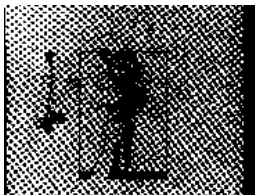

Policy Study

NOVEMBER 14,1986

PRIVATIZING THE AIR TRAFFIC CONTROL SYSTEM

Robert W. Poole, Jr.

EXECUTIVE SUMMARY

The Air Traffic Control (ATC) system, operated by the Federal Aviation Administration (FAA), is in serious trouble. Airline delays are severe and increasing. There aren't enough fully trained controllers, resulting in serious morale problems. Accordingly, safety margins are slipping. These problems are prompting ominous calls for reregulating the airlines.

These symptoms all stem from the inherent constraints of using a tax-funded government agency to provide ATC services. Adequate funds cannot be appropriated, despite earmarked aviation taxes. Executive and legislative entities micromanage the ATC system in detrimental ways. Federal personnel and procurement regulations pose major obstacles to businesslike management. And the absence of market pricing of airport and airway use leads to overuse at peak periods, thereby causing delays. Finally, a serious conflict of interest exists between FAA's dual roles of promoting civil aviation and serving as its safety regulator.

Privatization will resolve these problems. The FAA's ATC facilities, personnel, and equipment should be divested to a nonprofit, user-owned Airways Corporation (AC). AC's stockholders would be limited to airlines, private pilots, business aircraft owners, airline pilots, air traffic controllers, and federal government users. Ownership of control towers and landing slots would be given to the nation's airports, which would be freed to charge market prices. The present airline ticket tax and general-aviation fuel tax would be repealed, and the Aviation Trust Fund terminated. Controllers would be free to organize and to strike, but AC and the airports would be free to contract out operations to a number of private contractors.

Pricing airport/airway access in accordance with demand would end today's artifical shortage of capacity, shifting many flights away from (expensive) peak hours, thereby alleviating delays. Pricing

would also provide the increased resources needed to fund future capacity increases. The freedom to hire ex-PATCO controllers would quickly resolve today's controller shortage, thereby rebuilding safety margins. And complete independence from micromanagement and federal personnel and procurement regulations would permit truly businesslike management.

The potential coalition supporting privatization includes airlines, many private pilots, organized labor, airport operators, consumer and safety organizations, and the Reagan Administration. With appeal to both fiscal conservatives and pro-labor liberals, ATC privatization may be an idea whose time has come.

I. Whence Today's ATC Problems?

The air traffic control system is in serious trouble. Both popular articles and technical studies repeat a litany of problems: mounting delays in airline flights, serious controller morale problems, diminishing levels of safety, serious constraints on future aviation growth, and a very real threat that, to cope with these problems, the air transport system may be reregulated. How serious are these problems, and what are their underlying causes?

Delays

Airline delays head most observers' lists of ATC problems. As traffic levels recovered from the 1981 PATCO strike and the 1981-83 recession, the Federal Aviation Administration initiated capacity limits at busy airports and nationwide "flow-control" procedures aimed at confining delays to the ground rather than the air. By the summer of 1986, despite five years of workforce rebuilding, delays had reached record proportions.(1) The system has simply not been able to keep pace with demand.

The cost of these massive delays can be estimated quite easily. Using a daily average of 1,500 delayed flights (as in September 1986), and making the conservative estimate that the average delay is 20 minutes and the average passenger load 125, gives delays totaling 22,584,375 passenger-hours per year. If the average passenger's time is worth $20 an hour, that equates to nearly $500 million a year in lost time due to airline delays.

Morale

Working conditions are another symptom of an ATC system under continuing, serious stress. In 1985 the General Accounting Office spent a year studying the working conditions at the nation's 74 busiest ATC facilities.(2) It found that the composition of the controller workforce had changed drastically since the 1981 strike. Not only are there fewer controllers today, but the percentage classed as full performance level (FPL) controllers is down sharply, from 13,200 comprising 80 percent of the workforce in 1981 to only 8,673 comprising 62 percent today. This change has resulted in controllers being overworked at peak periods, remaining at their radar positions without a break for longer than is normal, and excessive amounts of overtime. Moreover, survey data revealed that much greater numbers of experienced (FPL) controllers will retire within the next few years than the FAA is planning for.

Predictably, overwork and understaffing have meant serious morale problems among controllers. Poor working conditions and autocratic management and supervision were among the factors leading to the 1981

strike. Soon after the strike ended, an independent task force appointed by the Transportation Secretary (and headed by Lawrence M. Jones of Coleman Corp.) reported that morale among controllers was "very poor."(3) The Jones task force warned that the problems that caused the strike were reappearing and could cause further trouble and disruption. Two years later, newly appointed FAA administrator Donald Engen asked the same task force to reassemble and take another look. Reporting back in December 1984, the Jones task force concluded that "conditions are as bad as in 1981, or perhaps a little worse."(4) No improvement in any significant degree has occurred in management and human organization practices, the probers concluded. These findings were seconded in 1985 by the investigations and oversight subcommittee of the House Public Works and Transportation Committee. "Little tangible progress has been made in the area of management and human relations since the 1981 strike," their report concluded. "The same human relations problems that existed before the strike continue to exist."(5)

Safety

It should not be surprising, given these problems, that the ATC system's margin of safety seems to be diminishing. Early in 1984, the FAA reported that operational errors had more than doubled over a five-month period ending in November 1983, compared with a year earlier.(6) In addition to making errors, controllers are so over-worked that they cannot always give pilots vital safety information. As part of its 1985 investigation, the GAO surveyed controllers in the busy New York/New Jersey area. One-third reported that they often decline to give pilots requested traffic advisories, and one-fourth often declined to give weather advisories.(7) Perhaps the most reported safety statistic is the number of near-collisions in mid-air. In 1983 the FAA broadened the definition of such incidents, but even so, the 777 reported for 1985 was a new high, considerably exceeding the 589 reported for 1984.

Diminished safety is frequently being linked to ATC problems. In its March 1986 report, the GAO concluded that "controllers at many major facilities are being stretched too thin, and over time the situation could impair their ability to continue to maintain the proper margin of safety." Likewise, the House Public Works and Transportation Committee's report charged that "Stress, fatigue, staffing shortages, increasing traffic, lack of supervision, and an unseasoned work force have all impacted the margin of safety."(8) Based on the GAO's findings, the Flight Safety Foundation concluded that conditions have changed since it reviewed ATC safety in the 1981 post-strike period. It concluded that "the present system does not provide the same level of safety as before the August 1981 strike."(9)

Growth Control/Reregulation

These concerns about safety and understaffing are leading a growing number of critics to advocate severe curbs on air traffic--in some cases extending even to reregulation of the air transport industry. In its March 1986 report, GAO recommended that the FAA restrict air traffic at facilities where controllers are overworked until FPL staffing goals are fully met. The House Public Works and Transportation Committee report made the same sort of recommendation. Similarly, National Transportation Safety Board chairman James Burnett has called for more stringent "flow control" by the FAA to shift flights out of high-demand peak times.(10)

Such changes pose the very real risk not merely of curtailing the growth of commercial aviation but also of reregulating the airline industry by the back door--letting government, rather than the marketplace, determine who can fly between what cities. Indeed, Sen. John Glenn recently suggested that the FAA temporarily stop certificating new airlines, in order to let the system catch up with the number of airlines already in operation. Deregulation opponents such as liberal columnist Tom Wicker were quick to seize on Glenn's suggestion. Other columnists, such as Jack Anderson and Carl Rowan, have also attacked deregulation on safety grounds.

