

Policy Study No. 278

February 2001

# How to Commercialize Air Traffic Control

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## Executive Summary

**T**he record levels of air traffic delays in the summers of 1999 and 2000 have revealed an air traffic control (ATC) system stretched beyond its limits. And not only are delays at record levels; so, too are runway incursions and operational errors by controllers. Clearly the ATC system is in crisis.

Over the past decade a growing consensus has emerged that air traffic control is essentially a commercial service, a 24 hour-a-day, seven-days-a-week, high-tech service business. A number of federal task forces and commissions have, accordingly, recommended that ATC be separated from the Federal Aviation Administration (FAA) and set up as some kind of corporate entity, funded directly by payments from users. Over the past 15 years, nearly two dozen other countries have taken this route, creating either self-supporting government corporations (e.g., Germany) or private nonprofit corporations (e.g., Canada). Recently a number of airline CEOs have spoken out for ATC commercialization along these lines.

The purpose of this report is not to make the case for commercializing ATC; we and others have done that elsewhere. Rather, this report's purpose is *to propose how, in some detail, it might be done*. Our intent is to set forth a realistic proposal for shifting the current ATC functions out of the FAA and into a self-supporting, nonprofit corporation governed by a stakeholder board and regulated at arms-length for safety by a slimmed-down FAA (which would also continue to operate the Airport Improvement Program—AIP—to make airport grants).

We first analyze the alternative forms of corporate structure and organization. Since ATC is, and will likely remain, a monopoly, it must be operated in a way that protects its users from possible monopoly exploitation. Three possible corporate forms are a government corporation, a nonprofit corporation, or a regulated for-

profit corporation. While a number of countries have opted for the first, the U.S. experience with government corporations has not been highly successful. On the other hand, a for-profit ATC corporation raises the perception of “safety versus profits,” which has led to fierce controversy in the United Kingdom. We strongly recommend the nonprofit corporation approach, as implemented successfully in Canada in 1996. Since it took over ATC operations, Nav Canada has speeded up modernization, dramatically increased efficiency and productivity, and cut user fees by one-third.

The most important feature we have adapted from Nav Canada is the concept of a stakeholder board. Because there are more distinctly different aviation interest groups in the United States, such an approach is even more critical in this country, to ensure that the different interests of, say, major airlines, low-fare airlines, regional airlines, cargo carriers, corporate jets, air taxis, and light plane owners are all taken seriously in the corporation’s decision-making, without any of these interests being able to dictate to the others. We also outline several kinds of external federal oversight of the new ATC Corporation: arms-length safety regulation by the FAA, oversight/appeals regarding fees and service levels by the U.S. DOT, and oversight by congressional committees of FAA and DOT.

Of crucial importance is a workable system of ATC fees and charges. The airline industry is still living with the consequences of the divisive battles of 1997 over restructuring the ticket tax. Our starting point for suggesting a workable fee structure is that the current airline shares of cost responsibility not change significantly at the outset; future shares would obviously depend on changing market structures in the dynamic airline industry. Drawing on international practice, as well as guidelines from the International Civil Aviation Organization, we recommend replacing most current aviation excise taxes with a simple weight-distance fee structure similar to current practice in Canada and Europe, but modified to take into account operations at severely congested airports.

Our initial exercise derives such a fee structure that keeps most airlines’ shares within 10 percent of their current levels (using 1998 as the base year). Moreover, taking into account payments by the federal government (for federal use of the system) and foreign carriers, the amount needed from U.S. airlines to pay for the ATC Corporation would be just 72 percent of what the airlines currently pay in aviation user taxes. Even taking into account the need to retain a small portion of the airline ticket tax and cargo waybill tax to pay for the Airport Improvement Program (AIP), *airlines would still pay 12 percent less for ATC and AIP, in total, than they currently pay in aviation taxes.* That 12 percent saving is *prior to any efficiency gains* thanks to corporatization of ATC. Overseas ATC corporations have achieved cost savings of about one-third, which have been passed along in the form of lower user fees. If similar gains were achieved in this country, total airline savings could be on the order of 40 percent by about year five of the new corporation.

General aviation (GA) comes in for special attention. There would be three GA seats on the proposed 15-member corporate board. The current GA fuel tax would be abolished. Instead, each non-jet GA plane would pay a single annual fee, on a sliding scale based on aircraft weight. *For most GA planes, the annual fee would be less than the average annual amount currently paid in fuel taxes.* The services of flight service stations would continue to be available at no charge, on safety grounds. GA pilots would also continue to receive flight-following and instrument flight services on the same basis as today. Only jet aircraft would pay weight-distance-congestion charges; their hourly cost to use the system would increase compared with today. However, it would take only modest (e.g., 5 percent) annual savings in flight-hours (due to the ATC Corporation’s modernized system) to completely offset the higher per-hour charges for business jets. The new FAA (after the spin-off of ATC) would be supported by general federal revenues (47 percent) and the AIP tax on passenger and cargo airlines (53 percent).

Finally, our plan addresses the transition of current FAA controllers and technicians to the new ATC Corporation. We note that the controllers union is on record supporting a government-corporation approach to ATC, such as the 1995 Clinton administration’s U.S. Air Traffic Services (USATS) proposal. Our plan offers the employees “USATS plus a board seat.” While the union is opposed to “privatization” of ATC, what they mean by that term is shifting ATC responsibilities to a for-profit company, creating a perceived conflict between profits and safety. Our nonprofit, stakeholder-controlled corporation avoids any such conflict.

While it is essential to bring in a new top management team for the ATC Corporation, it is important to retain the current controllers and technicians at the outset. The productivity gains expected from the shift to “free-flight” technologies will help to solve the projected retirement crunch later this decade, permitting a gradual downsizing of the work force. Drawing on two decades of global experience with corporatization and privatization, and U.S. experience with reinventing government, we suggest a number of policies for easing the employee transition: initial no-layoff guarantees, lateral transitions, outplacement assistance, early-retirement buyouts, and pension protection. We suggest a number of reasons why corporatization would benefit employees: an improved performance-oriented corporate culture, state-of-the-art technology, market-based compensation, possible gain-sharing (sharing in savings from productivity increases), and the seat on the corporation’s board.

### **Glossary of Acronyms**

ADF	Automatic direction finder	GAMA	General Aircraft Manufacturers Association
ADS-B	Automatic dependent surveillance—broadcast	GPS	Global Positioning System
AIP	Airport Improvement Program	ICAO	International Civil Aviation Organization
AOPA	Aircraft Owners & Pilots Association	IFR	Instrument flight rules
ARINC	Aeronautical Radio, Inc.	NATA	National Air Transportation Association
ARTCC	Air route traffic control center	NATCA	National Air Traffic Controllers Association
ATC	Air traffic control	NATS	National Air Traffic Services (U.K.)
ATS	Air Traffic Services branch of FA	NBAA	National Business Aircraft Association
CAA	Civil Aeronautics Authority (U.K.)	NCARC	National Civil Aviation Review Commission
CSRS	Civil Service Retirement System	NPR	National Performance Review, later renamed National Partnership for Reinventing Government
CTAS	Center-TRACON Automation System	OST	Office of the Secretary of Transportation
DME	Distance measuring equipment	PBO	Performance-based organization
DOC	Direct operating cost	TOC	Total ownership cost
DOT	Department of Transportation (U.S.)	TRACON	Terminal radar approach control facility
DFS	Deutsche Flug Sicherung (Germany)	USATS	U.S. Air Traffic Services corporation
DUAT	Direct User Access Terminal	VFR	Visual flight rules
FAA	Federal Aviation Administration	VHF	Very high frequency
FAR	Federal Air Regulation	VOR	VHF omnidirectional ranging system
FERS	Federal Employee Retirement System		
FISDL	Flight Information Services Data Link		
FSS	Flight Service Station		
GA	General aviation		
GAAP	Generally accepted accounting principles		



## Part 1

# ATC Corporate Structure and Governance

## A. The Overseas Experience

Over the past 15 years, nearly two dozen countries have corporatized their air traffic control systems, including Australia, Canada, Germany, Ireland, New Zealand, South Africa, Switzerland, Thailand, and the United Kingdom.<sup>1</sup> All of these ATC corporations operate on commercial principles, to a far greater extent than do typical U.S. government corporations (such as Amtrak, U.S. Postal Service, and the Tennessee Valley Authority). At a minimum, these commercial principles include the following:

- Keeping their books in accordance with generally accepted accounting principles (GAAP);
- Being governed by a corporate-type board of directors;
- Borrowing from the private capital market;
- Supporting themselves via fees charged to users.

The International Civil Aviation Organization (ICAO) has long supported ATC corporatization, which it terms the creation of “autonomous authorities.” ICAO has published extensive guidelines on the organizational and financial aspects of setting up such organizations. Specifically:

By autonomous, ICAO means that the organization should have greater freedom from the government in conducting its financial affairs, infrastructure funding, etc., and it should be self-financing, subject to the usual business taxes, and be required to seek a return on capital. Importantly, it should still be regulated by the government, and encouraged to be as competitive, efficient, and cost-effective as any other commercial business. Based on the empirical evidence so far, ICAO believes that such autonomous air navigation service providers are likely to be more efficient, more dynamic, and more business-like than their government-run counterparts, and more attractive to banks and other lenders.

ICAO specifies that an autonomous authority should have financial and managerial autonomy from the government. This means that it should finance its operations through user charges and any other revenues it may generate from its operations, be free to access national and international money markets to fund major infrastructure investment, and have the authority and flexibility to respond to market forces when it

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<sup>1</sup> Civil Air Navigation Services Organization, *Corporatization of Air Navigation Services* (Geneva, Switzerland, August 1999), available at [www.canso.org](http://www.canso.org).

comes to manpower and general management policies. . . . To that end, ICAO pledges its support and encouragement for any government contemplating this significant leap forward.<sup>2</sup>

We can learn a great deal about governance issues from a closer look at these overseas ATC corporations.

## B. Board of Directors

### 1. *Appointment*

In those countries whose ATC corporations are government-owned (e.g., Australia, Germany, Ireland, New Zealand, South Africa, and the United Kingdom), the government appoints the board members. By contrast, in Canada, Switzerland, and Thailand, whose ATC corporations are partly or entirely private, nonprofit entities, the board is self-selecting, in accordance with the stakeholder representation provisions of the corporate charter (which was approved by the government in question). In both types of model, the corporate CEO is selected by the board, not by the government.

### 2. *Airline Representation*

No official airline representatives sit on the boards of the government-owned ATC corporations. However, several of these corporations do provide ways of obtaining members with aviation experience:

- Air Services Australia permits retired aviation people to serve on its board, as individuals rather than as representatives of their former company or trade association.
- Germany's Deutsche Flug Sicherung (DFS) has both a Supervisory Board and a Managing Directors Board. The former is made up one-half by representatives of the shareholder (the government ministries of transport, finance, and defense) and one-half by representatives of employees. This board appoints the Managing Directors Board, which may include current or retired airline executives.
- The Irish Aviation Authority follows the same policy as Australia.
- The New Zealand government's original policy was not to have anyone with aviation connections on its board; in 1989 this restriction was dropped in favor of a policy of seeking some commercial aviation expertise, but not from major users.
- The U.K.'s National Air Traffic Services follows the same policy as Australia, Germany, and Ireland.

By contrast, Nav Canada, Swiss Control, and Aero Thai are set up essentially as stakeholder cooperatives rather than as government corporations. The board of each is therefore designed to represent the various constituencies or stakeholders involved in air traffic control—e.g., airlines, general aviation, airports, unions, and the government (in its role as a user of the system). Hence, board members representing airline interests are among the positions provided for in the corporate charters of these ATC corporations.

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<sup>2</sup> Ibid.

### 3. Stakeholder Representation

Further details on the stakeholder-controlled nonprofit ATC corporations' boards are as follows.

#### a) Nav Canada

As a non-share but stakeholder-controlled nonprofit corporation, Nav Canada has a 15-member board of directors. Ten positions are spelled out by the corporate charter to represent stakeholders, as follows:

- Four appointed by the Air Transport Association of Canada;
- One appointed by the Canadian Business Aircraft Association;
- Two appointed by Nav Canada bargaining agents (unions); and
- Three appointed by the government.

To further ensure that the interests of Nav Canada are served, these board members cannot be active employees or members of airlines, unions, or government. These 10 members select four independent directors, and those 14 then select the CEO, who becomes the 15<sup>th</sup> board member.

#### b) Swiss Control

As of 1996, the share capital was expanded but government ownership was increased from 71 percent to 99.85 percent. The remaining shares are held by Swiss airports, aircraft operators, aviation-related organizations, and employee associations. Board membership consists of the following:

- Five representing the government;
- Two representing Swiss airlines (Swissair and Crossair);
- One representing the Geneva airport; and
- One representing employee groups.

#### c) Aero Thai

Originally a nonprofit airline cooperative, Aero Thai became majority government-owned in 1993, when it also took over (from the military) approach/departure control at Bangkok International Airport. The Thai government now owns 91 percent of the shares and the airlines 9 percent; currently 52 airlines are shareholders. The 11-member board consists of:

- Eight government members;
- Two airline members; and
- One CEO, appointed by the other members.

The five-member executive committee includes three from government (including the managing director) and two from the airlines. The 11-member technical advisory committee consists of two from government organizations, five from international member airlines, and two from domestic member airlines, plus the general manager and the operations overseer.

## C. Government Oversight

Generally speaking, the government-owned ATC corporations are responsible to the relevant cabinet minister(s), generally the transport minister (the counterpart of the U.S. Secretary of Transportation). To some degree, this gives that official a dual role—as both principal (or sole) shareholder and as regulator of the corporation, on matters of policy. In most countries the finance ministry has a monitoring role (and in New Zealand is the sole shareholder in the government ATC corporation).

The most autonomous of the government corporations is Airways Corporation of New Zealand. Its corporate charter is called the Statement of Corporate Intent; it defines the scope and purpose of the business, in order to minimize political interference in its management and operation. The government is the sole shareholder (with the shares held by the finance ministry), and the board is expected to set policies in accordance with the government’s interest as a “rational shareholder.” The company is subject to New Zealand’s freedom-of-information act and to annual outside audit by a major accounting firm. It is also subject to once a year scrutiny by a committee of the House of Representatives, which reviews the Airways annual report against the previous year’s published objectives.

Nav Canada is the most autonomous ATC corporation, with no government ownership (but with three out of 15 board members representing the government). Air safety regulation remains the responsibility of the government (Transport Canada). The enabling legislation spells out certain other areas in which its behavior is regulated, including specific principles to which user fees must conform. Specifically, it must give 60 days notice of any proposed:

- New or revised fees and charges;
- Reductions in facilities; or
- Material changes in services.

Nav Canada is required to consult with users and other affected parties prior to making modifications with respect to fees and charges. Users may appeal the company’s decision to the Canadian Transportation Agency under certain specified circumstances. With respect to services, users can make representation to Transport Canada if they are concerned that Nav Canada’s proposals would adversely affect air safety. More stringent provisions apply to the possible reduction of designated services to remote and northern regions of the country.

## D. Economic Regulation

Air traffic control corporations are generally set up as legal monopolies, on the same rationale traditionally used for such services as local water and electricity distribution. In those fields, U.S. practice has included three alternative means of protecting consumers from possible monopoly pricing and/or other exploitation, depending on the type of organization selected:

- Setting up the enterprise as a government corporation, which is presumed to be operating in the public interest and hence is not externally regulated;

- Setting up the enterprise as a nonprofit user cooperative, in which the shared interest of users in low prices and low costs, consistent with quality service, is seen as a sufficient safeguard; or
- Setting up the enterprise as a for-profit company, subject to (1) a long-term franchise and (2) rate or profit regulation.

Since the government-owned ATC corporations are not investor-owned, for-profit companies, their governments (with the exception of South Africa) do not make use of explicit rate regulation. Canada and Switzerland follow variations of the user cooperative model, in which it is presumed that the shared interests of the stakeholders will serve to prevent monopolistic exploitation of ATC users. Canada has also legislated a comprehensive set of charging principles as further protection for users.

