Tensions, Trials, and Tribulations: The Federal Aviation Administration During the Carter Presidency, 1977-1981

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Author's Preface

I have always loved studying history. So much so that at the age of ten, I informed my parents that, when I grew up, I wanted to be a historian. Perhaps this was because my father had a long career as an Air Force historian. Nonetheless, after graduate school, I had the great pleasure of working as a historian for the Navy, Army, and the Federal Aviation Administration (FAA). After a 37-year career, and as I contemplate retirement, I am so thankful for the opportunities presented to me. I cannot think of a better job than to be able to research, write, and teach others about history.

Most of my career has been at the FAA. The agency allowed me to explore my love of aviation, and I sincerely appreciate all the agency has done and is doing to keep the national airspace system safe. This book, maybe my last as a federal historian, epitomizes the agency's long history. During the Jimmy Carter administration, the agency faced increasing public and congressional criticism and dealt with several high-profile accidents, deregulation, international disputes, growing public environmental concerns, and rising labor strife. Through it all, Administrator Langhorne Bond and an incredible workforce kept the agency on an even keel and accomplished what the agency does best, increased safety.

No historian writes in isolation, so it is essential I thank those who have guided me throughout my labors: my mentors Ned Preston and Mickey Schubert, and a host of other historians and colleagues who have provided insight and suggestions and helped me grow as a person and as a historian.

I am also grateful for the archivists at the National Archives, the Jimmy Carter and Ronald Reagan Presidential Libraries, the Georgia State University Labor Archives, and the Texas Labor Archives at the University of Texas, Arlington, who skillfully guided me through their collections. I also dedicate this work to those volunteers who read, edited, and provided critical insight to make this a better history: editor extraordinaire Curt Biberdorf, and my colleagues and friends Hannah Chan, Howard Martin, and Marvin Reyes.

I would be remiss if I did not thank those FAA historians who came before me—they set the bar high for those who followed them and created the excellent FAA history series that I am proud to be a part of:

- Nick A. Komons, *Bonfires to Beacons: Federal Civil Aviation Policy Under the Air Commerce Act, 1926-1938*
- John R. Wilson, *Turbulence Aloft: The Civil Aeronautics Administration Amid Wars and Rumors of Wars, 1938-1953*
- Stuart I. Rochester, *Takeoff at Mid-Century: Federal Civil Aviation Policy in the Eisenhower Years, 1953-1961*
- Richard J. Kent, Jr., *Safe, Separated, and Soaring: A History of Federal Civil Aviation Policy, 1961-1972*.
- Edmund Preston, Troubled Passage: *The Federal Aviation Administration During the Nixon-Ford Term, 1973-1977*

Last, but not least, I cannot forget those friends and family members without whose support I would not have been able to complete this volume. You know who you are! I would be remiss, however, if I did not offer individual shout-outs to my dear friend Marcia Alexander Adams and my ever-loving husband, John Henry King.

Theresa Kraus
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History is instructive. What it suggests to people is that even if they do little things, if they walk on the picket line, if they join a vigil, if they write a letter to their local newspaper… Anything they do, however small, becomes part of a much larger sort of flow of energy. And when enough people do enough things, however small they are, then change takes place.[1]

Prologue

The Carter team arrived in Washington ready to restore public confidence in government in the wake of growing distrust of the federal bureaucracy. When Richard Nixon resigned as president after the Watergate scandal, Gerald Ford assumed the presidency. However, he had never been elected vice president—he was the first vice president chosen under the terms of the 25th Amendment. With the country combating inflation, facing energy shortages, confronting international instability, and fighting the Cold War, Jimmy Carter campaigned as an outsider, distancing himself from Washington's woes and promising to restore faith in government and repair the economy.

For the Federal Aviation Administration (FAA), the new presidential team brought hope of stability. The previous administration saw three FAA administrators come and go: John Shaffer (March 24, 1969-March 14, 1973), Alexander Butterfield (March 14, 1973-March 31, 1975), and John McLucas (November 24, 1975-April 1, 1977). Because of the revolving door in the administrator's office, Senator Howard Cannon (D-NV) asked nominee Langhorne Bond if he intended to stay for four years at his confirmation hearing. Bond responded, "I do. I made that statement to the President, as well as to you."[1] He kept his promise and served until January 20, 1981, when Ronald Reagan became president.

