Privatization v. Corporatization of the Federal Aviation Administration: Revamping Air Traffic Control

Janie Lynn Treanor

Follow this and additional works at: https://scholar.smu.edu/jalc

Recommended Citation
https://scholar.smu.edu/jalc/vol63/iss3/6

This Comment is brought to you for free and open access by the Law Journals at SMU Scholar. It has been accepted for inclusion in Journal of Air Law and Commerce by an authorized administrator of SMU Scholar. For more information, please visit http://digitalrepository.smu.edu.
PRIVATIZATION V. CORPORATIZATION OF THE
FEDERAL AVIATION ADMINISTRATION: REVAMPING
AIR TRAFFIC CONTROL

JANIE LYNN TREANOR

TABLE OF CONTENTS

I. INTRODUCTION .................................. 634
II. SIGNIFICANCE OF THE AIRLINE INDUSTRY ... 634
III. HISTORY OF THE FAA ........................... 635
IV. ATC CURRENTLY PART OF THE FAA ........... 636
   A. Problems With the Current ATC Program ....... 637
      1. Aging Equipment .......................... 637
      2. Procurement Policies ...................... 640
      3. Budget Restraints ......................... 641
      4. FAA's Mismanagement ..................... 644
V. SOLUTIONS: PRIVATIZATION V. CORPORATIZATION .............................. 646
   A. Privatization in General .................... 646
   B. Corporatization in General ................. 647
   C. Privatization or Corporatization As A Solution to ATC Problems ........... 649
      1. History .................................. 649
      2. Organization of a Corporatization Proposition ............................. 650
      3. Privatization Deficit Reduction Benefits .... 651
      4. Concerns About Plans of Privatization ...... 651
         a. Safety .................................. 651
         b. Political Factors ...................... 654
         c. Right to Strike ....................... 654
VI. COMPARATIVE SYSTEMS ................................ 655
   A. CANADA ........................................ 655
   B. GERMANY ..................................... 660
   C. NEW ZEALAND .................................. 660
   D. SOUTH AFRICA ................................ 661
   E. UNITED KINGDOM .............................. 661

633
I. INTRODUCTION

The United States air traffic control system is in serious trouble. With air travel increasing daily, obsolete navigational equipment from the 1960s, and troublesome government procurement procedures, the Federal Aviation Administration (FAA) needs to respond to the important issues facing the U.S. air traffic control system. One response that could solve, or at least significantly lessen, these problems is privatization of the system.

Privatization can produce significant savings for both the government and the consumer while drastically increasing efficiency. Savings of thirty to forty percent over government performance can be achieved under several privatization schemes. At the heart of these privatization plans is competition. Competition drives the private sector and breeds efficiency. Injecting competition into the air traffic control arena may be the answer that management of the congested airways needs.

II. SIGNIFICANCE OF THE AIRLINE INDUSTRY

The airline industry produces twenty-two million jobs, carries 1.25 billion passengers, and accounts for one trillion dollars per year in economic production. It is estimated that between 1993

---


and 2005, U.S. air travel will rise by sixty percent. The organization responsible for regulating and managing this multi-million dollar industry is the FAA, which is within the Department of Transportation. The FAA employs approximately 46,000 people and has broad regulatory duties including aircraft and airport safety, pilot licensing, and maintenance of the air traffic control system.

III. HISTORY OF THE FAA

In 1938, Congress created the Civil Aeronautics Authority (CAA), an agency within the Department of Commerce, to regulate air safety. The CAA had authority for aviation safety, inspection, aircraft certification, and air traffic control operations. In 1958, the Federal Aviation Agency replaced the CAA. Then, in 1966, Congress transferred most of its duties to the Department of Transportation. Congress abolished the CAA in 1984, and today the only federal agency responsible for regulating general aviation is the FAA, formerly known as the Federal Aviation Agency.

A 1958 statute delegated great authority and responsibility to the FAA. The statute created agency obligations such as regulating air commerce safety; achieving efficient use of navigable airspace; implementing plans to control the environmental effects of civil aviation; and developing and operating a system of air traffic control, both for commercial and military navigation.

The FAA establishes air traffic control facilities at specific locations, determines facility designs and services to be offered, determines the number of controllers and their function at each facility, and decides what type of services to provide at each facil-

---

3 See Frederico Peña, The Case for an Air Traffic Corporation, ROLL CALL, Mar. 21, 1994, at *2.
5 See id.
9 See Shea, supra note 6, at 751-53.
10 See Creswell, supra note 8, at 52.
The air traffic control system (ATC) is the largest department within the FAA. The FAA's broad powers range from aviation safety to military defense. Thus, FAA policy is often influenced by competing interests from various facets of government including the Department of Transportation, the Department of Defense, the Department of Justice, the Office of Management and Budget, and congressional members and committees. These conflicting parties often exert a considerable amount of influence over FAA actions. The impact of these spheres of influence on the FAA is discussed later in this Comment.

IV. ATC CURRENTLY PART OF THE FAA

The air traffic control system is responsible for directing the 170,000 flight operations that affect more than 1.4 million Americans each year. Because the ATC is the largest department within the FAA, nearly forty-five percent of the FAA's budget goes to the ATC. Furthermore, air traffic control personnel account for almost 38,000 of the FAA's 53,000 employees. Of the 38,000 ATC-related employees, three-fourths of these workers operate the air traffic control system, and the remaining one-fourth maintain the equipment.

Because the FAA controls ATC, it is subject to federal operating guidelines. In its efforts to improve and modernize operations, the ATC has suffered from the "bureaucratic lethargy of the federal procurement process, civil service rules, and congressional and White House meddling." Although these guidelines were enacted for various noble reasons, they have instead introduced an increasing amount of inefficiency.

---

13 See Creswell, supra note 8, at 53.
14 See infra part IV.A.4 and accompanying text.
15 See Peña, supra note 3, at *2.
17 See Peña, supra note 3, at *2.
18 See Hodge, supra note 4, at 167.
19 Id.
A. PROBLEMS WITH THE CURRENT ATC SYSTEM—WHY WE NEED CHANGE

1. Aging Equipment

Historically, it usually takes the air traffic control seven years from the time an administrator concludes there is a need for a computer component until it is received. During this length of time, technology becomes obsolete. High technology, by its very nature, is in a continuous state of rapid evolution in almost all applications. The organization of our democratic government with its checks and balances and procedures does not lend itself to managing an industry that requires high technology in a constantly changing marketplace.

Most ATC computer equipment is over twenty years old. This age significantly reduces the safety of air traffic and has contributed to numerous near-airline accidents. Several incidences of power shortages and computer malfunctions have created potentially disastrous situations above busy airports. For example, computer malfunctions at Chicago’s busiest airports

21 See id.
23 See Thomas G. Donlan, FAA’s Aged Equipment Symbolizes the Failure of Government Management, BARRONS, Aug. 28, 1995, at 47.
24 See id.
25 See Glenn Jochum, Change Comes Slowly to Air Traffic Control, BUS. NEWS, July 1, 1996, at *1, available in 1995 WL 8419591. Air traffic controllers complain that air traffic computers have been malfunctioning for decades, citing this as one of the reasons for the 1981 strike of ATC workers. See Michael Sangiacomo, Almost Ready For Takeoff: New Computer at Air Traffic Control Center May Be Operational Ahead of Schedule; Equipment to be Replaced with Radar by 2001, PLAIN DEALER, Jan. 29, 1997, at B1, available in 1997 WL 6576751. Multiple computer failures in Chicago’s busiest airports raise questions over the reliability of air traffic control technology. See Gary Washburn, Computer Failure Sends FAA’s Aurora Center Scrambling: Latest Problem Follows Trouble at Elgin Facility, CHI. TRIB., Jan. 23, 1997, at 3. Aging air traffic control equipment malfunctioned in Long Island, forcing the controllers to use a manual backup system to handle the incoming flights. Unfortunately, these failures have become common in New York and across the country in recent years as computers age. See Juan Forero, Failure of Computer on Long Island Causes Delays at Newark Airport, STAR-LEDGER (Newark, N.J.), May 21, 1996, at 10. The outdated radar computers have become known for numerous computer malfunctions during the past three years at Fort Worth’s Air Route Control Center. See G. Chambers Williams III, Radar Fails for 1 Hour, Delaying Dallas/Ft. Worth Flights, FORT WORTH STAR-TELEGRAM, May 18, 1996, at 13.
have caused controllers' screens to go blank at least eight times in 1995, leaving the planes in the air without guidance.\(^{26}\) In one situation, an American Eagle turbo-prop plane avoided a collision with a private plane only because an onboard collision avoidance system gave a warning.\(^{27}\)

Each day, technology is rapidly advancing in almost every area of the transportation industry, which contributes to more efficient systems.\(^{28}\) Although technological advances have significantly contributed to the airline industry,\(^{29}\) air traffic control technology has not been keeping pace.\(^{30}\) In analyzing these amazing technological lags, Transportation Secretary Frederico Peña said "it's like stepping into a time machine."\(^{31}\) Vacuum tubes and room-sized computers are some of the most visible indicators of the seriousness of this technological gap.\(^{32}\) "There are air traffic controllers out at Washington National using a Univac computer that's the size of a house trailer. That huge Univac packs barely one-tenth the computing power of a three-pound laptop you can buy in any Radio Shack today."\(^{33}\) These outdated forms of control not only cause delays but have also begun to pose serious safety concerns. According to Mark Scholl of the Air Traffic Controller's Association, computer failures have become "an extreme safety hazard . . . [because] we are asking controllers to work every day with equipment designed before they were born."\(^{34}\) Currently, the FAA remains the largest buyer of vacuum tubes, purchasing $19 million worth a year, which are used by thirty-year-old main frame com-


\(^{28}\) See Hearings Before the House Aviation Subcomm., 104th Cong. 82-89 (1995) (testimony of Gerald Baliles, former Chairman, National Commission to Ensure A Strong Competitive Airline Industry) [hereinafter Baliles Testimony] (discussing technological advances in several areas of transportation such as shipping, railroad, automotive, and aviation).