But each country that has created an ATC corporation backs up this theoretical harmony of interests with government oversight mechanisms. Generally, these mechanisms include one or both of (1) mandatory consultation with users, and (2) appeal to the relevant government oversight agency.

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In Canada, the watchword of ATC reform was “user pay means user say.”

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### ***1. Mandatory Consultation***

As noted previously, Nav Canada is required to notify and consult with users about proposed changes in rates and services. Germany’s DFS is not required to consult, but has chosen to do so in the interest of good relations with users. Once a year DFS invites users to a workshop to discuss plans, charges, and other current issues. Airways Corporation of New Zealand does not have a legal requirement for consultation, but has entered into a memorandum of understanding with its airline customers, covering the consultation process, its investment program, and its profitability. It has also adopted an industry-agreed weighted-average cost of capital and uses EVA (Economic Value Added) to self-regulate the returns from its monopoly services; excess EVA is returned to users as fee reductions in subsequent years.

### ***2. Appeal to Government***

Air Services Australia has no explicit rate regulation, but the transport minister may reject proposed rate changes within 30 days, generally in response to user objections. In extreme cases, the minister may refer proposed rates to the Prices Surveillance Authority, the Australian antitrust agency. Similarly, in the U.K. rates proposed by NATS can be referred to the Competition Commission (formerly known as the Monopolies and Mergers Commission).

Germany’s DFS is not subject to any formal appeals process, but the Transport Minister has the final say on its rates. Each year DFS presents its preliminary cost estimate for the following year to the transport minister, who then sets the terminal charges and (in collaboration with Eurocontrol) the en-route charges.

New Zealand’s government has adopted the principle of “light-handed regulation” for all public utility-type enterprises. Under this approach, there is no formal regulation of the rates charged by such enterprises, but they may be appealed to the Commerce Commission and ultimately to the courts. In addition, should the “light-handed” approach be judged to be not working, the transport minister is empowered to create a formal

rate-making process, based upon principles of cost and fee methodology disclosure. Thus far, in 12 years of Airways Corporation’s existence, no serious demand for such rate regulation has developed.

The enabling legislation for Nav Canada sets out a formal appeals process, under which users can protest rate changes to the Canadian Transportation Agency. The new rates can be appealed on the grounds of noncompliance with either the charging principles set forth in the enabling act or notification and announcement requirements. In Nav Canada’s first three and a half years of operation, there have been no appeals.

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We have actual, hands-on experience from overseas that a commercial, corporatized approach leads to a corporate culture that looks out for users’ interest in greater efficiency.

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## E. Proposed Governance for U.S. ATC Corporation

### 1. *Alternative Models*

Given that air traffic control is and will remain a monopoly within a specific geographical area, there are three alternative ways in which the United States could set up a corporate entity to take over this service. The first is a *government corporation*, as in Australia, Germany, New Zealand, and other countries (and as proposed by the Clinton Administration and DOT in 1994-95 with the proposed United States Air Traffic Services Corporation—USATS). The shift from direct government provision of ATC to provision by a commercialized government corporation, paid directly by users, appears to have produced significant improvements in the performance of the ATC systems of those countries where this change has been made.

The second alternative is a *nonprofit, stakeholder-controlled corporation*, in which users are guaranteed seats on the board of directors—as in Canada and (to some extent) in Switzerland and Thailand. This approach has a strong precedent in the example of Aeronautical Radio, Inc. (ARINC), the nonprofit corporation created by U.S. airlines in 1929 to provide air-to-ground radio communications services and fledgling air traffic control services. The federal government took over ARINC’s ATC functions in 1936, but the company continued to develop as a telecommunications and information-services provider to the airlines. In this role, it continues to be both nonprofit and stakeholder-controlled. The National Performance Review (NPR) proposed a variant of this model for ATC in 1993. Drawing on the model of user cooperatives in oil and gas pipelines, electricity transmission, and deepwater port operations, the NPR’s Wayne Leiss termed this approach a “competitive joint venture.”<sup>3</sup> Leiss argued that the fee-paying customers, working via the board of directors, “have the same incentive to reduce costs as owners trying to make a profit.” Thus far, this approach seems to be working in the case of Nav Canada. There are several other precedents for this kind of stakeholder-controlled nonprofit in the transportation field. One example is terminal railroads, which provide switching and interchange services among several railroads in major urban areas. Another example is airport fueling system cooperatives such as LAXFuel.

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<sup>3</sup> Wayne Leiss, National Performance Review, presentation at Air Traffic Control Association annual meeting, Washington, DC, October 26, 1993.

The third approach is a *private, for-profit company* analogous to an investor-owned public utility. This approach takes full advantage of the powerful incentives for efficiency and responsiveness to customers inherent in our free-market system. Investors in modernizing a for-profit ATC corporation would have a very real stake in the modernization's succeeding, in order to make a return on their investment. There are two variants of the for-profit model. The government could enter into a long-term contractual (franchise) arrangement with a private firm (as has occurred in some Mideast and Caribbean countries) to operate and modernize the existing ATC system. In this case, protection from monopoly pricing would occur via enforcement of the provisions of the franchise agreement.

Alternatively, the government could sell the existing system and then regulate the resulting for-profit, shareholder-owned company similar to the way in which state governments have traditionally regulated investor-owned electricity, water, and telephone companies. This latter approach is being pursued by the current U.K. Labor government, which is seeking to sell 51 percent of the shares of NATS (the existing commercialized government ATC corporation) to investors. This plan has proved controversial. In February 2000, the House of Commons Environment, Transport and Regional Affairs Committee rejected this approach and instead recommended the Nav Canada model. The government defended its approach in an April 2000 report, which led to a site visit to Canada by Lord Brett in August 2000 and a defense by Lord Brett of the nonprofit, stakeholder model. The Labor government finally prevailed in November 2000, despite negative votes by 60 of its own members of Parliament.

## ***2. Political Feasibility Assessment***

Of the three alternatives, a government corporation would likely have fairly broad appeal in Congress. It could be seen as a revamped version of the Clinton Administration's USATS proposal, which has roots in the National Performance Review, or as a significant refinement of the performance-based organization (PBO) approach to ATC (as proposed by the National Civil Aviation Review Commission and endorsed by President Clinton's December 2000 executive order). It would also be the easiest alternative for the ATC unions to support (and NATCA is on record in support of USATS). It would probably be seen as the least-bad alternative by those currently opposed to commercialization across the board, including some low-fare and new-entrant airlines and most or all of the general aviation organizations. On the other hand, a government corporation is less likely to garner support from those members of Congress who are more inclined toward smaller government and privatization. Because of the generally poor performance of such existing government corporations as Amtrak, the Postal Service, and the Tennessee Valley Authority, it would be hard for some legislators to endorse what could be portrayed as a "flying Amtrak" (which term was applied by some members to the original USATS proposal).

The nonprofit, stakeholder-controlled corporation (the Nav Canada model) has a lot to recommend it. During 1999 and 2000, both the White House National Economic Council and the National Partnership for Reinventing Government (the former National Performance Review) expressed serious interest in this model. It is consistent with many recent ideas on reinventing government. This approach has also been incorporated in previous draft ATC commercialization bills by Reps. Joe Barton and John Kasich, as well as a draft Senate bill in 2000. It may be a somewhat harder sell with the unions than a government corporation, but it offers the advantage of giving them explicit representation on the board of directors—a benefit not available to the unions of Amtrak or the Postal Service. On the other hand, it may be a more difficult sell with low-fare carriers and general aviation, who appear to be more comfortable with the government retaining ownership, due to their concern about large-airline dominance of a user-controlled corporation.

The third approach—a for-profit ATC corporation—has initial appeal to market-oriented members of Congress. And indeed, as the generally excellent performance of U.S. investor-owned utilities suggests, in principle it has much to recommend it. However, in terms of political feasibility, this approach has several major drawbacks. First, it is anathema to the ATC unions, as evidenced by recent statements from the leadership of the National Air Traffic Controllers Association (NATCA). Second, it will be uncomfortable, ideologically, for many members of Congress to support. And third, a for-profit ATC corporation proposal invites criticism along the lines of “profits vs. safety.” While a red-herring in fact (since the airlines themselves are all for-profit companies), this kind of emotional issue could be a huge obstacle to achieving the goal of a user-responsive ATC corporation. Furthermore, in contrast to the growing track record of truly commercial ATC corporations like Airways Corp. of New Zealand and Nav Canada, the world’s actual experience with private, for-profit ATC is very limited—mostly in small Caribbean and Middle Eastern countries with low air traffic levels (and at low-traffic, Level 1 towers in the United States operated by private firms). Thus, the powerful empirical evidence that ATC commercialization works well (in the case of the first two approaches) would be only minimally available in support of this third approach.

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On balance, then, while the commercial incentives toward innovation and efficiency would likely be greater with a for-profit approach, the difficulty of getting such a proposal through Congress makes this alternative problematic. On the other hand, the government corporation approach appears less likely to deliver the strong efficiency gains and a user-friendly corporate culture. We conclude that the nonprofit, stakeholder-board model offers the best balance of features (including political feasibility) for transforming air traffic control.

### ***3. The Stakeholder-controlled Nonprofit Model***

As noted previously, there is a strong U.S. precedent for this approach to dealing with shared-use infrastructure facilities, including pipelines, electricity transmission systems, port operations, and aircraft refueling systems. But most striking is its previous use in air traffic control itself, via ARINC. This nonprofit joint venture was set up by U.S. airlines in 1929 to provide communications and navigation services on a shared-use basis. In 1935-36, ARINC created the first ATC centers, whose services were paid for on the basis of transaction fees by the users.<sup>4</sup> In a Depression-era bid to help the struggling airlines, the federal Bureau of Air Commerce took over responsibility for ATC services in mid-1936, which were subsequently provided at no direct charge. ARINC continued and expanded its air-to-ground communications services, developed telecommunications services to link airline computer systems, and expanded into a major role in setting standards for avionics. It also contracts with the FAA to provide ATC communications for international flights. After World War II ARINC helped to set up similar private, nonprofit ATC corporations in Mexico (RAMSA) and Cuba (RACSA), both of which were subsequently nationalized. But both of these near-

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<sup>4</sup> Paul Goldsborough, *A History of Aeronautical Radio, Inc. from 1929 to 1942* (Annapolis, MD: Aeronautical Radio, Inc., July 2, 1951)[unpublished manuscript in ARINC corporate archives].

neighbor countries had user-funded, private nonprofit ATC corporations for several decades (until 1960 in the case of Cuba and until 1978 in the case of Mexico).

Today, of course, Canada provides the cutting-edge model with Nav Canada. It was created by legislation enacted in 1996, which was the culmination of several years of research and advocacy by Canadian airlines and other aviation user groups—including airline pilots, business aircraft owners, and other general aviation interests.<sup>5</sup> The transfer took place in November 1996, when Nav Canada completed its initial financing and purchased the ATC system from the Canadian government. Charges for ATC services were introduced over a two-year period, during which time the existing ticket tax was phased out. A detailed article in the *New York Times* reviewed the results of Nav Canada’s first two and a half years.<sup>6</sup> In that time period, NavCanada achieved the following results:

- Productivity increased from 258 flights per employee to 341 (32%);
- Airline costs decreased from \$528 million to \$355 million (33%);
- The average controller salary increased from \$43,316 to \$57,530 (33%); and
- Total employees decreased from 6,300 to 5,400 (14%), via reductions in management and administrative staff, *not* controllers or technicians.

Technological modernization has been accelerated, in part by making greater use of off-the-shelf systems and in part by streamlining procurement. While Nav Canada’s initial four years of operations are a short period, these early indicators are very positive.

#### **4. Proposed Management and Board Structure**

The proposed ATC Corporation would have its powers vested in a board of directors representing the principal aviation stakeholders, as spelled out in its corporate charter, enacted by Congress as federal legislation. This board would hire a chief executive officer, who would have the normal powers and duties of a corporate CEO. The CEO, in turn, would assemble and supervise the management team.

Of critical importance is the structure and composition of the corporation’s board. It must represent the major aviation interest groups with a stake in air traffic control, but at the same time must provide the basis for reaching consensus on crucial matters such as fees and charges—which affect different groups differently. Nav Canada seeks to do this by designating half of board seats to be appointed by designated aviation stakeholders, but with these members then having to agree on a set of at-large directors. This appears to be a good model, which will be adapted to the proposed ATC Corporation.

The proposed board composition would be as follows:

- Four directors representing airlines, as follows: one from the major airlines, one from the regional airlines, one from low-fare/national airlines, and one from cargo airlines;

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<sup>5</sup> Robert W. Poole, Jr. and Viggo Butler, *Reinventing Air Traffic Control: A New Blueprint for a Better System*, Policy Study No. 206 (Los Angeles: Reason Public Policy Institute, May 1996), pp. 5-9.

<sup>6</sup> Matthew L. Wald, “Canada’s Private Control Towers,” *New York Times* (October 23, 1999).

- Three directors representing general aviation, as follows: one from business/corporate aviation (e.g., users belonging to NBAA), one from recreational aviation (e.g., users belonging to AOPA), and one representing the air-taxi and fractional-ownership segment (e.g., users belonging to NATA);
- One director representing airports at which ATC services are provided;
- One director representing ATC employee groups; and
- Two directors representing the federal government in its capacity as a user of the ATC system (and major funder of general aviation’s use of the system), specifically designees of the Secretaries of Defense and Transportation.

These 11 directors would be selected by the organizations representing the stakeholder groups in question. The individual board members should not hold any current employment position with any aviation company or organization while serving on the ATC Corporation’s board. They would have a fiduciary duty to the ATC Corporation, not to the stakeholder organization that appointed them. The 11 stakeholder directors would select three or more independent, at-large directors representing the flying public. And those 14 directors would select the CEO (who would also be a director).

This proposed structure has been created to ensure that all significant stakeholders have a place at the table—but without any one group or likely combination of groups being able to dominate the board’s decision-making. The four airline seats represent four quite different segments of the industry, with distinctly different interests and concerns. The same is true of the three different segments of general aviation. Those concerned that airlines would dominate the corporation’s decision-making should note that the various airline organizations would appoint just four out of 15 board seats—even though airlines represent the majority of ATC usage and pay (and would continue to pay) about three-quarters of the system’s costs. General aviation would have three seats (20 percent) while continuing to pay less than 6 percent of the system’s costs. In addition, the requirement that the aviation stakeholder board members agree on three independent outside directors is intended to provide an incentive for the board to find common ground on policies that will be in the interest of aviation overall—as opposed to the narrow interests of just a segment of aviation. Further safeguards against manipulation or domination are discussed in the following subsection.

### ***5. Relationship with Federal Government***

The ATC Corporation would be a federally chartered not-for-profit corporation, incorporated in the District of Columbia (as was Comsat).<sup>7</sup> This section proposes how the corporation would relate to four federal entities: the FAA, the Department of Transportation, the Treasury, and Congress.

#### **a. Federal Aviation Administration**

Creating the ATC Corporation would remove the current Air Traffic Services functions and staff from the FAA. The agency would thereafter continue to have two major functions: grant-making and safety regulation. As far as the new ATC Corporation is concerned, its primary relationship with the FAA would be with the Regulation and Certification branch. This would be directly parallel with the relationship in other countries between their commercialized ATC corporations and their transport ministries. The latter typically serves as

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<sup>7</sup> Anthony Michael Tedeschi, *Live Via Satellite: The Story of COMSAT and the Technology that Changed World Communication* (Washington, D.C.: Acropolis Books Ltd., 1989).

the arms-length safety regulator of the ATC corporation. This change puts the ATC service provider on the same basis—vis-a-vis safety regulation—as the other participants in the aviation system: airlines, private planes, airports, airframe manufacturers, repair stations, etc. Each is regulated at arms-length by the FAA today; under the status quo, the ATC provider organization is the only component of the system which is not at arms-length from the safety regulator. Creating this arms-length relationship has been one of the explicit goals of ATC corporatization in many of the countries that have carried out this reform; indeed, the director-general of the International Air Transport Association has stated that, “We have consistently argued that the regulatory and service provision activities must be separated.”<sup>8</sup> This change would be a significant enhancement to U.S. air safety, permitting the FAA to focus more clearly on safety oversight of aviation.