Bond's Senate confirmation hearing took little time, with only Cannon, Edward Zorinsky (D-NE), and committee staffer Robert Ginther, on behalf of Senator Adlai Stevenson (D-IL), asking questions. A seasoned politician, Bond answered or handily evaded questions on aircraft noise, a new St. Louis airport, FAA labor-management relations, the Age 60 Rule, airline deregulation, and aviation safety. The Senate quickly confirmed him on April 27, 1977, and he assumed office on May 4.

Langhorne McCook Bond was the son of William Langhorne Bond, an aviation pioneer who led the China National Aviation Corporation and opened air travel in China before World War II. Born in Shanghai, China, in 1937, he earned a Bachelor of Arts degree (1959) and a law degree (1963) at the University of Virginia. He later studied at the Institute of Air and Space Law at McGill University, the London School of Economics, and Oxford University.

He came to the FAA with a wealth of transportation experience but not much aviation

Key FAA events during the Carter Administration

March 27, 1977: Two Boeing 747s collided on a runway at Tenerife, Canary Islands.

March 30, 1977: Secretary of Transportation Brock Adams announced the withdrawal of federal support for a proposed new St. Louis airport near Waterloo, IL.

April 4, 1977: A Southern Airways DC-9 crashed near New Hope, GA.

May 4, 1977: Langhorne M. Bond became the seventh FAA administrator. Quentin Taylor became the deputy administrator, the first African American to hold the position.

May 7, 1977: The pilots of Wien Air Alaska went on strike.

May 12, 1977: FAA Administrator Bond imposed an agency-wide hiring and promotion freeze.

July 23, 1977: The United States and the United Kingdom signed the Bermuda II Agreement.

August 4, 1977: FAA Administrator Bond signed a policy paper reaffirming the Age 60 Rule.

September 23, 1977: Secretary of Transportation Brock Adams announced proposed permanent rules for civil supersonic transport (SST) operations.

January 1978: FAA and the Office of the Secretary of Transportation submitted to Congress a new master plan for the long-delayed modernization of the FAA's 292 flight service stations.

March10, 1978: The United States and the Netherlands signed a new international aviation agreement based on the principle of free competition.

March 23, 1978: In response to a federal court order, FAA issued draft environmental impact statements concerning the operation of Washington National and Dulles International airports and published a notice of proposed policy for the airports.

experience. He served as a member of the task Administration. He left federal service in 1969 to become executive director of the National Transportation Center, a nonprofit research organization in Pittsburgh, Pennsylvania, that managed bus technology projects for transit authorities. In March 1973, he became secretary of transportation for the State of Illinois.

As FAA administrator, Bond quickly discovered he had to deal with many issues left from the previous administration and faced one crisis after another during his tenure. He took office shortly after the horrific aircraft collision in the Canary Islands, followed the next year by the grounding of the DC-10, then a mid-air collision in San Diego, as well as other high-profile commuter airline accidents. He faced controversy over his predecessor's actions regarding a new St. Louis airport, landing rights for the Concorde, airport funding, and a Washington, DC, airports policy.

April 19, 1978: The All-Weather Operations Division of the International Civil Aviation Organization voted to adopt the FAA-sponsored microwave landing system for future use at the world's airports.

June 19, 1978: President Jimmy Carter signed a law renaming the FAA Aeronautical Center at Oklahoma City the Mike Monroney Aeronautical Center.

June 26, 1978: FAA established the Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee to examine the topic of post-crash survival of aircraft cabin occupants.

August 4, 1978: The Department of Transportation Appropriation Act signed by President Carter discontinued funding for the Air Traffic Controllers Second Career Program.

August 10, 1978: A five-year, FAA-funded study of the health problems of air traffic controllers challenged the generally held view that unusually high incidences of ulcers, psychiatric problems, and other serious stress-related diseases were to be found among controllers.

September 10, 1978: A major FAA headquarters reorganization went into effect.

September 25, 1978: A mid-air collision over San Diego between a Pacific Southwest Airlines Boeing 727 and a Cessna 172 caused more fatalities than any previous civil aviation accident within U.S. airspace.