Budget Problem

The problems discussed above--delays, controller shortages, morale problems, safety concerns, and the threat of renewed regulation--are merely symptoms. The underlying problem is a structural one. Because the ATC system is operated by the FAA, and the FAA is funded by tax money, its budget is therefore a component of the federal government's budget. Nominally, the taxes which provide the bulk of FAA's funding are "user taxes"--principally, a tax on airline tickets and another on general aviation fuel. Although these tax revenues are earmarked for aviation purposes and credited to an Aviation Trust Fund, Congress regularly limits appropriations from that fund, in order to hold down reported federal spending. Thus, at a time when the ATC system is desperately short of personnel and about $1 billion behind in implementing the National Airspace System Plan (the agency's $12 billion, 10-year equipment modernization program), adequate funds exist but cannot be spent!

Micromanagement

But the budget constraints are only one component of the underlying problem. A second major factor is the micromanagement problem, stemming from the complex oversight carried out by the legislative and executive branches of government. After a detailed study of the ATC system's problems, the National Academy of Public Administration concluded that the decline in the system's ability to perform effect-

ively stems from the "political and policy environment" in which the FAA must operate. Specifically:

> The federal policy process puts great pressure on program operations. Approaches to oversight and accountability tend to be too heavy-handed for field operations. In effect, real control has been diffused into a complex, confusing, and often kaleidoscopic array of authorities among FAA leadership, the Office of the Secretary of DOT, the Office of Management and Budget, the Office of Personnel Management, the White House staff, and several congressional committees.(11)

In explaining these points, the NAPA report shows how each of these oversight bodies, with the best of intentions, ends up undercutting effective management of the complex, demanding ATC system. Congress, too, in carrying out its responsibilities for managing public monies, is forced into a posture of micromanagement. But this understandable process has a high price, concludes NAPA, restricting management authority, producing a loss of control and accountability, and chilling initiative and innovation.

This sort of well-intended but dysfunctional oversight produces a number of specific consequences, as spelled out by NAPA. There are too many layers of oversight, resulting in uncertainty as to who controls a decision and how long it will take to get it made. Because oversight often develops into micromanagement, managers are unable to make normal management decisions themselves. Frequent changes of political leadership--nine FAA Administrators since 1961, serving an average term of less than three years--make for uncertainty and disruption. Finally, conflicts of judgement "can cause problems for a program like the ATC system which demands planning stability and a high order of technical understanding in order to optimize performance, safety, and reliability of operations." Such conflicts can delay and distort decisions which should be made on their technical merits.

Bureaucracy

A third fundamental problem stems from the internal constraints which are imposed on the FAA by its nature as a federal agency. These concern such matters as staffing, personnel management, and procurement. As the NAPA report makes clear, the FAA cannot adequately match its staffing levels with workload demands as a private business can. Furthermore, FAA personnel must be dealt with under all the constraints inherent in the federal civil service system and the regulations of the Office of Personnel Management. This results in general patterns of overstaffing, understaffing, or misallocating staff, geographically or in terms of the mix of staff to match

workload demand. In addition, FAA is constrained in taking disciplinary actions and in removing unsuccessful employees. It cannot use employee motivation and incentive programs, which can be especially important for employees in high-stress positions.

Given these inherent constraints, it is not too surprising that FAA has failed to resolve the difficult human-relations problems that ha plagued the ATC system both before and after the PATCO strike. Even with the best of intentions, FAA management simply does not have the means available to cope with its personnel problems, using a civil-service system designed for low-stress office occupations.

Similar difficulties are inherent in the FAA's required use of feder procurement statutes and regulations. While well-intended, this inflexible, time-consuming system of contracting for equipment and services makes it needlessly difficult for FAA to respond to its changing equipment needs in the marketplace.

Former FAA Administrator Langhorne Bond has confirmed the inherent nature of these problems. Interviewed by National Journal in 1985, Bond said, "I don't see how, if an agency remains within the executi branch and subject to civil service, budget constraints, cost-benefi analyses, and congressional opposition, that it can do much better than it is now."(12)

Pricing

A fourth underlying problem is the lack of pricing of the most scarc ATC resource: landing slots. By charging only on the basis of aircraft weight, rather than by the value of the slot at a particula time of day, airports give users no incentive to economize on the us of this limited resource. Market pricing of slots--with higher pric at times of higher demand, and the price of a slot dependent on the value of the slot, not the weight or type of aircraft using it--woul provide powerful economic incentives for users to operate only high-priority flights into major airports at busy times, thereby shifting demand to less-busy times--without arbitrary, bureaucratic allo-cations. Numerous studies by economists, both within and outside of government, have shown that market pricing would lead to significant reductions in delays.(13)

Conflict of Interest

One final problem is inherent in the present FAA structure: the conflict between the agency's two missions. The Federal Aviation Act of 1958 gives the agency two responsibilities: to promote civil aviation and to regulate aviation safety. Because of these dual functions, FAA is the only federal safety regulatory agency which is also charged with promoting the economic interests of the industries

that it must regulate. (The only similar case was the former Atomic Energy Commission. Resolving that agency's institutional conflict of interest was one of the principal reasons that its functions were split in 1975, with the creation of the Nuclear Regulatory Commission for safety regulation and the shift of AEC research and development efforts to what became the Department of Energy.)

Private aviation safety organizations, such as the Aviation Safety Institute, the Flight Safety Foundation, and the National Transportation Safety Association, believe that FAA is allowing airline operations to expand faster than the ATC system can handle given the slow growth of FPL controller staffing levels. Likewise, the government's NTSB chairman James Burnett has stated that he is concerned about "the pressures from industry" that could affect FAA's decisions with regard to flow control programs. While reasonable people can disagree as to whether a particular FAA decision may be influenced by its mandate to "encourage, develop, and promote" aviation, it is unarguable that concern over aviation safety has risen to new levels over the past few years--with FAA bearing the brunt of the criticism. Any solution to the ATC problem must serve to increase the degree of aviation safety. Separating FAA's regulatory functions from such operational matters as ATC system operations and airport development grants would be a net gain for safer skies.

II. Current Reform Proposals

There has been no lack of proposals for solving today's ATC crisis. They can be grouped into two broad categories: status-quo improvements (advanced by FAA, DOT, GAO, and NTSB) and federal corporation proposals (developed by the ATA and NAPA).