Under current FAA operations, certain Federal Air Regulations (FARs) are promulgated by the Associate Administrator for Air Traffic Services, while others are the responsibility of Regulation and Certification. The question of which rule-making authority should reside with an ATC corporation and which with the remaining FAA was addressed in a 1985 report prepared for the Air Transport Association.<sup>9</sup> The authors concluded that several alternative allocations of the rule-making authority would be workable, but recommended that the corporation be responsible for those rules that identify what airspace is within the system and that FAA Regulation and Certification be responsible for all others. Implementing such a clear-cut separation, they concluded, “would eliminate much of the confusion that exists today as to which organization [within FAA] is responsible for the various aviation rules.”<sup>10</sup>

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The International Air Transport Association has consistently argued that regulatory and service provision activities must be separated.

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#### b. Department of Transportation

While safety regulation is the province of the FAA, there is also the question of economic oversight or regulation. Since the stakeholder board concept is intended to promote a balanced, consensus approach to pricing and service issues, there should not be a need for traditional, hands-on public utility type regulation. But as noted previously, most countries that have corporatized ATC do provide for some sort of oversight/appeal process concerning proposed fee increases and service cutbacks. This oversight/appeal function is usually the province of the transport ministry. In the U.S. context, this appeal/oversight function could be handled at the outset by the Office of the Secretary of Transportation (OST). If the stakeholder board approach works as intended to minimize conflict, appeals to OST should be infrequent. If that turns out to be an overly optimistic assessment, a more formalized review body analogous to the Surface Transportation Board (the successor to the Interstate Commerce Commission, which handles appeals from “captive shippers”) could be created within DOT. In addition, the enabling legislation creating the ATC Corporation could include charging principles and notice requirements analogous to those in the Nav Canada enabling legislation.

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<sup>8</sup> Pierre J. Jeannot, quoted in “IATA Supports NATS Privatisation,” *CANSO News*, No. 2 (September 2000), p. 5. In addition, a position paper on the separation of ATC service provision from air safety regulation may be found on the CANSO web site, [www.canso.org](http://www.canso.org).

<sup>9</sup> Raymond G. Balanger and Charles H. Newpol, *A Study of the Safety/Regulatory Functions of the Air Traffic Control System* (Washington, D.C.: Air Transport Association, September 1985).

<sup>10</sup> *Ibid.*

### c. Treasury

One of the major virtues of a commercialized ATC corporation is its ability to issue long-term revenue bonds, based on a predictable revenue stream from fees and charges. Experience in other countries has shown that such corporations are relatively easy for the capital markets to finance. There is no need for government funding or guarantees. In fact, there is a respectable argument that the corporation should have neither access to Treasury borrowing nor any form of government guarantee of its debt.

One of the principal goals of this reform is to create a truly commercial corporate culture, not a “flying Amtrak.” Access to Treasury lending works against the creation of that kind of commercial discipline, for several reasons. Treasury interest rates will generally be lower than market rates, creating a de-facto subsidy for the corporation. Revenue bonds issued by the corporation will have to meet a more stringent market test if they must be sold to investors in the private capital markets. This will provide a more rigorous focus within the corporation on developing cost-effective capital improvements.

We have good evidence that fully commercial financing is feasible, because it has worked in Canada, Germany, and other countries with corporatized ATC systems. The legal monopoly on ATC services granted by the enabling legislation, combined with the projected steady growth in air travel, will make it feasible for the debt instruments of the ATC Corporation to be investment grade—as occurred with Nav Canada. The new corporation should have little difficulty financing a cost-effective modernization to implement satellite-based air traffic control technology in the United States.

There is also the question of an *implied* government guarantee of the corporation’s bonds. In New Zealand, the Treasury requires lenders to complete an acknowledgement stating that they recognize that there is no sovereign guarantee involved. By contrast, in Australia the Treasury acknowledges such a guarantee, but charges Airservices Australia a premium of around 30 basis points on all private-sector borrowings, to make this point explicit.

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Revenue bonds issued by the ATC corporation will have to meet a more stringent market test if they must be sold to investors in the private capital markets.

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### d. Congress

The greatest tension in crafting enabling legislation will be the understandable desire of many in Congress to remain in the loop after the corporation is created. Yet if there is one lesson to be learned from the experience of the nearly two dozen countries that have corporatized ATC, it is that removing this vital service business from direct legislative oversight (which often becomes, de-facto, micromanagement) is essential.

The purpose of the proposed reform is to change the corporate culture of the ATC service provider. What does this mean? In plain English, it means shifting from a bureaucratic culture in which the de-facto customer is Congress to an entrepreneurial culture in which the customers are the aviation users. That is why the most critical element of the proposal is changing the payment nexus. Instead of funds flowing from users to Congress (via taxation), and then (in an entirely separate appropriations process) to the ATC provider, funds will flow directly from users to the ATC provider. In Canada, the watchword of ATC reform was “user pay means user say.” It is the users who will provide the direct oversight, as customers and as board members. It

is appropriate for Congress to provide oversight when it is the Congress that is appropriating the funds; it is not appropriate when these funds are going directly to a user-controlled service provider.

Some will agree with the general thrust of this argument but will propose that the oversight/appeal function proposed above to be carried out by OST be given, instead, to Congress's respective aviation subcommittees, which have oversight responsibilities for DOT and FAA. But to have these subcommittees carry out this function would inevitably politicize these decisions, imposing on the corporation the kinds of uncertainty and time commitments by senior people that corporatization is intended eliminate. It would be better to lodge the oversight/appeal function within a small, professional DOT staff function following objective rules than to subject it to the vagaries of the political process. Congress would still retain its overall oversight of DOT and FAA. If it disagreed with the way in which FAA carried out its safety regulation of the ATC Corporation or disagreed with the way OST handled appeals of ATC charges, it could deal with these matters as part of this general oversight, rather than by attempting to micromanage the individual decisions.

## **6. Competition vs. Monopoly**

There remain concerns within some elements of the aviation community over the monopoly nature of a proposed ATC corporation. Some fear that a single, nationwide ATC corporation—facing no competition—would have little incentive to be efficient and would therefore end up being little better than the current FAA's Air Traffic Services branch. There are good reasons to believe this is an unrealistic fear.

First, there is the matter of incentives. Wayne Leiss of NPR has argued that a user co-op or, as he terms it,

*. . . a competitive joint venture achieves the same efficiency as competition, but in a monopoly market. The fee-paying customers, working through the board of directors, have the same incentive to reduce costs as owners trying to make a profit. . . . The key is the election of the board of directors by the fee-paying customers. They are the only ones with incentives for efficiency, as they are the ones paying for inefficiency. Politically appointed directors, while earnest in their intentions, do not share in these incentives.<sup>11</sup>*

It is not clear that stakeholder board members (with their disparate interests) will have as strong an incentive for cost-efficiency and service excellence as the board members of a typical for-profit corporation. On the other hand, we have the empirical evidence from Australia, Canada, Germany, and New Zealand, where costs and ATC charges have been reduced in the years following corporatization. This is no longer simply a matter of theory. We have actual, hands-on evidence that a commercial, corporatized approach leads to a corporate culture that looks out for users' interest in greater efficiency.

Some have argued that, given the sheer size of the United States, it might be worth considering some form of geographical division of the current ATC system into more than one corporation, each serving a different region. But the overhead costs of a number of ATC corporations would almost certainly be greater than the overhead costs of a single, national ATC Corporation. And the FAA's regulatory burden in dealing with a number of them, and ensuring coordination and compatibility, would also be more complex. Furthermore, the proliferation of ATC organizations runs counter to the thrust of advancing ATC technology. The next-generation ATC system will involve a major shift—from ground-based to space-based navigation systems and

<sup>11</sup> Leiss, National Performance Review.

from center-based to cockpit-based information. This trend calls into question the need to continue with 21 en-route centers in the next generation. Already, flow control is managed on a national basis from a single FAA center in Herndon, Virginia. While complete centralization of en-route ATC into a single center would be unwise (at the very least, for redundancy reasons), its consolidation into a far smaller number of centers is probable over the coming decade. That would argue against the proliferation of ATC provider organizations.

Another way of introducing competition might be to devolve the responsibility for airport ATC functions to individual airports, as is the practice in the corporatized systems of New Zealand, Switzerland, and the United Kingdom. British airports can carry out their ATC responsibilities in any of three ways: they may operate the tower themselves (as did Luton airport, north of London, until late-2000); they may contract with NATS (the corporatized national ATC provider); or they may contract with a private firm. U.K. controllers who work for an airport or a private firm are licensed by the Civil Aeronautics Authority (the equivalent of our FAA) and must meet the same standards as NATS controllers. The CAA regulates all towers on the same arms-length basis. A limited version of this model already exists in the United States, with the contract-tower program under which private firms operate 178 Level 1 and 20 Level II VFR control towers. Contract-tower controllers must be FAA-certified before they begin controlling traffic.

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Another way of introducing competition might be to devolve the responsibility for airport ATC functions to individual airports.

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If this model were more widely applied in the United States, airports and their towers would still be regulated for safety by the FAA, regardless of who operated them. Initially, all airports might choose to continue using the new ATC Corporation for tower operations. (Neither the major U.K. privatized airports nor the privatized airports in New Zealand have exercised their option to take over local ATC.) But the *option* of purchasing their tower and landing aids and hiring their FAA-certified controllers away from the ATC Corporation would always be there. It could be a useful force to help ensure that the corporation kept its airport ATC operations up-to-date technically, its costs reasonable, and its expansion in pace with each airport's needs. (Indeed, observers report such pressures in both New Zealand and the U.K.) Both domestic and global ATC tower-operating firms would market their services to airports, keeping them aware that they had a potentially more cost-effective alternative.

One major drawback of this approach is opposition from the controllers' union. They have strongly opposed the current contract-tower program and its proposed expansion to more Level II and Level III towers; they would be even more opposed to the possibility of all other towers being subject to possible private-sector operation. When NATCA opposes ATC "privatization," what its spokespersons mean is operation of the system (or portions thereof) by private, for-profit firms. They have not opposed the idea of a USATS-type government corporation, and they might be able to support a stakeholder-controlled nonprofit. Since bringing about ATC commercialization will require the support of most or all of the key stakeholders, the inclusion of what the unions could characterize as "a huge expansion of the contract-tower program" might be counterproductive. Yet that characterization is not correct. The current contract-tower program *mandates* that the towers in a given category be outsourced. What is being considered here is simply to give all airports the *option* of taking over their towers. While this option might well remain unexercised (as is largely the case in the United Kingdom and New Zealand), its very existence could have powerful incentive effects on the ATC Corporation's tower operations.

## Part 2

# ATC Fees and Charges

## A. Rationale for Pricing ATC Services

Inherent in ATC commercialization is the idea that users should pay the corporation for specific ATC services received. At the most fundamental level, this change from today's excise tax system is intended to create a meaningful customer-provider relationship, leading to a fundamentally different kind of corporate culture than exists within today's FAA Air Traffic Services organization.

Some degree of consensus has emerged within aviation circles on the importance of charging for ATC services. Recent advocates have included the National Commission to Promote a Strong Competitive Airline Industry, the National Performance Review, the DOT (OST) Executive Oversight Committee which developed the 1994 USATS proposal, the National Civil Aviation Review Commission (NCARC), and the National Research Council's 1999 report on airline competition. As the well-respected 1997 NCARC report pointed out, under the current FAA provision of ATC services, "customers pay for the system, but current payments bear little relationship to the particular facilities and services they actually use and whether they actually use them at busy or slack times."<sup>12</sup> In setting forth the benefits of moving to a system of "charges that reflect the costs of providing air traffic control services," NCARC emphasized the following benefits:

- The ATC provider and its customers would receive better information about where new investment was most needed;
- The ATC provider would have better information about its performance; and
- There would be revenue and pricing effects to the extent that customers adjust their behavior—e.g., shifting some operations to lower-priced times or locations—which could reduce system costs and/or increase system capacity.

Unfortunately, NCARC's actual pricing proposal would not produce these benefits. First, while changed behavior in response to pricing signals is repeatedly stressed as one of the benefits to be gained, NCARC recommends excluding from the pricing system those users likely to be the most price-sensitive—specifically commuters, air taxis, and general aviation. A detailed simulation model of the effects of peak pricing of landings and take-offs at a typical congested hub airport (Minneapolis-St. Paul) found that it was precisely these groups that would be most likely to take advantage of lower off-peak charges, thereby reducing peak-

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<sup>12</sup> National Civil Aviation Review Commission, *Avoiding Aviation Gridlock & Reducing the Accident Rate* (Washington, DC: December 1997), p. II-27.

period congestion and making better overall use of airfield capacity.<sup>13</sup> The categorical exclusion of significant groups of airspace users from a pricing system tends to defeat one of its major purposes.

The second problem is the difference between accounting costs and economic costs. NCARC continually refers to its proposed system as being cost-based. And to be sure, any business that charges fees for the use of its services must take into account the costs of those services as it goes about developing and fine-tuning its pricing structure. But NCARC then goes on to say that a “true cost-based system” should also take into account such “critical” factors as “time of day when the flight occurs and the level of congestion in the airports and airspace utilized.”<sup>14</sup> These are what economists refer to as costs, but they are not necessarily expenditures that are measurable by an accounting system. When airlines and members of Congress have talked about a cost-based system, however, they have usually been referring only to accounting costs, of the kinds that were estimated in the FAA’s FY 1991 Cost Allocation Study and which are expected to emerge from the ongoing development of an FAA cost-accounting system. But economists’ use of the term “cost” is broader, including such factors as the value of time savings and the cost of delays at the overall system level. It is only in terms of the latter, broader definition that an ATC corporation could develop a pricing system that approached the kinds of “market prices” NCARC praises.

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The shift from excise taxes to user fees is intended to create a meaningful customer-provider relationship, leading to a different kind of corporate culture within air traffic control.

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In legal terms, today’s FAA (like other government agencies) is not permitted to charge fees based on anything other than accounting costs. The FAA’s 1995 Cost Allocation Study provided a first attempt at an economic allocation of costs, which helped provide the basis for the agency’s first-ever overflight fees. But a federal appeals court decision in 1998 invalidated those 1997 overflight fees, because they were not based strictly on accounting costs, as required of government agencies and government corporations by the Independent Offices Appropriations Act. This restriction would carry over to a government ATC corporation, unless the enabling legislation specifically authorized different charging principles. But it would not restrict the pricing policies of a not-for-profit ATC corporation of the kind recommended in Part 1.

A third problem is that ATC pricing based on a strict application of accounting costs would produce huge changes in the fraction of ATC costs paid by various groups of users. The present system of aviation excise taxes, whose total receipts approximately equal the cost of the ATC system, includes large cross-subsidies among aviation users, whose magnitudes depend critically upon the allocation method chosen. Table 1 presents the results of three different cost-allocation studies of FAA Air Traffic Services costs. As can be seen, in general airlines are paying at least as much as their costs (if not more so), while general aviation is paying far less than its costs to the system. Even within the airline industry, the incidence of costs varies among carriers. Those who advocate a pricing system based strictly on average allocated accounting costs are implicitly proposing major shifts in cost responsibility among industry segments—which many would view as politically unrealistic and hence dooming any ATC commercialization based on this kind of pricing. They also ignore the fact that existing aviation taxes are not cost-based, either.

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<sup>13</sup> Joseph I. Daniel, *Distributional Consequences of Airport Congestion Pricing*, Working Paper No. 98-03 (Newark, Delaware: University of Delaware, January 1998).

<sup>14</sup> National Civil Aviation Review Commission, *Avoiding Aviation Gridlock*, p. II-29.

