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AIR TRAFFIC CONTROL: THE PRIVATE SECTOR OPTION

INTRODUCTION

The 1981 strike by members of the Professional Air Traffic Controllers' Organization (PATCO) was not an isolated incident. It was merely the latest crisis in the troubled history of the U.S. air traffic control (ATC) system. A reading of the system's history reveals an ongoing pattern of technological lag, lack of costeffectiveness, unresponsiveness to user needs, absence of longrange planning, political interference, and labor problems.

These problems are not the fault of particular people, such as Federal Aviation Administration officials. Nor are they the fault of the ATC system's congressional overseers per se. Rather, the cause of the problem is systemic, stemming from the way the ATC system has been organized and operated--as a government bureaucracy.

Evidence at home and abroad suggests that there are alternative ways of providing ATC services. In several countries, air traffic control is provided by private, not-for-profit corporations, funded by user fees. Elsewhere, the service is provided by a profit-making firm under contract. The U.S., in fact, has several profit-making firms operating airport control towers under contract. And a not-for-profit firm provides nationwide computer and communications services to airlines and other air-space users.

Many of America's ATC problems would fade were the present ATC system replaced by a two-level system, consisting of a not-for-profit ATC System Corporation which contracted out the operation of individual control centers to profit-making ATC operating companies. This would provide (1) uniform nationwide operating procedures and (2) the benefits of competition in the provision of services. In short, the current government operated American air traffic control system should be converted to a private sector system.

THE PROBLEM

The ATC "system" is a complex assemblage of people, equipment, facilities, and procedures. It is owned and operated by the Federal Aviation Administration (FAA), a government bureaucracy whose duties also include setting and attempting to enforce safety standards affecting the design and testing of aircraft, the operation and maintenance of aircraft, and the licensing of pilots and mechanics. As a government service the ATC system is (1) operated as a monopoly, with no competition, (2) paid for via taxes (both user and general), (3) governed by civil service rules, and (4) subject to political control and interference.

A large body of literature in the past two decades has addressed the costs and effectiveness of government services characterized by the four features listed above.¹ In contrast to private sector organizations which face competition, sell services directly to users, set their own personnel policies, and are reasonably free of political interference, bureaucratic entities suffer from inherent problems. Lack of competition removes strong incentives for economic efficiency. Obtaining revenue via taxation precludes the direct feedback from users inherent in buyer-seller relationships in the marketplace. Civil service regulations significantly restrict the efficient use of personnel. And political control makes long-range planning difficult. Given its structure, it is hardly surprising that we find such problems in the ATC system.

The history of the ATC system provides ample evidence of the drawbacks of government operation. One of the most serious indicators is the historical pattern of technological lag. Few outside the aviation industry realize that most of the fundamental advances in air navigation technology have been developed outside the FAA. During the 1930s, airborne VHF radio, omnidirectional navigation beacons (VOR), and blind-landing systems (ILS) were developed by electronics firms under the leadership of Aeronautical Radio, Inc. (ARINC), a not-for-profit company set up in 1929 with the airlines as its stockholders.² These innovations were pushed by ARINC despite the reluctance and conservatism of the FAA's predecessor agencies, the Bureau of Air Commerce and

¹ See, for example, F.A. Hayek, The Road to Serfdom (Chicago: University of Chicago Press, 1944); Anthony Downs, Inside Bureaucracy (Boston: Little, Brown & Company, 1966); Gordon Tullock, Private Wants, Public Means (New York: Basic Books, 1970); William A. Niskanen, Jr., Bureaucracy and Representative Government (Chicago: Aldine-Atherton, 1971); James M. Buchanan and Robert D. Tollison (eds.), Theory of Public Choice (Ann Arbor: University of Michigan Press, 1972); Thomas Sowell, Knowledge and Decisions (New York: Basic Books, 1980); James T. Bennett and Manuel H. Johnson, Better Government at Half the Price (Ottawa, Illinois: Caroline House, 1981); E. S. Savas, Privatizing the Public Sector (Chatham, New Jersey: Chatham House, 1982).

the Civil Aeronautics Authority. ARINC also set up the first air traffic control centers, in 1935 and 1936. After World War II ARINC pioneered the replacement of radiotelegraph communication with voice radio for overseas flights--again, over the opposition of the CAA.³

During the 1950s, the CAA resisted the implementation of radar separation of air traffic, known as the "positive control" of airspace, to reduce the likelihood of mid-air collisions. The gradual introduction of positive control came in response to a series of mid-air collisions in 1956, 1958, 1960, and 1965. Outside advisory committees--the Radio Technical Committee for Aeronautics in 1948, the Huff Committee in the 1950s, and the Alexander Committee in the 1960s--laid out evolutionary plans for making full use of state-of-the-art electronics and communications technology, but their recommendations were not systematically followed by the CAA or the FAA.