\(^{29}\) See id. In the past several decades, airplanes have been the recipient of significant technological advancements, such as the advent of the commercial jet engine and the applications of computer designs to aviation aircraft. See id.

\(^{30}\) See id.

\(^{31}\) Peña, supra note 3, at *3.

\(^{32}\) See Baliles Testimony, supra note 28, at 85.

\(^{33}\) Peña, supra note 3, at *2-*3.

In 1996, equipment failures, overhaul, relocation, and modifications resulted in over 2.5 million hours of outages. One may think that because there have been technological lapses, there would be an increase in personnel to pick up the slack where technological advancements have not. This is not the case. Unfortunately, working without additional technology, there are 2000 fewer full-time air traffic controllers today attempting to manage thirty-six percent more traffic than existed in 1981. Systems specialists are maintaining 12,000 more facilities than they were in 1981 with 5,600 fewer specialists. Today's controllers are feeling the pressures of six-day work weeks, increased workloads, and intense air traffic. The premise of the lower staffing ratios was that a technological revolution would occur and that the ATC would be able to manage with fewer controllers. This revolution, unfortunately, has not occurred, and air traffic controllers today are forced to manage and direct today's air traffic with 1960s technology.

This outdated equipment has led to significant economic losses. "Depending on whose numbers you believe, delays caused by air traffic control cost airlines and passengers from $300 million to $1.5 billion a year." Although many delays are weather related, new "state of the art systems could make a significant dent in delays due to weather conditions and congestion. . . . [T]hese technologies could increase peak-hour capacity during poor weather by up to 40 percent at some busy

---


36 See generally Air Traffic Control and Aviation Oversight: Hearings Before the Senate Subcomm. on Transportation Appropriations, 105th Cong. 5 (1997) (testimony of Barry Krasner, President, National Air Traffic Controllers Association) [hereinafter Krasner Testimony].


39 See Krasner Testimony I, supra note 36.

40 See Krasner and Johnson Testimony, supra note 38.

41 See id.

42 David Field, Gore Set to Unveil Air Traffic Control Plan, WASH. TIMES, May 3, 1994, at B7 (emphasis added).
Currently, during times of air congestion, "safety is only maintained . . . by spacing out planes and keeping them on runways." Former Transportation Secretary Jim Burnley predicts major congestion and horrendous delays for travelers if reform is not initiated now.

The ATC system is often perceived as unresponsive with regard to scheduling and routing needs, but it is the lagging technological implementation that makes this perception a reality. Since World War II, the methods of separating aircraft and assigning routes have virtually remained the same. "Without technological improvements, the reduction of separation criteria in order to more effectively use airspace—long urged by the aviation community—is an impossibility. Current equipment limitations prohibit even considering such reductions."

In addition to delay increases, by the year 2015, the number of passenger planes is expected to more than double to 23,000, thus sharply increasing the potential number of accidents. "According to some estimates, by 2005 there will be a major airplane accident somewhere in the world once every two weeks. By 2015, there could be a major accident every week." These predictions send a startling message. Unless the nation listens and responds with a plan to efficiently manage the ever-increasing amount of air congestion, the United States will cease to lead the world in aviation safety. As the technology utilized by the nation's air traffic controllers continues to become more obsolete, and air travel congestion rises, the risks of a foreseeable disaster rise significantly.

2. Procurement Policies

"Federal procurement policies were originally developed to ensure fairness and to diminish the likelihood of bias . . . in federal purchasing or contract awards." These policies, how-

45 See id.
47 Id.
49 Id.
50 Charles & Newman, supra note 12, at 41.
never, "have become counterproductive by driving costs up and reducing organizational effectiveness."

At the heart of the FAA's failure to use computer technology effectively "is a procurement system that does not procure." President Clinton has cited government procurement restrictions and red tape as factors that inhibit the FAA's ability to modernize. Bidding laws often create delays of up to five years by requiring written specifications and evaluations of plans, submission of detailed documents for solicitation, and contract awards. For example, the FAA cannot accept the first bid on any contract, even if it is clearly the best price and quality of equipment available in the world. [It] must solicit bids from a vast universe of potential contractors, and even then may see the winning bid delayed in an elaborate appeals process by losers.

These procurement procedures have been criticized because they are "so cumbersome that by the time the FAA finalizes its contracts, it is often buying out-of-date equipment." In addition to slowing technological advancements, federal government procedures also "hinder the FAA's ability to hire and reassign personnel." Thus, these costly federal procurement requirements contribute both to a lagging system of technological advancement within the ATC system controls, and also to the current shortage of qualified air traffic controllers. Although there have been recent changes with the FAA's procurement procedures, the effectiveness of the attempted reform remains to be seen.

3. Budget Restraints

Currently, the ATC is under the budget control of Congress. Unfortunately, congressional interference in ATC management has proven to be another hurdle to efficient operations. David Linowes, Senior Policy Advisor to the Institute of Govern-

---

51 Id.
52 Donlan, supra note 23, at 47.
55 Peña, supra note 3, at *3.
56 Bureaucracy to Boardroom, supra note 43, at 55.
57 Charles & Newman, supra note 12, at 41.
58 See infra part V.
59 See id.
ment Public Affairs, has said that "the problem is with the agency structure and legislative restrictions. Congress has a penchant for micro-managing its agencies."60 Congressional restraints have resulted in the FAA’s inability "to compensate ATC employees equitably with respect to high-cost living areas, and to implementation of technical resources in inappropriate locations in response to more powerful Congressional leaders exercising budgetary control."61 In addition, Congressional funding is an unpredictable, year-to-year process that makes long-range planning impossible.62

These budget restraints have severely hindered any progress or technological advancements encouraged by the private market. "The FAA and its technologically backward air traffic control system are constrained by an inflexible bureaucracy and stifled by rigid civil service and procurement rules."63 Severe restraints and limitations are imposed on the agency’s ability to spend the funds it receives through the federal budget process.64

Many of the proposed plans that call for removing Congressional control of the ATC from Congress are defeated before the perspective chambers even vote. Persuading Congress to reduce its control is often very difficult.65 As one commentator noted, such a "plan would remove power from people who are very good at keeping power."66

There is a significant amount of unpredictability that accompanies the federal budgetary process.67 This unpredictability often hinders long-term planning abilities for all who are controlled by Congress.

High technology, by its nature, is in a continuous state of rapid evolution in almost all applications. When tied to governmental bureaucracy it can be severely restrained. As a department wholly contained within a federal agency, and, perhaps more importantly, as an organization funded by tax revenues, the air traffic control organization is tied directly to the Congressional budget process. As the goals and priorities of Congress change...
with each fiscal year and election period, budgetary planning for ATC becomes tenuous, at best.68

In addition, it is not surprising that when an ATC area is placed "under the control of Congress, despite the presumed education, sophistication, and good intentions of [members of Congress, there is] an irresistible temptation to meddle with that area’s internal structure, regardless of the knowledge or experience of particular individuals."69 This Congressional "micro-management has been broadly cited by government and industry as a major hurdle to efficient conduct of the nation’s air traffic control system."70

Although Congress has succeeded in passing some legislation to expedite the lengthy process of ATC modernization,71 the budgetary dilemma rages on. Congress recognizes the existence and the seriousness of the FAA’s long-term financing problems and has created the National Civil Aviation Review Commission to address concerns and offer financial solutions to the Secretary of Transportation.72 In addition, Congress has directed an independent assessment of the FAA’s financial requirements.73 It is difficult to estimate the severity of the FAA’s modernization funding crises. The FAA has already estimated a $9 billion shortfall between its existing requirements and funding levels through 2002.74 FAA officials estimate that this $9 billion potential shortfall could increase by an additional $4 billion if the agency tries to accelerate the National Airspace System modernization.75

Notably, the Clinton Administration strongly supports funding air modernization efforts through user fees.76 The Adminis-

---

68 Id. at 41.
69 Id. at 42.
70 Id.
71 See infra part VII.
73 See id.
74 See id.
75 See id.
tration has requested $300 million in user fees for fiscal year 1998 and supports a 100% user funded system for 1999.\textsuperscript{77}

4. \textit{FAA’s Mismanagement}

The FAA has been plagued with its share of management difficulties. Most of these difficulties are related to the excessive bureaucratic procedures and policies. The FAA culture has been referred to as “averse to risk... often [pitting] one internal organization against another,... [and inhibiting] the effective flow of information.”\textsuperscript{78} Both President Clinton’s National Performance Review and a federal commission studying the airline industry concluded that the FAA, as a government agency, has little incentive to provide air traffic control services efficiently.\textsuperscript{79}

A former airline commission member, Daniel Kasper, explained that the “air traffic control system is the equivalent of the production line for the airline industry.”\textsuperscript{80} Usually, if there is an investment, such as new equipment, which will lower a firm’s production costs, then the firm will invest in the new equipment to increase their production line efficiency.\textsuperscript{81} The problem is that airlines cannot invest in much needed new equipment because they do not own the production line; the FAA does.\textsuperscript{82}

