190, at 1602; see, e.g., 1971 House Pub. Health and Environment Hearings, supra note 198, at 262-72 (statement of Stuart Tipton, President, ATA); Airport and Aircraft Noise Reduction: Hearings Before the Subcomm. on Aviation of the House Comm. on Pub. Works and Transportation, 95th Cong., 1st Sess. 427-28 (1977) (statement of John Tyler, Executive Director, NOISE) [hereinafter cited as 1977 House Aviation Hearings]. Environmental groups opposed the airline industry, but did not throw their support behind the Muskie-Tunney bill until the last minute. Noone, supra note 190, at 1603. Major environmental groups evidently had not considered noise control to be a priority. But see 1971 House Pub. Health and Environment Hearings, supra note 198, at 262-72 (material taken from Thomas Kimball letter to Rep. Paul Rogers). Finally, the EPA urged the Committee to compromise in the interest of passing some sort of legislation in 1972, rather than delaying another year. Noone, supra note 190, at 1600-02.

204. H.R. 11021, 92d Cong., 2d Sess., 118 CONG. REC. 37,312-17 (1972).

205. For the bill initially passed by the Senate, see S. 3342, 92d Cong., 2d Sess., 118 CONG. REC. 35,378-85, 35,867-93 (1972).

206. See id. at § 508(a), 118 CONG. REC. at 35,384.

207. This provision, § 509 of the bill, was added as a floor amendment by Senator Cranston. Id., 118 CONG. REC. at 35,879-81.

208. This provision was added as a floor amendment by Senator Brooke. Id., 118 CONG. REC. at 35,878-79.


210. Lake, supra note 28, at 1222. For the final version of the bill passed by both houses, see H.R. 11021, 92d Cong., 2d Sess., 118 CONG. REC. 37,312-17 (1972). See also id. at
The final compromise produced legislation that is ill-conceived and ineffective. The major change is to give the EPA a role in the regulatory process. It does so, however, in a way that has been described as setting up a "public ping-pong game" between the FAA and the EPA. Under the Act the FAA retains its regulatory authority over aircraft noise, but must consult with the EPA before granting exemptions to its own regulations. The Act also requires the EPA to propose aircraft noise regulations to the FAA. In turn, the FAA must hold hearings on the regulations and publicly give reasons for rejecting EPA proposals.

In practice the EPA has had little influence in the regulatory process. The FAA has rejected nearly all of the EPA's proposed regulations, often after long delays. Moreover, some observers believe the lack of coordination between the two agencies has resulted in wasteful duplication of research. Indeed, the only significant benefit of the bill may be that giving the EPA a visible role will make it more difficult for the FAA to cave in to industry demands.

In addition to changing the FAA-EPA relationship, the Act prohibited the FAA from granting a new type certificate for any aircraft.
AIRPORT NOISE

whose noise could be reduced, unless the FAA had already adopted noise standards for the aircraft.\(^{220}\)

Congress considered the airport noise problem again briefly in 1973\(^ {221}\) and 1974,\(^ {222}\) but it did not give the issue serious attention until the House Aviation Subcommittee held extensive hearings in 1975 and 1976.\(^ {223}\) The hearings focused largely on the problems of retrofitting existing aircraft to meet FAR 36 emission standards,\(^ {224}\) but they also provided a forum for discussion of broader federal involvement in airport noise reduction. Testifying for the Airport Operators Council International, Clifton Moore urged greater federal involvement in the problem.\(^ {225}\) He emphasized that airport proprietors faced continued uncertainty in the use of operational controls, and that even when such controls were allowed, they could create serious air traffic management problems.\(^ {226}\) The House Hearings continued in 1976, and in that year Congress passed an amendment to the Airport and Airway Development Act authorizing the FAA to make grants to airports to purchase noise suppression equipment and to acquire land to reduce noise impacts.\(^ {227}\)

In 1978 Congress passed the Quiet Communities Act of 1978,\(^ {228}\) amending the Noise Control Act of 1972. It authorized the Administrator of the EPA to make grants to state and local agencies for the development of noise abatement plans around major transportation facilities, including airports\(^ {229}\) and to provide technical assistance to state and local governments in their noise control efforts.\(^ {230}\) In the same year, Congress considered, but failed to enact, a bill that would have established a grant-in-aid program in the Department of Transporta-

\(^{220}\) Id. § 1431(b)(2).

\(^{221}\) Aircraft Noise Abatement, Hearings before the Subcomm. on Aeronautical and Space Technology of the House Comm. on Science and Astronautics, 93d Cong., 1st & 2d Sess. (1973).

\(^{222}\) Aircraft Noise Control Programs, Hearings before the Subcomm. on Aviation of the Senate Comm. on Commerce, 93d Cong., 2d Sess. (1974).


\(^{224}\) See text accompanying notes 237-57 infra.

\(^{225}\) 1975-1976 House Aviation Hearings, supra note 4, at 492. See generally id. at 491-560.

\(^{226}\) He also asserted that land acquisition is not a cost-effective or politically feasible solution to the problem. Id. at 495. See also text accompanying notes 87-94 supra.


\(^{228}\) Pub. L. No. 95-609, §§ 1, 2, 4, 5, 92 Stat. 3079, 3081 (codified at 42 U.S.C.A. §§ 4901, 4905, 4910, 4913 (West Supp. 1979)).


\(^{230}\) Id. § 4913(f).
tion to assist local airports in planning and implementing land use compatibility programs.\textsuperscript{231}

In 1979 Congress again considered legislation\textsuperscript{232} concerning retrofit deadlines and noise compatibility planning but failed to pass a bill. In early 1980 it passed legislation extending the deadlines for compliance with noise emission standards by the older and noisier aircraft in the fleet.\textsuperscript{233} This legislation has weakened noise control efforts in the short run.

\section*{IV

FAA REGULATION OF AIRPORT NOISE}

FAA\textsuperscript{234} activity under the mandates of section 611 and the Noise


The FAA did not fully support the program. Testimony of the Administrator suggested that the FAA was concerned about the possibility of a reversal of Griggs.