In the 1960s and the 1970s, the FAA began using computers in air traffic control. Its initial automation plan was based on IBM 7090 computers which even IBM protested would be obsolete by the time they were installed. The second-generation computer system (using IBM 9020s) installed in the 1970s has been the subject of ongoing controversy, especially over the frequency of system outages and the inadequacy of the back-up equipment and procedures.⁴

In addition, today's primary navigation aid remains the old-fashioned network of VOR stations. Aircraft flying under instrument flight rules (IFR)--which means all commercial flights and many private planes as well--must generally fly along radial paths from one VOR to another, in zigzag fashion. The modern alternative is to use an on-board computer to plot a straight-line course from origin to destination, using the VOR signals merely as references. Widespread use of this technique, known as "area navigation," has been possible for over a decade. It would greatly expand the capacity of the airways. But the FAA's ATC system is still not equipped to handle large numbers of pilots setting their own courses.

Knowledgeable observers long have faulted the FAA for inept management. In 1970, Aviation Week editor Robert Hotz criticized the FAA's lack of meaningful progress on ATC automation, citing the "technical incompetence and slothful leadership of the FAA

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

³ Robert W. Poole, Jr., "Toward Safer Skies," in Robert W. Poole, Jr., ed., Instead of Regulation (Lexington, Massachusetts: Lexington Books, 1982).

⁴ U.S., Congress, Senate, Committee on Appropriations, Investigations Staff, "FAA's En-Route Air Traffic Control Computer System" (Report of the Subcommittee on Transportation, October 1980).

and its predecessor agencies."⁵ The House Government Activities Subcommittee, studying ATC problems in 1970, stated that "The FAA simply does not move forward. All too often in the past, progress has been the result of tragedy."⁶ In 1975, the FAA's bureaucracy was termed "large and unwieldy and may serve as a detriment to FAA's performance of its safety mission" by a ten-man task force appointed by Transportation Secretary Claude Brinegar.⁷ Furthermore, the task force described the agency's advanced technology program as "relatively immediate and short-term in outlook." Serious FAA planning and management problems, such as a lack of cost-effectiveness analysis, were also identified by the General Accounting Office in a 1976 report on air traffic control system improvements.⁸

One of the most serious indictments of the ATC system was made by the Special Air Safety Advisory Group, six retired airline pilots appointed by the FAA in 1975. They concluded that the ATC system itself is "too dependent on the human element.... [and] has grown from old concepts with complex fixes applied to it in an attempt to accommodate its inadequacies."⁹ This, in turn, created "a monster of procedures, rules, methods" which has actually "created hazards, slowed traffic, restricted productive flight...and used energy in frightening amounts."

Why this history of a lack of effective long-range planning, technological lag, unconcern with cost-effectiveness, and unresponsiveness to user needs? To what extent are these problems inherent in the nature of air traffic control? To what extent are they a function of the ATC system as a government bureaucracy? Would the same problems exist were ATC being provided by, say, ARINC or Bendix Field Services?

Inadequate Long-Term Planning

Why can't the FAA make and carry out long-term plans for ATC that provide the services airspace users need? One reason is a lack of continuity in top management. Between 1961 and 1981, the FAA had seven administrators, serving an average term of 35 months (plus a number of short-term acting administrators). Each

⁵ Robert Hotz, "A Lagging Bureaucracy," Aviation Week & Space Technology, July 20, 1970.

⁶ U.S. Congress, House of Representatives, Government Activities Subcommittee, "Problems Confronting the Federal Aviation Administration in the Development of an Air Traffic Control System for the 1970s," July 16, 1970.

⁷ U.S. Department of Transportation, "Report of the Secretary's Task Force on the FAA Safety Mission," April 30, 1975.

⁸ U.S. General Accounting Office, "Issues and Management Problems in Developing an Improved Air Traffic Control System," December 15, 1976.