Table 1: ATC Allocated Costs vs. User-Tax Revenue (\$M)									
User Group	1985 Study <sup>15</sup>			1991 Study <sup>16</sup>			1995 Study <sup>17</sup>		
	Cost	Revenue	%	Cost	Revenue	%	Cost	Revenue	%
Domestic jet	2176	2419	111	3300	4123	125	2231	4324	194
International	121	108	89	189	217	115	187	221	118
Cargo	123	134	109	171	222	130	479	361	75
Commuter	<u>713</u>	<u>90</u>	<u>13</u>	<u>1361</u>	<u>217</u>	<u>16</u>	<u>1068</u>	<u>418</u>	<u>39</u>
Subtotal: airline	3133	2751	88	5021	4779	95	3965	5324	134
Air taxi	132	13	10	216	20	9	367		
GA piston	683	24	3	1009	37	4	1121		
GA turbine	520	61	12	817	95	12	474		
Rotor	<u>64</u>	<u>3</u>	<u>5</u>	<u>101</u>	<u>5</u>	<u>5</u>	<u>75</u>		
Subtotal: GA	1399	100	7	2143	157	7	2037	199	10
Military/Govt	704	0	0	923	0	0	270	0	0
Int'l overflights	NA	0	0	NA	0	0	35	0	0
TOTAL:	5236	2851	54	8137	4936	61	6307	5523	88

## B. Charging Practices Overseas

Nearly all of the world's developed countries charge for ATC services, whether or not they have commercialized their ATC systems. The International Civil Aviation Organization (ICAO) has long-established standards for such charges. ICAO standards call for charges for three flight regimes: terminal-area (landings and takeoffs), en-route, and overflight. ICAO states flatly that, "Only distance flown and aircraft weight are recommended . . . as parameters suitable for use in a charging system."<sup>18</sup>

There are two reasons for the nearly universal adoption of weight-distance formulas. First, the parameters are readily available for each flight; both the distance from the take-off airport to the landing airport and the maximum gross takeoff weight of a particular aircraft are well known and already are incorporated into computer-based flight plans for use in billing. Hence, the administrative costs, both to customers and to the ATC provider, are very low. Second, weight and distance bear some relationship to both cost and value of service—though admittedly only a crude approximation. Distance flown is roughly proportional to the extent of contact with ATC in both overflight and en-route (domestic) regimes. Weight is universally used as the basis for airport landing charges, in part because it is related to ability/willingness to pay—which in turn is related to the value of the service provided; i.e., a fully loaded 747 presumably receives more value from landing on time at JFK than does a Twin Otter. (Weight is also related to needed runway strength, extent of fire/rescue needs, and terminal size.)

<sup>15</sup> Daniel E. Taylor, *Allocation of Federal Airport and Airway Costs for FY 1985* (Washington, DC: FAA Office of Aviation Policy & Plans, 1986).

<sup>16</sup> Daniel E. Taylor, *Allocation and Recovery of Federal Airport and Airway Costs* (Washington, DC: FAA Office of Aviation Policy & Plans, FAA/APO, 91-4, February 1992).

<sup>17</sup> GRA, Incorporated, *A Cost Allocation Study of the FAA's FY 1995 Costs* (Washington, DC: FAA Office of Aviation Policy & Plans, March 1997).

<sup>18</sup> International Civil Aviation Organization, *Manual on Route Air Navigation Facility Economics* (Montreal, Canada, 1986), p. 26.

The coalition of airlines, business aviation, and other parties that developed Nav Canada reviewed the ATC pricing systems in Australia, Germany, Ireland, New Zealand, South Africa, Switzerland, and the United Kingdom. All charge for overflight, en-route, and terminal-area ATC services, and all use some variant of the ICAO weight-distance principles.<sup>19</sup> Based on this experience, they decided to adopt a weight-distance system for Nav Canada.

Nav Canada's system has been in full operation since March 1, 1999. The basic weight-distance formula applies to all jet aircraft over three metric tonnes. Aircraft weighing less than this amount pay a single annual charge for access to the system (C\$60 if less than two tonnes and C\$200 if between two and three tonnes). And propeller aircraft over three metric tonnes pay daily charges each time they use the system, on a sliding scale based on weight (though they have the option of paying the en-route and terminal charges applicable to jet aircraft, if they prefer). Furthermore, if such a propeller aircraft is used exclusively for recreational purposes, its fee is a flat C\$60 per year, regardless of weight.

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The present system of aviation excise taxes includes large cross-subsidies among aviation users.

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### C. Pricing System Criteria

What criteria should be used to develop the pricing system for a U.S. ATC corporation? Drawing on international experience, recent U.S. studies on ATC restructuring, and the reality of considerable resistance to direct charges in certain quarters, the following criteria are suggested:

- **Simplicity:** The charges must be easy to compute, use readily available information, and have a low cost of collection and administration;
- **Safety:** Charges should not be structured in such a way as to deter some users from making use of needed ATC services (e.g., weather briefings);
- **Efficiency:** Charges should encourage users to take into account the cost of providing particular ATC services, when deciding when, whether, and how much of those services to use;
- **Equity:** Two identical flights should pay the same—e.g., two B-737-300s flying between Miami and Philadelphia at the same time of day.
- **Investment signals:** The pricing system should indicate to the ATC corporation where additional (or fewer) resources are needed in the system;
- **Fairness:** On one hand, fairness argues for a long-term goal of people paying only for what they use (i.e., the eventual elimination of cross-subsidies). On the other hand, the principle of fairness must also recognize the element of willingness to pay—the principle on which airline ticket pricing systems are based.

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<sup>19</sup> Transport Canada Aviation, *International Experiences of ANS Commercialization*, Discussion Paper No. 4, (Ottawa, Canada, 1995).

- **No double payment:** The proposed fees and charges should replace the current aviation excise taxes, not add to or supplement them.
- **Political feasibility:** A feasible reform plan must be able to pass both houses of Congress and be signed into law by the President. Hence, it must be acceptable to a broad range of aviation interests—which implies that it not drastically change the share of cost responsibility of each major segment of aviation.

There are obvious tensions among these various criteria, requiring trade-offs in the development of a workable fees and charges concept. The kind of detailed, finely grained marginal-cost-based pricing systems desired by many economists would fail the tests of simplicity, safety, and feasibility. A system based strictly on allocated accounting costs would likewise fall short on simplicity, safety, fairness, and feasibility. An across-the-board fuel tax would be simple, but would fail the efficiency, investment, and (probably) feasibility criteria. Our strong preference is for an adaptation of the Nav Canada approach, in which a pricing system based on weight and distance is applied to all jet aircraft, with piston and turboprop aircraft paying annual or daily fees. A quantitative assessment of one such system is presented in subsection D, below, after which it is assessed against the above criteria.

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Nearly all the world's developed countries charge for ATC services, whether or not they have commercialized their ATC systems.

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## D. Proposed Pricing System

The pricing system proposed here is based on charging for en-route and overflight services on the basis of weight and distance, and for terminal-area (landing and take-off) services on the basis of weight, modified by a congestion factor for operations at heavily congested airports during congested hours. (Small, noncommercial planes would pay an annual fee rather than per-transaction fees.) This overall approach is consistent with the ICAO principles and the actual practice of other developed countries, including Canada and Europe. The proposed pricing system would replace all current aviation excise taxes, including the current airline segment fees and the fuel taxes on both commercial and general aviation (except for retention of a small portion of the airline ticket tax and cargo waybill tax to fund AIP, as discussed in subsection F). It is aimed at recovering the cost of operating and maintaining the entire ATC system, except for Flight Service Stations, which are considered a safety function that should not be directly charged for (as discussed in subsection F).

Specifically, the proposed system would use the square root of maximum gross takeoff weight, following Nav Canada's current practice. It would use the great-circle distance between each originating airport and each destination airport as the measure of distance. In addition, terminal charges would include a factor that differentiates between major airports that are heavily congested during the hours of day when they are considered congested. Thus, terminal charges would be higher at those airports than at others, during the congested portion of the 24-hour day.

Let us review the proposed system in light of the eight principles set forth in the previous subsection.

**Simplicity.** Three factors are needed to compute the charges for each flight segment: the aircraft's maximum gross takeoff weight, the great-circle distance between the departure and arrival airport, and whether or not each of these airports is a heavily congested airport (and whether the departure or arrival time falls within its congested period). Each of these factors is known in advance of the flight and would be part of the flight-plan software. Since flight plans would be filed with the ATC corporation, billing would simply require extracting this information from each flight plan filed by a particular operator and applying the weight-distance formula to it.

**Safety Implications.** The principal safety concern raised by pricing opponents is that a system that charged GA pilots directly for nonmandated Flight Service Station (FSS) services such as weather briefings, flight-plan filings, etc., might cause some of them to avoid such services, with detrimental safety consequences. Although no published estimates of the possible extent of such impacts exists, this could be the kind of emotional issue that has the potential to defeat ATC commercialization. Hence, it seems wiser to exempt FSS functions from fees and charges. (How to cover FSS costs is discussed in subsection F.)

**Efficiency.** The proposed system would represent a significant change from the present indirect method of user funding, in that it would relate the provision of ATC services, in each phase of flight, to charges based on that phase of flight. It would reflect the fact that the majority of ATC costs occur in the terminal stages of flight, as opposed to en-route and overflight stages. It would reflect the fact that congested terminal areas indicate demand greater than supply, encouraging those who can to adjust their flight activity to other time periods or locations. Over time, such a system can be expected to lead to changes in user behavior which will make the overall system more efficient (i.e., more services provided per dollar spent).

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The new system would not drastically shift the cost burden from one segment of aviation to another, or from one airline segment to another.

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**Equity.** Since the charges are based on gross take-off weight and distance flown, two airline flights between point A and point B using the same aircraft type at the same time of day would pay the same ATC charge. Conversely, a flight that avoided peak-hour congestion at point B would pay somewhat less.

**Investment Signals.** The corollary of changes in behavior by users is changes in behavior by the system provider. User willingness to pay higher prices to access busy facilities at busy times signals to the ATC corporation that more capacity is needed at those places and times—and the increased revenues provide a means of paying for that capacity. This type of information is not generated by the present excise-tax system, nor does it generate the additional revenues to make capacity-increasing investments.

**Fairness.** The proposed pricing system would be a significant step toward a true pay-as-you-go system. It would charge a corporate Learjet the same amount as a Learjet serving as an air taxi and receiving the identical ATC services to go from Wichita to Santa Fe. On the other hand, the new system would not drastically shift the cost burden from one segment of aviation to another, or from one airline segment to another (as will be seen, below).

**No Double Payment.** It is critically important, as proposed here, that the new ATC fees and charges be replacements for the current aviation excise taxes, not additions to them. One of the few negative results of the transition to Nav Canada in that country has been the resentment of general aviation that they must continue to pay a fuel tax in addition to the new ATC fees, while the previous airline ticket tax has been entirely replaced by new ATC fees. But since the proposed ATC fees and charges would pay only for the new ATC corporation, other funding mechanisms must be devised for those functions which would remain with the FAA after ATC is shifted to the new corporation (as discussed in subsection F).

**Political Feasibility.** The ultimate test of the proposed fee system is whether it can pass muster with the various aviation constituencies and thereby gain sufficient support to be enacted by Congress. Our rejection of strictly accounting-cost-based pricing—and hence of the huge shifts in cost burden which such pricing would entail—is aimed at meeting this criterion. Likewise, the avoidance of pricing optional safety-related services is intended to remove that potentially contentious issue from the debate. In addition, the *substitution* of ATC fees for excise taxes is aimed at countering fears that “user fees” represent an *additional* burden on general aviation.

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The reason for the \$2 billion saving is that airlines would no longer be paying far more than the cost of the system, which historically led to a large build-up of money in the Aviation Trust Fund.

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## E. Quantitative Illustration of the Proposed Pricing System

The numerical exercise below is an attempt to illustrate, using 1998 data, a simplified version of the proposed fee structure. An important goal of this exercise is to keep the relative share of airline ATC costs more or less unchanged from their actual values under the 1998 excise tax structure. As can be seen in Table 2, as of 1998, the aviation industry altogether paid \$6.7 billion into the system. Of this total, 90.2 percent (\$6.02 billion) was paid by the 10 major passenger airlines and the six major cargo carriers. The initial analysis begins with those carriers, using the following procedure.

First, the revenue objective for the user-charge system is the 1998 budget total for the two FAA branches that would constitute the new ATC corporation: Air Traffic Services (which operates and maintains the system) and Research and Acquisitions (which makes capital improvements to it). That total is \$6.448 billion (see Table 3) For reasons discussed later, in Part 3, the Flight Service Station component should not be paid for by the airlines, so its \$532 million cost is subtracted, leaving \$5.916 billion to be paid by various users. How much of this will come from domestic airlines? To arrive at this figure, we must subtract an estimated \$35 million in international overflight fees, an estimated \$442 million in Oceanic ATC charges to international airlines, an estimated \$378 million in GA fees (see Part 3), and estimated military/government user payments of \$600 million. This leaves a total of \$4.461 billion to be paid by all domestic airline users. For the 10 major passenger airlines and six major cargo carriers, we seek to derive 90.2 percent of this amount—\$4.024 billion—from the proposed weight-distance-congestion user-charge system.

Table 2: Aviation User-tax Payments, 1998		
Industry Segment	Total Amount Paid	Percent of Total
Major Carriers		
▪ Delta	\$1,113,526,000	16.7
▪ United	992,756,000	14.9
▪ American	819,696,000	12.3
▪ US Airways	713,368,000	10.7
▪ Northwest	504,889,000	7.6
▪ Southwest	456,295,000	6.8
▪ Continental	449,548,000	6.7
▪ TWA	257,197,000	3.8
▪ America West	167,344,000	2.5
▪ Alaska	115,198,000	1.7
Subtotal: Major Carriers	\$5,589,817,000	83.8
Major Cargo Carriers	\$ 428,939,000	6.4
Subtotal:	\$6,018,756,000	90.2
National Carriers	\$ 262,125,000	3.9
All Other Carriers	\$ 211,263,000	3.2
General Aviation (fuel tax)	\$ 182,000,000	2.7
TOTAL:	\$6,674,144,000	100.0

Source: Roberts Roach & Associates analysis prepared for RPPI.

Table 3: FAA Budget, FY 1998 (\$millions)	
Air Traffic Control	
▪ Air Traffic Services	\$4,153
▪ Research & Acquisition	92
▪ Administration (1/2)	128
▪ Facilities & Equipment	1,876
▪ Research, Engineering, & Development	<u>199</u>
Subtotal, ATC	\$6,448
Other FAA	
▪ Aviation Regulation/Certification	\$ 610
▪ Security	97
▪ Airports	48
▪ Commercial Space Transportation	6
▪ Administration (1/2)	128
▪ Staff off.	73
▪ Airport Improvement Program	1,700
Subtotal, other FAA	<u>\$2,662</u>
TOTAL:	\$9,110

Source: Federal Aviation Administration Budget in Brief, Fiscal Year 2000.

That total payment is the sum of each one's departure fees, en-route fees, and arrival fees over the one-year period. For each carrier, that equals its annual number of departures (N) times the sum of what it pays in each of the three fees. Using a weight-distance formula similar to Nav Canada's,<sup>20</sup> the equation is as follows:

<sup>20</sup> This equation is taken from Richard Golaszewski, et al., "Recovering the Costs of Air Traffic Services in the United States," in Gail F. Butler and Martin R. Keller (eds.), *Handbook of Airline Finance* (New York: Aviation Week/McGraw-Hill, April 1999), pp. 456-457.

Payment =  $N \times [\text{sq. rt. of } (W/38.5)] \times (R_a + R_d + [\ln(D) \times 100 \times R_e])$ , where:

- $R_a$  is the arrival coefficient
- $R_d$  is the departure coefficient
- $R_e$  is the en-route coefficient
- $D$  is the average 1998 domestic stage length in miles
- $W$  is the fleet average maximum take-off weight in tons.