October 24, 1978: President Carter signed the Airline Deregulation Act of 1978 allowing immediate fare reductions of up to 70 percent without Civil Aeronautics Board approval, and the automatic entry of new airlines into routes not protected by other air carriers.

December 1, 1978: FAA issued a revision of Federal Aviation Regulations Part 135, governing air taxi and commuter airline operations.

December 27, 1978: FAA Administrator Bond and Secretary of Transportation Brock Adams announced a regulatory program to reduce the risk of mid-air collisions by 80 percent.

He battled the aviation community over the Age 60 Rule, airline crew complement, and certification of new aircraft, and faced an airline strike. In addition, security concerns, labor relations, environmental worries, and the FAA’s role in international aviation resulted in congressional and public concerns. His biggest issue was how to best keep the national aviation system safe, especially in the new deregulated environment.

During his tenure, the FAA upgraded existing or installed several new air traffic control systems, such as the Automated Radar Terminal System (ARTS) II, ARTS IIIA, the Low Level Wind Shear Alert System (LLWAS), and the Air Route Surveillance Radar (ARSR) 3. In addition, National Weather Service meteorologists began working at thirteen of the FAA's Air Route Traffic Control Centers.

Faced with intermittent slowdowns by the air traffic controllers union, Bond predicted almost a year in advance that the Professional Air Traffic Controllers Organization (PATCO) would

Calendar year 1978: Aircraft of U.S. registry experienced eight hijacking attempts, the highest level since the screening of passengers and carry-on luggage was instituted in early 1973.

January 8, 1979: FAA and Panama's Department of Civil Aviation signed an agreement under which the FAA's air traffic facilities would be turned over to the Republic of Panama over a five-year period.

March 16, 1979: FAA Administrator Bond announced his plan to eliminate the "blanket immunity" provisions of the Aviation Safety Reporting Program while continuing to provide anonymity to those using the program to report hazards and safety-related incidents.

May 25, 1979: An American Airlines DC-10 crashed into an open field near Chicago's O'Hare International Airport after its left engine and pylon assembly separated from the aircraft on takeoff.

December 29, 1979: Public Law 96-171 required the National Institutes of Health to produce a study of the FAA’s Age 60 Rule.

January 1, 1980: Administrator Bond established the lead region concept under which designated FAA regions assumed certain certification responsibilities on a nationwide basis.

January 7, 1980: John F. Leyden resigned as president of PATCO after a bitter struggle with Robert E. Poli, a regional vice president, for control of the organization.

February 18, 1980: President Carter signed the Aviation Safety and Noise Abatement Act of 1979. The law gave airlines more time to comply with Stage 2 aircraft noise standards insofar as they applied to two-engine jets over 75,000 pounds.

March 1, 1980: A FAA emergency rule on experience requirements for commuter airline pilots became effective.

April 2, 1980: Administrator Bond announced a proposed revision to the master plan for automating the flight service stations.

April 15, 1980: PATCO distributed to its members an educational package that many in FAA considered a strike plan.

strike. In 1980, he developed a contingency plan to keep air traffic moving should the strike occur. To emphasize the government's determination to break a possible strike, Bond published his strike contingency plan in the *Federal Register*.

When President Carter signed the Airline Deregulation Act of 1978, the FAA workload increased exponentially. This put the administrator in a precarious position as he tried to maneuver between the president's calls for a smaller federal workforce and the agency's need for safety inspectors. Inspector workload increased after the agency issued a comprehensive revision of Federal Aviation Regulations Part 135 governing air taxi and commuter airline operations.

The aviation agreement with the United States and the United Kingdom, called Bermuda II, brought concerns that the United States gave away some of its international rights. Bond, however, subsequently signed a new aviation agreement based on the principle of free

May 29, 1980: FAA changed the name of its National Aviation Facilities Experimental Center (NAFEC) to the FAA Technical Center, and at the same time dedicated a new complex of buildings at the New Jersey facility.

June 26, 1980: The Committee on FAA Airworthiness Certification Procedures, popularly known as the Blue Ribbon Panel on Aircraft Certification, issued its report.