An example of the internal mismanagement is the FAA’s plan to modernize air traffic control. This plan, known as the Advanced Automation System (AAS), has been the victim of poor predictive planning, the cost has risen from $2.5 billion to $7.6 billion, and the estimated time of completion has been moved from 1994 to 2002. Critics say that “[t]he FAA is a mess. In the 1990s, its top improvement projects have, on average, run five years behind schedule and 52% above budget. Its effort to replace automated ATC facilities has burned through $7.6 billion since 1983 and is still eight years behind schedule.”\textsuperscript{83}

\textsuperscript{77} See \textit{id}.
\textsuperscript{78} \textsc{Gerald Dillingham, United States General Accounting Office, Aviation Research: Perspectives of FAA’s Efforts to Develop New Technology} (1995).
\textsuperscript{79} See \textit{Bureaucracy to Boardroom, supra} note 43, at 55.
\textsuperscript{80} \textit{Id}.
\textsuperscript{81} See \textit{id}.
\textsuperscript{82} See \textit{id}.
\textsuperscript{83} Lane, \textit{supra} note 35, at 48.
The time for change has arrived. The ATC has fallen significantly behind technologically, and the current federal bureaucratic restraints are only harming the American public. It is not that the FAA and the ATC are not trying to improve, but given the nature of the federal governmental guidelines, budget restraints, and procurement procedures, the ATC has not been afforded the opportunity to keep pace. Gerald Baliles, former chairman of the National Commission to Ensure a Strong Competitive Airline Industry, has stated that “unless we make major changes, we will be putting not only the efficiency but the safety of the air transportation system at risk. Some argue that we put those things at risk by acting. I believe the risk of inaction is much greater, and far more certain.”

“In America, too many government agencies are trying to solve today's social and fiscal problems with outmoded structural designs and solutions. We must break away from archaic concepts and apply constructive alternatives . . .” In 1991, a National Academy of Sciences panel found that the shortcomings of the FAA are a result of managerial problems inherent within any government agency. Over the years, commentators have identified numerous problems contributing to the modernization crises. These causes include technical difficulties, management problems, and the lack of stability and continuity in the FAA's top management. Since 1987, there have been seven FAA Administrators, averaging one every sixteen months.

But there is good news. Modern communication technology that can revolutionize our skies exists, adding hundreds of new services and products that can be maintained and managed by the private sector. “The bad news is that the FAA is standing in the way” of the badly needed changes. “Beset by equipment failures, inefficiencies, featherbedding, and an insatiable fiscal appetite, America's air traffic system overcontrols, overregulates, and overtaxes its customers.” Although the ATC system is still

84 Baliles Testimony, supra note 28, at 85.
85 Linowes, supra note 20, at 86.
86 See Flying the Tangled Skies, supra note 44, at A10.
87 See Anderson Statement, supra note 72, at 490.
88 See Lane, supra note 35, at 48.
90 Id.
91 Id.
safe, criticism is mounting as Washington debates, ATC equipment ages, and the system grows increasingly inefficient.\(^2\)

It is ironic that the purpose behind government control was to give people better goods and services at lower prices.\(^3\) The idea was that without the cost of profits, competition, and advertising, "government could outperform the private sector."\(^4\) This has not been the case, and as a matter of fact, the exact opposite has resulted. Because competitive stimuli and commercial pressures are absent, government-owned facilities have been less effective as well as more expensive.\(^5\) Two of the most prevalent solutions offered to solve these problems are privatization and corporatization.

V. SOLUTIONS: PRIVATIZATION v. CORPORATIZATION

A. Privatization in General

Privatization refers to "the transfer of government assets [or] operations to private business interests."\(^6\) Usually, privatization is a reaction to government control that has "become entangled in its own power, stifling creativity and productivity."\(^7\) Too often, government agencies responsible for serving people are unable to deliver effective services. The result is inefficiency. Privatization is often seen as an effective alternative to the outmoded structural designs and solutions frequently implemented to combat the continual problems facing government agencies. It is important to note, however, that although privatization calls for removing governmental control and creating a corporation, the government must always be responsible for making policy and monitoring standards for anything that affects the public welfare.\(^8\) Although operations of those functions may be turned over to the private sector, governmental safety regulation is imperative.

Reasons for the governmental breakdown stem from the fact that a government agency does not have to keep abreast of the latest technology, to find the latest cost saving developments, or to innovate. The pressures existing on the private sector are not


\(^{93}\) See Linowes, *supra* note 20, at 87.

\(^{94}\) Id.

\(^{95}\) See id.

\(^{96}\) Id.

\(^{97}\) Id.

\(^{98}\) See id.
present within the government, nor are there funds within the government with which to experiment and conduct research.

Compared to government supply systems, privatization schemes offer superior means of delivering services such as air traffic control because there are greater incentives that exist within the private sector, resulting in lower costs and innovative production.99 "Privatization's biggest strength is that it introduces competition into government services . . . [which] forces firms to work harder . . . mean[ing] that the quality of service goes up."100 A privatization plan would remove the ATC from government control, thus adding competition and removing the bureaucratic red tape that keeps government agency modernization moving at such a slow pace.

There are primarily three forms of privatization: contracting out, divestiture, and corporatization. Contracting-out is the most frequently undertaken form of privatization. This refers to the government contracting out specific support functions to private companies to obtain services that may increase efficiency. Divestiture (full privatization) refers to complete privatization of government operations or assets to private ownership. Usually, this takes the form of selling off an organization or function of the government,101 as our Canadian counterparts have done.

B. CORPORATIZATION IN GENERAL

Corporatization, a more modest version of privatization, refers to transferring government operations to serve primarily commercial public functions.102 Corporatization does not call for a complete government withdrawal. Instead, corporatization of the ATC calls for restructuring the air traffic control as a government corporation. This arrangement would allow the government to retain control and ownership of the ATC, but would remove the budget restraints that the system currently exper-

101 See White et al., supra note 1, at B7.
102 See id.
iences. Corporate principles of finance and procurement would replace government procedures.

In 1993, the Clinton Administration established the National Commission to Ensure a Strong Competitive Airline Industry. The commission was given ninety days to produce a report to the President and Congress. The Commission made several recommendations, which all centered on four themes: "efficiency, technological superiority, financial strength, and access to global markets." The commission finally concluded that creating a government corporation was the most feasible solution.

The Commission further concluded that this federal corporate entity operate according to several principles:

1. The corporation should have the ability to create and use a predictable, stable source of revenue for operations, maintenance and capital investment;
2. The corporate entity should have the ability to issue long term bonds for capital purchases;
3. Expenditures and revenues should be removed from the federal budget in equal amounts for a fiscally neutral effect;
4. The corporate entity should have the flexibility to attract and retain high-caliber leadership and staff;
5. The corporate entity should have the flexibility to create systems for procurement, staffing, and budgeting consistent with the best practices in the private sector;
6. There should be flexibility in an orderly transfer of operating functions to the corporate entity; and
7. Air traffic control services to the Defense Department should be continued in order to meet national security requirements and retain flexibility to attract and retain high-caliber leadership and staff.

---

104 See Baliles Testimony, supra note 28, at 83.
105 See id.
106 Id.
107 Id.
C. FULL PRIVATIZATION OR CORPORATIZATION AS A SOLUTION TO ATC PROBLEMS

1. History

Air traffic control is an area in which there has been growing concern with the government’s ability to effectively and efficiently maintain a safe, effective navigation system. Privatization was first put forth by Glen A. Gilbert, an aviation consultant, in 1975.\textsuperscript{108} He proposed a plan separating the ATC from the FAA, which was to be funded by user fees and tax revenues.\textsuperscript{109} In 1982, Robert Poole proposed a plan based on a nonprofit, user-funded, user-owned corporation.\textsuperscript{110} In 1985, the Air Transport Association (ATA), a nonprofit organization representing airline interests, proposed a plan for an ATC organization which would be completely user-funded.\textsuperscript{111}

Finally, in 1989, the federal government commissioned the Transportation Research Board (TRB) of the National Research Council to investigate and report on the operation of the airline industry since the beginning of deregulation in 1978. In 1991, the board published its report entitled Winds of Change: Domestic Air Transport Since Deregulation.\textsuperscript{112} The report stated that “the FAA had fallen steadily behind the airlines it was serving and regulating, and had lost much of its ability to keep pace with the needs of the industry.”\textsuperscript{113} The focus of the report was on the air traffic control system’s inability to technologically keep pace with the air traffic growth. The ATC was cited as being responsible for traffic delays, a condition sure to get worse as air travel increased.\textsuperscript{114}

“In 1992, the Aviation Consumer Action Project focused on the effect of the ATC problem most visible to the public-operational delays.”\textsuperscript{115} The project issued a report calling for the ATC to be spun off from the FAA. In 1993, yet another group—the Infrastructure Subcouncil of the Competitiveness Policy Council—concluded that the FAA needed fundamental change.

\textsuperscript{108} See Robert W. Poole, Jr., How To Spin Off Air Traffic Control, in THE REASON FOUNDATION 10 (1993).
\textsuperscript{109} See id.
\textsuperscript{110} See id.
\textsuperscript{111} See id.
\textsuperscript{112} See id. (citing WINDS OF CHANGE: DOMESTIC TRANSPORT SINCE Deregulation (1991)).
\textsuperscript{113} Id.
\textsuperscript{114} See id.
\textsuperscript{115} Charles & Newman, supra note 12, at 40.
Eventually, on May 3, 1994, the Executive Oversight Committee (EOC) produced a two-hundred-page report advocating and detailing the creation of the United States Air Traffic Services Corporation (USATS). This report mirrored the earlier findings of the TRB’s 1991 Winds of Change analysis emphasizing findings of the ATC’s inability to keep pace with the deregulated airline industry. The USATS report set forth a plan for solving the ATC crisis through a solution known as “corporatization.”