Status-Quo Improvements

FAA's basic approach has called for making minor technical improvements in the short term, bringing the system up to prestrike capacity as rapidly as possible, while relying on future airport capacity expansion for the longer term. For example, the agency is attempting to resolve controller shortages at high-demand locations by means of a "cross-option" program which allows for voluntary transfers of FPL controllers to those locations. But the price of this solution is to deprive other locations of needed FPLs. The Reagan Administration remains firmly opposed to hiring any of the former PATCO controllers who took part in the 1981 strike, thereby limiting the rate at which FPL controller levels can be rebuilt. FAA continues to rely heavily on overtime work by controllers, exacerbating existing morale and stress problems. Other technical fixes include ordering advanced computers and display systems.

For the longer term, FAA's basic solution is more physical capacity at airports. FAA's $12 billion, 10-year National Airspace System Plan is essentially a modernization of the agency's existing hardware and software, to keep pace with changes in the state of the art. As FAA Administrator Donald Engen told the Regional Airline Association in one of his first speeches after taking office, "There is no substitute for concrete and asphalt when you're talking airport capacity."(14) Similar views have been expressed by DOT officials. In July 1986, DOT's James R. Smith told Fortune magazine, "You can do just so much with existing facilities and then you have to find more landing places. The ultimate solution is more airports."(15)

While FAA and DOT might be termed the technological optimists, other government agencies seem to take the position of technological pessimists. Estimating that FAA will need more than four years at its present rate of hiring and training to meet its defined controller staffing requirements (in part, because FAA is underestimating the effects of upcoming retirements), GAO has recommended that FAA restrict air traffic at facilities where controllers are overworked until the staffing goals are met. NTSB chairman James Burnett agrees, calling for improved flow control for "leveling of peaks and valleys and the managing of peaks and valleys" of flight operations.

Neither of these status-quo approaches would relieve most of the symptoms of the ATC crisis discussed in Section I--delays, morale, safety, growth limits, and the reregulation threat. Even worse, they would address none of the underlying problems which have generated these symptoms. By clamping down on flight operations for the next four or five years, the technological pessimists' approach would increase the system's safety levels and reduce the degree of controller overwork--but at the price of partial reregulation of the airline industry. By reducing the number of flights, especially at peak hours, it would reduce the level of service offered to aviation users--though probably reducing the extent of delays of those flights still allowed to operate.

But the FAA/DOT approach would be even less effective, alleviating none of the symptoms. Delays would continue because of the continued mismatch between demand and capacity. Safety would continue to be questionable so long as the system is operated with below-standard staffing and experience levels (i.e., for at least the next four years). Without fundamental structural changes in management, personnel policies, workloads, and compensation, controller morale will continue to be a major problem. As for growth in airport capacity, the only major new airport being planned between now and the turn of the century is in Denver, a city in the throes of an oil-

industry depression (which might seriously delay the building of the new airport). And Gramm-Rudman-Hollings budget constraints will continue to restrict airport grants for the foreseeable future, as they will likewise constrain NAS Plan implementation. The FAA's "concrete and asphalt" solution seems little more than a fond desire, not a likely reality. Thus, given the continuation of delays, safety, and morale problems under the FAA/DOT status-quo approach, the threat of reregulation will remain a very real one.

Federal Corporation Proposals

Recognizing that the symptoms of the ATC crisis reflect underlying structural problems, the Air Transport Association in 1985 conducted a study of how best to deal with these problems.(16) ATA's proposed solution is a federal corporation, to which FAA's ATC system and airport development grants program would be spun off. The corporation would, by charter, be exempt from federal personnel (civil service) and procurement constraints, although its workers would be forbidden by law to strike. Perhaps most important, the corporation would be funded entirely by user fees, thereby removing it from the federal budget process. ATA cites the precedent of other federal corporations, such as Amtrak, Conrail, the U.S. Postal Service, and the Tennesee Valley Authority.

Reviewing this proposal against the list of ATC symptoms is revealing. By providing its own source of revenue, the corporation proposal would provide a more certain way of paying for additional ATC personnel and equipment. This would reduce the pressure for reregulation in order to solve capacity limitation problems. Moreover, by separating ATC operations from FAA, the latter would be free to concentrate on safety standard-setting and enforcement, as an independent regulator. Finally, the new corporation, freed from civil service rules, would presumably be free to develop and implement more enlightened and effective personnel and management policies.

The ATA subsequently asked the National Academy of Public Administration to review and critique its federal corporation proposal. NAPA's report (17) concurred in ATA's assessment of the need for the basic structural changes that a shift to a federal corporation would provide: independence from the federal budget process (and therefore from micromanagement) and independence from federal personnel and procurement regulations. NAPA agreed that the corporation should be funded by user fees, on a self-sustaining basis. NAPA also agreed that airport development is so closely related to ATC system capacity that both airport and airway planning and management should be embodied in the same organization.

But NAPA disagreed with ATA's plan in two important respects. First, NAPA rejected the idea that the corporation should have a board of

directors representing users. Instead, it recommended that the corporation be run by an administrator who would report to the Secretary of Transportation. Second, NAPA recommended including FAA's safety-regulation function in the federal corporation, on the grounds that "safety must be regarded as an integrated system in which all elements must be coordinated."

In effect, then, NAPA recommended converting the present FAA into a new FAA which would be exempt from federal personnel and civil service rules and outside the federal budget process (except perhaps for appropriations for airport grants), but still operating as an appendage of DOT. Despite the NAPA panel's forthright and realistic discussion of the high cost of executive-branch and legislative-branch micromanagement, the potential for such micromanagement would be much greater in the NAPA model than in ATA's version of a federal corporation. In addition, NAPA completely ignored the issue of the conflict between safety regulation and system operation.

As might be expected, both federal corporation plans deal with most of the symptoms of the ATC crisis. Both would begin to address the delays, growth, and reregulation issues, by providing a more businesslike manner of operating and managing the ATC system. These changes would lead to increases in the system's level of safety, and the ATA plan would enhance it further by resolving the conflict of interest problem. Neither plan would provide a rapid alleviation of delays, however, because neither would provide a rapid solution to the current shortages of FPL controllers and airport landing slots.

Furthermore, both plans deal inadequately with the controller morale problem. One of the major causes of this problem is the degree of overwork resulting from the shortage of FPL controllers. The only way that staffing levels could be brought up to full capacity in less than the projected four years would be to hire some of the former PATCO controllers. Neither ATA nor NAPA contemplates doing so, in part because to do so would be to violate current Administration policy that the federal government must not rehire those who struck illegally against it. A federal corporation would be an arm of the federal government and could not turn to this obvious source of experienced personnel to solve the present shortage more rapidly.