As for the noise and land planning contemplated by title I of H.R. 8729, we are concerned that the Federal role is too substantial. We object to the requirement which places the burden of “approval” or “disapproval” of such plans on the Secretary. This provision inserts the Federal Government squarely into the domain of local decisionmaking. Local authorities are responsible for noise liability and should remain so.

\textsuperscript{1978 Senate Aviation Hearings, supra note 80, at 80 (statement of Langhorne Bond, Administrator, FAA).}

The present Secretary of Transportation, Neil Goldschmidt, has expressed a similar concern that responsibility for assuring land use compatibility should remain with local authorities. Letter from Neil Goldschmidt to Speaker of the House, Thomas O’Neill (Oct. 18, 1979).

However, the FAA has in fact established a grant program for airport noise planning under its AADA authority. U.S. Department of Transportation, Advisory Circular 150/5900-1B (Jan. 31, 1979). See text accompanying notes 178-85 supra. It has made grants to 49 airports under the program. Telephone interview with John Sekman, Office of Airport Planning and Programs, FAA (Dec. 19, 1979).

\textsuperscript{232} See text accompanying notes 302-05 infra for a discussion of this legislation.

\textsuperscript{233} Aviation Safety and Noise Abatement Act of 1979, Pub. L. No. 96-193, — Stat. — (1980). See notes 306-07 infra and accompanying text for further discussion of the deadline extensions. The Act also amends the Airport and Airway Development Act to provide funding for airport noise compatibility planning. Pub. L. No. 96-193, § 103(b), — Stat. —. As the FAA has already established a planning grant program, see note 231 supra, it is unclear what this feature of the bill will mean.

\textsuperscript{234} The CAB, which has authority over airline routes, fares, and competitive practices, is the other federal agency that potentially could regulate aircraft noise. It could do so by refusing to certify new routes or suspending or altering existing certificates because of their noise impacts. Although the D.C. Circuit Court of Appeals has required the CAB to consider environmental factors, Palisades Citizens Ass’n v. CAB, 420 F.2d 188 (D.C. Cir. 1969), the CAB has no mechanism for evaluating environmental impacts and has never denied or altered a route certificate for noise reasons. Lake, supra note 28, at 1173. As Lake noted, the CAB’s ability to reduce the noise impacts of its route certificates is limited by § 401(e)(4) of the Federal Aviation Act, which prevents the CAB from conditioning a certificate so as to “restrict the right of an air carrier to add or to change schedules [and] equipment . . . as the
Control Act of 1972 has focused almost exclusively on reducing aircraft noise at its source, by setting limits on permissible aircraft noise emissions. This section examines the noise emission standards, illustrating their weaknesses and the problems that have arisen in their application.

A. FAR 36

FAR 36, originally promulgated in 1969, is the principal rule in the FAA's program to control noise at the source. It requires aircraft manufacturers to meet specified noise standards in order to obtain the "type" certificate required before a new plane design can be put into production. FAR 36 has a sliding scale of noise limits keyed to the maximum loaded weight of each type of plane, permitting greater noise from heavier aircraft. It also has a tradeoff feature allowing excess noise at one of three measuring points to be offset by less noise at another point. For the heaviest planes, the 1969 FAR 36 standard allowed a maximum noise output of 108 EPNdB. That year the development of the business and the demands of the public shall require.” 49 U.S.C.A. § 1371(e)(4) (West Supp. 1979).

The Airline Deregulation Act of 1978, Pub. L. No. 95-504, 92 Stat. 1704 (codified at 49 U.S.C.A. §§ 1301-1358, 1388, 1399, 1482a, 1490, 1518, 1551, 1552 (West Supp. 1979)), which gradually eliminates CAB control over routes and fares, has further reduced the likelihood that the CAB would deny or alter routes on the basis of noise considerations. The airlines' freedom to enter new markets is a crucial feature of the statutory policy and has led the CAB to oppose airport noise restrictions that would make it more difficult for airlines to open new routes. For an account of the noise problems that deregulation has caused at San Francisco Airport and the CAB's response, see O'Lone, Deregulation Spawns Airport Burdens, AVIATION WEEK & SPACE TECH., Apr. 9, 1979, at 29.

235. The FAA, under its authority to regulate air traffic, has also recommended that airports use certain operational procedures, such as steep takeoffs and landings, to keep planes at higher altitudes over populated areas. Advisory Circular 90-59, Arrival and Departure Handling of High-Performance Aircraft (Feb. 28, 1972); Advisory Circular 91-39, Recommended Noise Abatement Takeoff and Departure Procedure for Civil Turbojet-Powered Aircraft (Jan. 18, 1974). These procedures have been criticized because they have had only a marginal effect on airport noise and because they often reduce noise several miles from the airport while increasing it close to the airport. 1975-1976 House Aviation Hearings, supra note 4, at 938 (testimony of Lloyd Hinton, Executive Director, NOISE).

236. 14 C.F.R. pt. 36 (1979). The limits have been determined primarily by what is technologically feasible. It would be impossible to tie aircraft noise limits to health requirements as research has not yet established precise links between noise and health. See text accompanying notes 3-27 supra. See also Noise Policy, supra note 6, at 17 (indicating that the FAA considers aircraft noise to be largely an annoyance problem).


238. See 14 C.F.R. § 36.1 (1979). See also id. pt. 21 (procedures governing the issuance of type certificates).


240. Id. § C36.5(b). Noise is measured on takeoff at 3.5 miles from the beginning of takeoff roll, on landing at one mile from the beginning of the runway, and 1/4 mile from the side of the runway where noise is greatest after takeoff. Id. § C36.3.