It is important to point out the distinction between plans calling for full privatization and those that take a more modest privatization approach, often set up as plans of corporatization. Many commentators use these terms almost synonymously with one another. Nevertheless, plans calling for true privatization call for complete government withdrawal from air traffic control. The ATC would be completely turned over to the private aviation industry. But full scale privatization proposals are often criticized for creating organizations that will make safety a bottom-line pressure. Thus, full scale privatization is a much less popular approach than corporatization.

2. Organization of a Corporatization Proposition

The USATS plan calls for privatization of the air traffic control system by creating a wholly owned not-for-profit government corporation to operate and maintain the system. The FAA’s role in maintaining safety and security would remain unchanged. The government corporation’s responsibilities would include operation and maintenance of the ATC system, purchasing navigational equipment, hiring, firing, and reassignments of those employees free of civil service regulations.

The operation of USATS would be governed by an eleven-member board of directors. The positions on this board will include a CEO, the Secretary of Transportation, the Secretary of Defense, four commercial airline seats, and several government and union seats. Board decisions would be based on the majority-rule principle. The FAA would retain regulatory control

---

116 See Darienzo, supra note 46, at 9.
118 See id.
120 See Darienzo, supra note 46, at 10.
121 See Charles & Newman, supra note 12, at 45.
over USATS, but Congress would lose control of the ATC's budget.\textsuperscript{122} Congress dislikes this proposal because it objects to the loss of authority over the largest portion of FAA and contends that it should have a role in the system affecting the facilities and costs of the traveling consumer.\textsuperscript{123}

The USATS plan essentially focuses on removal of the ATC from the Congressional budgetary process and relief from the restrictions of government procurement regulations and personnel laws. Acquisition guidelines would replace regulations for procurement and the no-strike provision would be retained.\textsuperscript{124} In addition, this privatization plan would eliminate the currently inefficient procurement system of waste.\textsuperscript{125}

3. Privatization Deficit Reduction Benefits

Privatizing the ATC, whether through full privatization or corporatization, could contribute to repairing the deficit by giving the government one outlet to raise revenue without a tax increase and without cutting the quality of services provided. Experts say that the sale of federal assets could raise significant sums of money\textsuperscript{126} and the sale of the ATC could be a part of that savings plan. An estimated $3.5 billion can be raised for the United States government by selling the ATC to its users.\textsuperscript{127} Those disillusioned with reform attempts, which have raged on for more than a decade and accomplished very little, recognize the utility of privatization and say that it is unfortunate that outright privatization of the ATC has received so little consideration.\textsuperscript{128}

4. Concerns About Plans of Privatization

a. Safety

Currently, the U.S. is proud to have the safest and most efficient air traffic control system in the world today. However, the cracks in the system are now starting to show, and if this nation intends


\textsuperscript{123} See Avery Vise, ATC's Future Hostage to Turf Sensitive Congress, AV. WK. & SPACE TECH., May 16, 1994, at 39.

\textsuperscript{124} See Charles & Newman, supra note 12, at 45.

\textsuperscript{125} See id.

\textsuperscript{126} See Oliver, supra note 100, at A1.

\textsuperscript{127} See id.

\textsuperscript{128} See McClanahan, supra note 92, at J2.
to maintain its leadership status in the aviation arena, meaningful reform of the FAA is a must.\textsuperscript{129}

America has relied primarily on the private sector to create aircraft technology that leads the world, cost-effective airlines that span the globe, corporate and general aviation that supports the world's most competitive economy, and an aviation infrastructure that keeps mankind's most complex machines in the air, day in and day out. This private initiative and creativity is now ready to help repair our aviation system's weakest link, an outdated air traffic control structure.\textsuperscript{150}

Safety is the primary concern for those who believe that effectiveness will be impaired as FAA officials cross from the FAA government bureaucracy to the ATC corporate organization.\textsuperscript{131} The fear centers around the risk of cost control pressures leading to a reduction in safety standards. In arguing for corporatization rather than a full privatization scheme, the union representing air traffic controllers believes that air traffic control and aviation safety are inherent government functions, and contend that continued government ownership is a necessity.\textsuperscript{132} In his address before the House of Representatives, Barry Krasner, President of the National Air Traffic Controllers Association (NATCA), stated that the controllers

fully understand the budget pressures that seem to be driving the concept of a private air traffic control corporation. However, prior to considering this drastic leap, two questions must be answered. Can a fully private ATC system provide better and/or safer services? Are the budget savings worth the risk? Both NATCA and PASS (Professional Airways Systems Specialists) believe that the answer to both of these pivotal questions is a resounding NO.\textsuperscript{133}

Although NATCA and PASS do not support full scale privatization because of fear that a private company, whether for-profit or not-for-profit, will make safety answerable to the bottom line, they are both on record as supporting the Clinton Administration's plan to corporatize the ATC.\textsuperscript{134}

\textsuperscript{129} Krasner Testimony I, supra note 36, at 5.

\textsuperscript{130} See Coyne, supra note 89, at A14.


\textsuperscript{132} See Krasner Testimony II, supra note 103, at 235.

\textsuperscript{133} Id.

\textsuperscript{134} See id.
There are several different versions of privatization plans, and many areas of the aviation industry disagree over which approach is the best approach to take to solving a universally recognized inefficient system of control. Of these various plans utilizing varying degrees of privatization, one thing that the entire aviation community agrees on is that full scale for-profit privatization is not the answer. A government corporation, on the other hand, would allow the government to retain control over safety yet free the ATC from the cumbersome federal rules of procurement and personnel activities.

One privatization scheme proposed by the Reason Foundation centers around the principle of “user pay means user say.” Robert Poole, founder of the Reason Foundation and co-author of the proposal emphasized that “[t]he only way to solve the underlying problems of our dysfunctional air traffic control organization is to change its corporate culture by taking ATC outside of government and turning funding and control over to aviation users.” This plan calls for implementing a fee-structure developed by the board of a user-controlled, not-for-profit ATC corporation modeled after the Canadian company, Nav Canada, which recently took over ATC in Canada. The plan’s safety depends on a user-driven corporate system. Poole stated that “[s]afety is inherently a function of technology. A commercial corporate culture would put in place and keep in place state-of-the-art technology that meets the needs of users, rather than wasting years and billions on systems that do not work.”

One thing this system does value, as do all of the various proposed privatization and corporatization plans, is the need for continued FAA involvement in safety regulation. The various plans differ as to the amount of involvement the government should have in funding and control of the system, but virtually every plan recognizes the need for some amount of safety supervision by a governmental agency such as the FAA.

135 See id.
138 Id.
139 See id.
140 Id.
b. Political Factors

Despite the apparent overall benefits of corporatization, the airline industry itself remains skeptical. Much of this hesitancy stems from how the Clinton Administration's plan organizes the board of directors. There is much concern pertaining to balanced and proportional representation on the board. The Administration's plan (USATS) calls for "a government-owned corporation, supported by user fees and governed by a board of directors that represents the system's customers."141 Representatives of smaller users expect it to be biased in favor of large air carriers. Although the current plan calls for four of the at-large board seats to be filled by members of the airline community, the airline industry is withholding endorsement of USATS until more details can be obtained.

Likewise, airline pilots are noncommittal about the ATC corporation. Airline Pilots Association President, Randolph Babbitt, said pilots "believe that analyzing the problem and finding solutions should precede a decision on a governmental corporation or a privatized ATC system."142

c. Right to Strike

Those opposed to plans of privatization are very concerned about the legal rights that private employees have to strike. In any private corporation arena, the employees have the right to strike. National Air Traffic Controllers President, Barry Krasner, said that in a government corporation, workers "would forgo the right to strike in exchange for binding arbitration; but in a private corporation, workers would not accept that exchange."143 A semi-government controlled ATC corporation proposal would continue to prohibit controllers from striking.144 Although the wisdom of outlawing strikes by government workers is debatable, such a ban exists and would continue to exist under any privatization plan.145 The policy behind this ban supports the notion that the ATC is a vital part of the American

142 NATCA Faults Privatization, supra note 136, at 270.
143 Id.
145 See Clinton's Union Homage, Orange County Register, May 12, 1993, at B8.
infrastructure and a strike by ATC employees could endanger the public safety.

VI. COMPARATIVE SYSTEMS

A. CANADA

Canada is the first country to achieve a completely privatized air traffic control system. On November 1, 1996, the Canadian government sold the nation’s air traffic control system for $1.5 billion Canadian ($1.12 billion U.S.). The government transferred all air navigation operations, equipment, and 6,400 employees to a new company called Nav Canada. In addition to the purchase price of $1.5 billion, Nav Canada was forced to obtain an additional $1.5 billion in financing as reserve funds to support continuing operations.

Nav Canada is a nonprofit organization made up of Canada’s major airlines, private aircraft owners, the pilots’ union, and the air traffic employees. Nav Canada has a “legislated monopoly over air traffic control . . . [with] . . . the right to set fees for planes that fly through Canadian air space.” The company will rely completely on user fees to meet operating costs and profits will be used to modernize the system. The company has been carefully structured with a board that has representation from all aviation interest groups in order to avoid domination by any one.