August 15, 1980: PATCO-affiliated controllers at O'Hare International Airport conducted a one-day traffic slowdown that caused 616 delays of 30 minutes or more and cost air carriers more than $1 million in wasted fuel.

September 30, 1980: The Airport Development Aid Program lapsed as of midnight on this date due to Congress' failure to extend or replace legislative authorization.

October 9, 1980: The FAA published a new Federal Aviation Regulations Part 125, representing a substantial upgrade of safety standards for certain large airplanes.

October 20, 1980: Republican presidential candidate Ronald Reagan wrote to PATCO president Robert E. Poli, saying: "You can rest assured that if I am elected President, I will take whatever steps are necessary to provide our air traffic controllers with the most modern equipment available and to adjust staff levels and workdays so that they are commensurate with achieving a maximum degree of public safety."

November 3, 1980: The FAA published a special rule allocating reservations, or slots, for takeoffs and landings under instrument flight rules at Washington National Airport.

December 29, 1980: The Air Line Pilots Association organized a "public awareness" campaign called Operation USA (Unity for Safe Airtravel). Shortly thereafter, the union threatened a general one-day work stoppage in March unless the president appointed a panel of independent experts to examine the question of crew complement.

January 10, 1981: The New York Terminal Radar Approach Control facility (TRACON) became operational at Hempstead, Long Island.

competition with the Netherlands. When the United States agreed to withdraw from Panama, the FAA worked closely with Panamanian authorities to train its personnel before turning over FAA-run aviation facilities to that country's government.

Although Bond's tenure proved controversial, he focused on improving safety. As a reporter remarked, "Since becoming President Carter's FAA chief in May 1977, Bond has been making waves—tightening safety rules, shaking up his bureaucracy with reassignments, harping about safety in the skies."[2] He withstood criticism from within and outside the agency as he tried to balance between politics and the FAA's mission. With one crisis after another, it took all of Bond's political prowess to keep the agency on an even keel. Bond found himself continually under attack from Congress, employee unions —especially PATCO—and consumer and aviation groups. During his tenure, few in the aviation community fully supported him. Bond was able to maneuver through many agency issues. As one colleague from Illinois noted, "He knew when to zig and when to zag."[3]

Under his leadership, the agency had some successes and failures, but the achievements outweighed any criticism he faced while at the agency, including calls for his resignation. His well-known critics, like Air Line Pilots Association (ALPA) president Captain John J. O'Donnell, Representative John Burton (D-CA), members of the controllers' union, and even National Transportation Safety Board Chair James King kept up an ongoing public tirade against Bond personally and the FAA in the media. Bond took the criticism in stride. When someone printed and circulated "Impeach Langhorne Bond" bumper stickers, an amused Bond proudly put one on his car.[4]

Bond survived all criticism. His emphasis on safety proved successful. As he neared the end of his tenure, on December 31, 1980, the aviation community celebrated the completion of the first calendar year without a fatal accident for major U.S. airlines in scheduled service, including the flag, trunk, and local service categories.

It is time for us to take a new look at our government, to strip away the secrecy, to expose the unwarranted pressure of lobbyists, to eliminate waste, to release our civil servants from bureaucratic chaos, to provide tough management. –Jimmy Carter[1]

Chapter 1: Peanut Farmer to President

James Earl "Jimmy" Carter January 20, 1977
Courtesy: www.whitehouse.gov

After eight years of a Republican presidency rocked by the Watergate scandal, Richard Nixon's resignation, an energy crisis, and recession, Democrat James Earl "Jimmy" Carter, Jr., became the nation's 39th president on January 20, 1977. Campaigning as an outsider—a peanut farmer and former Georgia governor with no Washington, DC, experience—Carter capitalized on national concerns by promising to restore America's faith in government through honesty and management competency. Promising to reform the government and reduce government regulation, Carter won the election by a narrow margin. In his inaugural address, he urged the country to create a "new national spirit of unity and trust" because "if we despise our own government, we have no future."[2]

Team Building

After the election, Congress quickly approved most of the new president's Cabinet nominations. Brockman "Brock" Adams became Secretary of Transportation on February 1. Carter selected Adams because, like Vice President Walter Mondale, he hoped that as a Washington insider, Adams could help the new administration navigate

Washington and congressional politics. Adams, a Democrat from Washington's 7th District, served in the U.S. House of Representatives since 1964. In his twelve years in Congress, he rose through the party ranks and, when selected as secretary, served as the new House Budget Committee chairman. Adams developed some expertise in transportation issues while in the House. He helped to establish Amtrak and restructure the East Coast railroad system after the collapse of the Penn Central Transportation Company. He also served as executive director of Carter's Washington State campaign.