⁹ U.S. Special Air Safety Advisory Group, "Report to the Federal Administration," July 30, 1975.

sought to put his own stamp on the agency, resulting in frequent shifts of emphasis and direction. None of them had real long-term commitment to the ATC system because the job is a political appointment, not a career position. Real reform is blunted because each new administrator can place the blame for mismanagement on his predecessors, assuring Congress that this time things are finally under control. No one suggests that it may be the system itself that prevents continuity and so discourages reform.

A second cause of planning failure is congressional oversight. Unlike a private business where feedback from the users is expressed directly, ATC user and employee dissatisfaction gets filtered through the political system. The result is continual interference from Members of Congress. Much of this criticism may be in response to genuine problems, as the many GAO and congressional committee reports attest. But political grandstanding by vote-seeking congressmen does not produce a climate conducive to rational, long-term system planning and management. Instead it creates an atmosphere of crisis response and bureaucratic self-preservation.

These constraints would disappear if ATC services were transferred to the private sector. Complex, continuously operating systems such as the telephone system, gas and oil pipelines, chemical process plants, and airline communications and computer systems are all managed successfully by private sector firms which engage in routine long-term planning for system improvements. There is no reason to think that similar planning would be any less successful in an ATC corporation.

Technological Lag

Historically the FAA has failed to develop new technologies and resisted their implementation. One reason may be simple bureaucratic sloth. An organization that is insulated from the marketplace, faces no competition, and whose revenues come from taxes rather than directly from its customers, simply has no strong incentives to seek out new and better ways of doing things. Instead, the internal incentives of preserving the status quo and protecting bureaucratic fiefdoms usually dominate. This tendency is reinforced by the civil service system, which makes it extremely difficult to fire incompetent employees. "The FAA as an organization has more independent empires than medieval Europe," concluded the House Government Activities Subcommittee in 1970, and there is little reason to believe that the situation has changed materially in the meantime.¹⁰

A second reason for technological lag is political. There are inherent conflicts between the interests of different air-space users. The most important of these conflicts is between

¹⁰ Note 6, supra.

private pilots of light aircraft (referred to as "general aviation") and the airlines. The general aviation community has opposed numerous advances in air safety, such as positive control, airborne transponders, and collision-avoidance systems, because they would restrict the amount of airspace available to light aircraft whose owners refused to spend the money needed to add new safety equipment. In a free marketplace setting, the large economic interests of airline and business-jet users would be served most effectively by an ATC system that readily took advantage of new safety technology. General aviation users, who mainly fly for pleasure, would either have to pay the price of flying in the more sophisticated regions or be relegated to out-of-the-way locations where they would not pose a hazard to properly equipped aircraft.

But the ATC exists in a political, not marketplace, setting. The 250,000 general aviation aircraft owners, located in every congressional district, exert considerable pressure on the FAA, via Congress, to compromise on safety requirements. The most recent instance concerned the FAA's decision to reject the Airborne Collision Avoidance System (ACAS), developed by Honeywell, in favor of an FAA-developed system called TCAS, which will be available many years later at five times the cost of ACAS. The principal reason for the decision, according to former FAA official James Pope, was the opposition to ACAS expressed by general aviation interests. To be effective, ACAS would have required restrictions on the operation of non-ACAS-equipped aircraft, a requirement missing from TCAS.¹¹ The implementation of a nationwide collision avoidance system, therefore, has been delayed five to ten years, and its cost raised substantially, because of the pressures inherent in the ATC system's present political nature.

Lack Of Cost-Effectiveness

According to the GAO report previously cited: the FAA, as of 1976, did not know "whether programs to develop the [ATC] system are cost-effective"; the FAA's development plans for the system "do not use savings techniques such as life-cycle costing and design-to-cost goals"; furthermore, "cost-benefit analyses were not done to anticipate the needs of decision-makers" but only after the fact.¹² Once again, the FAA's insulation from the marketplace is at fault. With no stockholders to satisfy, no financial markets to deal with, and no customers to risk losing, the FAA simply does not have the incentives for cost-effectiveness that exist in corporate entities. It can virtually allow engineers to design whatever they like, and then present the tab to Congress as a fait accompli.

¹¹ John Doherty, "Collision Course," Reason, Vol. 14, No. 2, June 1982.

¹² Note 8, supra.