Table 1 provides a summary comparison of these general approaches to solving the ATC crisis. Each is weighed against the four symptoms of the problem and the five underlying causes that have been discussed. As can be seen, the FAA/DOT approach deals poorly with the symptoms and fails to address any of the underlying causes. The NTSB/GAO approach of limiting demand addresses some of the symptoms but fails to deal with the causes of the crisis. Of the structural change

proposals, the ATA plan is better in addressing the symptoms and definitely better in dealing with underlying causes. But even it fails to provide short-term relief for delays, deals only partially with controller morale, and still risks significant micromanagement/oversight problems. What's needed is a plan that alleviates all the symptoms and solves all of the underlying problems.

TABLE I
COMPARISON OF PROPOSED SOLUTIONS

	FAA/DOT	NTSB/GAO	ATA	NAPA
SYMPTOMS				
Delays	poor	fair	poor	poor
Morale	poor	fair	fair	fair
Safety	poor	good	good	fair
Growth/ Reregulation	poor	poor	good	good
CAUSES				
Budget	no	no	yes	part
Micromanagement	no	no	part	no
Bureaucracy	no	no	yes	yes
Pricing	no	no	no	no
Conflict of Interest	no	no	yes	no

III. The Private-Sector Model

The ATA federal corporation model addresses a number of the problems which underlie today's ATC crisis. But it does not go far enough. What is needed is a solution which quickly ends the delay problem, quickly restores a full complement of qualified controllers, fully resolves the morale problem, and does not risk creating another micromanaged entity like the U.S. Postal Service. That solution is true privatization of ATC and of airport funding.

There are many possible ways in which a privatized system could be structured. What follows is a proposal designed to address the concerns of all relevant participants in the aviation community. There are four basic elements in the solution. The first is an independent, nonprofit Airways Corporation, owned by its users (following the model of Aeronautical Radio, Inc.--ARINC). The second element is the divestiture to the nation's airports of both control towers and landing slots, giving airports substantial financial and managerial autonomy as enterprises (whether government-owned or private). The third element is completely private funding via prices for airport and airway use, based on supply and demand for these limited resources. The fourth element is freedom for both labor and management: freedom for labor to organize (and to strike) and the corresponding freedom for management to contract out.

In contrast to the federal corporation proposals, this privatization plan would permit a rapid solution to the problem of delays, without the imposition of arbitrary regulation. Pricing access to airports and airways in accordance with demand would end today's artificial shortage, while providing the increased resources to fund increases in physical capacity in the future. In addition, since both airports and the Airways Corp. would be free to hire former PATCO controllers, today's artificial shortage of experienced personnel could be rapidly ended. Moreover, keeping the operating entities independent of the federal government (except for DOD's participation as a user/owner), would completely insulate them from the problems of micromanagement so ably described in the NAPA report.

Freed of its conflicting dual roles, FAA would be able to concentrate totally on ensuring the safest possible aviation system. FAA would still be responsible for certificating airlines and aircraft, licensing pilots and mechanics, and developing and enforcing regulations for both the design of aircraft and their safe operation. It would be FAA's responsibility to ensure that Airways Corp. maintains standard procedures and terminology throughout the airport/airways system.

The following paragraphs spell out in more detail the basic rationale for each of the design features of the private airport/airways system.

Airways Corporation: A User Co-op

The first element of the privatized ATC/airports system would be a nonprofit, federally chartered, user-owned corporation. The model for Airways Corporation is Aeronautical Radio, Inc. ARINC was created in 1929 to provide joint communications and navigation services for several airlines.(18) From the outset, ARINC has been user-owned, with a limitation on the amount of stock that could be held by any one firm. Its activities were, and are, paid for entirely by transaction-based user charges. In 1935 and 1936 ARINC created the nation's first air traffic control centers, but this function was taken over by the federal government as a way of aiding the airlines during the Depression. ARINC continued and expanded its communications role over the years and today provides extensive air-to-ground communications, telecommunications, and highly respected standard-setting activities. ARINC has 51 stockholders, of which 41 are airlines and 10 are other firms with aviation interests (including General Motors, Goodyear, and McDonnell Douglas).(19)

Airways Corporation (AC) would take title to all of FAA's air traffic control facilities and equipment (except for airport control towers, which would be divested to the individual airport operators). It would operate the ATC system, charging all users (including DOD and other public-sector users) on a transaction basis. The structure of the user fees would be determined by AC management, subject to the approval of its board of directors. That board, in turn, would reflect the various interests of AC's stockholders, who would represent all segments of the aviation user community--airlines, private pilots, business aviation, federal government (DOD, Customs, DEA, etc.), and perhaps air traffic controllers, as well. Maximum percentages of the authorized shares available to each group would be specified in the corporate charter.

Airways Corporation would be organized as a nonprofit corporation because the services it provides are in the nature of a natural monopoly. To avoid the well-documented difficulties of public utility-type regulation, while also avoiding the potential of monopoly pricing, the user co-op form of organization provides an excellent solution. With any profits reinvested in the corporation, rather than distributed to shareholders, there would be little incentive for any user group to structure the pricing or operational procedures so as to profit at the expense of other user groups. This structure has stood the test of time at ARINC, having worked well for more than 50 years.

User ownership would also serve to make Airways Corp. responsive to the true needs of the various aviation user groups, as ARINC has been for its owner/users. Potentially contentious issues involving pricing, access to airways, or procedures would be decided by AC's management, in accordance with policies adopted by the corporation's board. In contrast to today's system of executive/legislative oversight and micromanagement, where both long-term system planning and quick response to changing conditions prove difficult, AC's user-group corporate structure should prove to be far more responsive to the needs of the aviation community.

A federal corporation, even if not reporting to the Secretary of Transportation, is far more likely to be plagued with excessive oversight and micromanagement. The "independent" U.S. Postal Service is continually subject to political constraints regarding its pricing, labor policies, equipment ownership, facilities location, etc. It is hardly the model of autonomous, responsive, businesslike management that is needed to operate the ATC system in today's fast-moving deregulated aviation environment. Neither is the Tennessee Valley Authority or the Federal Savings & Loan Insurance Corporation a good model; both are having serious difficulties coping with their own deregulated environments.

What is needed is an enterprise more like Comsat than the Postal Service. While the federal government played a role in the creation of Comsat (as it would in creating Airways Corp.), it did not set it up as a federal corporation. Comsat was given a federal charter, incorporated in the District of Columbia, and required to have three of its 15 directors appointed by the President. Otherwise, Comsat is a stockholder-owned corporation like any other, subject only to regulation of certain communications activities by the Federal Communications Commission, just as any private telecommunications firm would be (and as Airways Corp. would be subject to FAA safety regulation). In the early studies suggesting a corporate structure for the air traffic control system (e.g., Glen Gilbert [20] and The Futures Group [21]), it was Comsat that was suggested as a model, not a USPS-type federal corporation.

Finally, a truly private enterprise such as Airways Corp. would be free to hire its personnel without regard to their previous status as members of PATCO, which a federal corporation would be unlikely to be free to do. This freedom is the key to making possible a rapid restoration of controller staffing levels, thereby resolving current delay and safety problems.