The corporation is accountable to a fifteen-member board of directors. “Ten [of these] members are appointed by a cross-section of stakeholders—four by commercial air carriers, three by the Canadian government, two by unions representing Nav Canada’s employees and one by business aircraft owners.” Those ten board members select four more board members who cannot be stakeholders, and those fourteen then appoint the

---

147 See Ed Carson, O’ Canada! Privatizing Air Traffic Control, REASON, Apr. 1, 1996, at 23.
150 See Poole & Butler, supra note 63, at A14.
151 Bruce D. Nordwall, Canada’s ATC First to Go Fully Private, AV. WK. & SPACE TECH., Nov. 4, 1996, at 25.
president and chief executive officer, who becomes the fifteenth board member.

Critics say that the structure raises serious questions of accountability because there is little external market discipline, leaving the board only constrained by its members. Although the Nav Canada board does represent a cross section of the aviation industry, critics fear that this structure will ultimately result in a closed system.\footnote{152 See Westell, supra note 149, at 14.}

This privatization scheme moves Canada beyond other countries that have commercialized their ATC systems by running them as government-owned corporations. Nav Canada is completely "operated and financed by its business users."\footnote{153 Elizabeth Aird, Air-Traffic Control Now in Private Hands, MONTREAL GAZETTE, Nov. 2, 1996, at D4.} Fees will be imposed on those aircrafts that use the air traffic control system rather than the now outdated method of generating revenue through an airline ticket tax. The eight percent transportation tax consumers used to pay on air tickets will be phased-out within the next two years and commercial airlines and business aircraft owners will pay user fees to cover the cost of operating the ATC.\footnote{154 See id.}

Nav Canada has been strategically structured as a not-for-profit corporation. This "zero-profit basis"\footnote{155 Nordwall, supra note 151, at 25-26.} will contribute to the continued safety of air traffic control by removing any motivation to maximize profits by cutting safety features. "Sheltered from the need to give shareholders a competitive return on investments, the theory is that Nav Canada will be able to apply what would have been profit to reduce user fees and operating costs and upgrade the air navigation system."\footnote{156 Id.} Consumer groups warn, however, that commercial airlines will pass on the cost of user fees to passengers through an increase in ticket prices.\footnote{157 See Aird, supra note 153, at D4.} Response to this criticism by Nav Canada Chairman John Crichton is that airline ticket prices are not likely to go up because the fees should not exceed the previously assessed eight percent ticket tax.\footnote{158 See id.} No one really knows for sure what will happen to Canadian ticket prices until the system has been fully implemented and evaluated.
The 6,400 transferred federal employees will maintain the same pay, benefits, working conditions, and seniority as under the government system. These employees include 2,300 air traffic controllers, 950 flight service specialists, 950 electronic technicians, and other staffers. The expected results of this Canadian ATC venture are diminished costs, improved performance for the airlines, and lower ticket prices for passengers, without a compromise in safety.

Because Nav Canada now owns Canadian air traffic control, the corporation’s primary responsibilities are operating Canada’s “Civil Air Navigation System (ANS), which includes the air traffic control (ATC) and flight information systems, electronic navigation/landing aids, providing aviation weather data, and publishing aviation information.” According to the President of Nav Canada, Kenneth B. Copeland, “[t]his puts Nav Canada in control of the world’s first fully privatized air navigation system in the world.” Nav Canada is responsible for the safe and efficient movement of aircraft, but all regulatory functions, including establishing and monitoring safety rules, will remain with the Canadian government. In addition, Nav Canada takes on the obligation of researching and developing new technological advances to modernize the ATC system.

Nav Canada has not wasted any time implementing modernization plans. Less than two weeks after purchasing the ATC from the Canadian government, Hughes Aircraft of Canada won a $486 million contract from Nav Canada to implement an advanced air traffic management system known as CAATS (Canadian Automated Air Traffic System). This management system will automate flight data processing between all major ATC facilities nationwide. It will also replace aging equipment with advanced communications software and computing equipment that will make it possible to control planes without the use of radar.

---

160 See Canadian Air Traffic Control System Plans IPO, supra note 148.
162 Nordwall, supra note 151, at 25.
163 Id.
164 See id.
166 See id.
Morale among the air traffic personnel appears to be high. Dave Lewis, president of the Canadian Air Traffic Control Association, said that the 2,200 air traffic controllers are happy about the change—a change that they have lobbied for since 1991. Lewis emphasized that safety was the primary reason for the controllers advocating this drastic shift to commercial ownership. He indicated that with the government remaining the regulator and legislator, and with the corporation (Nav Canada) as a non-profit organization, Canada will continue to have the safest air traffic control system in the world.

Along with the operational control change of the ATC comes liability. Because of this shift, Nav Canada has arranged for extensive insurance coverage. This coverage has been procured from a London-based insurer.

Nav Canada attacked its $3 million financing debt by planning public offerings. The offering was led by the Royal Bank of Canada, which “agreed to arrange $3 billion in financing from a syndicate of Canadian and international banks through three credit facilities.” The bond issue has exceeded expectations according to John Morris, Nav Canada’s Director of Communications. By December 16, 1996, less than seven weeks after Nav Canada’s purchase, the initial public offerings of revenue bonds were completed and fully subscribed to. Morris says that investors are confident in the stability and future of Nav Canada.

So far, Canadian privatization appears to be operating smoothly. The privatization of the federal air traffic control system has been the key to a $2.4 billion improvement in deficit reduction. The sale to Nav Canada alone is being praised for adding $1.5 billion to federal budgetary revenues.

In addition to this praise, the transition has also been hailed a success with regard to job security. Because Nav Canada offered jobs to everyone and ninety-nine percent accepted, and because there will be virtually no change in working conditions, the

---

167 See id.
168 See Aird, supra note 153, at D4.
169 Canadian Air Traffic Control System Plans IPO, supra note 148.
170 See id.
172 See Canadian Air Traffic Control System Plans IPO, supra note 148.
privatization scheme won an award from ReDo, the federal agency responsible for helping the capital region digest more than 15,000 job cuts. Not only did Nav Canada not cut jobs, it also resisted efforts to move the headquarters out of Ottawa, saving 850 jobs.\textsuperscript{174}

With privatization schemes, the biggest winners appear to be consumers, who usually enjoy lower prices and improved services. Privatization allows more competition by removing the regulations and allowing the market to direct business. Removing government management will allow the ATC to have more flexibility and the ability to speedily implement new technological and other improvements.\textsuperscript{175}

Despite the numerous advantages to ATC privatization, there is a compromise: lessened privacy rights. Federal Privacy Commissioner Bruce Phillips said that "thousands of Canadians lose their rights under the Privacy Act when such agencies as the air traffic control system are transferred to the private sector."\textsuperscript{176} Documents that are kept secret under federal laws, such as union grievances, harassment records, and medical reports, will not be entitled to similar protections under the private domain. Nav Canada has offered to keep the records confidential, but to Phillips those assurances are just "words of comfort that are not legally enforceable."\textsuperscript{177} Nav Canada has not been forced to comply with privacy laws because of concerns that doing so would unfairly single it out. There is hope, however, for privacy protection advancement for the private sector.

Overall, despite privacy concerns, Nav Canada has proved to be very successful, and United States airline executives supporting privatization point to Nav Canada's success to suggest that the United States use the Canadian system as a model.\textsuperscript{178} The Canadian system has significantly reduced the federal deficit, replaced aging equipment, and lowered prices for consumers. If

\begin{flushleft}
\textsuperscript{175} See Mark Evens, \textit{Privatization and Deregulation Have Become Common Themes in the Transportation Sector; They Have Caused Significant Changes, Forcing Players Into New Territory to Retain Market Share}, \textit{FIN. POST}, June 1, 1996, at 34.
\textsuperscript{177} Id.
\end{flushleft}
the United States were to mimic that system, it is very possible U.S. ATC would reap the same benefits.

B. GERMANY

Germany has turned its air traffic control system into a government corporation. The new German ATC was established in 1993 and is operating on a nonprofit basis, but it is not legally prohibited from making profits. This new corporation cut German air traffic delays by twenty-five percent in its first year alone. Funding is from user fees and ninety percent of the ATC's income is generated by fees for enroute flight operations within Germany and internal landing fees.

C. NEW ZEALAND

New Zealand has met with unusual success in becoming the world's first fully commercial air traffic control organization. Its ATC firm has produced remarkable results, and has turned deficits into profits that have continued to grow year after year. Before becoming a corporation called Airways Corporation of New Zealand, the New Zealand government controlled the ATC system and posted operating losses of more than $40 million.