One of the strongest indications of poor cost-effectiveness is the ATC system's men vs. machine trade-offs. The FAA's monopoly status and the presence, until recently, of a strong union has led to retention of an overly large workforce of highly paid people, much of whose work could have been automated at less cost. Transportation economists have noted a similar phenomenon in municipal transit systems over the past two decades. With a near-monopoly on the transit market, nearly unlimited access to federal funds, and strong unions, labor costs accounted for 71 percent of the increase in transit system costs between 1967 and 1976.¹³ Thus, for institutional reasons having to do with its bureaucratic/monopoly/non-marketplace structure, the FAA has poured resources into labor that should have gone into advanced technology.

Unresponsiveness To User Needs

The results of voting in politics differ significantly from the results of voting with dollars in the marketplace. Much of the FAA's behavior in resisting technology and procedures that could enhance safety stems from these political constraints. In economic terms, the interests of millions of airline passengers and corporate aircraft fliers are subordinated to those of the far less numerous but politically influential pleasure fliers.

The same issue is at the root of conflicts over peak-hour access to airports. The FAA has always resisted efforts to put a price on this scarce (and therefore) valuable commodity. Naturally, at a price of zero, demand tends to exceed supply during highly desirable hours at popular airports. A private system operator, faced with this problem, would solve it easily by peak-hour pricing, testing various prices until he found one at which demand and supply at each airport were in balance. The telephone system charges higher rates during business hours than for evenings and weekends; even movie theaters charge more at busy times such as Saturday nights.

The FAA on the other hand, has attempted to solve the problem arbitrarily, by a rationing system called "flow control." As of July 1982, Air Transport Association (ATA) and Regional Airline Association officials were expressing concern that the FAA was planning to make permanent its "temporary" flow-control procedures, adopted during the air controllers' strike, as a way of saving money. "Right now the FAA can limit access to any airport for any reason based on their subjective judgment," Gary Church of the ATA told Aviation Week. "We don't want some supervisor at La Guardia making the decisions unilaterally. The FAA

¹³ Charles A. Lave, "Dealing with the Transit Deficit," Journal of Contemporary Studies, Vol. IV, No. 2, Spring 1981.

must involve users on a day-to-day and even hour-to-hour basis."¹⁴ But in practice such involvement is unlikely to occur in a system so insulated from the marketplace, where users must fight for political clout, rather than being able to express their preferences by means of prices.

Poor Labor Relations

A common view of the PATCO strike is that it was the result of union militants exploiting their monopoly position. But according to an independent task force appointed by Transportation Secretary Drew Lewis after the strike, the FAA's labor relations have been dismal for 15 years--and still are. "Morale within the air traffic and airway services divisions of the FAA is not good. It is, in fact, very poor," said the report.¹⁵ The problems that caused the strike are reappearing and could cause further trouble and disruption, concluded the task force.

Once again, the culprit is the FAA bureaucracy. FAA's air traffic control managers have never been selected on the basis of management talent or trained in modern management techniques. They tend to be "autocratic," "impersonal," "by-the-task" types, the study says. And because of civil service constraints, such bad apples cannot be fired, as they could in a private organization. Moreover, superfluous layers of management, the result of a lack of cost-consciousness, tend to alienate regional FAA managers and insulate top managers from controllers' problems.

As with the other problems cited, there are no guarantees that private sector organizations would be immune from morale problems. But once the link is understood between the FAA's institutional nature--its bureaucratic, civil service structure; its monopoly provider status; its funding by taxes rather than direct user payments; and its subordination to severe political constraints--it becomes clear that its problems are predictable. And these problems would be much less evident were ATC services provided by marketplace institutions.

A PRIVATIZED ATC SYSTEM

The idea that air traffic control can and should be turned over to private enterprise is not new. After all, the first three air traffic control centers in this country were created and operated by a not-for-profit firm, ARINC. Initially the company provided only air-to-ground radio communication, but in

¹⁴ "FAA Continues to Weigh Peak-Hour ATC Staffing," Aviation Week & Space Technology, July 26, 1982.

¹⁵ U.S. Department of Transportation, "Management and Employee Relations within the Federal Aviation Administration," Larry M. Jones, et al., March 1982.

1935 it set up the first air traffic control center in Newark, with costs shared among participating airlines in proportion to airport use. A second and third center followed in 1936, at Chicago and Cleveland, respectively. Each center controlled traffic within a 50-mile radius of the airport.