241. Id. § C36.5. See note 4 supra for a definition of EPNdB.
noisiest commercial jets operated at approximately 118-120 EPNdB, a sound level perceived by the human ear to be more than twice as loud as 108 EPNdB.242

Preoccupation with quieting jet engines in order to reduce airport noise is an example of what commentators, in another context, have called the "technological fixation."243 A technological fix is quicker, easier, and more predictable than "social engineering," and is less disruptive of the status quo.244 The FAA's technological approach made sense in 1969 for each of these reasons. The first sustained attack on jet engine noise achieved a significant decibel reduction.245 For example, the Boeing 747, the first plane to meet the FAR 36 limits, is only half as noisy as the 707, although it is twice as large and heavy and can carry three times as many passengers.246

Nonetheless, FAR 36, as initially implemented by the FAA, had several serious weaknesses: it did not apply to all planes; it did not force the development of new technology; and its effect was being counteracted by the rapid growth of commercial aviation. The original FAR 36 standards applied predominantly to applications for design approval submitted after December 1, 1969.247 Plane designs that had been submitted prior to that date remained unregulated, even if the planes were produced after 1969.248 This situation was not addressed until 1973, when the FAA amended FAR 36 to cover all newly manu-

244. Id at 278.
245. See Noise Advancements Coming More Slowly, AVIATION WEEK & SPACE TECH., Nov. 10, 1975, at 89. The drop was attributable to the introduction of high bypass-ratio turbofan engines. Id.
246. 1971 Senate Aviation Hearings, supra note 242, at 674 (statement of John Shaffer, Administrator, FAA). Source controls, however, have technological limits. Until now, improvements in aircraft design have yielded planes that are both quieter and consume less fuel. 1978 Senate Aviation Hearings, supra note 80, at 110 (statement of Paul Ignatius, President, ATA). But planes are beginning to approach what is known as the airframe noise threshold, a floor below which noise improvements are nearly impossible to achieve. This is because a landing aircraft will produce aerodynamic noise of up to 93 EPNdB even if all engines are shut off. 1977 House Environment, Energy, and Nat. Resources Hearings, supra note 3, at 510 (statement of William Becker, Vice President for Operations, ATA). Designers say that improvements from this point on will come slowly. Small improvements will incur rapidly rising costs and possibly increased fuel consumption. Noise Advancements Coming More Slowly, AVIATION WEEK & SPACE TECH., Nov. 10, 1975, at 89.
247. 34 Fed. Reg. 18,364 (1969) (codified at 14 C.F.R. § 36.201). The 1969 limitation applied to aircraft that did not have turbojet engines with by-pass ratios of two or more. 14 C.F.R. § 36.201(c) (1979). Those with turbojet engines with by-pass ratios of two or more were required to comply with FAR 36 if applications were made after January 1, 1967. Id. § 36.201(b).
248. 1971 Senate Aviation Hearings, supra note 242, at 674 (statement of John Shaffer, Administrator, FAA).
factured aircraft of pre-1969 design.\textsuperscript{249} Most planes were not affected by the amendment until 1975,\textsuperscript{250} however, and in the intervening six years the industry had produced 735 commercial jets that did not meet FAR 36 standards.\textsuperscript{251} Since these 735 planes have useful lives averaging fifteen years,\textsuperscript{252} future reductions in airport noise will be difficult to achieve unless these planes are retrofitted to make them quieter or new planes are required to meet even more stringent standards to compensate for the noisier older planes.

The second weakness of FAR 36 is that it has not forced improvements in new plane design; rather, it has institutionalized existing industry practice. The 1969 regulations required only the use of technology already developed by the industry.\textsuperscript{253} These regulations were not amended to require further improvements until 1977.\textsuperscript{254} The new rule required noise emission reductions of one to nine EPNdB depending on the aircraft weight and the number of engines.\textsuperscript{255} Since the reductions had already been achieved by the A-300 Airbus, the DC-10, the L-1011, and the 747, the new standards in fact did nothing more than incorporate industry initiative into a federal rule.\textsuperscript{256}

Finally, the benefits of FAR 36 have been substantially counteracted by airline industry growth. The Department of Transportation has acknowledged that by the 1980's increases in the number of scheduled flights will more than offset decreases in airport noise exposure.\textsuperscript{257} This prospect may have played a key role in motivating the

\begin{itemize}
\item \textsuperscript{249} Noise Standards for Newly-Produced Planes of Older Type Designs, 38 Fed. Reg. 29,569, 29,574 (1973) (codified at 14 C.F.R. §§ 21.183, 36.1(d)).
\item \textsuperscript{250} See 14 C.F.R. § 36.1(d)(1) (1979).
\item \textsuperscript{251} See 1975-1976 House Aviation Hearings, supra note 4, at 81 (testimony of Frederick Meister, Associate Administrator, FAA).
\item \textsuperscript{252} William Becker, Vice President for Operations, ATA, has said that planes wear out in a 12 to 14 year period. 1971 House Pub. Health & Environment Hearings, supra note 198, at 277-78. Frank Borman, President of Eastern Airlines, has said that the useful economic life of Eastern's planes is 20 years. Aircraft/Airport Noise Control: Hearings Before the Subcomm. on Aviation of the House Comm. on Gov't Operations, 95th Cong., 1st Sess. 205 (1977).
\item \textsuperscript{253} 1977 House Environment, Energy, and Nat. Resources Hearings, supra note 3, at 32 (statement of Charles Elkins, Deputy Assistant Administrator for Noise Abatement and Control, EPA).
\item \textsuperscript{257} 1975-1976 House Aviation Hearings, supra note 4, at 3 (statement of John Barnum, Deputy Secretary of Transportation).
\end{itemize}
FAA to advocate retrofit of noncomplying planes to meet FAR 36 standards.

B. Retrofit

The so-called retrofit rule, issued by the FAA in 1976, requires all aircraft weighing more than 75,000 pounds to meet FAR 36 standards by 1985. There are several methods of complying with this rule: old planes can be replaced with new ones; the engines can be replaced ("reengining"); the engines can be refanned; or the nacelle—the housing that holds the jet engine—can be retrofitted with sound-absorbent material. The last method, known as SAM retrofit, achieves less noise reduction than the other methods, but it is also much cheaper. The FAA probably expected the vast majority of planes to be brought into compliance with the standards via SAM retrofit.