In the five years after privatization, the New Zealand ATC contributed more than $57 million to the government in dividends and taxes. Total annual operating costs decreased from $70.5 million to $47 million. These encouraging results are due to payroll reductions (1,055 employees to 656 employees) and because the cost per trainee has been reduced twenty-seven percent. The system is a government-backed for-profit corporation that does not draw on taxes but is funded only by user fees. After only six months of operation, New Zealand ATC reported a $3 million after-tax profit. New Zealand has re-

---

179 See Carson, supra note 147, at 23.
181 See Poole & Butler, supra note 63, at A14.
183 See id.
184 See Field, supra note 42, at B7.
186 See id.
187 See id.
188 See id.
189 See Field, supra note 42, at B7.
placed its outdated air traffic management system with computerized state-of-art technology. In its ten years of operation, Airways Corporation has reduced the cost of air traffic control by more than a third.\textsuperscript{190}

Because of its success in New Zealand, Airways Consulting, a subsidiary of Airways Corporation of New Zealand, is involved in the bidding for the privatization program of Malaysia’s air traffic control services, which is currently being managed by the Department of Civil Aviation. Last year, Airways Consulting introduced communications, navigation and surveillance/air traffic management in New Zealand, and is anxious to implement similar plans in Malaysia to reduce the congestion due to air traffic control infrastructure constraints.\textsuperscript{191}

D. South Africa

In 1992, the South African government transferred ownership of ATC to a commercial corporation that remains one hundred percent government owned. Funding is entirely generated through user fees, and responsibility for oversight and enforcement of safety matters remains with the government.\textsuperscript{192}

E. United Kingdom

One of the world’s largest international carriers, British Airways, which serves seventy-two nations and has a total of 155 different destinations, was fully privatized in 1987.\textsuperscript{193} Serving and transporting twenty-eight million passengers annually, British Airways is the leading carrier in the U.S.-U.K. market, flying nearly forty percent of the seats. Earning a profit every year for the past ten years has been partly attributed to greater flexibility as a privatized company.\textsuperscript{194}

Although Britain’s largest air carrier is fully privatized, plans to privatize the British air traffic control continue to flounder. Recently, the U.K.’s Civil Aviation Authority (CAA) proceeded with the privatization of the country’s air traffic control system, known as National Air Traffic Systems (NATS),\textsuperscript{195} through mak-

\textsuperscript{190} See Poole & Butler, supra note 63, at A14.
\textsuperscript{191} See NZ Firm, Local Partner Bid for Privatization Project Note: International Airport Technology & Ground Support Exhibition Malaysia, BUS. TIMES, July 27, 1996, at 3.
\textsuperscript{192} See Charles & Newman, supra note 12, at 39.
\textsuperscript{193} See Dempsey, supra note 2, at 74.
\textsuperscript{194} See id.
ing the NATS a separate publicly owned subsidiary of the CAA.\textsuperscript{196} The CAA is accepting bids from private companies to build two new ATC centers at Prestwick, Scotland.\textsuperscript{197}

This private finance initiative is the U.K.'s first "attempt to encourage private companies to undertake public sector capital expenditure for aviation."\textsuperscript{198} The U.K.'s goal for air traffic control is to implement a system that uses two air traffic control centers in case one of the centers is not available for service.

Under the new financing scheme, private companies will supply funds to design and build the equipment to be used at both new ATC facilities in Scotland. This new plan will make NATS, a formerly civil-military operation, strictly civil. The Ministry of Defense will pay £40 million per year for allowing military controllers to use NATS equipment to manage military air traffic.\textsuperscript{199}

Although the new scheme appears well-planned, there are those who strongly oppose the transition. Derek McLauchlan, chief executive of NATS, said that the scheme was "ill-suited to the complex nature of the ATC."\textsuperscript{200} McLauchlan's primary concerns are based on the complex nature and safety issues revolving around ATC systems. He would prefer a plan that would give NATS more control in figuring the detailed specifications of a bid instead of allowing investors to develop plans to meet general requirements.\textsuperscript{201}

Under government controlled methods of contracting work out to the private sector, detailed specifications are provided by the government for those private companies interested in bidding on the job. But with the private sector controlling the contract negotiations, comprehensive specifications are left to each private party interested in bidding. Proponents of privatization say that this is a positive factor because it stimulates competitive creativity and competition for ideas among the private bidders. "Implicit in this view is the notion that governments should shift their focus from specifying inputs to specifying some desired outcome, leaving the private sector providers with the opportunity of formulating means of realizing that outcome in the most


\textsuperscript{198} Id.

\textsuperscript{199} See Morrocco, \textit{supra} note 196, at 32.

\textsuperscript{200} Id.

\textsuperscript{201} See id.
cost-efficient way possible." This method of contract procurement abolishes old methods of the traditional contract-out regime where government agencies relied on standardized specifications or bureaucratic development of design specifications with the designers having little incentive to cut costs or maximize service innovations.

In addition to reservations about planning, McLauchlan fears the privatization scheme is too time-consuming, and says that if NATS were allowed to borrow financing from private banks, as the German system allows, the new Scottish ATC centers would already be two-and-a-half years further along.

Despite concerns, this new shift in U.K. air space control could prove to be an intermediary step in making NATS totally independent. Under this new partial privatization system, air space policy and regulatory activities previously undertaken by NATS have been transferred to a newly created body called the Joint Air Navigation Services Council. This council will be made up of representatives from NATS, Military Air Traffic Operations, and the Director of Airspace Policy.

F. UNITED STATES

In Washington, Republican leadership endorses full privatization, whereas President Clinton, favoring corporatization, has proposed turning the ATC into a government corporation. The FAA has established three key principles that must be followed in restructuring the ATC system toward a government-controlled private corporation:

1. The need to upgrade equipment and systems must be recognized as urgent and be acted upon;
2. The organization must have the ability to raise capital through private markets and through the Treasury;
3. The organization must have the ability to attract the highest quality managers and staff.

Unfortunately, no privatization plan of any kind has left the House Transportation Committee.

One concern has been that the governmental revenues generated by the sale of the ATC would not be enough to justify sell-

\footnotesize{202} Daniels & Trebilcock, supra note 99, at 375.
\footnotesize{203} See id.
\footnotesize{204} See Morrocco, supra note 196, at 32.
\footnotesize{205} See id.
\footnotesize{206} Charles & Newman, supra note 12, at 39.
There has also been concern that privatization could be blamed for airline crashes in the future. The expectation, however, is that airline safety will improve with privatization. The FAA will still have control of airline safety regulations, and a private corporation should be able to increase efficiency and thus upgrade the aging air traffic system. This should decrease situations like the six-minute control tower power outage at Pittsburgh International Airport on January 31, 1995, when an air traffic controller had to use a pay phone to call other airports and tell them to hold flights to Pittsburgh.

Salaries should also benefit from privatization, thus enticing the best personnel to our busiest airports. Currently, there are uniform government salaries that make places with high living costs such as Chicago and New York less desirable for air traffic controllers.

Political pressures from the aviation community in general appear to be the primary reason privatization has been grounded in the United States. The Aircraft Owners and Pilots Association is a strong lobby opposing privatization because private pilots do not presently pay their full share for air traffic services. In addition, the U.S. air traffic controllers union opposes privatization.

Since 1985, over thirteen studies of FAA/ATC reorganization have been completed. Although each of these past efforts was met with opposition from certain aviation sectors, there is one thing on which the entire aviation community agrees: change is badly needed.

VII. PLANS & PROPOSITIONS FOR CHANGE

A. THE REASON FOUNDATION PROPOSAL

The Reason Foundation, a Los Angeles-based advocate of privatization, proposes a user controlled air traffic control system that is predicated on a system of "user pay means user say." This plan, which calls for taking air traffic control

---

207 See Carson, supra note 147, at 23.
208 See id.
209 See id.
210 See id.
211 See id.
212 See id.
213 See id.
214 See Darienzo, supra note 46, at 12.
215 Reason Foundation Proposes User-Controlled ATC System, supra note 137, at 344.
outside government, and turning control and funding over to aviation users, attempts to meet the needs of the users by replacing old systems with state-of-the-art technology.\textsuperscript{216} Robert Poole, President of the Reason Foundation, said that the user-controlled system would “still be regulated for safety at arm’s length by a revamped FAA.”\textsuperscript{217}

The user-fee approach would replace the ten percent federal tax currently imposed on airline ticket prices to finance the FAA. Poole emphasizes that “this is hardly a new idea . . . . [A]t least 15 other countries already have ATC air traffic control user fees in place.”\textsuperscript{218} Darrle Jenkins, director of the Aviation Foundation, a Virginia research group, says that “[c]urrently, the FAA believes that its clients are the air traffic controllers . . . [but t]he reality is that the airlines and travelers are the clients.”\textsuperscript{219} It is the airlines who are hurt by an inefficient ATC, because their costs go up and in cities with congestion, low-cost carriers are restricted. In addition, the consumers are hit hardest because they bear the costs of congestion and regressive taxes through ticket prices.\textsuperscript{220}

Fort Worth-based American Airlines supports the imposition of user fees because they will be fairer.\textsuperscript{221} The fees will not increase with the distance of a route, no matter how long.\textsuperscript{222} Under the current system, flight distance can add $100 or more to the price of a ticket.\textsuperscript{223}

Big carriers such as American also contend that this will equalize the costs between larger carriers and smaller ones.\textsuperscript{224} Big carriers contend that short-haul carriers take off and land more often, using ATC more, so should be responsible for their share of the costs from using the system.\textsuperscript{225}

Short-haul carriers such as Dallas-based Southwest Airlines are against user imposed fees because they claim the fee would

\textsuperscript{216} See id.
\textsuperscript{217} Id.
\textsuperscript{218} Michael D. Towle, \textit{Airline Ticket User Fee Sought Aviation and Public Policy Groups Say Such a Fee Would More Equitably Finance the FAA Than the Current Federal Tax}, \textit{Fort Worth Star-Telegram}, May 24, 1996, at 1.
\textsuperscript{219} Id.
\textsuperscript{220} See id.
\textsuperscript{221} See id.
\textsuperscript{222} See id.
\textsuperscript{223} See id.
\textsuperscript{224} See id.
\textsuperscript{225} See id.
make up a disproportionate amount of their ticket price. Smaller carriers do not favor the system because their fares are low which means the taxes are low, usually about $6 per ticket, but a user fee could more than double this figure. Southwest spokesman Ed Stewart said it would not favor any fee that raises the price of tickets because Southwest Airlines is committed to offering its customers low fares. Chairman, President, and CEO of Southwest Airlines, Herbert D. Kelleher, asserts that a user-fee system is a scheme by the seven largest airlines to increase short-haul carrier taxes while decreasing their taxes.