Brock Adams

More cautious and reserved than his predecessor, William Coleman, Adams moved slowly on significant policy issues. Carter believed in a Cabinet form of government and instructed his agency heads to run their organizations as they saw fit. Adams, however, tended to go to the president for direction on significant decisions. As a result, the White House staff became heavily involved in transportation issues, especially concerning aviation. For example, Simon "Si" Lazarus and Mary Shuman, who served on the president's domestic policy staff, took the lead on aviation regulatory reform. Charles Schultze, chairman of the Council of Economic Advisors, and his special assistant, George Eads, also helped lead the charge for deregulation. Harrison Wellford, the Office of Management and Budget (OMB) director for management and reorganization, became a key player on several other aviation issues.[3]

Appointing a new FAA administrator proved more difficult than finding a new Secretary of Transportation. As a result, Carter asked John McLucas to remain as the administrator until he could find a replacement. McLucas agreed to stay through March

1977. The difficulty in finding a suitable replacement came from the nature of the job itself. The Carter transition team characterized the job as an administrative rather than a policy position. Team members noted that "given a succession of strong Secretaries, and the Secretary-elect will certainly fit this mold, policymaking has drifted away from what was once a fiercely proud and independent agency." They cited management ability as a skill needed in the new administrator. They explained, "Management skill has been sadly lacking in the Administrator and the agency has managed the Administrator rather than vice versa."[4]

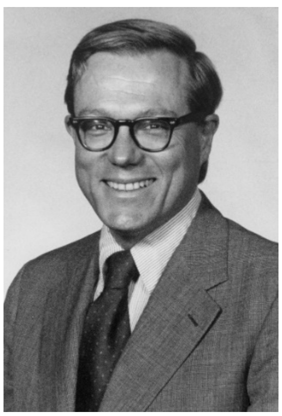
In addition, the position required some technical background, as well as experience dealing with labor-management problems. According to the transition team, "The Agency's almost twenty thousand air traffic controllers are a militant force seeking ever expanding benefits and money. They have effectively enforced their wishes by periodic slow downs of the nation's airways system." Hence, an administrator "should be skilled in dealing with employee disputes, demands and tactics aimed at blackmailing the agency into meeting demands." Recognizing, in recent years, the position "has been a revolving door with no administrator firmly grasping and managing the agency," the team recommended finding someone willing to stay at least four years[5] to gain effective control of the FAA.[6]

Although John McLucas had a better background and experience than his predecessors to be administrator, the team claimed he "has not exercised strong leadership in managing the agency and has not been a major source of input for DOT [Department of Transportation] aviation policy." Carter's advisors saw McLucas as a captive of his staff and unable to vigorously deal with major problem areas, such as hardware procurement, disputes over future air traffic control equipment, labor issues, and air safety needs. They also criticized him for being "too close to industry."[7]

The transition team suggested several candidates for the FAA administrator position, including M. Cecil Mackey, president of Texas Tech University. Mackey formerly served as director of the FAA's Office of Policy and Development, director of the Office of Transportation Policy for the Department of Commerce, and assistant secretary for Policy and Development for the Department of Transportation. The team also recommended Jim McDivitt, a former astronaut and president of a Pullman-Standard Car Manufacturing Company subsidiary, who topped the list of candidates for administrator. Other potential candidates included Frank Borman, former astronaut and airline president; Mary Anderson, president of Aviation Management International; Quentin Taylor, a career federal employee then serving as a FAA regional administrator; and G. H. Ridgeway, commissioner of Aviation at Hartsfield Atlanta International Airport.[8]

By February, with no nominee named, *Aviation Week & Space Technology* speculated that the front-runners for the job included Clifton Moore, John Nammack, and James Dow. Moore, manager of the Los Angeles Department of Airports and president of the Airport Operators Council International, had extensive experience in aviation noise issues. Bert Lance, Carter's OMB director, recommended Nammack, executive vice president of the National Association of State Aviation Officials and a former Air Force pilot. James Dow, the former deputy FAA administrator, served for a short period as acting administration before the appointment of John McLucas.[9]