But those were Depression years. So when in mid-1936 the Bureau of Air Commerce asserted federal responsibility to establish "a uniform centralized system of airway traffic control,"¹⁶ ARINC and its airline owners were pleased to have the government (i.e., the taxpayers) take over the burden. ARINC continued to develop airline communications services. Today it operates the world's largest private line intercity communications network, serving more than 135 airline users. Its message-switching system interconnects 52 airline reservation computer systems. ARINC provides all airline-to-aircraft communications services and contracts with the FAA to provide ATC communications for all international flights out of New York, Miami, San Juan, San Francisco, and Honolulu.

Overseas, ATC is sometimes provided by private sector organizations. In Switzerland the provider is Radio Suisse, a private nonprofit corporation. Although its start-up costs were underwritten by the Swiss government, its operations are funded entirely by user fees. A similar nonprofit corporation was set up in Mexico after World War II, with assistance from ARINC. Called RAMSA (Radio Aeronautica de Mexico, S.A.), it followed the ARINC model, with Mexican airlines as its stockholders. Although the airlines were later nationalized, RAMSA continued as an independent entity, supported by user fees. In 1978, it, too, was nationalized, but continues to operate as an ATC services corporation, charging fees for its services. ARINC also helped set up a similar company in Cuba, called RACSA. The company, and its airline owners, were nationalized by the Castro government.

A subsidiary of British Airways, International Aeradio, provides ATC services in Commonwealth countries in the Caribbean and in large portions of the Persian Gulf. These, too, are paid for by user charges. In nearby Saudi Arabia a different form of privatization exists. There the government contracts out the service to a private firm for five years at a time. In 1980, the contract was awarded to Bendix Field Engineering Corporation; the previous contractor had been Lockheed Aircraft Corporation.

There is even a small amount of private air traffic control in the U.S. Since 1968, Barton ATC has been building and operating control towers at airports whose overall traffic volume does not qualify for an FAA tower. The local airport operator con-

¹⁶ Glen A. Gilbert, "Historical Development of the Air Traffic Control System," IEEE Transactions on Communications, Vol. COM-21, No. 5, May 1973.

tracts with the company for the services, which must be provided by FAA licensees and in conformity with FAA procedures. But whereas the minimum FAA tower costs just under a million dollars to install and \$275,000 a year to operate, a Barton tower typically costs just \$120,000 a year including amortization of construction costs (1979 figures). Not bound by civil service regulations or union work rules, Barton requires the controllers to handle clerical tasks during light traffic periods. Barton radios cost one-third as much as FAA installed radios. And Barton uses modular, prefabricated building components to keep down construction costs.¹⁷

In the aftermath of the 1981 controllers' strike, resulting in the closure of 66 smaller towers, new firms have entered the tower business. A group of FAA controllers, who had not joined the strike, set up Air Traffic Control Services, Inc., and won a contract to reopen the tower at Owensboro-Davis County Airport in Kentucky. Most aggressive of the newcomers is Midwest ATC Services of Olathe, Kansas, which has won a number of tower contracts. The price for operating the Farmington, New Mexico, tower is \$99,000 a year. The cost of the FAA operation had been \$287,000.¹⁸ Also in the business significantly is Pan American World Services, Inc., a subsidiary of the international airline, which has operated military control towers overseas under contract.

The idea of privatizing the entire ATC system was first suggested in 1968 by aviation consultant Glen A. Gilbert, who in 1936 was the Bureau of Air Commerce's first controller. To free ATC from the problems of bureaucracy and politics, he proposed setting up a Comsat-like corporation, funded half by user fees and half by taxes.¹⁹ But while the idea has merit, with tax funding would come congressional oversight, and with that, political constraints.

A variation of Gilbert's proposal, nevertheless, was endorsed by the controllers' union in 1969. The idea was for the controllers to resign en masse, set up a public service corporation, and contract with the government to operate the ATC system.²⁰ The Special Air Safety Advisory Group report, in 1975, recommended that a study be conducted "to determine whether the air traffic system would be operated more efficiently with advanced technology as an independent public company."²¹ And two years later The Futures Group, a Glastonbury, Connecticut, think

¹⁷ William Langewiesche, "The Tower Trade," Flying, December 1979.

¹⁸ Brenton R. Schlender, "Some Small Airports Hiring Firms to Provide Air Traffic Controllers," Wall Street Journal, March 24, 1982.

¹⁹ Glen A. Gilbert, The United States Air Traffic Services Corporations (Washington, D.C.: Glen A. Gilbert & Associates, 1975), 2 vols.

²⁰ "PATCO Seeks Mass Resignations Ruling," Aviation Week & Space Technology, November 10, 1969.