Poole's response to Southwest Airlines' view is that the company should not jump to conclusions on the impact user fees will have on their business. According to Poole, "[a] system based upon both en route charges, that take into account distance, and terminal charges, that take into account airplane weight and the number of terminal operations, would be fair both to Southwest and to the large airlines." The use of weight in the fee structure promotes the fairness of the system because the lighter the aircraft, the lower the fee.

B. FAA'S PLANS FOR CHANGE—CHALLENGE 2000

In 1995, the Challenge 2000 project was created in response to the changing needs in the aviation industry. This re-examination of the FAA's safety and certification operation will serve to aid in charting a course for the future of the aviation industry. A Virginia-based firm was hired to conduct the review and provide recommendations for positioning the agency's regulation and certification efforts. Former FAA Administrator David R. Hinson emphasized the FAA's need to respond to changes and said "that's why last year I asked two independent sources to take a top-to-bottom look at our safety regulation and certification operation." Hinson noted that any changes in the FAA's certification and regulation organization will be done methodi-

---

226 See id.
227 See id.
228 See Towle, supra note 218, at 1.
230 Towle, supra note 218, at 1.
233 Id.
cally over the next three to six years. Some of the key recommendations by Challenge 2000 are efforts the FAA has already begun. Other recommendations by the committee are:

1. Identification of industry practices that promote a safe operating environment with encouragement and implementation of these procedures.

2. The regulation and certification organization, working with the airline industry, would create centers of excellence which would serve as repositories of expertise. These centers would become the recognized authorities on specific subject areas, thus increasing efficiency and consistency of information provided to other FAA offices and to the industry.

3. The rule-making function of the FAA would be improved by creating integrated rule-making teams. These teams would include all necessary FAA resources and would coordinate closely with the Aviation Rule-Making Advisory Committee (ARAC). ARAC is made up of sixty-four organizations representing all areas of the aviation community. This new rule-making technique would focus attention on the outcome rather than the bureaucratic process of developing a rule.

4. The regulation and certification organization would be restructured to accommodate the new model-centers of excellence.

This effort by the FAA comes late, but it is concrete proof that the FAA is attempting to meet the challenges of "rapidly changing technology, and unprecedented growth in air travel . . . ." This plan should assist the FAA in achieving its goal of zero accidents in the future. Plan organization is set to be done methodically over a period of three to six years.

C. FAA'S STANDARD TERMINAL AUTOMATION REPLACEMENT SYSTEM

The FAA awarded one of its largest contracts to Raytheon Co. to build the Standard Terminal Automation Replacement System (STARS). STARS is a joint acquisition between the FAA and the Department of Defense (DOD) that will provide new computers, displays, and software for up to 172 approach con-

---

234 See id.
235 Id.
237 See id.
trol facilities and towers. STARS is the FAA’s first large program acquisition in which the FAA minimizes costs by taking advantage of commercially available hardware and software. Transportation Secretary Peña has stated that “[w]ith the STARS contract award, the administration is delivering on the commitment we made to Congress to put air traffic control modernization back on track.”

STARS is a huge step in the right direction for modernizing the FAA and the air traffic control system. In addition to standardizing air traffic control equipment at 172 FAA facilities, STARS will also standardize 199 Department of Defense facilities. The new system will result in the 1.5 million people who fly every day continuing to benefit from the safest aviation system in the world, fewer delays for these travelers, and safer, more reliable automated control facilities. Furthermore, the STARS system is equipped to handle expected growth into the twenty-first century. It is estimated that in the next decade, nearly 800 million more people will be flying each year—nearly forty percent more than today. This new system is set up to accommodate this growth.

Between September 1994 and October 1996, there were thirty-one breakdowns of air traffic control systems at major airports. The most frequent breakdowns have occurred at some of the busiest airports such as Chicago and New York—airports that have the oldest computers. These cities will receive new system implementation first. STARS is expected to provide the much needed improvements in the ATC system, including “improved surface separation, improved weather displays, color displays of flights, better data link communications, improved conflict alert warnings, better traffic management capabilities,

---

241 See id.
243 See id.
245 See id.
and supplemental flight data processing for the controllers."\textsuperscript{246} STARS should be operational in Boston in 1998, and will be installed subsequently in other FAA and Department of Defense facilities through the year 2007.\textsuperscript{247}

Although the outlook for the STARS program looks promising, problems have already arisen between the FAA and Raytheon. Teams from the FAA and Raytheon have spent a significant amount of time addressing differences of interpretation pertaining to software specifications for the program.\textsuperscript{248} David Ford, manager of the program for the FAA, said that out of the 80,000 lines of code being developed for the STARS program, the issue in controversy pertained to 24,000 lines of code affecting 25 functions.\textsuperscript{249} Despite these disagreements, Executive Vice President and General Manager of Raytheon Electronic Systems, William H. Swanson, insists that Raytheon "is fully committed to meeting or beating the STARS contract schedule requirement, including completion of the initial system operation at the Boston STARS site."\textsuperscript{250}

In addition to software disagreements, the STARS program has also been hit with an expected cost increase that could be as high as $529 million. The General Accounting Office has predicted that the life-cycle cost baseline for STARS could increase from the $2.23 billion level approved in January 1997 to as much as $2.76 billion.\textsuperscript{251} According to the GAO, the cost increase stems from higher costs for operating and maintaining STARS equipment.\textsuperscript{252} FAA officials acknowledge that there may be cost growth but insist that they do not expect an actual cost increase will be as high as $529 million.\textsuperscript{253} Because of completion date delays caused by disagreements and cost increases, FAA officials overseeing the implementation of the STARS pro-

\textsuperscript{246} Id.
\textsuperscript{247} See News Conference, supra note 242, at 1.
\textsuperscript{249} See id.
\textsuperscript{252} See id.
\textsuperscript{253} See id.
gram have informed Raytheon that they intend to elevate STARS to a "high risk status." 254

The STARS program appears to be a step in the right direction for Air Traffic Control, but its effectiveness and efficiency remain to be seen. So far, the FAA needs improved coordination within the agency for STARS to be completed on schedule. 255 The GAO has concluded that in order for Raytheon to be able to deliver STARS on time, the FAA must mitigate risks from potential scheduling conflicts, from potential difficulties developing software, and from a lack of commitment from those with vested interests. 256 Without these changes, this modernization project, like many of the FAA's other modernization projects, will most likely run over budget and miss implementation deadlines.

D. FAA's New Procurement System

Although no real privatization schemes have been put into action in the United States for ATC, the FAA has made attempts to combat some of the problems that privatization would solve. On April 1, 1996, the FAA put into effect a new procurement system, pursuant to the Fiscal Year 1996 Transportation Appropriations Act, 257 which exempts the FAA from many of the fundamental acquisition laws and regulations. 258 This system should aid modernization plans by expediting the process of obtaining contracts with private sector companies.

The FAA's procurement reform is an ambitious effort to change the current process of handling bid protests and contract disputes which often plague the procurement process. 259 Section 348 of the DOT Appropriations Act created the new procurement system that essentially creates an independent procurement process for the FAA. 260 The system change was spurred by the privatization movement, which, by itself, has yet to be accepted as a solution to ATC problems. Although refus-

256 See id.
258 See White et al., supra note 1, at B10.
259 See Allen & Yukins, supra note 257, at 135.
260 See id.
ing to turn to privatization as an answer for ATC procurement delays, Congress agreed that something needed to be done to increase efficiency. Toward that goal, Congress passed a radical procurement reform for the FAA.

The goal of the new system is to run the FAA more like a private organization through implementing a new personnel system, reducing lengthy procurement rules, and buying commercially-available products. Improved employee training and the creation of procurement teams who focus on efficient purchasing techniques are part of the FAA’s latest attempt to free itself from the weights of government control. Former FAA administrator David R. Hinson firmly believes that the FAA’s new system will be able to cut in half the amount of time it takes to get new equipment. Hinson points to the award of the STARS contract as an example of an efficient contract award under the new system because it took only six months to award the contract to Raytheon. Under the old system, it may have taken up to eighteen months.

A key element of the FAA’s procurement reform sets out new specific internal procedures for processing bid protests and contract disputes. Under the new system, the FAA’s Office of Dispute Resolution (ODR) hears both the bid protests and contract disputes. The ODR’s decision is only reviewable by the FAA Administrator. Judicial review of FAA decisions is limited to the United States courts of appeals.

In an attempt to reduce litigation, the new procedure works in the following manner. Protests by contractors are first submitted to the Contracting Officer, who acts under the advice of the FAA legal department and who has full discretion to settle the dispute provided it does not involve fraud.