Airports as Enterprises

The second element of the privatization model is to grant significant autonomy to the nation's airports to operate as enterprises,

responding to the changing needs of a deregulated aviation industry. Thus, rather than retaining a centralized airport-grant system, funded by a portion of the airways user charges (as proposed in the ATA and NAPA corporation proposals), the airports should be defederalized. Airports would be given the authority to set their own user fees, whether on a per-passenger basis or simply as part of landing fees, so that they can raise the revenue needed to match their capacity to the demand. As part of this change, the existing federal airline ticket tax would, along with the general-aviation fuel tax, be abolished.

Another key element of airport-enterprise status would be to resolve the issue of airport landing slots. The law should recognize that a landing slot is a resource that inheres in the airport itself, as a function of the capacity which the airport's owners have created and are willing to maintain. Thus, airports should be freed to offer their slots to all would-be users on a supply-and-demand basis. Because a number of slots have in recent years been "purchased" by one airline from another (e.g., the recent acquisition by Pan American of 46 slots at LaGuardia and 18 at Washington National from Texas Air Corp. for $65 million), it might be necessary as part of the transition to the privatized system to "buy out" these slots and return them to airport ownership.

A third and final element would be for ownership of airport control towers and landing aids to be shifted from FAA to airport operators. The towers are physically part of each airport, and their function is restricted to the airspace near the airport. Purchasing and maintaining the equipment needed for controlling landings is properly an airport-operator responsibility, as it affects the airport's capacity as directly as the extent of concrete and asphalt does. Moreover, having the controllers be employees of the airport (rather than of Airways Corp.) provides a desirable degree of decentralization that is a safeguard against the threat of a nationwide air traffic control strike.

Funding via Pricing

The key to solving the longer-term capacity problems of both the ATC system and the airports is to allow both the ATC system operator and all airport operators to have their own, dedicated sources of revenue, which they alone control. Such revenues must come from prices charged to users, not from such crude, indirect means as today's fuel and ticket taxes. The problem is not simply that Congress will not appropriate adequate sums from the Aviation Trust Fund. In addition, the lack of pricing of airport and airways use results in inefficient use of whatever level of capacity exists. In short, we are not getting full use of the airways and airports capacity that already exists, nor will we do so in the future unless pricing provides

incentives for conserving the use of these scarce and valuable resources. Numerous studies by economists, as well as reports of the GAO, the FTC, the Justice Department, and the Council of Economic Advisers have supported market pricing of airport access.

A basic requirement, then, is that the present federal taxes on airline tickets and general aviation fuel be repealed. Thereafter, airports must be free to set their own prices, varying them in accordance with whatever (nondiscriminatory) criteria may make sense--e.g., based on the time of day, expected traffic levels, extent of service provided, etc.--in other words, in accordance with the true economic value of the transactions involved. Such pricing will face airway and airport users with the true cost of their use of these scarce resources, which will motivate shifts in demand so that only the highest-valued needs get met at the highest-cost times.

It may be objected that "charging whatever the traffic will bear," although it will equate demand with supply, is not legitimate, because airports and airways are monopolies akin to public utilities. For the airways, this objection is dealt with by the user co-op, nonprofit status of the proposed Airways Corp. As far as airports are concerned, in today's deregulated environment, competition among airports has become the byword of the industry. Many of our largest cities--New York, Los Angeles, Chicago, Houston, Dallas--have two or more commercial airports which compete with one another. In every city, smaller airports compete for general-aviation business with the air-carrier airports. But in addition, airports throughout the country compete with one another for airline patronage, particularly for hub status. Salt Lake City, Kansas City, Memphis, Dayton, Washington-Dulles, and Charlotte are all examples of formerly under-used airports which have developed into important hubs over the past five years, in competition with other would-be hubs. In this sort of competitive environment, for an airport to charge noncompetitive, "monopoly" prices would be self-defeating.

Both ATA and NAPA would retain a centralized airport-grant structure as part of their federal corporation proposals. A significant portion of the airways user-charge revenue would be set aside for allocation as grants to airport operators, in accordance with a formula based on passenger emplanements, aircraft departure weight, or some other basis. One problem with such grant-allocation schemes is that they are inevitably arbitrary, with some recipients getting more than others feel they are entitled to. But there is no inherently "correct" way to carve up the pie. The advocates of such centralization maintain that it permits overall planning of the airways/airports system. That argument had a certain validity in the days before deregulation, when the growth of each airline's route system was slow

and predictable. It has very little validity in today's unpredictable, competitive environment. Each airport operator, working with its airline and other customers, is in the best position to have the knowledge needed to plan for expected capacity in the face of increased uncertainty. Hence, each airport must be free to raise its own revenues, rather than being dependent on allocations from a centralized body over which it will have little influence and which will possess far less information on which to base its decisions.

Labor/Management Freedom

The fourth component of privatization is essential for creating a new era in labor/management relations in air traffic control. Controllers must be given the freedom to form and join unions, and even to engage in strikes. In short, they must be given the normal freedoms enjoyed by other aviation employees. But likewise, Airways Corp. and the individual airports must be free to hire outside contractors to operate towers, en-route centers, and other facilities.

The basic concept is that of a trade-off. To promote a more positive approach to labor/management relations, ATC employee status must be normalized--made just like that of any other business. At the same time, the system design must be such as to minimize both the likelihood of a nationwide strike by controllers and the negative impact of any strike that might occur. Thus, the system should be designed in a decentralized manner, with Airways Corp. contracting out some or all of its facilities to a number of different firms, and with towers operated by hundreds of individual airports. Unions would then face the task of organizing small numbers of employees working for a multiplicity of employers, rather than the entire workforce of a single employer. As a matter of policy, Airways Corp. should stagger the expiration dates of its facilities-management contracts, so that they expire in different months and in different years. All of these factors make the likelihood of a nationwide controller strike very remote--yet without a legislated ban on the right to strike. A strike by controllers at a few towers or centers, while creating problems, would not have the devastating impact on air commerce or the nation's economy that a nationwide strike would have.

Airways Corp. would not be required to contract out all of its facilities, but it would be wise to make use of such contracting. Decades of operation by FAA have left ATC operations not only with severe personnel problems but also with the legacy of a bureaucratic, nonmarket approach to all aspects of the business. Governments at all levels--local, state, and federal--have found that contracting out the operation of facilities can lead to innovations, greater productivity, and important cost savings. Facility management contracts are quite common in data processing, for example, and cost savings of as much as

one-third have been reported. Contract operation of control towers has been taking place for at least 10 years by airport operators, and more recently by FAA under its contract-tower program. Until the Labor Department recently ruled that compensation by tower contractors must be equal to that of FAA, the private firms were able to operate towers for up to 50 percent less cost than FAA.(22) The savings resulted in part from lower wages and less-generous fringe benefits, but in part from more productive use of personnel and equipment.