²¹ Note 9, supra.

tank, suggested a "Comsat-like quasi-government authority" to operate the ATC system instead of the FAA.²²

So there has been no shortage of proposals for some form of ATC privatization. Recognition of the high costs of bureaucratic operation of the ATC is widespread. It is also clear that there is no lack of models of various forms of private sector participation in ATC. The challenge is to design a privatized system that solves as many of the present system's problems as possible without creating new ones.

There are three basic issues which must be resolved in any privatization model. They are:

1. Who pays what: Two issues concern costs. The first is the overall allocation of costs among classes of users; the second is the specific structure of user charges.

The cost allocation issue is a perennial political football. In 1973, the Department of Transportation analyzed total airport and airway costs, allocated them to each class of users and compared these figures with the revenues collected from each class.²³ The results showed that the airlines were covering 95 percent of their allocated costs while general aviation covered less than 20 percent of its allocated costs. The federal executive branch has attempted on a number of occasions to obtain legislation to increase user charges to cover 100 percent of costs, only to be defeated by political pressure from general aviation interests. As a result, in 1978 the taxpayers were still paying 54 percent of the FAA's budget.²⁴ However, new aviation taxes and user fees were enacted in the 1982 tax legislation, which should lead to full cost recovery in 1983--although even then general aviation will not be paying its full share of costs. Moreover, as long as the system is operated under political constraints, there is no guarantee that it will not revert to the historical pattern of taxpayer subsidy.

General aviation interests defend their position by arguing that there is some sort of "public benefit" involved in the existence of a national airways system--or what an economist would call a positive externality. But that is true of any economically beneficial activity. We all benefit from having a telephone system--but should the taxpayers in general be taxed to pay for part of its cost, rather than users paying directly in

²² U.S. Federal Aviation Administration, The Futures Group, Aviation Futures to the Year 2000, 1977.

²³ U.S. Department of Transportation, Airport and Airway Cost Allocation Study; Determination, Allocation, and Recovery of System Costs, September 1973.

²⁴ U.S. Department of Transportation, Financing the Airport and Airway System: Cost Allocation and Recovery, FAA-AVP-78-14, November 1978.

proportion to their use? Should taxes cover part of the cost of grocery stores? The economically rational way for the public to pay for the benefits they receive from, say, the ability of the president of Jones Manufacturing to visit far-flung plants via Learjet is in the price of the company's products. If Jones Manufacturing can succeed in charging prices high enough to cover the cost of the Learjet's operation--including the true user charges for airway and airport use--then the marketplace will have vindicated Jones' judgment that use of the Learjet is worthwhile. Instead, that decision is being made today on the basis of incorrect information; so some decisions lead to a waste of resources.

The ATC system should be paid for entirely by user fees, with no revenue coming from taxes. Not only does this make economic sense, it also insulates the ATC system from the political control that must accompany the use of tax money.

The second payment issue concerns the types of user charges. While the exact details can be left to the marketplace, it is important to note that today's so-called aviation user taxes are a poor substitute for true user fees. To be sure, some of them vary in a crude proportion to use of the airways: fuel taxes, domestic passenger ticket taxes, and cargo waybill taxes. Aircraft registration fees and weight taxes, however, are paid once a year, regardless of use.

But economists raise a more fundamental objection to the fuel and ticket taxes (which are the principal sources of revenue among these taxes). While they are roughly proportional to usage, they are not proportional to true cost of the service. Guiding a Learjet carrying two or three people between Newark and O'Hare costs just as much in the way of air controller manpower and equipment as guiding a huge DC-10 airliner. Yet the Learjet pays a tiny fraction of what the DC-10 must pay. Moreover, the Learjet's presence in the system displaces another aircraft from that particular space-and-time segment of the airway, thereby imposing costs on DC-10s, 727s, and all other potential users of that segment.

Access to a controlled airway or a takeoff or landing slot at a busy time is a valuable service. Unless users face the true cost of this service, they will tend to demand more of it than is available or can be provided. A privatized ATC system must be left free to establish prices for its services on the basis of supply and demand. This means direct payments for specific services over specific route segments, at specific locations, and at specific times of day. It does not mean indirect fees like fuel taxes.