The FAA had first seriously considered retrofit in 1970, but backed away from the idea under Airline Transport Association opposition. Following initial research by NASA, the FAA commissioned Rohr Corporation to study the economic impact of retrofit. The Rohr report estimated that retrofit would cost between $73,570 and $1,190,211 per plane and could reduce landing noise by up to thirteen EPNdB and takeoff noise by up to six and one-half EPNdB. The report further estimated that a fare increase of generally less than one per cent would be required to offset this cost. The FAA responded to the report in November 1970 by issuing an Advance Notice of Proposed Rulemaking, asking for public comment on a possible retrofit requirement.

In October 1971 the FAA Administrator said that a proposed retrofit rule with respect to 727's, 737's, and DC-9's would be issued "imminently." The proposal evidently had considerable support from

259. See 1975-1976 House Aviation Hearings, supra note 4, at x.
260. See id. at 1157-58 (statement of John McLucas, Administrator, FAA). Replacement of all noisy planes would have cost an estimated 20 to 30 billion dollars, reengining eight to 10 billion dollars, and buying enough property around airports to reduce noise to acceptable levels, 10 to 12 billion dollars. Id. Retrofit would cost an estimated one billion dollars. Id. at 1159.
263. Id. at 82. The costs would vary by type of plane and type of retrofit material.
264. Id. at 4.
265. Id. at 105-06.
some manufacturers, from administration officials, and from Congress.\textsuperscript{269} In May 1972, however, the Administrator told the Aerospace Industries Association that he did not believe the airlines could absorb the costs of retrofit.\textsuperscript{270} By 1973 there was still no proposed rule; the FAA issued an Advance Notice of Proposed Rulemaking on overall fleet noise requirements,\textsuperscript{271} implying a rejection of the retrofit program.

Retrofit was considered again in 1975 in response to an EPA proposal, but its economics made less sense by then. In the early 1970's, when 707's and DC-8's were expected to be in service for another ten years, retrofit was a plausible approach. By 1975, however, those planes were closer to retirement and retrofit seemed less reasonable.\textsuperscript{272} Jet fuel prices had tripled from their previous levels\textsuperscript{273} and retrofit would increase fuel use by one percent.\textsuperscript{274} Moreover, the airline industry was experiencing financial losses.\textsuperscript{275} Despite these factors, the FAA, presumably concerned about the weaknesses of FAR 36 and the growing airport noise problem, appeared to support the EPA proposal\textsuperscript{276} that all commercial aircraft be retrofitted to comply with FAR 36.

As required by the 1972 Noise Control Act, the FAA held hearings on the proposal in March 1975,\textsuperscript{277} hoping to issue a final rule by July of that year.\textsuperscript{278} It ran into opposition, however, from the Council on Wage and Price Stability.\textsuperscript{279} After reviewing an EPA analysis, the Council concluded that pollution charges "would be the most efficient, least inflationary way to proceed."\textsuperscript{280} Additionally, it argued that the same benefits would be realized without the cost of retrofit as older

\begin{footnotes}
\item[269] Ellingsworth, \textit{Noise Policy Playing Key Role in Replacement Plans}, \textit{Aviation Week \\& Space Tech.}, Nov. 10, 1975, at 87.
\item[270] Speech of John Shaffer, Administrator, FAA, before the Aerospace Industry Association 28th Annual Conference, May 10, 1972, as cited in W. Rodgers, \textit{supra} note 262, at 590.
\item[271] 38 Fed. Reg. 2,769 (1973). The proposed rules initially required each commercial airline to freeze its domestic fleet noise level and then to reduce those levels by 1976. All planes would be required to meet FAR 36 by 1978. The rules, however, were never adopted.
\item[272] Ellingsworth, \textit{supra} note 269, at 87-88.
\item[273] Id. at 87.
\item[274] 1978 Senate Aviation Hearings, \textit{supra} note 80, at 110 (statement of Paul Ignatius, President, ATA).
\item[275] Ellingsworth, \textit{supra} note 269, at 88.
\item[278] Shumann, \textit{EPA Suggests Fare Rise to Finance Quiet Nacelles}, \textit{Aviation Week \\& Space Tech.}, Feb. 17, 1975, at 32.
\end{footnotes}
aircraft were retired from the fleet. The FAA, however, presented an analysis showing a favorable cost-benefit ratio.

The weaknesses of FAR 36 and the costs of alternative noise abatement measures may explain the FAA’s apparent support of retrofit in 1975. Only twenty percent of the commercial jets in use in 1975 met the 1969 FAR 36 standards. The best estimates were that seventy-five percent of the fleet still would not meet the standard in 1980 and that forty-eight percent would not comply in 1990. This increased the likelihood that Congress would pass further noise legislation if the FAA did not act; the FAA may have feared that such legislation would require the use of more expensive alternatives.

The President unexpectedly resolved the retrofit dilemma in 1976. In the midst of the Presidential campaign, President Ford announced in a speech at New York’s John F. Kennedy Airport that all planes would be required to meet FAR 36 standards by 1985, with intermediate targets in 1981 and 1983. Ford also called on Secretary of Transportation Coleman to hold public hearings to determine if the industry would need additional financial help to meet the deadline. In response to Ford’s announcement, the FAA issued a formal rule requiring all airplanes to meet FAR 36 by 1985 with intermediate deadlines in 1981 and 1983.

The Department of Transportation held hearings in December and in early 1977 sent Congress a legislative proposal. This proposal would have provided the airlines with funds, through a two percent tax on new aircraft.

281. Id.
283. 1975-1976 House Aviation Hearings, supra note 4, at 56 (statement of Frederick Meister, Associate Administrator, FAA).
284. Id. at 1157 (statement of John McLucas, Administrator, FAA).
285. Id. at 56 (statement of Frederick Meister, Associate Administrator, FAA).
286. As noted in text accompanying note 223 supra, the House began to hold hearings on the problem in 1975.
287. See note 261 supra. Retrofit would have less effect on the noise problem than the alternatives. The FAA believed that SAM retrofit would reduce the number of people adversely affected by noise by only 20% nationwide. 1975-1976 House Aviation Hearings, supra note 4, at 1161 (statement of John McLucas, Administrator, FAA).
288. 12 Weekly Compilation of Presidential Documents 1552 (Oct. 25, 1976). Robert Ginther, President of the Association of Local Transport Airlines, observed that the decision was totally political, that senior officials had only a few hours’ notice of it, and that it was made despite grave reservations of senior officials at DOT and OMB. 1978 Senate Aviation Hearings, supra note 80, at 138 (statement of Robert Ginther).
surcharge on airline fares, to retrofit, reengine, or replace aircraft. The House Aviation Subcommittee held hearings on retrofit financing in the spring of 1977, and the Senate Aviation Subcommittee followed with hearings in 1978. The announcement of record airline profits in July 1978, however, fueled strong opposition to noise control financing. Although a bill to finance compliance with the retrofit rule passed the House in 1978, similar measures failed in the Senate.