At the highest level of abstraction, this equation can be applied to the entire 16-carrier group, using industry-wide average values for all of the above parameters. Doing so, and accepting an initial value (from Golaszewski, et al.) of \$.27/mi. for  $R_e$ , we can solve for an industry-wide estimate of  $R_a + R_d$  that yields the desired total payment of \$4.024 billion. Next, we can use that value of  $R_a + R_d$  to compute the payment to be made by each of the 10 passenger carriers plus the six main cargo carriers, by using each one's average  $D$  and  $W$  for 1998. Those results are shown in Table 4. For most carriers, the change in the fraction of ATC payments each would bear is modest, in keeping with our objective of not dramatically changing the competitive position among carriers. However, two cases stand out as having much larger changes: Southwest (a 34 percent increase in its fraction) and the Major Cargo group (a 44 percent increase). This kind of differential impact would make it much more difficult to gain broad airline industry support for ATC commercialization.

	\$(M)	Percent	Previous Percent
Delta	667.4	15.0	16.7
United	611.7	13.7	14.9
American	532.5	11.9	12.3
US Airways	372.0	8.3	10.7
Northwest	368.8	8.3	7.6
Southwest	404.3	9.1	6.8
Continental	271.3	6.1	6.7
TWA	193.1	4.3	3.8
America West	104.0	2.3	2.5
Alaska	88.3	2.0	1.7
Major Cargo	410.6	9.2	6.4
TOTAL	\$4,024	90.2	90.2

Source: RPPI calculations

Hence, the next step is to take into account the different flight activity patterns of the major carriers in terminal areas—i.e., the extent to which each one uses the nation's most-congested airports (Table 5) during their busy periods. Table 6 estimates the proportion of each carrier's daily operations that land or take off from one of these airports during its congested hours. Based on that percentage, a congestion-related term has been added to the equation for each carrier. The resulting 1998 payments by each carrier, taking these new coefficients into account, are shown in Table 7. As can be seen, the fraction paid by each carrier under the new fee system differs only modestly from the fractions paid in 1998 under the then-existing excise tax system. Each carrier saves a significant sum, and in aggregate the carriers save close to \$2 billion. (The reason for this large saving is that under our proposal, airlines would no longer be paying far more than the cost of the system, which historically led to a large build-up of money in the Aviation Trust Fund.)

**Table 5: Most-Congested Airports, 1999**

Airport	Airborne Delay (min., Jan.-Nov.)
Atlanta	1,675,280
Boston	235,881
Chicago O'Hare	783,962
Cincinnati	420,174
Dallas/Ft. Worth	241,776
Denver	278,665
Minneapolis	276,013
New York—LGA	305,131
New York—Newark	250,153
Philadelphia	320,321
San Francisco	337,239

Source: Federal Aviation Administration

**Table 6: Major Carrier Use of Congested Airports During Congested Hours**

	Percent of Flights
Delta	53.9
United	50.2
American	50.2
US Airways	29.7
Northwest	36.2
Southwest	0.6
Continental	23.5
TWA	10.6
America West	0.0
Alaska	0.0
Major Cargo	0.0

Source: Official Airline Guide database (OAG Worldwide, Oak Brook, Illinois)

**Table 7: Weight-Distance-Congestion ATC Fee Payments vs. 1998 User Tax Payments**

	1998 User Taxes (\$ millions)	Percent	Revised 1998 ATC Fee Payments	Percent	Savings (\$M)
Delta	1113.5	16.7	776.5	17.4	337.0
United	992.8	14.9	696.6	15.6	296.2
American	819.7	12.3	606.2	13.6	213.5
US Airways	713.4	10.7	367.5	8.2	345.9
Northwest	504.9	7.6	382.3	8.6	122.6
Southwest	456.3	6.8	311.6	7.0	144.7
Continental	449.6	6.7	256.0	5.7	193.6
TWA	257.2	3.8	164.0	3.7	93.2
America West	167.3	2.5	80.2	1.8	87.1
Alaska	115.2	1.7	67.7	1.5	47.5
Major Cargo	428.9	6.4	315.4	7.1	113.5
TOTAL	6018.8	90.2	4024.0	90.2	1994.9

Source: RPPI calculations

## F. Paying for Other FAA Functions

Much recent congressional debate has concerned the issue of whether the FAA (all of its current functions, including ATC) should be funded entirely via user taxes or whether there should be a “general fund contribution.” Our approach, in principle, is that ATC services should be provided by an ATC corporation funded exclusively by its users. On the other hand, functions considered inherently governmental (such as safety regulation) should remain within the government (i.e., the FAA) and be funded out of general revenues. Thus, at a minimum the approximately \$0.962 billion needed in FY 98 for FAA’s safety regulation and security functions should come from the general fund, just as other federal safety regulatory agencies (CPSC, FDA, FRA, NHTSA, OSHA, etc.) are paid for by general revenues.

But this leaves two other major FAA activities up in the air: Flight Service Stations (FSS) and the airport grant program known as AIP (Airport Improvement Program). How should these be paid for? FSS is discussed in Part 3, in the context of general aviation, where a case is made that the approximately \$0.532 billion cost of this GA-oriented function should be paid for out of general revenues. That leaves AIP for discussion here.

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Inherently governmental functions such as safety regulation should remain within the government and be paid for out of general revenues.

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In recent years AIP has been funded at less than \$2 billion per year, but the most recent FAA reauthorization legislation, popularly known as AIR-21, dramatically increased that funding level to \$3.3 billion per year in 2002. We take it as a given that this new funding level must be maintained. AIP has traditionally been funded via aviation user taxes, and there appears to be no realistic prospect either of (1) replacing AIP with local airport funding or (2) paying for these grants out of general federal revenues. And since GA cannot begin to pay for AIP, that leaves only the air carriers as the remaining source of funding for this program. Our suggestion is to use a combination of international departure/arrival taxes and a residual portion of the current domestic ticket and waybill taxes to pay for AIP. We estimate that approximately one-half of the current international departure/arrival would be converted to weight-distance user fees paid to the Corporation for ATC services for international carriers. The other half would continue as a federal aviation user tax, available for AIP purposes. To this would be added the residual “AIP tax” on domestic airline tickets and cargo waybills.

Table 8 derives the amount needed for the residual AIP tax, for both our base year of 1998 and for 2002, when AIP spending reaches its maximum level. For 1998, one-half of the current international tax would produce \$442 million. Subtracting that amount from the \$1.7 billion AIP total for 1998 leaves a balance of \$1.258 billion to be funded by the residual AIP tax. The second portion of the table derives the base amounts of passenger and cargo revenue involved. The third portion uses those amounts to compute new rates for a 1.9 percent ticket tax and 1.3 percent for the AIP waybill tax, respectively.

Because Congress increased AIP substantially in AIR-21, we must also estimate what rate of AIP tax would be necessary in 2002 to ensure the promised \$3.3 billion AIP program in 2002. One-half the current international tax would bring in \$629 million in that year, while AIP is authorized at \$3.3 billion, leaving a balance of \$2.671 billion to come from the AIP tax. The right-hand column in Table 8 uses NCARC’s

projection of cargo and passenger dollar volume increases through 2002 to repeat the previous calculations for 2002, coming up with an AIP ticket tax rate of 3.2 percent and an AIP waybill tax rate of 2.0 percent for 2002.

	1998	2002
Amount of AIP tax needed:		
▪ AIP—authorized	\$1,700	\$3,300
▪ 50% of current intl. dep./arr. tax	\$442	\$629
▪ Balance needed for AIP	\$1,258	\$2,671
Estimation of value of tickets and cargo (based on current law):		
▪ Ticket tax proceeds	\$5,567	\$5,759
▪ Ticket tax rate	9%	7.5%
▪ Total ticket value	\$61,856	\$76,787
▪ Cargo waybill tax proceeds	\$426	\$590
▪ Waybill tax rate	6.25%	6.25%
▪ Total cargo value	\$6,816	\$9,440
Calculation of new AIP tax rate:		
▪ Total pass./cargo tax paid	\$5,993	\$6,349
▪ Passenger fraction	.929	.929
▪ Cargo fraction	.071	.071
▪ AIP revenue needed	\$1,258	\$2,671
▪ Passenger portion	\$1,169	\$2,481
▪ Pass. ticket tax rate	1.9%	3.2%
▪ Cargo portion	\$89	\$190
▪ Cargo waybill rate	1.3%	2.0%

Source: RPPI calculations

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The new system's total cost to users, at the outset, would be *12 percent less* than that of the old system.

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In 1998 U.S. airlines altogether paid \$6.492 billion in aviation excise taxes. Had the proposed ATC corporation been in operation that year, U.S. airlines would have paid \$4.461 billion in ATC fees and another \$1.258 billion in AIP taxes, for a total of \$5.719 billion. Hence, the new system's total cost to users, in our base year, would have been *12 percent less* than that of the old system. Moreover, if the ATC Corporation were able to improve its productivity comparable to that of similar ATC corporations in Australia, Canada and New Zealand, significant cost reductions (and hence fee reductions) should be realizable within the first five years of operation. Airservices Australia has delivered total real price reductions of 25 percent between June 1998 and December 2000.<sup>21</sup> And Nav Canada, as noted in Part 1, has reduced airline costs by 33 percent.

<sup>21</sup> "Airservices Set to Reduce En Route Charges in the New Year," *ATC Market Report* (December 7, 2000), p. 7.

Table 9 shows the combined impact of the ATC user fees and the residual AIP tax on each of the large carriers examined previously. As can be seen, each would realize a net saving, paying less under the new system than they did under the old one.

Carrier	'98 User Taxes	'98 ATC Fees	'98 AIP Tax	'98 Total	Savings
Delta	\$1113.5	\$776.5	\$186.2	\$962.7	\$150.8
United	992.8	696.6	172.1	868.7	124.1
American	819.7	606.2	141.4	747.6	72.1
USAirways	713.4	367.5	126.9	494.4	219.0
Northwest	504.9	382.3	85.9	468.2	36.7
Southwest	456.3	311.6	72.0	383.6	72.7
Continental	449.6	256.0	77.4	333.4	116.2
TWA	257.2	164.0	43.8	207.8	49.4
Am. West	167.3	80.2	28.0	108.2	59.1
Alaska	115.2	67.7	18.8	86.5	28.7
Cargo	428.9	315.4	89.2	404.6	24.3

Source: RPPI calculations

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The new ATC corporation would be paid for 92 percent by user fees and 8 percent from the general fund, with the latter paying solely for the FSS program.

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## G. The "General Fund Contribution" Issue

Under the new system, how much of a "general fund contribution" towards the functions traditionally performed by the FAA would there be? As noted above, had the proposed ATC corporation been in effect in 1998, it would have collected \$4.461 billion from U.S. and \$477 million from foreign airline customers, via a weight-distance-congestion pricing structure. Another \$378 million would be derived from general aviation fees (see Part 3). It would also have obtained around \$600 million from military and other government users, whether paid as a lump-sum annual appropriation or as direct fees and charges for individual flights.<sup>22</sup> The corporation would have used these funds to operate the oceanic, en-route, and terminal ATC system. It would also have collected approximately \$532 million from the FAA to operate the FSS system to serve its GA customers, for a total budget of \$6.448 billion (see Table 10).

The FAA, in turn, would have obtained from general federal revenues the \$532 million to pay for FSS, along with the approximately \$962 million needed to carry out its safety regulatory and security functions, and another \$1.7 billion from the reduced international arrivals/departure tax and the residual AIP tax, for a total of \$3.194 billion. Thus, the new FAA would be funded 47 percent from the general fund and 53 percent from user taxes, with the former paying for its safety-related functions and the latter paying for its AIP program.

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<sup>22</sup> The ATC corporations in Germany, New Zealand, and South Africa charge military and other government users for ATC services.

The new ATC corporation would be paid for 92 percent by user fees and 8 percent from the general fund, with the latter paying solely for the FSS program.

<b>Table 10: Funding Sources for ATC Corporation and New FAA (using FY 1998 data)</b>				
<b>Sources of Funds (\$millions)</b>				
	Aviation User Fees	Federal Gen. Rev.	Aviation Taxes	Total
ATC Corporation				
• Dom. airline fees	\$4,461			
• Overflight fees	35			
• International fees	442			
• GA fees	378			
• Mil/Gov fees		600		
• FSS contract		<u>532</u>		
Total Corporation	\$5,316	\$1,132	\$0	\$6,448
New FAA				
• Safety reg. approp.		\$962		
• FSS approp.		532		
• New AIP tax			1,258	
• Int dep/arr tax (revised)			<u>442</u>	
Total FAA		\$1,494	\$1,700	\$3,194

Source: RPPI calculations

There is likely to be resistance by the military to having to pay for ATC services received from the civilian ATC system for which it is currently not charged. The military will point out, correctly, that it provides some ATC services to non-military air traffic (including commercial airlines) in some portion of U.S. air space. No reliable estimates are available of the relative amounts of service provided by civil ATC to military users and vice versa. Thus, the number in Table 10 is subject to revision once better data become available. In addition, if the military is unwilling to add a line-item to its own budget for purchase of such ATC services, this sum may have to come from general federal revenues, on behalf of military as well as non-military government users of services provided by the ATC Corporation.

Assuming that general federal revenues are needed for the military/government use of ATC Corporation services, for the FSS contract, and for operating FAA's safety regulatory function, that would mean a total of \$2.1 billion (in our FY 1998 base year) in total general revenues going for both ATC and FAA functions, under our corporatization scenario. That compares with \$3.4 billion in general revenues actually provided to the FAA in FY 1998.

## Part 3

# General Aviation and ATC

## A. Introduction

General aviation (GA) plays a vital role in the United States. For several hundred thousand people, flying is a major hobby and recreational activity. GA provides the training for many commercial pilots (especially now that U.S. military forces have been downsized in the post-Cold War era). The experimental aircraft sector pioneers new designs in aircraft and innovations in cockpit displays. Air taxi/commuter services and corporate aircraft provide air-access for business and cargo to thousands of small airports that are not served by scheduled airlines. And as our country grows more populated, suburban and rural GA airports become small commercial airports. In many ways, the private pilot/private plane community serves as the feeder and support base for the commercial aviation system. Thus, it would be counterproductive to cause harm to this vital component of U.S. aviation via an ill-considered user fee system that would make GA flying unaffordable. The challenge is to incorporate GA into a commercialized ATC system in a way that is fair to all parties and that maintains and enhances air safety.

The general aviation community (specifically, AOPA, NBAA, GAMA, and NATA<sup>23</sup>) has historically opposed proposals aimed at corporatizing air traffic control. While sharing many of the airlines' frustrations with the FAA's personnel and procurement problems, and its inability to make use of state-of-the-art technology, GA organizations have correctly equated corporatization with direct user fees. That is because an integral purpose of the reform is to create a direct payment nexus between the users and the provider of air traffic services—and that means users paying fees to the ATC provider, not paying taxes to the U.S. Treasury.

But GA users fear that a shift from the current fuel taxes to direct user fees would dramatically increase their cost of flying. Thus, even though previous proposals for a government corporation (USATS) and the NCARC recommendation of a performance-based organization (PBO) each specifically exempted all of general aviation from user fees, those measures were still opposed by the GA organizations, out of fear that they might lead to unaffordable user fees in the future.

Other countries which have corporatized ATC have made special provisions for small-plane operators. As noted in Part 2 of this study, Nav Canada charges single-engine piston aircraft under three tonnes a flat annual charge of between C\$60 and C\$200. Prop planes above three tonnes can opt to pay either a daily weight-based charge or the standard en-route and terminal fees applicable to jet aircraft. Unfortunately, because

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<sup>23</sup> Aircraft Owners & Pilots Association, National Business Aircraft Association, General Aviation Manufacturers Association, National Air Transportation Association.

Canada’s fuel tax has never been dedicated to aviation purposes, it was not reduced or eliminated when Nav Canada took over the ATC system, so GA users in Canada must now pay *both* user fees and the fuel tax.