If the parties fail to reach a settlement agreement, they are confronted by a maze of procedural options. The protest or dispute will go to the Office of Dispute Resolution, where the FAA dispute resolution officer will attempt to encourage informal alternative dispute resolutions. If that fails, the parties may opt for binding arbitration. The decision in binding arbitration will

---

262 See id.
263 See id.
264 See id. at 146.
then be subject to review by the FAA Administrator, who may indicate "nonconcurrence" with the arbitrator's decision.\textsuperscript{266}

In the event the parties do not choose binding arbitration, a dispute resolution officer will hear the dispute and give his recommendation to the FAA administrator who will make a final decision in the matter.\textsuperscript{267}

Although the goal of this procurement scheme is to increase efficiency within the FAA, thereby effectuating aviation improvements, it is questionable whether the FAA's new dispute system will be successful. One reason for concern stems from the idea that the new dispute system "will not decrease the time it takes the FAA to procure new equipment."\textsuperscript{268} Because claims are generally heard years after a procurement is completed, changing the claims process will not shorten the amount of time it takes the FAA to procure new air traffic control systems.\textsuperscript{269} In fact, it is possible that the new procurement process will actually slow procurement procedures since contractors may want to negotiate every detail of a deal for fear of not being able to recover unanticipated costs later.\textsuperscript{270} Similarly, FAA procurement costs may go up if contractors fear being unable to recover additional costs through a subjective, internal claims process controlled by the FAA administrator.\textsuperscript{271}

There is also concern that the new procedures eliminate important procedural safeguards from the traditional dispute system.\textsuperscript{272} Critics fear that the revamped FAA system could undermine the goals of open competition, fairness, and uniformity that guide federal bureaucracies.\textsuperscript{273}

Despite the criticism, the FAA's new procurement plan is a plausible attempt to address the need for quicker procurement procedures. Its implementation, however, could prove to be another inefficient governmental attempt to facilitate modernization. The actual effectiveness of this legislation remains to be seen.

\textsuperscript{266} Id. at 146-47.
\textsuperscript{267} See id. at 147.
\textsuperscript{268} Id. at 154 (emphasis added).
\textsuperscript{269} See id.
\textsuperscript{270} See id.
\textsuperscript{271} See id.
\textsuperscript{272} See Barr, supra note 261, at A19.
\textsuperscript{273} See id.
E. Congressional Action To Aid FAA Funding Needs

The FAA's most recent attempt to rectify its funding problems through Congress finally gained approval. On October 9, 1996, President Clinton signed the Federal Aviation Reauthorization Act of 1996, which provides critical funding for the construction, safety, and security upgrades needed by U.S. air navigation systems. Prompted by the 1996 tragedies of the Valujet crash and TWA Flight 800 disaster, political awareness of the urgency for change finally came to the forefront of discussion. Increasing numbers of passengers traveling through the skies highlighted the pressures placed on airport capacities and their air traffic control systems. The House, which first passed the legislation, appeared to be committed to aviation legislation by the overwhelming passage of this bill and recent previous pieces of legislation pertaining to making the FAA an independent agency and reforming the costly procurement and personnel procedures.

The much needed FAA Reauthorization Act authorizes funding for improvements such as new air traffic control equipment, more FAA inspectors, and also funds aviation security improvements such as new bomb detection systems. The new Act shifts the focus of the FAA's primary purpose from air commerce regulation to air safety and security.

Although the Act is a positive change for FAA funding, the length of time it took to actually implement the change is a primary example of problems with Congressional decision making. Critical decisions that need to be made in a timely fashion and quickly implemented get stalled in Congress. During Senate debate, a plan to allocate $19 billion to FAA programs over the next two years was stalled when senators objected to a single provision.

The one area in dispute in an otherwise noncontroversial bill centered around language some said would make it more difficult for Federal Express workers to unionize by placing them under the Railway Labor Act, which requires them to organize

---


nationally.\textsuperscript{278} The fact that the express carriers were not under the Act until now is being blamed on a previous technical error in the 1995 ICC Termination Act. Thus, this Reauthorization Act corrects the error by placing carriers under the Railway Labor Act.\textsuperscript{279} The result is that Federal Express employees fall under the same labor laws as do the airlines. The Senate refused to pass the House version but did finally approve its own version of the bill.

The Reauthorization Act recognizes the FAA’s unique situation in that it functions twenty-four hours a day and badly needs a more efficient organizational structure to move into the twenty-first century.\textsuperscript{280} The goal of the Act is to create a more autonomous and accountable FAA within the DOT.\textsuperscript{281} The reform section of the Act requires that the FAA establish an air traffic control modernization review and mandates the termination of projects that fall short of performance goals or fail to meet budgets.\textsuperscript{282}

F. Systems Architecture Recommendation

Despite the recent legislative initiatives to facilitate ATC modernization, more internal organization is needed within the FAA. GAO Official John Anderson has suggested that what the FAA needs is a well-defined management system called a “Systems Architecture.”\textsuperscript{283} This scheme should serve as a detailed blueprint of the FAA modernization goals and the methods to be used to achieve those goals.\textsuperscript{284} The FAA badly needs this technical architecture because currently the FAA’s modernization program consists of hundreds of segmented yet interrelated systems that each have their individual goals and methodologies.\textsuperscript{285} The FAA needs to unify these missions with a systems architecture to ensure that each plan operates effectively and efficiently. The focus of this architecture must be setting out the details of specific technological information so that it can be

\textsuperscript{278} See id.
\textsuperscript{281} See id.
\textsuperscript{282} See Wilson, supra note 276, at 9.
\textsuperscript{283} Anderson Statement, supra note 72, at 491.
\textsuperscript{284} See id.
\textsuperscript{285} See id.
uniformly used to build modernized system hardware, software, and data management centers.\textsuperscript{286}

The most expensive and complex component of ATC modernization is new software development for new computer systems.\textsuperscript{287} Often, it is the actual process of developing and maintaining the software that determines its effectiveness and efficiency.\textsuperscript{288} Preliminary studies of the FAA’s current software development and acquisition system show that the process is at great risk of not delivering timely software programs suitable for their intended use within budget.\textsuperscript{289} This prediction stems from the fact that although the FAA is attempting new procurement procedures, it does not have an organized, effective management approach to coordinate its modernization efforts.\textsuperscript{290}

Two examples of the need for software development coordination are STARS and the Wide Area Augmentation System (WAAS). Both plans called for extensive software development and neither program is scheduled for completion until after the year 2000. Although recent legislative reform did accelerate the speed with which these two major contracts were awarded, the FAA has continued to struggle with the technical and managerial aspects of both plans.\textsuperscript{291}

Furthermore, the FAA modernization effort needs financial coordination as well. In an independent financial assessment of the FAA, Coopers & Lybrand concluded that the FAA must learn to manage money. The firm strongly suggested that the FAA develop a detailed accounting system with financial management tools and personnel incentives.\textsuperscript{292} The need for coordination and consolidation is clear; if Congress will not privatize, then it should at least recognize the need for a detailed system of architecture to provide the FAA with specific guidance on the implementation of its modernization agendas.

\begin{footnotes}
\textsuperscript{286} See id. at 491-92.
\textsuperscript{287} See id. at 493.
\textsuperscript{288} See id. at 493-94.
\textsuperscript{289} See id. at 494.
\textsuperscript{290} See id. at 494-95.
\textsuperscript{291} See id. at 495.
\end{footnotes}
This extensive internal organization plan is also supported by NATCA. According to Eastern Region Vice President of the Air Traffic Controllers Association, Joe Fruscella, air traffic controllers and their current work environment deserve careful study to accurately determine future requirements in both technology and ergonomics. To simply develop technology and abandon present ground-based navigation and surveillance systems could create resistance and ultimately result in failure of any modernization efforts. Therefore, it is absolutely necessary to establish a central organization to coordinate both the developing technology and attendant human factors issues.

NATCA's concern centers around the FAA's lack of coordination in new system development and human concerns. Often, controllers are brought in too late in the development to assist in new technological system implementation. By not including air traffic controllers in the initial technological development of new programs, often the plans work in theory but run into problems when the systems are actually set up. This problem is another example of the need for an internal organizational scheme within the FAA.

VIII. CONCLUSION

With its outdated equipment and overworked controllers, the United States air traffic control system is a disaster waiting to happen. The reason the nation has let the ATC digress to this point is simple: the FAA and in particular, the ATC, is not accountable to its users. The government has no obligation whatsoever to incorporate the views of those who use the air traffic control system. Thus, the government is not accountable for the consequences of its decisions.

Privatization (or a form of privatization) offers a solution to the problem of accountability. It offers a method to maintain and improve the safest ATC system in the world while dramatically revamping and modernizing equipment, thus increasing the efficiency of aircraft control. Although monitoring air safety is inherently a governmental function, air traffic control is not. “The federal government deems a function to be ‘inherently governmental’ if the public interest mandates the performance

---

293 See Fruscella Testimony, supra note 37.
of that function by government employees, such as a function. 295 These inherently governmental functions usually refer to decision-making functions that require government authority or rendering of value judgements. "In contrast, commercial activities eligible for contracting out include . . . management support services [and] security and civil and military transportation."296 Thus, air traffic control is not an inherent governmental function.

Air control is performed for a variety of users—airlines, private pilots, and military aviation. The ATC should be organized to be accountable to those users and to the flying public, those with a stake in the consequences of air traffic decisions.297 Changing funding from a ticket tax to user fees, like the system proving to be successful in Canada, would create a system of accountability for the U.S. aviation industry, free up funding from binding Congressional ties, and aid in the reduction of the deficit.

In addition, privatization plans offer an end to the fear of an air disaster caused by aging navigation equipment. Allowing the private sector to have direct control eliminates the hassles and delays associated with lengthy government procurement procedures and Congressional politics. In addition, private control would allow for safer and much more efficient technological methods of navigation to be implemented throughout the nation's increasingly busy airports. With safety regulation remaining a government function, but the many other responsibilities of the ATC shifting to private control, the United States navigational system would become accountable to its users, safer through technological advancements, and significantly more efficient.

295 White et al., supra note 1, at B10.
296 Id. (emphasis added).
Articles