Until Congress granted an extension it appeared unlikely that the airlines would meet the deadlines of the 1976 retrofit rule. Initial uncertainty over what Congress would do about financing led the airlines to delay any action towards compliance. As a result, manufacturers are now unable to supply enough retrofit kits to meet the early deadlines.

Furthermore, the airlines have continually put pressure on Congress to extend the deadlines. In October 1979 the Senate passed a bill that would have allowed the FAA to waive retrofit regulations on a finding that the airline had made a good faith effort to comply and

292. 1977 House Aviation Hearings, supra note 203, at 528, 531-32 (statement of Brock Adams, Secretary of Transportation).
293. Id.
294. See 1978 Senate Aviation Hearings, supra note 80.
295. Aircraft Noise Control Subsidy Bill Faces Key Test in Rules Committee, 36 CONG. Q. 1981 (1978). The financing issue had been complicated when the House Committee on Public Works and Transportation tried to link it to airline deregulation. Demkovich, Airlines are Making Noise Over Paying for Quieter Skies, 10 NAT'L J. 1431, 1432 (1978). Deregulation was a top legislative priority of the Carter Administration but was opposed by most airlines. On the other hand, noise control financing was eagerly sought by the airlines but had little White House support. Key members of the House Public Works Committee were lukewarm on deregulation. They saw passage of retrofit financing legislation as a quid pro quo for approval of deregulation. Aircraft Noise Control Subsidy Bill Faces Key Test in Rules Committee, 36 CONG. Q. 1981 (1978). When the announcement of record airline profits in July 1978 fueled strong opposition to noise control financing, the committee decided to separate the bills. Id.
297. See note 306 infra and accompanying text.
299. 1978 Senate Aviation Hearings, supra note 80, at 219 (statement of Karl Harr).
300. Id.
that it had good cause for noncompliance. The bill would also have altered the present FAA noise emission standards (FAR 36) to provide that any operating aircraft that exceeded them by no more than five EPNdB be deemed in compliance. The Carter Administration opposed the bill, arguing that the effect of the five decibel exemption would be to permit all 727's, 737's, and DC-9's to continue operating for an indefinite period beyond their 1983 compliance deadlines.

In February 1980 the full Congress approved a more moderate piece of legislation that will apply various waivers from retrofit deadlines, depending on the type of aircraft. The waivers are most generous for small two-engine planes although they allow short extensions for large two-engine planes and conditional extensions for three-engine planes. As these extensions may not be sufficient, it would not be surprising to see further legislative activity on the issue. As Senator Cannon, Chairman of the Senate Aviation Committee has observed: "Are you going to ground the whole aviation system of the country? I think not."

303. The waiver could be granted in "any case in which the failure to grant a waiver would create burdens on an individual operator which are unreasonable in comparison to burdens imposed on other operators of noncomplying aircraft.” H.R. 2440, 96th Cong., 1st Sess., § 303(2) (1979) (Senate version).
304. Id. § 310.
306. Aviation Safety and Noise Abatement Act of 1979, Pub. L. No. 96-193, §§ 303, 304, - Stat. — (1980). Two-engine planes with fewer than 100 seats as of December 1979 will not have to comply until 1988; those with more than 100 seats will have to comply by 1985. DC-9's and 737's are two-engine jets that can be equipped with more or less than 100 seats. BAC-111s generally have fewer than 100 seats. Approximately 300 of the 600 two-engine jets in the commercial fleet have less than 100 seats. Telephone interview with Dave Traynham, House Public Works Comm. Staff (Feb. 19, 1980).
308. 1978 Senate Aviation Hearings, supra note 80, at 193.
Federal policy on airport noise has two major shortcomings: its narrow focus on noise emission reduction neglects overall ambient noise control, and its reliance on traditional regulatory methods ignores useful economic techniques. This part examines these problems, particularly as they relate to the retrofit program, and offers an alternative approach to achieving a reduction in airport noise.

The FAA has concentrated on setting noise emission standards for individual aircraft rather than focused on reducing ambient noise levels. This is important for two reasons. First, human health is affected by the total noise environment, not just by single noise events. Second, while ambient noise levels are closely related to aircraft noise emissions, concentration on emissions obscures a range of other techniques that could be used to reduce airport noise. These techniques include reducing the number of operations, using the quietest planes at airports with the most severe noise problems, soundproofing buildings, and purchasing noise-affected land.

Closely related to concentration on aircraft emissions is reliance on traditional regulatory methods to achieve airport noise reduction to the exclusion of more efficient economic techniques. Economists have frequently urged that pricing systems, which rely on economic incentives rather than regulatory imperatives, be used to control various forms of pollution. A pricing system imposes a fee on each unit of pollution, giving the polluter an incentive to control emissions up to the point where further control would cost more than the charges it would save. By contrast, a regulatory system simply prohibits all pollution above an established standard. Economists have shown that pricing systems are more efficient than direct regulation because they can


310. Generally a pricing system will fine each unit of pollution so that the total fine imposed is a function of the total amount of pollution emitted. In theory, the charge per unit of pollution should equal the total cost of a unit of pollution to society. A major advantage of pricing systems is that they provide a continuous incentive to reduce emissions and to improve control technology. By contrast, regulatory methods give a polluter an incentive to reduce emissions only to the level allowed by law. See generally ENVIRONMENTAL IMPROVEMENT THROUGH ECONOMIC INCENTIVES, supra note 309, at 3-38.