Our proposal offers a better deal to general aviation. The GA community would receive three seats on the board of directors of the ATC Corporation. The present GA fuel tax would be abolished, and the costs of the FAA’s safety regulatory functions and the Flight Service Station system would come from general federal revenues. Modest annual access charges would be paid to the ATC Corporation by all non-jet GA aircraft, on a sliding scale based on aircraft weight. For all but large turboprop aircraft, the annual fee would be less than the typical amount now paid per year in fuel taxes—meaning net savings for most GA pilots. In exchange for paying a single annual ATC access charge, GA users would receive VFR flight-following, FSS, and IFR services without having to pay any other fees or charges. Only jet aircraft, which fly in the same air space as jet airliners, would pay transaction-based user fees. Moreover, if the shift to an ATC corporation produces the same kinds of gains in productivity experienced overseas (e.g., 30-35 percent), the initial user fees may go down by one-third or more in the initial years of the corporation’s existence.

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It would be counterproductive to cause harm to general aviation via an ill-considered user fee system that would make GA flying unaffordable.

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## B. Business vs. Recreational GA

The umbrella term “general aviation” serves to obscure important distinctions between two fundamentally different types of aviation activity carried out in smaller planes. Well over half of all GA flight hours are personal, recreational, and instructional. And nearly three-fourths of the GA fleet is single-engine piston (see Figure 1). This broad majority of GA activity can be approximated by the term “recreational” flying. Most of this flight activity takes place outside of controlled air space. Most of it does not even make use of a control tower: a 1993 analysis by one of the authors calculated that (using 1990 FAA data) only 30 percent of all GA piston landings and takeoffs made use of a towered airport.<sup>24</sup> The main ATC service used by recreational GA is flight service stations which, under our proposal, would not be charged for.

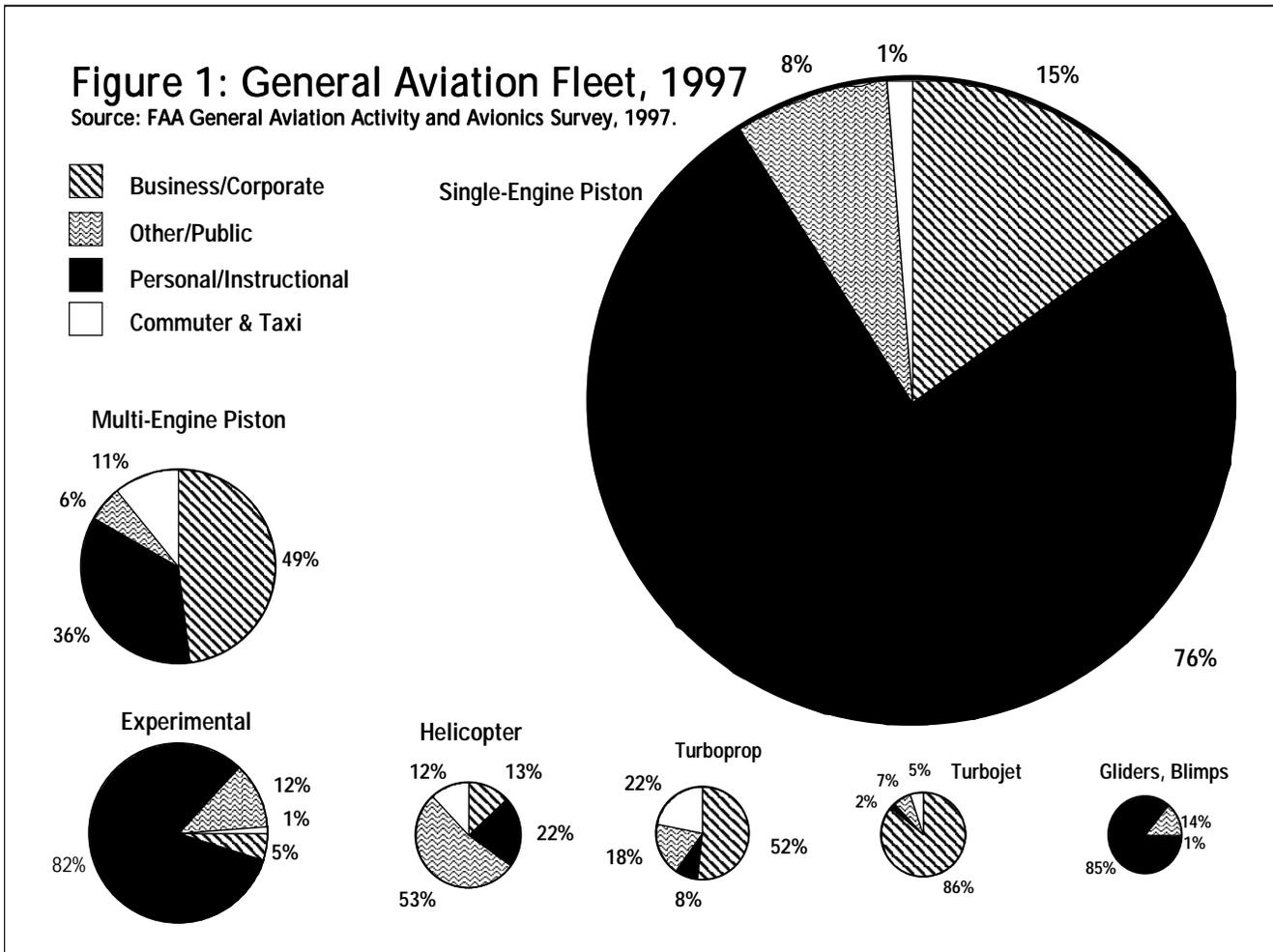
The other broad category consists of (generally larger) GA aircraft used for business and commercial purposes. Included here are both piston and turbine-powered planes, most of them multi-engine, which are owned and used by businesses, as well as planes available for hire as charters and air taxis. These aircraft make up about 17 percent of the GA fleet. A much larger fraction of this segment of GA makes use of towered airports (99 percent of all turbine-powered GA landings and takeoffs occurred at towered airports in 1990). Business jets (and many turboprops) make use of the full range of ATC en-route and terminal services.

While most countries with corporatized ATC systems make special provisions for recreational GA aircraft, nearly all countries follow standard ICAO charging principles for ATC when it comes to business GA aircraft (particularly jet-powered aircraft, which fly at the same altitudes and use the same services as jet airliners). A corporate Learjet in Canada pays en-route and terminal charges based on its weight and distance flown, just

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<sup>24</sup> Robert W. Poole, Jr., *How to Spin Off Air Traffic Control*, Policy Study No. 166 (Los Angeles: Reason Public Policy Institute, August, 1993), Table 7, p. 21.

like those paid by its competition—either an air-taxi Learjet or a commercial CRJ-100. Under current U.S. practice, however, business jets operated by air-taxi operators, under Part 135, must collect and pay the same ticket tax and segment fee as a commercial airliner. But the same business jet owned by a corporation, under Part 91, pays only the GA-turbine fuel tax. Yet these two different ways of operating business jets are direct competitors which receive identical ATC services. It is clearly unfair for one to pay four or five times as much as the other for the same services.



The GA community would get three seats on the ATC Corporation board. And the GA fuel tax would be abolished.

### C. Proposed GA Fees and Charges

The core principle suggested here is that those GA users who fly in controlled air space and make use of extensive instrument flight rules (IFR) services of the ATC system should pay for those services, on a comparable basis with other commercial users. On the other hand, recreational users—for whom that system

was not created and who make little use of it—should pay only a modest charge for access to the system. And since those ATC services are to be provided by a not-for-profit corporate entity controlled by aviation stakeholders, those ATC fees should be paid directly to the ATC Corporation. They cannot be paid as a tax, because a tax is a payment to a government, and the government will no longer be providing ATC services. The basic idea of the reform is to create a customer-provider relationship, based on both fees for services and customer representation on the corporation's board.

One implication of these principles is the *elimination of the fuel tax*. It has always been an excise tax dedicated to aviation, but it is superfluous when ATC is provided on a fee-for-service basis. It would be unfair to charge users both a tax and a fee. Some might argue that GA (and other aviation users) should continue to pay taxes to the government to pay for the remaining functions of FAA—namely, its safety regulation and airport-grant program. But safety regulation is generally accepted as inherently governmental. Nearly all of the federal government's other safety-regulatory activities—regarding consumer products, automobiles, railroads, workplaces, food and drugs, etc.—are paid for out of general tax revenues. There is no reason to single out aviation and demand that this one segment of the economy pay earmarked taxes for its federal safety services. As for AIP, the amount that could be generated from GA—at an average of perhaps \$1,000/plane/year in fuel tax times 192,000 GA planes, which equals \$192 million—would amount to only 6.5 percent of the \$3+ billion level of annual AIP spending authorized by AIR-21. It would be far wiser to abolish the fuel tax and charge ATC fees that guarantee access to the system.

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All piston and turboprop planes would pay a flat annual fee, based on weight. Only jets would pay transaction-based user fees.

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What would those fees be? In an economist's ideal world, the new ATC Corporation would use its businesslike accounting system to develop a finely grained analysis of the marginal costs of all of its services. And for users such as recreational GA, it would charge only marginal costs, since the TRACONS and en-route centers would be there anyway to serve commercial users. In actual practice, however, no commercialized ATC system has attempted to institute such a detailed charging system, even for business/airline customers. User-friendliness and administrative efficiency apparently override the economists' ideal in the real world of commercialized ATC. Thus, we recommend that all recreational GA aircraft pay a simple annual fee based on maximum take-off weight, with the specific amounts to be determined by the ATC Corporation. For purposes of calculation in this report, we will assume annual fees averaging \$200 for single-engine piston aircraft under two tons, \$400 for heavier single-engine piston planes, and \$750 for multi-engine piston aircraft. (Charging these users on an *annual* basis also eliminates any concern that charging small users for individual transactions might tempt some of them to forego a safety-related service in order to save a few dollars.)

Turboprops typically fly IFR but generally fly in the relatively uncrowded (but still legally Class A controlled) airspace between 18,000 and 30,000 feet. Applying a typical weight-distance formula to a twin-turboprop such as a King Air would produce annual charges in the \$30,000 range—more than four times what such a plane would typically pay in today's fuel taxes. Thus, it seems more realistic to charge this category an annual access fee analogous to that paid by piston aircraft, though higher because of its much greater use of ATC services. For purposes of calculation in this report, we assume an average annual fee of \$6,000 for this category of aircraft. (Lighter-weight, single-engine turboprops would pay a smaller annual sum.)

Turbojet-powered aircraft, for the most part, fly in the same air space and use the same IFR services as commercial jets. Hence, they should be charged on a per-transaction basis, using the same weight-distance formulas that would apply to air-carrier aircraft of all types. This is the standard practice for business jets in virtually all countries other than the United States.

Using these principles, and representative figures for typical GA aircraft, we can compare costs under the proposed ATC Corporation with costs under today's excise tax regime. Those figures are shown in Table 11. As can be seen, most recreational GA pilots would actually be better off under the proposed system of paying an annual access fee instead of the current fuel tax. A Cessna 172 operator flying 120 hours per year would pay 14 percent *less* than today, saving \$32 a year under the new system. A Beech Baron operator flying 175 hours a year would save about \$94 per year, paying about 11 percent less than today. A twin turboprop like a King Air, flying 350 hours a year, would pay only slightly more than today—\$6,000 versus \$5,722 in fuel tax.

Category	Single-Engine Piston	Multi-Engine Piston	Turboprop	Turbojet
Example	C-172	Baron	King Air	Lear 35
Fuel Tax Estimate				
• Gals./hr.	10	25	75	215
• Annual flt-hrs	120	175	350	550
• Annual gals.	1,200	4,375	26,250	118,250
• Tax rate	\$.193	\$.193	\$.218	\$.218
• Annual tax	\$232	\$844	\$5,722	\$25,778
ATC Fee Estimate				
• MTOW (tons)	n.a.	n.a.	6.25	9.15
• Annual departures	n.a.	n.a.	500	450
• Avg. dist. (mi.)	n.a.	n.a.	400	550
• Annual fees	\$200	\$750	\$6,000	\$43,546
• Change in Cost	-\$32	-\$94	+\$278	+\$17,768
• Annual TOC	n.a.	n.a.	\$500,000	\$1,000,000
• Fee as % TOC	n.a.	n.a.	1.20%	4.4%
• Fuel tax as % TOC	n.a.	n.a.	1.14%	2.6%

Note: MTOW is maximum take-off weight; TOC is total (annual) ownership/operating cost

Source: RPPI calculations

On the other hand, operators of business jets—who make much greater use of ATC resources for which they currently pay only a token amount—would begin to pay their fair share under the new system. And although their costs would go up, compared with the current fuel tax system, the new weight-distance fees would increase their total annual costs of owning and operating their aircraft by only a few percentage points. That total annual cost of the Lear 35 in our table would increase by just 1.8 percentage points. Moreover, the new system would put air taxi and charter operators on a level playing field with their corporate aircraft competitors.

Furthermore, the calculations in the table ignore any offsetting savings in aircraft operating costs that might come about from the improved ATC system—for example, reductions in flight delays for business jets. For the Lear 35 in the table, its 1995 direct operating cost (DOC) was \$720/hour. Based on the assumed 550

annual flight hours, the fuel tax works out to be \$47/hour, while the proposed user fees work out to \$79/hour. Thus, the new system would increase DOC by \$32/hour. However, balanced against that increased hourly cost must be any savings from reduced delays—i.e., a smaller number of annual hours flown. Doing the math yields the result that if the new ATC system saves more than 25.6 flight hours over the course of the year, the Lear 35 operator saves enough from reduced flying time to offset the slightly higher cost of each hour flown. That 25.6 flight hours is only 4.5 percent of the assumed baseline 550 annual hours. Thus, the new ATC system need only reduce delays by 5 percent to produce net economic savings for the Lear owner.

Using these estimated charges for the various categories of GA aircraft, we can also estimate total revenue generated for the new, nonprofit ATC Corporation by the proposed ATC fees. That calculation, using estimated GA fleet composition for 1998, is shown in Table 12. Overall, the GA fleet would pay \$378 million. This is still far less than the estimated ATC cost burden of air taxi and GA operations, which Table 1 (in Part 2) found to be \$2.036 billion. Thus, the proposed fee system would generate about 18 percent of what it costs the ATC system to provide services to the GA fleet.

All of the hypothetical fees presented in this chapter are based on the cost and functions of today's (FY 1998) ATC system. But as discussed elsewhere in this report, new technology offers tremendous opportunities for cost savings in ATC—e.g., by consolidating centers and by partially automating various functions now performed in labor-intensive ways. The corporatized ATC systems of Australia, Canada and New Zealand have reduced costs by between 25 and 30 percent—partly by consolidating regions and centers and partly by administrative streamlining, leading to corresponding reductions in user fees. There is at least that much potential for cost-savings and resulting fee reductions in the U.S. ATC system today, after which the switch to free flight technologies will permit further cost saving, because as more information and control is shifted to the cockpit, ATC itself will become less labor-intensive. By setting up the ATC Corporation on a nonprofit basis, the resulting cost savings will continue to be passed through to users as lower fees and charges.

	1998 Fleet (est.)	Avg. Paid	Total Paid (\$millions)
Single-Engine Piston	140,000	\$250	\$35.0
Multi-Engine Piston	16,000	\$750	12.0
Rotary Piston	2,500	\$500	1.25
Turbo Prop	6,000	\$6,000	36.0
Turbo Jet	5,200	\$53,635	278.9
Rotary Turbine	4,500	\$2,500	11.25
Experimental	14,500	\$200	2.9
Other	4,000	\$200	0.8
<b>TOTAL:</b>	<b>192,700</b>		<b>\$378.1</b>

Source: RPPI calculations

## D. Flight Service Stations

Not included in the above discussion of GA use of ATC services was the issue of Flight Service Stations (FSSs). As of 1995 there were 58 automated and 35 nonautomated FSSs (down from over 300 nonautomated FSSs in the early 1980s). FSSs provide preflight pilot briefings, communications with visual flight rules (VFR) flights while en-route, the opening and closing of flight plans, assistance to lost aircraft and other

emergencies, and broadcasts of weather and other airspace information. A previous analysis of FSS usage found that 76 percent of their contacts were with individual GA aircraft and another 15 percent with air taxis, with air carriers and the military accounting for the other 9 percent.<sup>25</sup> The 1995 cost attributed to the FSS system by Golaszewski, et al. was \$532 million.<sup>26</sup> Since this system—unlike the rest of ATC—does exist primarily to serve GA, under strict cost-responsibility principles it would have to be paid for by GA. But dividing that \$532 million by the approximately 193,000 GA aircraft yields an average annual cost of \$2,756 per plane—far more than the vast majority of GA owners could afford. But it would clearly be unfair to impose the bulk of this cost on non-GA aircraft, which could get along fine without this system.