It seems clear that by contracting out center operations, Airways Corp. would be likely to achieve significant productivity improvements, as well as decentralizing its labor relations and guarding against nationwide strikes. A number of large aerospace/avionics firms have experience operating ATC facilities and systems under contract, including Bendix, RCA, and Lockheed.(23) About a dozen other firms have experience operating towers and/or airports under contract, including Avco, Pan American, and Britain's International Aeradio Ltd. So there should be no lack of qualified contractors.

IV. Interest Group Assessment

In order for the privatization proposal described above to be implemented, it must be seen to be politically feasible. That, in turn, means that enough of the interest groups involved in aviation must see the proposal as better than either the status quo or the most likely alternative reform proposal (e.g., the federal corporation concept) to constitute an effective coalition in favor of privatization. This section examines whether the makings of such a coalition exist.

Airlines constitute one of the most important interest groups. The major airlines, via the Air Transport Association, are already on record as supporting the divestiture of the ATC system from FAA and the replacement of aviation taxes by user fees. As they come to see their federal corporation plan converted more and more, via the mark-up process, into an equivalent of the Postal Service--subject to numerous federal regulations and to considerable oversight and micromanagement--they may well come to agree that only true privatization will produce a businesslike ATC enterprise. Some major airlines would oppose market pricing of landing slots, but other airlines have supported pricing as being more consistent with deregulation than bureaucratic allocation of slots. Airlines would also be leery of allowing controllers to strike, but if this provision were the key to assembling a winning coalition, they would probably still support the plan.

Smaller airlines, represented by the Regional Airline Association, are something of a question mark. Most likely, they will support privatization in general, as consistent with deregulation and continued airline growth. Some will probably oppose slot pricing, while others will conclude that their chances of gaining sufficient access to airports will be greater in an open-market setting than in an old-boy-network committee setting in which they are newcomers.

According to conventional wisdom, "general aviation" will oppose any form of privatization or slot pricing. But what the Aircraft Owners & Pilots Association has historically opposed is increases in aviation taxes, not true user fees (which have never been a live alternative). In fact, a large number of pilots fly most of their hours under visual flight rules (VFR) and use airports without control towers. The abolition of the aviation fuel tax would be strongly supported by these pilots on the principle that one should pay only for services one actually receives. And with a share of ownership in Airways Corporation, private pilots and AOPA might be persuaded to support the plan, despite their opposition to market pricing of slots at major airports.

Business aircraft operators, however, fly most of the time on instrument flight rules (IFR)--i.e., using ATC services--and use mostly airports with FAA control towers. Thus, replacement of the fuel tax by user fees would result in increased costs for many if not most business aircraft, especially those using major airports where slot prices would be high, reflecting heavy airline demand. With landing fees no longer based on aircraft weight, a Learjet and a 757 might well pay the same landing fee (at the same time of day), if they used the same amount of services. So it seems likely that such groups as the National Business Aircraft Association and the General Aviation Manufacturers' Association will oppose privatization.

Organized labor has long been on record in support of ATC privatization, in order to obtain for controllers the legal right to strike. The Professional Air Traffic Controllers Association (PATCO) called for privatization as early as 1969.(24) During the 1981 PATCO strike, union leaders Lane Kirkland (AFL-CIO) and William Winpisinger (IAM) both made public endorsements of privatization.(25) And in 1984, Larry Phillips, head of a would-be controllers union (U.S. Air Traffic Controllers Organization), wrote a Wall Street Journal op-ed piece advocating privatization.(26) While unions would not like the contracting-out provisions of the privatization plan, individual controllers (whom would-be unions must attract) would favor the worker-ownership provisions. And the unions themselves may realize that this plan is likely to be their best available chance to achieve

their goal of restoring the right to strike (which will definitely not occur under either tha status quo or the federal corporation plan).

The conventional wisdom also pictures the Defense Department (and by implication, other federal users such as the Customs Service) as opposed to privatization and to paying for airway use. Yet a persuasive and publicly appealing argument can be made that the military must pay for all its other means of production--fuel, aircraft, computers, telephone lines, etc. Why should they not pay for airway use as well? Obviously, Airways Corp., in turn, would have to reimburse DOD for any services which are provided to it by military ATC. DOD is used to dealing with private enterprises for a host of goods and services, and has considerable experience in contracting out--e.g., for base maintenance and logistics services and even in some cases for control tower operations. So DOD will have difficulty opposing the privatization plan in a credible way.

Airport operators might well support the plan. Several years ago, the Airport Operators Council International backed a proposal sponsored by Sen. Nancy Kassebaum to defederalize the largest 69 airports, leaving them free to levy per-head charges on passengers in lieu of receiving federal airport grants. The privatization plan incorporates this feature but goes further in giving airport operators control of their destinies. The operators would have much more valuable enterprises to run if they owned the towers, landing aids, and especially the landing slots. By deciding for themselves how and when to expand these assets, and by setting their own fees and charges to finance improvements, the airport operators would be able to function as do other entrepreneurs. AOCI's 1986 annual conference passed a resolution favoring the concept of a privatized U.S. air traffic control authority.(27)

The smaller-airport organization--American Association of Airport Executives--has been a strong proponent of contract-tower operations. So they would be receptive to that aspect of the privatization plan. Whether AAAE would consider independence from the airport grant program in favor of pricing freedom a net gain remains to be seen. Such a change would substitute direct competition among airports (for customers and revenue) for today's indirect competition for grants.

There are two aviation consumer organizations--the Aviation Consumer Action Project and the International Airline Passenger Association. ACAP was a key member of the coalition in favor of airline deregulation and might be persuaded of the privatization plan's necessity as a means of forestalling reregulation. ACAP and IAPA have been strongly critical of both the safety shortcomings and the serious delays inherent in the ATC status quo. Ending FAA's conflict of

interest and freeing it to be the best possible safety regulator (by spinning off ATC to the private sector) may be seen by one or both as a positive solution to today's worsening problems.

The Reagan Administration has been rhetorically committed to both privatization and market pricing (as well as to airline deregulation). Entities such as the Justice Department, the Office of Management & Budget, the Council of Economic Advisers, and the Federal Trade Commission have all supported market pricing of airport access. The White House is strongly committed to privatization of commercial activities of the federal government. Thus, this plan ought to receive the Administration's support on its merits.

That leaves Congress as the most problematical. The various aviation committees would lose most of their authority over ATC operations, but their influence over safety matters would probably increase, as safety became the FAA's full-time focus. The Congressional Budget Office and the Office of Technology Assessment might support elements of the plan (such as slot pricing), as might the Joint Economic Committee. Even committees such as the aviation subcommittees which could be expected to oppose a measure that decreases their influence might decide that the privatization plan is the best alternative for solving today's serious ATC problem--if presented with a coalition including airlines, private pilots, organized labor, airport operators, consumer organizations, and strong Administration and White House support. On the above analysis, such a coalition seems distinctly possible.