311. Thus a “pure” regulatory scheme does not allow for private decisionmaking about whether, or how much, to control pollution. Nor does it distinguish among polluters, according to the amount of pollution emitted, or among pollution sites. See generally id. at 8-18 for a discussion of charges versus direct regulation. In practice, however, the distinctions between the two approaches may not always be so clear, and the two approaches may be merged to meet the needs of the particular situation. Id. at 17.
achieve reductions in pollution at the least cost to society.\textsuperscript{312}

The problem of airport noise is well suited to an economic approach.\textsuperscript{313} Direct regulation is more appropriate where it is important to attain a specific level of control, as when dealing with highly toxic chemicals.\textsuperscript{314} Airport noise, however, is transitory in the environment, localized in effect, and not so dangerous in the short run that health would be endangered while fees are adjusted to achieve desired ambient levels.

An examination of the inefficiencies of the present regulatory approach illustrates the advantages of a pricing system. The requirement that all planes be either retrofitted\textsuperscript{315} or scrapped creates the primary inefficiency of the regulatory approach.\textsuperscript{316} A uniform rule ignores differences in the benefits derivable from the retrofit of various aircraft—benefits that vary according to the amount of noise reduction that will be achieved by retrofit, the remaining useful life of the plane, and the severity of the noise problem at airports where the plane is regularly used. These factors should be considered before retrofit is required.

Clearly it is wasteful to require an aircraft owner to retrofit a plane to achieve a slight noise reduction in order to meet a uniform standard. For example, the following chart shows that retrofitting 707's and DC-8's will produce large noise reductions, while retrofitting 727's, 737's and DC-9's will produce only marginal improvements, because these latter planes already approach the FAR 36 standard.

\begin{itemize}
\item \textsuperscript{312} Under the constraint of an emission fee, sources that can abate pollution cheaply abate more than sources with high cleanup costs. Most of the cleanup is done by those who can do it more cheaply, thus minimizing cleanup costs. See id. at 10; J. KRIER & E. URSIN, supra note 243, at 284.
\item \textsuperscript{313} Despite the apparent advantages of fee systems, they have not been widely used in this country. See generally ENVIRONMENTAL IMPROVEMENT THROUGH ECONOMIC INCENTIVES, supra note 309. In 1978 Congress directed EPA to investigate the use of economic incentives, including emission charges, for noise control. 49 U.S.C.A. § 4913(b)(5) (West Supp. 1979).
\item \textsuperscript{314} ENVIRONMENTAL IMPROVEMENT THROUGH ECONOMIC INCENTIVES, supra note 309, at 46. Under a fee system, it may be difficult to predict the extent to which polluters will pay charges instead of reducing pollution. The fee must be adjusted in light of the polluters' response until the proper pollution level is attained.
\item \textsuperscript{315} The retrofit standards are not uniform since FAR 36 noise limits vary with the weight of the plane, allowing heavier planes to make more noise. 14 C.F.R. pt. 36, app. C36.5 (1979). See chart in text accompanying note 317 infra. However, the weight categories are gross, and the differences in noise limits for commercial jets are small. These differences do not mitigate the inefficiencies examined in the Article.
\item \textsuperscript{316} It does not seem wasteful, however, to require all newly manufactured aircraft to meet uniform FAR 36 noise standards. Given that the technology exists, it does not appear to be significantly more expensive to manufacture quiet planes rather than noisy ones. Moreover, it is clearly less disruptive and presumably cheaper to build a plane to operate quietly than it is to require add-on controls later. Since noise problems will probably increase in the future, it seems wise to require new planes to be uniformly quiet.
\end{itemize}
NOISE IMPROVEMENTS FROM RETROFIT\textsuperscript{317}

<table>
<thead>
<tr>
<th>Plane</th>
<th>Noise Levels in EPNdB</th>
<th>Retrofit Cost Per Aircraft in Thousands (est. 1982)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1969 FAR Limit</td>
<td>Present</td>
</tr>
<tr>
<td>B-707-32B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeoff</td>
<td>103.7</td>
<td>113.0</td>
</tr>
<tr>
<td>Sideline</td>
<td>106.3</td>
<td>102.1</td>
</tr>
<tr>
<td>Approach</td>
<td>106.3</td>
<td>116.8</td>
</tr>
<tr>
<td>DC-8-61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeoff</td>
<td>103.5</td>
<td>114.0</td>
</tr>
<tr>
<td>Sideline</td>
<td>106.2</td>
<td>103.0</td>
</tr>
<tr>
<td>Approach</td>
<td>106.2</td>
<td>115.0</td>
</tr>
<tr>
<td>B-727-200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeoff</td>
<td>99.0</td>
<td>102.2</td>
</tr>
<tr>
<td>Sideline</td>
<td>104.4</td>
<td>100.4</td>
</tr>
<tr>
<td>Approach</td>
<td>104.4</td>
<td>103.2</td>
</tr>
<tr>
<td>B-737-200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeoff</td>
<td>95.8</td>
<td>92.0</td>
</tr>
<tr>
<td>Sideline</td>
<td>103.1</td>
<td>103.0</td>
</tr>
<tr>
<td>Approach</td>
<td>103.1</td>
<td>109.0</td>
</tr>
<tr>
<td>DC-9-30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeoff</td>
<td>96.0</td>
<td>96.0</td>
</tr>
<tr>
<td>Sideline</td>
<td>103.2</td>
<td>102.0</td>
</tr>
<tr>
<td>Approach</td>
<td>103.2</td>
<td>107.0</td>
</tr>
</tbody>
</table>

The chart indicates the magnitude of proven reductions in effective perceived noise decibels.

Retrofit is also wasteful for planes with short remaining useful lives. An airline faced with the retrofit rule will compare the present cost of retrofit, including the present value of increased fuel consumption,\textsuperscript{318} with the present value of the expected stream of income from the plane over its remaining useful life. If the cost is not justified, the airline will replace the plane rather than retrofit it. This choice is wasteful because it requires a valuable plane to be scrapped in order to prevent excess noise emissions for a brief period. Even if the cost of retrofit is justified from the airline's point of view, it may be socially wasteful to require a large retrofit expenditure that yields improved noise emissions for only a short time, and thus only a small benefit to the public.