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Charging GA planes on an annual basis eliminates any concern that charging for individual transactions might tempt some to forego a safety-related service in order to save a few dollars.

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In previous debates over user fees and GA, questions have been raised by GA representatives about the possible safety implications of charging small-plane owners for weather briefings and flight-plan filings. While no hard data exist on the extent to which a per-transaction fee would deter GA pilots from using such services, it is plausible that a safety problem might be created. This provides some degree of justification for considering the FSS system a safety function, rather than an ATC function, per se. If it is necessary to the safety of the GA system, but is clearly not affordable for the GA community to pay for, then a case can be made for funding this service—like FAA safety regulation, per se—out of general federal revenues. The only other alternative would be to charge non-GA aviation (i.e., the airlines) for this GA service, which seems obviously unfair. If GA is to be given this service in the interests of safety, it is better to spread the cost of it over all taxpayers than to burden a single industry with it.

Thus, our proposal calls for the ATC Corporation to provide FSS services as part of its mission, but for the funding to come from the federal government, out of general revenues. Organizationally, this might best be handled by having the FAA administer the funds, contracting with the ATC Corporation to operate the FSS system. New technology (see subsection E) offers the possibility of accomplishing FSS functions in less-costly and more effective ways. Having the ATC Corporation carry out the FSS mission, with the cost made fully visible, will provide incentives for improving these important functions, quite possibly reducing their cost burden over time, via better technology.

## E. New Technology and General Aviation

The same new technologies that are being developed for airline “free flight” offer tremendous potential for improved safety, accuracy, and cost savings for ATC services to general aviation in coming decades. The microchip revolution continues to shrink the size and decrease the cost of avionics. Digital communications can transmit vastly more information to and from aircraft than voice. And GPS with ground-based augmentation will ultimately provide affordable precision-approach systems for thousands of GA airports.

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<sup>25</sup> Golaszewski, et al., “Recovering the Costs of Air Traffic Services in the United States,” p. 448.

<sup>26</sup> GRA, Inc., *A Cost Allocation Study of FAA’s FY 1995 Costs* (Washington, DC: FAA Office of Aviation Policy & Plans, March 1997).

The question facing all of aviation—GA as well as airlines—is under which kind of organizational and financing structure will these benefits be made available sooner and more affordably: under the continuation of the FAA bureaucracy or under the auspices of a stakeholder-controlled, customer-driven, nonprofit ATC Corporation?

Most of the new technologies required for free flight—GPS navigation, digital data link radio, multifunction computer display, etc.—are being tested in GA-specific versions under the FAA’s Capstone demonstration project in Alaska. About 150 GA aircraft are to be equipped, primarily in charter and air-taxi service. The cockpit display includes a GPS-based terrain database of Alaska, VFR and IFR charts, weather graphics and text, and ADS-B position reports from other aircraft. It is estimated that the complete avionics package, in large-scale production, would cost about \$12,000 per aircraft. Were the package to be mandated for installation in all (or a major portion) of the GA fleet, unit costs might drop to half that sum.

It should be noted that a shift to free-flight technologies would replace the need for a whole raft of equipment now required for IFR operations: VOR, NavCom, ADF, DME, ILS, etc. that can add as much as \$25,000 to such a plane’s cost. Moreover, by providing cockpit displays of the positions of other aircraft, and of weather information, a free-flight ATC system would greatly reduce (and perhaps eliminate) the need for such old systems as manned FSSs and ground-based radar, thereby significantly reducing system (as opposed to per-plane) costs. These changes could lead to lower fees over time, as they led to a lower-cost ATC system. Another step in that direction is the introduction, in summer 2000, of the new Flight Information Service Data Link (FISDL), which provides text weather messages from FAA and National Weather Service to a cockpit display. Graphic information will be available on a subscription basis.

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It would take only a 5 percent reduction in delays to offset the increase in ATC charges for a typical business jet.

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These kinds of changes would revolutionize flying, giving pilots far more information and control, gradually shifting the role of ground-based controllers to traffic monitors and conflict-resolution managers, rather than controllers, per se. In this truly computer-based ATC system, GPS-derived position reports would be sent from all aircraft in the system to control centers and other aircraft in the vicinity. The ground-based computers would send navigational messages, via digital data link, to any plane that might be affected by another plane’s course. Those messages would be processed by the recipient plane’s on-board computer and linked directly to its autopilot.

To gain the full benefits of this free-flight technology would require some redesign of U.S. airspace. To access most categories of airspace, VFR planes would be required to have GPS units and “squitters” (under \$700) that broadcast their position so that they will show up on the displays of all IFR aircraft in their vicinity. The light plane IFR pilot would add a combination computer/datalink with LED message display and moving map display (in the \$6-8,000 range). A twin-piston or turboprop pilot would have a more capable computer, a bigger display showing traffic and weather, and direct links to the autopilot (as outlined above); this package would be in the \$8-15,000 range.

As digital datalinks and graphic displays become more common, the FSS system in its current form will become less and less necessary—and its current \$500+ million cost can be greatly reduced. Already, a large

fraction of GA pilots download pre-flight weather data via the DUAT computer services (or via AOPA's and others' web sites). The newly introduced FISDL will provide extensive weather data in the cockpit. These on-line and on-screen systems provide more data, more quickly and at lower cost, than the traditional FSS operation. Here again, technology is producing better service at less cost.

The question for GA organizations and individual pilots to ponder is this: Under which future scenario is it more likely that these technological transformations will be implemented rapidly, smoothly, and at lower cost? Is this more likely to occur with a continuation of the FAA that has spent 20 years and tens of billions of dollars to modernize the ATC system—and yet still uses vacuum-tube-equipped radars, software written in the 1960s, and “new” mainframe computers that are no longer in production? Or is it more likely to occur under a stakeholder controlled “user co-op” similar to NavCanada, on which GA organizations hold three board seats? As one point of reference, both the FAA and Nav Canada are implementing new software tools developed by NASA-Ames called the Center-TRACON Automation System (CTAS). In doing so, Nav Canada is accomplishing in three years what it is taking the FAA more than 10 years to do.

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The corporatized ATC systems of Australia, Canada, and New Zealand have reduced costs and charges by 25 to 30 percent.

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A good example of what is at stake concerns the advent of new small GA jets. Companies like Eclipse and Safire are developing a new generation of relatively low-cost (tentatively, under \$1 million), light-weight jet aircraft. If these planes enter production at their projected price and performance levels, there could be thousands of them in the skies above 30,000 feet within the next decade. Coping with this influx would be very difficult for the FAA's technologically backward airways system, and airlines might well seek FAA policies to restrict these small jets' access to the limited and crowded airways. ATC commercialization offers the best hope for implementing affordable free-flight technology and systems in the coming decade. And a stakeholder board, with serious GA representation counterbalancing airline representation, offers the best hope of implementing procedures under which larger numbers of both airliners and small jets can share this air space safely.

## **F. Summary: A Better Deal for General Aviation**

Major policy changes usually involve winners and losers. Traditionally, battles over major structural reform of ATC have portrayed the airlines as the winners and GA as the losers. Because they suffer considerably from the technological backwardness of the traditional FAA-run ATC system, the airlines have powerful incentives to push for ATC corporatization, so as to bring about as soon as possible a high-tech, efficient, and user-friendly ATC system. The challenge for policy designers is to make this new system also a good deal for general aviation.

The overall plan set forth in this document is intended to do just that. As Part 1 explained, the proposed ATC corporation would be governed by a stakeholder board, on which airlines would have four seats and GA three (one each for recreational GA, for air taxi/fractional ownership operators, and for business/corporate GA), out of a total of 15. Thus, although the airlines would be providing 77 percent of the corporation's revenues, they

would control only 27 percent of its board. GA, contributing less than 6 percent of the corporation's revenues, would have 20 percent of the board representation.

In terms of the impact on the cost of GA flying, the large majority of GA pilots would be better off paying the proposed annual access charges than continuing to pay the current fuel taxes. The only members of the GA community whose cost of flying would initially increase—by less than two percentage points a year—would be operators of business jets. A portion of this group—air taxi and charter operators—would be clearly better off under the new system, as well, because they would no longer be facing unfair competition from corporate jets and turboprops. All such planes would thenceforth be paying for ATC services on the same level playing field. The only “losers” from the change might be corporate owners of jets and (some) turboprops. The addition of two percentage points to the annual cost of owning and operating a business jet would be a real increase in costs. But it is hardly large enough to cause most corporations to sell (or not acquire) such a plane, given the huge value of such aircraft as business productivity tools, as NBAA continually reminds us. Moreover, to the extent that the new ATC system succeeds even modestly in reducing delays at jet altitudes, time savings are likely to offset the modest increase in per-hour flying costs. And if the U.S. ATC corporation achieves the kinds of cost savings attained by corporatization overseas, its nonprofit structure will pass those savings along to users.

In exchange for paying the new ATC user fees, GA aircraft operators would be gaining a greatly improved ATC system. The same free-flight technology which the airlines are desperate to have in place will produce the same benefits for corporate jets and turboprops—vastly expanded airways, new approach paths to busy airports, etc. Based on the global experience with corporatization facilitating ATC modernization, these benefits will be realized much sooner via a corporatized U.S. ATC system. In addition, the entire GA community will benefit from the speedy implementation of smaller-scale versions of the same free-flight technologies, as well as the continued availability (and future modernization) of the FSS system.

## Part 4

# ATC Employee Issues

## A. Introduction

In 1995, then-president Barry Krasner of the National Air Traffic Controllers Association (NATCA) discussed the issue of ATC restructuring in a position paper. As he noted therein, “the status quo is not an option.” He cited the bylaw approved by NATCA’s Executive Board on FAA reform:

*NATCA supports a plan to restructure the air traffic control component of the FAA. We endorse the government corporation concept, as described in the administration’s May 1994 report [i.e., USATS], because it goes the furthest toward correcting the FAA’s personnel, procurement, and budgetary problems.<sup>27</sup>*

In explaining how NATCA reached this position, Krasner cited the FAA’s outdated management structure and responsibilities, conflicting missions, and funding problems.

The USATS proposal cited with approval in NATCA’s bylaw would have been a stand-alone government corporation, organizationally separate from the FAA and regulated by the FAA at arms-length. It would have been supported by user fees, which would permit the issuance of long-term revenue bonds for capital improvements. It would have been exempt from federal civil service and procurement regulations. In short, except for being legally a government corporation, it would have been very similar to the kind of nonprofit, user-fee-funded corporation proposed in Part 1 (and functionally quite similar to the existing Nav Canada organization). The principal functional difference is that the proposed nonprofit corporation (equivalent to a user cooperative) would have a stakeholder board, including employee representation.

NATCA is on record in opposition to “privatization” of air traffic control. That term can encompass several different meanings. One possible meaning is the outsourcing of government functions to for-profit companies—as illustrated by the FAA’s current Contract Tower program for Level 1 towers. Another possible meaning is the sale of all or part of an existing government entity to private investors—as illustrated by the British Labor government’s controversial proposal to sell 46 percent of NATS to investors. The common factor in both such forms of “privatization” is the shift from nonprofit to for-profit operation. Yet none of the commercialized ATC corporations in operation today in other countries is operated for the profit of private shareholders. While several (e.g., Airways Corporation of New Zealand) are expected to earn a

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<sup>27</sup> Barry Krasner, *Privatization Case Studies* (Washington, DC: National Air Traffic Controllers Association, undated).

commercial rate of return for the government (as sole shareholder), most—like Nav Canada—use any annual surplus either to permit reductions in the next year’s fees and charges or to invest in capital equipment.

Within this frame of reference, then, both USATS and NavCanada represent ATC commercialization but not privatization (if the essence of privatization is the transfer of a function to a for-profit, private-sector operator). The actual differences between a commercialized government ATC corporation (USATS, Germany’s DFS, etc.) and a commercialized nonprofit ATC corporation (NavCanada) are quite small, relating mainly to board representation for key stakeholders in the latter model. Hence, current ATC employees who favor a USATS approach ought to give equal consideration to an adaptation of the user-coop-type nonprofit corporation approach, as well.

Air traffic controllers and airway facilities personnel have many frustrations with current FAA management practices and labor relations. Krasner’s case for fundamental structural reform remains compelling. This section reviews key personnel questions that must be addressed in transitioning the U.S. ATC system from the FAA to a commercialized corporate form.

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Both USATS and Nav Canada represent ATC commercialization but not privatization.

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## B. Current and Future Work Force

As has been done in other countries, the proposed ATC Corporation would be created by transferring to a new, federally chartered, legal entity the personnel, equipment, and responsibilities of the FAA’s existing Air Traffic Services and Research and Acquisitions branches, and presumably also the Academy and the Logistics Center. (A study should be conducted to identify exactly which FAA units would most appropriately fit within the commercialized ATC corporate structure.) The board of directors would recruit a new chief executive officer and top-management team, but otherwise the initial staffing would consist of all current employees of those two branches willing to make the transition to the new entity.

What fraction of the work force would make this transition? That is impossible to predict with accuracy, but the experience of other countries is that more than 90 percent make the initial transition—especially if there are transition protections such as no-layoff guarantees (as discussed below in subsection C). In the short term, it is critically important to retain current staff, especially controllers and technicians, to ensure a smooth transition. In the medium and long term, however, one of the benefits to be gained from commercialization is a higher-performing and better-paid work force—which may mean early retirement for those not compatible with a more performance-oriented corporate culture.

Two long-term trends will reduce ATC work force requirements to less than would be expected from simple extrapolation of the growth of aviation activity. One trend is the gradual shift of more information and decision-making from the ground (towers, TRACONS, and Centers) to the cockpit, as free-flight technologies are fully phased in. In effect, these new technologies will make ATC less labor-intensive in coming decades, reducing the rate of growth of the controller work force to less than the rate of growth of aviation activity.

The second likely change is geographic consolidation, as current and future information-processing technology makes it possible to consolidate some of the current 21 en-route centers into a smaller number of centers. A study

of ATC costs by Roberts Roach & Associates found that domestic air route traffic control center (ARTCC) unit costs decline dramatically with volume. As an example, they found that “if all domestic ARTCC services were provided by a smaller number of facilities, each handling the same volume of activity as the Chicago center does today, there would be five fewer domestic ARTCCs and total ARTCC costs would be reduced \$350 million annually.”<sup>28</sup> In a further hypothetical calculation, the same report suggests that replacing 16 ARTCCs with one could produce annual savings of \$1.8 billion. While such drastic consolidation is unlikely to occur (in part for reasons of preserving necessary system redundancy), the opportunity to realize meaningful cost savings for users is one of the likely longer-term results of commercialization. A similar process is expected to occur in Europe, under the Single European Sky initiative.