V. Transition Steps

This section reviews in more detail the most important issues which must be dealt with in making the transition from the present airport/airways system to the privatized system.

Corporate Structure

Airways Corporation is structured as a not-for-profit user cooperative. Organizations of this sort are set up to carry out functions required by a number of users who are normally competitors but share a common need for certain services. Current examples include (the previously discussed) ARINC, Microelectronics and Computer Technology Corporation (MCC), and the Corporation for Open Systems (COS). The latter two organizations are primarily R&D cooperatives. Another example of a service-providing user co-op is LAXfuel Corp. which provides fuel services to airlines at LAX.

Like Comsat, Airways Corporation (AC) would be incorporated in the District of Columbia with a federal corporate charter. The enabling

legislation would spell out certain ground rules for AC's structure and ownership (as, for example, Comsat's charter provision limiting any one person or group to a maximum of 10% of its stock). Similarly, the enabling legislation would set forth the percentages of AC's shares available to each user group, and the maximum number of shares that any one individual or company could purchase. One possible allocation would be as follows:

Airlines	40%
Private pilots	20%
Business aircraft owners	10%
Airline pilots and controllers	15%
Federal government users	15%

Since the allocation of shares will determine each group's relative influence in setting AC's operating policies, determining the actual allocation will be no small problem. In one sense, every possible allocation scheme will be "arbitrary." Yet the fact that horse-trading and negotiation will be required to arrive at an acceptable compromise is not a sufficient reason for failing to make the effort. After all, such horse-trading is standard practice in setting federal policy on aviation (and other) issues today. Once all affected groups are brought on board, however, they will have every incentive to work together to develop functional policies for AC's operations.

Asset Transfer

Some critics of ATC privatization may question the transfer of public-sector assets such as the FAA's ATC facilities and equipment to a private organization. The fundamental reply to such concerns is that Congress would be making a considered judgement that the interests of the public in a safe, efficient airport/airways system are best served by transferring responsibility for the system to a more businesslike organization. But in practical terms, privatization of ATC is likely to be far more acceptable if Airways Corporation buys the ATC facilities and equipment from the federal government. Thus, the shareholder groups spelled out above will have to purchase the originally authorized shares in order to raise the start-up capital needed to acquire the ATC system's current tangible assets.

An initial capitalization of $100 million should be realizable by authorizing 1 million shares at $100 each. Individuals and companies in each of the eligible groups would be able to purchase shares up to the total number allocated to each group (with limits on the number of shares a single entity in each group could own). Using the above hypothetical allocation of shares, the capitalization would work out as follows:

User Group	Alloc. %	Shares Avail.	Participants (no.)	Avg. Shares Each	Average Invest.	Total Invest.
Airlines	40	400,000	20 large	15,000	$1,500,000	$30 mil.
			100 small	1,000	100,000	10 mil.
Priv. pilots	20	200,000	200,000	1	100	20 mil.
Bus. aircraft	10	100,000	500	200	20,000	10 mil.
Airl. pilots & controllers	15	150,000	30,000	5	500	15 mil.
Fed. gov't.	15	150,000	--	--	--	15 mil.

While the above numbers are solely for illustration, the magnitudes are realistic in terms of what individuals and firms might be willing to pay for a stake in setting Airways Corporation policies. And $100 million is certainly in the ballpark for the market value of FAA's present non-airport-based ATC facilities and equipment, given the high degree of obsolescence of much of the computer inventory and navaids.

Airport control towers and landing aids would be divested from FAA to the individual airports at no charge. Since the airports are all public entities, and since they have, in effect, paid for these assets already (via aviation user taxes), questions about the propriety of this portion of the asset divestiture should not arise.

The other major asset is the unused balance in the Aviation Trust Fund. According to May 1986 estimates by the General Accounting Office, this sum will total $6.5 billion at the end of 1987, $8.2 billion by the end of 1988, and $10.2 billion by the end of 1989, if present taxing and spending policies are continued.(28) On one hand, user groups could argue that these are funds which have been collected from them for the sole use of aviation; hence, they should be divested to Airways Corp. and/or the airports as part of the enabling legislation which repeals the user taxes and terminates the Trust Fund. The Office of Management & Budget will point out, on the other hand, that the "balance" in the Trust Fund is an accounting convention but does not represent any actual funds on hand in the federal Treasury; in other words, the actual dollars collected from users have long since been spent. To actually cash-out the Trust Fund would require Congress to appropriate the remaining balance from general revenues--a difficult proposition in the Gramm-Rudman era.

The way out of this dilemma involves a trade-off, which gives something to each of the relevant parties. Instead of receiving the proceeds from the Trust Fund, the airports would be given full ownership rights in their landing slots, including the freedom to price them at market value. To compensate those airlines which have,

in effect, purchased landing slots in recent years, several hundred million dollars from the Trust Fund would be allocated by Congress to buy out those rights prior to their divestiture to the airports. (In addition, another one-time distribution might be made to the smaller airports which have the least revenue potential from landing slots, before termination of the Trust Fund.) Airways Corporation, while not receiving any funds from the dissolution of the Trust Fund, would be receiving the ATC facilities and equipment and the right to engage in ATC services. And Congress and OMB would be relieved of having to come up with $7-8 billion that would have been required to cash out the Trust Fund.

Liability

Another important issue is the liability of a private firm such as Airways Corp. or its facility-operations contractors. One of the factors seriously affecting the private airport control tower industry during the past two years has been the increasing cost and decreasing availability of liability insurance. Could a firm such as AC obtain liability coverage? And would it be available at price that would be affordable?

Several points must be kept in mind in assessing this issue. First of all, the same issue of liability for possible errors that might contribute to an air crash exists whether the people and equipment belong to FAA, to a federal corporation, or to a private, nonprofit Airways Corporation. These days, people are just as likely to file suit against a government entity as they are against a private firm, especially given the prevalence of "deep-pockets" theories of litigation. The real question is where the funds will come from to defend against and pay such claims--from explicit, visible insurance policies (paid for by those who use aviation) or from the taxpayers as a whole. The costs will be there in any case.

Second, there is a profound difference between a small, privately owned control tower firm and a major, nationwide company owned by the nation's airlines and other aviation users and employing tens of thousands of highly skilled people and billions of dollars worth of high-tech, state-of-the-art equipment. The fact that the former is very difficult to insure says very little about the availability of coverage for the latter.

Third, Congress has the power to affect the conditions under which insurance companies assess the risks in providing ATC insurance coverage. One possibility would be to provide a legislated limit to the liability which AC would have to bear, as part of the enabling legislation. This would be analogous to what Congress has historically done with nuclear power plant liability via the Price-

Anderson Act and to the international aircraft accident liability limits of the Warsaw Convention. But a far better solution would be for Congress to specify in the enabling legislation not a ceiling on the amount of liability (which goes against basic principles of due process) but rather that the liability of Airways Corporation would be based solely on fault, rather than being absolute. This form of tort reform would significantly reduce the uncertainties facing insurance companies considering writing coverage for AC, making premiums far more affordable.