Finally, the uniform retrofit rule is inefficient because ambient noise levels should be allowed to vary at different airports according to the costs of noise at each site. There is no reason to prohibit high ambient noise levels at airports in isolated areas, since there is no cost associated with airport noise if no one hears it. Thus aircraft noise emissions should be allowed to vary according to where the aircraft is used. However, this is not the case: all aircraft are required to comply with

\textsuperscript{318} See text accompanying note 274 supra.
FAA source regulations regardless of where they are used. The 1976 retrofit rule required that about 1,600 planes be retrofitted or scrapped by 1985, although many are used at airports with insignificant or moderate noise problems, where the benefits of a small noise reduction may not justify the retrofit costs. For example, Alaska Airlines flies almost exclusively in Alaska, where most airports have no noise problem. Yet it must retrofit each of its nine planes, at a cost of $250,000 per plane and with a resulting loss in fuel efficiency.

The inefficiency of the retrofit rule could be avoided by a case-by-case review of the rule. The FAA could weigh the costs and benefits of retrofit for each plane in the fleet and exempt planes for which the cost of retrofit exceeds its benefits. In effect this procedure would create a variable emission standard, with some planes being allowed to be noisier than others. To do this properly, however, would require the FAA to gather immense amounts of information; gains in efficiency would be offset by the administrative costs of achieving them.

A system of charging airlines for noise, using noise-based landing fees, could avoid the inefficiencies of the regulatory system. Waste would decrease because airlines could choose whether or not to retrofit old planes. Airlines, seeking to minimize the sum of control costs and noise fees, would retrofit their planes only when it was cheaper than paying the fees. If fees were higher at airports with greater noise problems, airlines would have an incentive to route quiet planes to airports where many people are affected by noise and to route noisy planes to airports where few people are affected. Such a system could

320. S. REP. No. 976, 95th Cong., 2d Sess. 5 (1978). This has been changed somewhat by the 1980 deadline extensions. See note 306 supra. The changes, however, will not cure this problem.
321. Senate Aviation Hearings of 1978, supra note 80, at 106 (statements of Senator Howard Cannon, Chairman of the Subcomm. on Aviation, Committee of Commerce, Science, & Transportation & Langhorne Bond, Administrator, FAA).
322. Id.
323. See generally J. KRIER & E. URSIN, supra note 243, at 303.
324. In theory, prices on airport noise should be set to equal the costs of the noise. While it is theoretically possible to approximate the prices that people associate with airport noise by comparing property values in different noise environments, as a practical matter there is no way to set noise fees to equal the external costs of noise. A reasonable alternative is to select a desired ambient noise level and then to adjust fees until that level is reached.
combine economic and regulatory characteristics and rely on the FAR 36 standards already promulgated by the FAA.

The proposed system would classify airports according to the severity of their noise problem and penalize users of noisy planes at problem airports. Airports would be assigned to one of three classes on the basis of their Adjusted Noise Impacted Population (ANIP). Only the quietest planes—those meeting 1977 FAR 36 levels—would be allowed to use airports in the highest ANIP class without paying fines. Airports with moderate ANIP values would accept planes that meet an intermediate standard, slightly less stringent than 1969 FAR 36 levels. All planes would be allowed to use airports with low ANIP values. Thus, older planes would not have to be retrofitted to use airports where noise problems do not exist, and only newer or retrofitted planes would be allowed to use noisy airports without paying fines. The following chart illustrates which planes would be allowed to use airports in each class:

I. High ANIP Airports: Boston, Chicago O’Hare, JFK, La Guardia, Newark, Los Angeles; possibly San Francisco, San Diego, and Miami.

747-200
DC-10
L-1011
Retrofitted Planes
[all other planes would pay fines]

II. Moderate ANIP Airports: Atlanta, Buffalo, Denver, Cleveland, Minneapolis, St. Paul, Seattle, and St. Louis, among others.

747-200
DC-10
L-1011
727
737
DC-9
Retrofitted Planes
[all other planes would pay fines]

III. Low ANIP Airports: All airports not in Group I or Group II.

All planes

The system proposed in the text accompanying note 327 is economic in that it relies on fines as an enforcement mechanism and allows for private decisionmaking. It is regulatory in that it would not fine each unit of unauthorized noise. Rather, the system would impose a uniform fine for any noise exceeding the specified standard for an airport. The proposal is also regulatory in the sense that it would initially impose the same fees at all airports within a single class, rather than setting individualized fees at each airport.

The adjusted noise impacted population could be calculated by a simple process: (1) establish the NEF contours for each airport; (2) determine the number of people affected by airport noise in each contour; and (3) weight the population in each contour to account for the relative noise levels of the contours. The total weighted population would be the ANIP.


See generally Noise Policy, supra note 6, at 20.
The proposed system would rely on small (100-200 dollars) fines as an enforcement mechanism. The use of fines, rather than a ban on noncomplying planes, has several advantages. First, it allows the airlines to retain essential scheduling flexibility. Since planes will frequently fly between airports with different ANIP values, an absolute ban would create serious scheduling problems. Second, the use of fines provides the airlines with an incentive to make economic tradeoffs among retrofitting noncomplying planes, scrapping them, using them at low ANIP airports, or paying fines for their continued use. Finally, the fines could be collected and used at each airport to finance other noise reduction activities, such as soundproofing and land acquisition, or to purchase noise easements.

If this plan is adopted, the airlines will have an incentive to work with the proprietors of noisy airports to improve the noise environment, lowering the ANIP and enabling more types of planes to use the airport. For example, since night noise is given extra weight in NEF calculations, the airlines might agree among themselves to curtail some night operations in order to reduce the ANIP enough to put the airport in a lower ANIP class. Additionally, it is possible that passengers using airports with noise problems would have to pay higher fares to cover the additional cost of the airlines' fines. Thus, those who benefit from noise would bear its costs.