Since ATC commercialization will produce a corporate culture more focused on technological modernization and on cost-savings for users, commercialization will accelerate both of the above trends. And that, in turn, will ease the impending work force crisis triggered by the projected retirement bulge over the next 15 years, as large numbers of post-strike controllers become eligible for retirement. Several different projections have attempted to quantify this bulge. The most sophisticated projection, from the FAA Civil Aeromedical Institute, predicts a significant retirement bulge after 2008, peaking in 2013 at over 900 per year (out of the approximately 15,000 current work force).<sup>29</sup> By contrast, a survey by NATCA of its members’ retirement intentions predicts a peak as early as 2007, with as many as 1,200 retiring in that year.<sup>30</sup> The transition to a commercialized ATC corporation might lead to an increase in controller retirements before the mandatory age of 56 for those uncomfortable with losing civil service status. On the other hand, the corporation’s ability to pay whatever is necessary to retain existing staff and to fill vacancies (e.g., with experienced military controllers hired away at significantly increased compensation) should guard against any serious shortfalls developing in the early years. And over the longer term—with the shift to full-fledged free flight and possible geographic consolidation of en-route centers—the later stages of the retirement bulge will ease the transition to a somewhat smaller but higher-paid work force.

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One of the benefits to be gained from commercialization is a higher-performing and better-paid work force—which may mean early retirement for some.

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### C. Dealing with Employee Transition Issues

Shifting government employees to a commercialized, corporate environment requires careful planning and concern. On the one hand, employees possess the essential working knowledge without which the enterprise cannot succeed; moreover, many of them may have been frustrated by the constraints of operating within a government bureaucracy and will welcome the flexibility of becoming part of a customer-focused service business. It is essential that the transition plan reach out to these employees, dealing realistically with their concerns and issues, with the aim of retaining as many of them as possible.

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<sup>28</sup> Roberts Roach & Associates, *Where’s the Value? Airlines Are Paying Too Much for FAA Services* (Hayward, CA, 1998).

<sup>29</sup> Dana Broach, *Retirement Projections for the Air Traffic Controller Workforce* (Oklahoma City: FAA Civil Aeronautical Institute, May 1999).

<sup>30</sup> Ruth Marlin, “Retirement Survey Results: Data Will Assist Union in Developing Strategy,” *The Air Traffic Controller* (June/July 1999).

On the other hand, most government agencies also contain some people who are comfortable with noncompetitive work and who will not be well-suited to the new kind of corporate culture of a commercialized ATC service business. The transition plan needs to include fair and reasonable ways of easing these people out of the new organization and into either some other government job or to retirement.

Fortunately, a wealth of information has been amassed worldwide over the past two decades about making such transitions. During these years government enterprises worth over \$1 trillion have been corporatized or privatized.<sup>31</sup> Nearly all faced the employee-transition question, with some making much smoother transitions than others. Among the relatively standard kit of tools used in successful transitions are the following:

- No-layoff guarantees;
- Lateral transition procedures;
- Outplacement assistance;
- Early-retirement buyouts; and
- Pension protection.

Each of these will be discussed in reference to transitioning employees from FAA to the new corporation.

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Commercialization will ease the impending controller work force crisis triggered by the projected retirement bulge over the next 15 years.

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### ***1. No-layoff guarantees***

The most common employee concern in such situations is that the new management may implement sweeping layoffs, to create a new corporate culture by replacement rather than from within. Since this policy would be self-defeating in any event, it makes sense for the ATC corporation to make an explicit no-layoff guarantee. The exact dimensions of this guarantee are beyond the scope of this study to specify. A commercialized ATC corporation, in operating as a business, will have to be able to make normal commercial personnel decisions, including hiring and firing, once it is established and in full operation. Thus, the no-layoff guarantee must be limited to an initial transition period of perhaps one to two years. In addition, while it should apply across the board to “line” positions (e.g., controllers, technicians, etc.), it should not apply to top management. Generally speaking, much of the potential for dramatic change is within these management layers. The transition plan needs to encourage the retention of those managers who can play key roles in creating the new corporate culture—and encourage the departure of those who cannot (by using the following two techniques).

### ***2. Lateral transfers***

For good managers whose skill sets are better suited to a government agency than a high-tech service business, the goal should be to ease their transition to comparable civil-service positions elsewhere in the FAA or another federal agency. Many city and state governments that have outsourced functions have made

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<sup>31</sup> Wade Hudson (ed.), *Privatization 2000* (Los Angeles: Reason Public Policy Institute, May 2000).

skillful use of lateral transfers of such people to other departments requiring similar skills. One way to increase the likelihood of there being openings for such people is for the parent agency (in this case, the FAA and perhaps the DOT) to institute selective hiring freezes during the time of transition, so that more vacancies become available to which ATS managers could transfer.

Nav Canada adopted several policies to ease the way for such transfers. The new management (which during its first three years downsized by over 1,000 mostly administrative and mid-management people) actively and successfully sought to transfer affected staff to other positions within government. A reciprocal pension transfer agreement facilitated their return to the government.

### ***3. Outplacement services***

Several federal agencies, including NASA, have hired professional outplacement services to assist departing employees at times of downsizing. By giving employees personalized, hands-on assistance in finding new positions, these agencies helped to keep morale at reasonably good levels, both among those who were staying and those who were leaving. Outplacement assistance reduces the fear factor among departing employees, giving them real options.

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The transition plan needs to encourage the retention of those managers who can play key roles in creating the new corporate culture—and encourage the departure of those who cannot.

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### ***4. Early retirement buyouts***

There may well not be sufficient openings elsewhere in the federal government for employees unsuited to the commercialized ATC corporation. Hence, it would be wise to institute a system of bonuses under which such people can be compensated for taking early retirement. Nav Canada offered both early departure and early retirement incentive packages, along with layoff procedures similar to those within government. These provisions were agreed to by the unions.

### ***5. Pension protection***

The other common fear of employees in such situations is of loss of pension benefits. Clearly, those benefits must be protected. While it is to be expected that the new ATC corporation would create its own retirement system (most likely, a 401(k) or 403(b) plan), those transitioning employees vested in the CSRS and FERS retirement systems would remain in those systems, and the new corporation would continue to make the same payments into it for the duration of their employment. Those not yet vested in FERS may be offered a choice between remaining in FERS or shifting to the new system. And all new hires of the ATC corporation would be enrolled in the new retirement system.

In addition, there is the question of union recognition. Clearly, the labor agreements in force at the time of the transition to the new corporation should be binding on that corporation. The enabling legislation should specify the continued right of the corporation's employees to collective bargaining, subject only to continuation of the existing legal prohibition on the right to strike—due to the essential public-interest nature

of air traffic services. It should be noted that in Canada, the Nav Canada unions do have the legal right to strike. However, at the one time in recent years when it appeared that strike action was imminent, the Canadian parliament was poised to enact new legislation forbidding such a strike. (In the event, a new contract agreement was reached without resort to a strike, and the legislation was not enacted.) Thus, it is not clear that the unions' legal right to strike is very meaningful in Canada.

## D. Employee Benefits from Commercialization

Major organizational change is always perceived as risky. It's natural to pose and answer the question: What's in it for current FAA air traffic control employees to make the transition to a commercialized ATC Corporation?

At the macro level, several points should be noted at the outset. The FAA has always been known as a rigid, top-down bureaucracy, often seen as operating in a quasi-military fashion. The prospect of turning air traffic control into a high-tech service business, managed like the best private-sector businesses, ought to be appealing to those who chafe at the rigidities of the FAA's current organizational culture.

A second macro factor is that commercialization would bring the organization fully into the information age, with state-of-the-art technology. This would give controllers the hardware and software tools to do their jobs with less stress and greater safety than is possible today. That Sperry-Univac mainframe computers and vacuum-tube powered long-range surveillance radars persisted into the late 1990s within Air Traffic Services is pitiful. For the airway facilities staff who maintain ATC equipment, the opportunity to work with the latest computer and electronics equipment will give them experience that is more transferable to other private-sector jobs, should their career plans change.

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Although some much-overdue modernization has finally taken place in recent years (e.g., DSR), modernization is not a one-time thing. What is needed is a corporate culture dedicated to making optimal use of the latest and most cost-effective technology as a routine, ongoing way of life. A customer-driven ATC corporation is far more likely to develop and sustain that kind of corporate culture than a micromanaged government agency.

Market-based compensation is a third feature of a commercialized ATC provider. Freed from the remaining constraints of civil service, the corporation will be able to create the pay and benefit packages needed to attract and keep the best people for each type of job function and geographical location. In particular, this would mean the ability to attract and retain top management from the commercial world, experienced in running customer-focused high-tech service businesses.

A fourth macro factor is that under the nonprofit, stakeholder-controlled corporation model, ATC employees would have a seat on the corporate board. While employee board representation is common in Germany, it is virtually unknown in the United States. The corporate board would set overall policy, including such issues as

major technology upgrades, facilities locations and consolidation, pricing policies, etc. Being represented on that board would give the employees far more influence over corporate policy than they would have under any other form of organization (including a government corporation such as USATS).

In addition to these large-scale benefits, there is also the long-standing issue of morale. There is considerable literature and much folklore about, in particular, poor controller morale. Among the factors cited are outdated and illogical staffing policies (for example, management resistance to the Controller in Charge program), resentment of supervisors who never work traffic, resentment of controllers who fail to maintain (or never achieve) proficiency but continue in place, and resentment of highly paid “special project managers” whose job functions are obscure.

Another important change would be to “decriminalize”—i.e., adopt a nonpunitive approach to—operational errors, as Nav Canada has done, in the interest of improving air safety. While it is not possible to specify in advance exactly how the commercialized U.S. ATC corporation would be managed, its need to satisfy its customers by operating cost-effectively would have little room to tolerate many of FAA’s dysfunctional practices.

Another possible benefit to ATC employees is gain-sharing. Although the proposed ATC corporation would be structured as a nonprofit, and hence could not reward employees and managers with either stock options or profit-sharing, there are ways of sharing gains from improved performance with employees and managers even in not-for-profit organizations. For example, suppose that employees agree to facility consolidation that leads to major cost savings and thus to dramatic increases in productivity (ATC operations per employee). Under the nonprofit model, these cost savings would normally make possible reductions in future-year fees and charges to customers. But it is quite possible for these savings to be shared in some fashion, with a portion of the savings made available to employees and managers, rewarding them for changing the way they do business to make possible the gains in productivity. Having a seat on the corporation’s board would give employee groups greater standing to advance such gain-sharing proposals as matters of corporate policy.

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Gain-sharing is considered an important tool for reinventing government. David Osborne and Peter Plastrik define it as “giv[ing] employees a guaranteed portion of financial savings their organization achieves while continuing to meet specified service levels and quality. It gives workers a clear economic stake in increasing productivity.”<sup>32</sup> They provide a number of examples drawn from local government where gain-sharing has helped to produce significant cost savings, including Indianapolis, Indiana, King County, Washington, New York City, and Portland, Maine. Unions such as AFSCME and SEIU were directly involved in developing the gain-sharing programs. In the ATC field itself, Nav Canada is in the process of developing a gain-sharing program that will reward employees for bringing greater efficiency to users.<sup>33</sup>

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<sup>32</sup> David Osborne & Peter Plastrik, *The Reinventor’s Fieldbook* (San Francisco: Jossey-Bass, 2000), p. 237.

<sup>33</sup> Perry Flint, “Towering Success,” *Air Transport World* (October 2000).

Yet another possible benefit for employees is the prospect of consulting work overseas, assisting other countries to modernize and corporatize their ATC systems. As a government agency, the FAA cannot charge for such services (and given its recent track record on modernization, is less likely to be in demand for such services than in its earlier days when it was clearly the world leader). But our proposed ATC Corporation would be under no such restriction. It could enrich the work experience of some of its staff by marketing ATC consulting services on a global basis.

## E. Changing Corporate Culture

Can dramatic change in corporate culture be brought about in an organization which has long functioned as part of a government bureaucracy? One of the world's best laboratories for such change over the past decade has been New Zealand. Numerous national and local government agencies there have been corporatized—i.e., legally incorporated as business enterprises still owned by the government but thenceforth governed by commercial law and accounting rules and even expected to pay business taxes. Some of these enterprises were later privatized, either by sale to a commercial firm or via a public share offering. But many others, including Airways Corporation of New Zealand, have remained government-owned. The conclusion of outside researchers is that corporatization generally led to dramatic and positive changes in corporate culture.<sup>34</sup>

In this country, the National Performance Review (now the National Partnership for Reinventing Government) frequently cites the New Zealand experience as a laboratory for reinventing government and has drawn many useful lessons from that country's experiences. One of the best examples of both the potential—and the limitations—of remaking the corporate culture of a government entity comes from NPR-inspired reform within the FAA's Logistics Center in Oklahoma City.

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In 1996 the management of the center, with encouragement from NPR, developed plans for two fundamental changes in an effort to dramatically improve its performance. One was to shift the basis of its funding, so that its customers within the ATC system would be given the funds that would normally pay for the center's operations—and the customers would then pay full price for the parts and services they ordered. The second was to carry out major internal changes to boost performance, emulating best practices from the private sector. Thanks to unusually talented top management, the second set of changes was implemented successfully, creating benchmarks for best practices, shaking up management, training employees to be businesslike and customer-driven, and reorganizing on a product-line basis. The results have been dramatic, including the achievement of ISO 9000 quality certification, receipt of the President's Quality Merit Award for 2000, and significant improvement in a number of performance measures.<sup>35</sup>

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<sup>34</sup> Barry Spicer, David Emanuel, and Michael Powell, *Transforming Government Enterprises: Managing Radical Organisational Change in Deregulated Environments* (Sydney, Australia: The Centre for Independent Studies, 1996).

<sup>35</sup> Norman Bowles, *Boosting Government Performance Using a Private Sector Approach* (Oklahoma City: FAA Logistics Center, June 2000).

But the most fundamental reform—changing the center’s funding system so that it would have to compete for business by satisfying its customers—was delayed for three years by Congress, occurring finally in 2000. This change makes it more likely that the gains achieved since 1996 can be retained after the recent flurry of “reinvention” dies down and new management takes over the Logistics Center in future years.

Two important lessons can be drawn from this example. First, dramatic improvements can be brought about in what *Federal Computer Week* characterized as a “sleepy operation” by highly skilled managers with the freedom to make major changes.<sup>36</sup> Second, the potential for major, ongoing change may be critically limited if Congress is unwilling to permit more fundamental changes, such as permitting an organization to be funded directly by its customers.

The Logistics Center example is suggestive of the kinds of improvements that could be brought about within the ATC system by the shift to a customer-driven, nonprofit corporation model—staffed mostly by the same people who currently provide ATC services. The keys to making this transformation would be (1) top-flight management talent committed to building a new corporate culture, (2) the flexibility provided by businesslike accounting, personnel, and procurement policies, and (3) the incentives provided by having to derive the revenue stream directly from customer payments—and hence the need to satisfy those customers on an ongoing basis.

This is precisely what has been recommended in this study: creating a nonprofit ATC Corporation with top management recruited from private industry, running it truly as a business, and obtaining its revenues directly from its customers.

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<sup>36</sup> Paula Shaki Trimble, “FAA retools biz model,” *Federal Computer Week* (July 24, 2000), p. 30.

## About the Authors

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## Acknowledgements

**T**his project has benefited from extensive, ongoing input from an informal group of about two dozen advisors, including transportation consultants, airline officials, people within the federal government, airline and private pilots, and representatives of a number of aviation stakeholder groups. While not all of these individuals agree with all the points made in this policy study, their advice has been extremely valuable and is gratefully acknowledged. Needless to say, all statements in this policy study (and any possible errors or omissions) are the responsibility only of the authors.

# Other Relevant RPPI Policy Studies

*Airline Deregulation: The Unfinished Revolution.* By Robert W. Poole, Jr. and Viggo Butler, Policy Study No. 255, March 1999.

*Reinventing Air Traffic Control: A New Blueprint for a Better System.* By Robert W. Poole, Jr. and Viggo Butler, Policy Study No. 206, May 1996.

*How to Spin Off Air Traffic Control.* By Robert W. Poole, Jr., Policy Study No. 166, August 1993.

*Building a Safer and More Effective Air Traffic Control System.* By Robert W. Poole, Jr., Policy Study No. 126, February 1991.

*Privatizing the Air Traffic Control System.* By Robert W. Poole, Jr., Policy Study No. 101, November 1986.

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