Military and Other Government Users

Another important issue is the participation of federal government aircraft users such as DOD, DEA, US Customs, etc. Under the Airways Corp. charter, these federal users would be given 15% of the ownership (representing the percentage use of civilian airways by federal users) and thus represented in that proportion on the board of directors. Under peacetime conditions, military and other federal users would continue to use the common ATC system as they do today. The enabling legislation could provide for military direction of Airways Corporation during time of war, if Congress thought that to be prudent.

Like other users, federal aircraft operators would be billed for their use of ATC services at prevailing, transaction-based rates. Likewise, to the extent that Airways Corp. received any ATC services from military controllers, those services would be paid for by AC. Federal agencies pay market prices for equipment, consumables, and services procured from the private sector. There is no good reason for their use of civilian airways not to be paid for explicitly rather than implicitly.

Pricing and Access

Probably the most contentious issue in crafting the privatization enabling legislation will be pricing and access for general aviation users. The economic benefits of charging market prices for airport and airway use are so great that it is worth taking special pains to secure the cooperation of general aviation interests. To protect general aviation users, Congress should include in the privatization enabling legislation an equal-access provision. While granting Airways Corp. and airports the right to charge market prices, this provision would require that any aircraft willing to pay the market price must be granted equal access to any airport at any time. By this provision, no airport could exclude business jets or light planes at busy times, as long as their owners were willing to pay the market price for landing at that time.

A related general-aviation issue is that of Flight Service Stations, a nationwide network of 318 information-service facilities for private

pilots, now operated by FAA. Flight Service Stations provide weather briefings, flight-plan filing services, and other more user-specific services such as individual trip planning. A 1985 study by COMSIS Corp. raised the concern that if such services were privatized, a fraction of private pilots would forgo weather briefings rather than have to pay for them.(29) Were this to occur, of course, those unbriefed pilots would pose an increased risk to themselves and possibly to others. Thus, it may be necessary to require the private operators of Flight Service Stations (whether Airways Corp., airports, or contractors) to offer certain basic services at no charge, covering those costs from their charges for value-added services. In no case should this relatively minor issue be used as an obstacle to the overall privatization of ATC services.

NOTES AND REFERENCES

1. "Airline Delays," Aviation Week & Space Technology, Sept. 29, 1986, p. 13.

2. "Serious Problems Concerning the Air Traffic Control Workforce," U.S. General Accounting Office, March 1986.

3. Lawrence M. Jones, et al., "Management and Employee Relations within the Federal Aviation Administration," U.S. Department of Transportation, March 1982.

4. Penny Pagano, "Survey Finds Controller Morale, Skill Declining," Los Angeles Times, Dec. 16, 1984.

5. "Committee Claims ATC System Less Safe Due to FAA Management Problems," Aviation Week & Space Technology, Sept. 16, 1985, p. 32.

6. James Ott, "Control Errors Spur FAA Probe," Aviation Week & Space Technology, Jan. 16, 1984, p. 29.

7. "Conditions Within the Air Traffic Control Work Force at Six FAA Facilities," Statement of Herbert R. McLure, U.S. General Accounting Office, Subcommittee on Aviation, House Committee on Public Works and Transportation, March 3, 1986.

8. "Committee . . .," op. cit.

9. James Ott, "FAA Chief Cites Controller Understaffing as Safety Factor," Aviation Week & Space Technology, March 17, 1986, p. 33.

10. Cecilia Preble, "Growth of Air Traffic Raises ATC Staffing Issue," Aviation Week & Space Technology," March 31, 1986, p. 42.

11. "The Air Traffic Control System: Management by a Government Corporation," A Report by a Panel of the National Academy of Public Administration, March 1986.

12. Burt Solomon, "FAA Runs into Some Heavy Turbulence in Aviation's Worst Year for Fatalities," National Journal, Oct. 12, 1985, p. 2313.

13. See, for example, A. Carlin and R.E. Park, "The Efficient Use of Airport Runway Capacity in a Time of Scarcity," Rand Corporation, RM-5817-PA, August 1969; Michael Levine, "The Airport Crisis and How to Solve It," Reason, April 1973, p. 14; "Airport Delays at Major U.S. Airports Can Be Reduced," U.S. General Accounting Office, CED-79-102, Sept. 4, 1979; Donald Koran and Jonathan D. Ogur, "Airport Access Problems: Lessons Learned from Slot Regulation by the FAA," Federal Trade Commission, May 1983.

14. "FAA Chief Assigns Priority to System Capacity Gains," Aviation Week & Space Technology, May 28, 1984, p. 34.

15. Jeremy Main, "The Worsening Air Travel Mess," Fortune, July 7, 1986, p. 50.

16. "Federal Corporation Approach to the Management and Funding of the Air Traffic Control System," Air Transport Association, September 1985; and "Executive Summary: National Aviation Authority Act of 1987," undated, Air Transport Association.

17. "The Air Traffic Control system . . .," NAPA report, op. cit.

18. Paul Goldsborough, "A History of Aeronautical Radio, Inc. from 1929 to 1942," July 2, 1951 (unpublished ms.).

19. "Annual Report 1985," Aeronautical Radio, Inc., Annapolis, MD.

20. Glen A. Gilbert, "The United States Air Traffic Services Corporation," Glen A. Gilbert & Associates, 1975 (2 vols.).

21. The Futures Group, "Aviation Futures to the Year 2000," U.S. Federal Aviation Administration, 1977.

22. John Doherty, "Towering Entrepreneurs," Reason, May 1983, p. 23.

23. Robert W. Poole, Jr., "Air Traffic Control: The Private Sector Option," Heritage Foundation Backgrounder, Oct. 5, 1982.

24. "PATCO Seeks Mass Resignations Ruling," Aviation Week & Space Technology, Nov. 10, 1969.

25. See Poole, op. cit., p. 16.

26. Larry Phillips, "Time to Change Our Stalling Air Traffic Control System," Wall Street Journal, July 5, 1984.

27. "Airline Observer," Aviation Week & Space Technology," Oct. 6, 1986, p. 35.

28. "Aviation Funding: Options Available for Reducing the Aviation Trust Fund Balance," U.S. General Accounting Office, May 1986.

29. "Flight Service Station Privatization Study," Prepared for the Office of Aviation Safety, FAA, COMSIS Corp., Wheaton, MD, June 1985.

ABOUT THE AUTHOR

Robert W. Poole, Jr. received his B.S. and M.S. degrees in engineering from MIT. He has 19 years of experience in aerospace and policy-research positions and is the author or editor of four books on public policy topics. He serves as president of the Reason Foundation.

NOTES

Nothing in this study is to be construed as necessarily reflecting the views of the Reason Foundation or as an attempt to aid or hinder the passage of any bill before Congress.

Additional copies of this study are available from the Reason Foundation for $5.00 each.