2. Type of organizational structure: Present practice provides several models of private ATC operation. There are not-for-profit corporations operating essentially in perpetuity as monopolies, such as Radio Suisse and RAMSA. And there are

for-profit companies operating under relatively short-term contracts with either a national government (as in Saudi Arabia) or a local airport industry. There is no example of a for-profit firm being allowed a permanent monopoly, presumably because of the danger of monopoly pricing. That problem can be avoided with either a not-for-profit structure or a for-profit structure open to periodic competition.

Three alternatives seem to exist for a country as large as the United States. The federal government could retain ownership of the ATC system but contract out its operation, following the Saudi Arabia model. Or a nationwide Comsat-like corporation could be created, perhaps on the model of ARINC, with airlines and other airspace users (including general aviation interests such as the Aircraft Owners and Pilots Association) as stockholders. Or, considering the size of the United States and the beneficial effects of competition and decentralization, regional not-for-profit corporations could be created with contiguous, nonoverlapping territories.

While competing ATC companies are conceivable, this arrangement is unlikely to be accepted by airspace users for reasons of safety. It was dual, overlapping ATC systems (civilian and military), blamed for a series of military-civil midair collisions in the 1950s, that led to the creation of the FAA and a unified ATC system in 1958.

3. Type of ownership: Who should the owner(s) of the ATC system be? For those services that are to be provided by profit-making entities, conventional stockholder ownership would be wise. Economists have found that stockholders are highly sensitive to the performance of a firm, providing for strong feedback to its managers. Even in the case of aircraft manufacturers, stockholders respond sharply to any news indicating that a particular firm's practices may have been the cause of a crash.²⁵

If the choice is a not-for-profit firm, the ARINC model of user organizations as stockholders has much to recommend it. There would be conflicts among the interests of various airspace users, especially between general aviation and airlines, and to a lesser extent between business-jet operators and airlines. If all these user groups were stockholders it would at least provide a framework for working out fee structures and operating procedures that would be responsive to the broad needs of all, if not wholly satisfactory to any.

²⁵ Andrew Chalk, "The Role of Brand Names in the Provision of Safety: An Empirical Test on the U.S. Passenger Aircraft Market," Washington University Department of Economics (unpublished paper presented at Western Economic Association, July 1982).

Another ownership option ought not be overlooked: employee ownership. One of the new contract control tower firms is employee owned. Given the long history of controller dissatisfaction with the FAA, it is likely that many controllers have good ideas on how to operate and manage, say, en-route control centers. To the extent that the organizational structure permits, employee ownership would be worth pursuing.

DESIGNING THE SYSTEM

It is clear that there are three essential criteria for a privatized ATC system. First, it must be 100 percent user charge funded, to insulate the system from political control and to provide proper economic incentives for user-provider interactions. The user fees ought to be set in the marketplace, by supply and demand, rather than by government fiat.

Secondly, to maximize safety, there must be a single, unified ATC system throughout the country, regardless of how many entities (single or decentralized) are involved as providers. A unified "system" includes common procedures, terminology, and technical standards, but not necessarily identical equipment or capital labor combinations. The example of private control tower operators reminds us that, when alternate ways of meeting a common technical requirement are allowed, some will develop more cost-effective solutions than others.

Finally, there should be some form of competition and diversity in the system structure. A structure leading to monopoly pricing would be unfair to users and wasteful of resources. A structure based on a single workforce would probably end up unionized with a single union. This would raise the possibility of a nationwide strike, which would be legal if the employer were a private firm. Moreover, cost-saving innovations are more likely to be developed in a competitive atmosphere rather than in a monopoly.

These seemingly contradictory design requirements can all be met. The key is a two-level ATC organization. The top level would be an ATC System Corporation with overall system design and coordination responsibility. The System Corporation would contract out the operation of the individual en-route and approach/ departure control centers to ATC Operating Companies. The Operating Companies would be profit-making firms, perhaps including the existing U.S. control tower contractors and such aerospace firms as Bendix and Lockheed with ATC experience. The ATC System Corporation would be a not-for-profit firm analogous to ARINC, with user organizations as stockholders.

The enabling legislation setting up the System Corporation would transfer to it, from the FAA, ownership of the existing facilities and equipment of the ATC system. Contracts for operating the various centers initially would be let for differing time periods, so that they would not all come up for rebidding simul-

taneously. In addition, no Operating Company would be allowed to have more than three center contracts in effect at any given time. In this way, a diversity of operators would be achieved and the threat of a nationwide strike minimized. Initial center contracts should pass title of ownership of much of the equipment to the contractor, and contracts should run for a long enough period, perhaps six to ten years, to make ongoing investment in new equipment a rational expense for the contracting firms.