If the FAA uniformly implemented the proposal, it could evolve into a decentralized system. The FAA could experiment with a uniform fine for noncomplying planes until it found the level needed to induce the airlines to reroute or retrofit an acceptable number of planes. Later the FAA could set a minimum, national noncompliance fine: airports more interested in attracting airline service than in reducing noise would be required to levy at least the minimum fine. The FAA could give airports the freedom to experiment with higher fines. For example, a higher fee might be used at La Guardia than at San Francisco, even though both were in the same group, if a higher fee were needed to reduce La Guardia's noise to target levels. Another refinement would be to impose variable fines, based on the number of decibels by which a plane exceeds the airport guidelines, or on the time of day of the flight.

As the FAA and airport operators gain experience in administering noise-based fees, they could determine target ANIP values for each airport and adjust the fee structure to attain those values. Communi-
ties could decide that the number of people affected by airport noise should remain constant, decrease by a certain percentage, or even be allowed to increase. Once an airport had selected a target ANIP value, the ambient noise levels might actually be allowed to rise. This would occur where noise fee proceeds had been used to purchase land, thus reducing the number of people living near the airports, and to purchase noise barriers, thus reducing the impact of noise on residents. Noise easements could also be purchased to compensate people, perhaps on a yearly basis, for the effects of airport noise. The ANIP calculations would then exclude compensated persons.

The proposed plan appears politically feasible. It would meet the goals of the airport operators and the FAA, and perhaps even the goals of the airlines, better than the present system of regulation. Many airlines would have been unable to meet retrofit deadlines before the latest extension and they may still be unable to do so. Further deadline extensions must certainly be undesirable to airport operators and FAA officials. This proposal should be attractive to the airlines because it would allow them to retrofit selectively. Planes that are used chiefly where there are no noise problems and planes with short remaining useful lives could pay fines when they use airports with noise problems instead of undergoing expensive modifications.

Most operators of high and moderate ANIP airports should favor the plan. Although they may experience slightly higher noise levels than they would under a strictly enforced retrofit rule, the present extension of retrofit deadlines and the possibility that there will be further extensions make the benefits of retrofit uncertain. Moreover, under this plan they would be compensated for unauthorized noise, thus obtaining revenues for noise abatement projects.

Low ANIP airports, which generally serve small-to-medium sized cities, would obtain a different benefit. Following deregulation, many airlines shifted flights to larger markets and reduced or discontinued

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331. The recently enacted retrofit deadline extensions will provide some relief to the airlines. See note 306 *supra*. But the deadlines for all but small two-engine planes may still be sufficiently stringent to require that airlines make economically inefficient choices between retrofit or early retirement of noisy planes. Airlines may thus prefer a fee system that allows them to retrofit selectively. On the other hand, if the new deadlines provide adequate relief, or if the airlines expect to obtain further extensions or administrative exemptions, they probably would oppose a fee system.

332. For example, as of November 1979, none of Allegheny Airlines' 45 DC-9's had been retrofitted and no retrofit kits had been ordered. Phone conversation with Dave Traynham, House Public Works Comm. Staff (Nov. 5, 1979). Prior FAA regulations required half of them to be retrofitted by January 1, 1981. 14 C.F.R. § 91.305 (1979). TWA, United, and Eastern Airlines would also probably have been unable to meet the deadlines. Telephone interview with J.J. Corbett, Vice President, Airport Operators Council International (Nov. 14, 1979).

333. See note 332 *supra*.
service to these airports. By allowing nonretrofitted planes to use these airports without paying fines, the plan would give them an advantage in attracting service.

The FAA should have no significant objections to the plan. In principle, the FAA supports airport efforts to reduce noise, although it opposes measures that may interfere with efficient operation of the national air transportation system. Because airlines have some flexibility to reroute planes on the basis of noise characteristics, the operation of the air transportation system should not be affected. Furthermore, the proposed plan should avoid the inefficiencies caused by unilateral actions of individual airports. Nor would the FAA incur unreasonable administrative burdens under the plan. Present CAB regulations require airlines to report their takeoffs and landings by airport and type of aircraft. The FAA could use these data to determine the fines owed, then bill each airline and rebate the proceeds to the airports. Alternatively, each airport could use its own records to bill the airlines directly.

The plan should not increase federal control over airport noise so much that the courts might overrule Griggs. Airport proprietors would retain control over all activities that are currently cited as justification for local liability: planning, land use control, land acquisition, and other control techniques that do not interfere with air traffic. The federal role under this plan would be one of coordination and central administration, leaving room for local decisionmaking.

CONCLUSION

The proposed plan has several advantages over the present retrofit rule. First, to the extent that airlines can reroute quiet planes to airports with severe noise problems, it would provide an improved distribution of noise without significant cost. Second, by giving the airlines decisionmaking authority and economic incentives, the plan would in-

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335. See note 110 *supra*.
336. Boston's Logan Airport requires airlines operating there to use the maximum feasible number of planes that meet FAR 36 standards. Massachusetts Port Authority, Logan Airport Noise Abatement Rules and Regulations, Article II (1976). The percentage of operations at Logan by planes that comply with FAR 36 has increased from 26% in 1976 to 52% in December 1979. Telephone interview with Ted Baldwin, Logan Airport Noise Abatement Office (Dec. 18, 1979). In contrast, the percentage of FAR 36 aircraft in the domestic fleet has grown from 26% to only 36% in the same period. *Id.*
337. The increased use of FAR 36 aircraft at Logan has diverted noisier planes to other airports. If these airports include JFK and La Guardia, where even more people are affected by noise than at Logan, the net effect would be negative.
339. See text accompanying notes 52-60 *supra*. 
duce efficient tradeoffs between reducing flights, rerouting quiet planes to problem airports, and retrofitting or replacing noisy planes. Third, it would focus noise reduction activities on the improvement of the ambient noise environment of airports rather than solely on the regulation of aircraft noise emissions. Fourth, it would provide a source of funds for use in other noise abatement activities and would place the burden of the activities' costs directly on the airlines, rather than on the airport proprietors. Finally, the proposal would be an intermediate step between regulation and purely economic pricing systems. The advantages of a pure pricing system could eventually be realized as the plan is refined, yet the disruptions and uncertainty that would result from an abrupt switch from regulation to pricing would be minimized.