The not-for-profit System Corporation would define and collect the user charges for all en-route ATC services. This would simplify matters for the user, who would have only one billing organization to deal with no matter how many centers served a particular flight. Operations data required for computation of billings would be collected as ATC services actually are rendered and would be stored in computer files as a by-product of routine system operations.

The System Corporation would be responsible for long-term ATC research and development, systems planning and design, and certain aspects of hardware and software procurement. It would serve as the overall ATC system manager, coordinating the activities of the various Operating Companies.

This two-level structure provides complete independence from political control, thanks to market determined prices and the absence of tax funding. It provides competition among suppliers to maximize cost-effective innovations. Yet it maintains the safety advantage of a single, nationwide ATC system. The not-for-profit, user owned top-level structure provides safeguards against monopoly pricing. And the decentralized structure provides safeguards against nationwide strikes, while permitting unionization of individual center workforces if the employees so desire. Yet the need for each Operating Company to remain competitive would serve to restrain union demands for unreasonable remuneration.

The proposed system provides incentives for long-term planning, for using state-of-the-art technology, for being cost-effective, and for being responsive to user needs. With a diversity of Operating Companies, some of them possibly employee owned, individual controllers would have a choice of work environments and probably a much higher level of morale than currently exists.

Privatization of the air traffic control system in this two-level manner would solve the problems plaguing today's ATC system by radically changing the incentives of all the participants.

PROSPECTS

What are the political prospects for privatizing air traffic control? It faces two primary sources of institutional resistance: the FAA bureaucracy and the general aviation community.

FAA management will resist any reduction in its jurisdiction; it already opposes privatization proposals. General aviation organizations have a long history of opposing aviation user charges. Since privatization involves a shift from taxation to user fees--and consequently cost increases for general aviation--opposition from general aviation organizations can be expected. On the other hand, the recent boost in aviation tax and user charges means that the impact of changing to a private system would not be so great, as far as users are concerned. This might well reduce the strength of general aviation's resistance to the idea.

What is surprising is the extent of possible support for ATC privatization. Many airline managers are greatly disturbed about backdoor re-regulation of the industry by the FAA in the guise of landing/takeoff slot restrictions and flow-control procedures. The airlines with most to lose from inadequate slots are the new entrants to the industry--carriers such as Jet America, Muse Air, and New York Air. These entrepreneurial airlines have captured the public's imagination and could become powerful advocates of a privatized system that would prevent bureaucratic sabotage of the competition encouraged by deregulation. But even the "establishment" Air Transport Association has been sounding the alarm about the prospect of the FAA making flow control permanent. Airline interests thus may be mobilized for ATC privatization.

Because it would restore the controllers' right to strike, privatization has already been endorsed by organized labor. In an interview on Cable News Network on August 19, 1981, AFL-CIO president Lane Kirkland said, "There's no reason why it [ATC] could not be a service maintained collectively by these private, profit-making companies [the airlines] and carried out in that way." Similarly, in September, International Association of Machinists' president William Winpisinger told Pat Buchanan on a Washington, D.C., television program (Channel 9's "After Hours") that air traffic control should be turned over to the private sector. So privatization would allow fired controllers to return to work, without a retreat by either the Administration or the controllers.

Privatization of government services is also quite consistent with the Reagan Administration's objective of reducing the scale and scope of the federal government. Thus, conservatives would have good cause to support the move. Liberals, too, should find much to applaud in privatization. Not only would the right to strike of air traffic controllers be restored, but 100 percent user charge financing would end the present subsidy of general aviation's well-to-do private pilots and corporate jet-setters by the majority of less affluent passengers and taxpayers.

Initial media reaction to the idea has been positive. Stated the New York Times: "Indeed, an experiment with more private controllers could be broadly useful. If they can do the job as well, it is hard to see why the Government should be in the business at all." (editorial, October 23, 1981) And Lindley

Clark of the Wall Street Journal observed, "There is no good reason why the government could not turn over the bulk of the traffic control system to private enterprise." (December 29, 1981)

In short, the privatization of air traffic control may well be an idea whose time has come. The only interest groups likely to oppose it are general aviation and the FAA bureaucracy itself. But as a proposal which: unites the support of labor, conservatives, and liberals; improves transportation efficiency; reduces delays and fuel waste; improves air safety; and simultaneously cuts the federal budget, it would seem to be both a very popular and a very rational reform.

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