President Carter ultimately nominated forty-year-old Langhorne Bond. Bond worked for the Carter campaign during the Illinois primary and then on the transportation task force during the campaign with Carter advisor Stuart Eizenstat. Eizenstat and other task force members recommended Bond for the job. Carter nominated Bond for FAA administrator on March 30. Since he did not receive Senate confirmation until April 27, Quentin Taylor, a career FAA executive nominated by Carter to be the deputy administrator, became the acting administrator when John McLucas left the agency on March 31.



Langhorne Bond

Bond, no stranger to Washington and the aviation community, became the seventh administrator of the FAA on May 4, 1977. Quentin S. Taylor became the FAA deputy administrator, succeeding James Dow on March 4. The forty-one-year-old Taylor was director of the FAA's New England Region when Carter nominated him for the position. Born in Front Royal, Virginia, he held a Bachelor of Science degree from Howard University in electronic engineering and a Master of Arts degree in political science from Syracuse University. Taylor joined the FAA in 1959 as an electronics engineer assigned to the Airway Facilities Service and served successively as a staff specialist in the Office of Appraisal, special assistant to the associate administrator for Administration, the FAA's first director of Civil Rights, and deputy director of the Alaskan Region. His appointment to the New England Region's top post in February 1975 made him the first African American to head a FAA region.

Although not consulted about the deputy administrator position, Bond did help select the agency’s other political appointees: Mary Anderson, associate administrator for

Policy Development and Review; Clark Onstad, chief counsel; Peter Clapper, assistant administrator for Public Affairs; and Robert Aaronson, assistant administrator for Airports Programs. With Bond's approval, Onstad created an appointed position for Cher Brooks, counsel with the Democratic National Committee, to serve as his special assistant, primarily recruiting more women into the chief counsel's office.[10]

Bond took over an agency in need of a strong leader and someone committed to staying in the position for the duration of the administration. Although his predecessors brought essential skills to the job, the lack of continuity adversely affected the agency. Butterfield served almost two years, but after disclosing the existence of a White House audio-taping system at the Watergate hearings, he and the agency he headed became political outcasts. McLucas, who served as administrator for almost sixteen months, had the confidence of President Ford. He had a solid technical and managerial background and was the first and only administrator with a Ph.D., but he was also the first administrator without a pilot's license.

Overall, Bond believed the FAA did a respectable job regulating the industry. However, he needed more clarification about the agency's internal politics and management attitudes. He recounted something he learned early in his tenure. There was "a very poisonous attitude in the FAA, a resentment of the superiors in the Department of Transportation or in OMB or somewhere else." He presumed the attitude came, to some extent, from "the industry that we regulate" and from some of the "previous administrators, whose egos have not been strong enough to allow them to be good subordinates" to the Secretary of Transportation. That, in turn, permitted the agency "to externalize our failures, to blame them on somebody else, when, in fact, they are not blamable on somebody else. They are our own damn fault and curable by ourselves.”[11]

As with all new administrations, it took some time for Carter’s aviation team to get organized and determine what direction to take on policy issues, such as regulatory reform, international aviation, and noise.

Housecleaning

In his first fireside chat on February 2, 1977, President Carter laid out some of the goals for his administration. In saving government money, "the place to start is at the top—in the White House,” Carter said. "I am reducing the size of the White House staff by nearly one-third and have asked the members of the Cabinet to do the same at their top staff. Soon, I will put a ceiling on the number of people employed by the Federal Government agencies, so we can bring the growth of Government under control.” He announced: “We are now reviewing the Government's 1,250 advisory committees and commissions to see how many could be abolished without harm to the public. We have eliminated some expensive and unnecessary luxuries, such as door-to-door limousine service for many top officials, including all members of the White House staff.” He said, “Government officials can't be sensitive to your problems if we are living like royalty here in Washington."[12]

The new president’s plan included "zero-based budgeting, removal of unnecessary Government regulations, sunset laws to cancel programs that have outlived their purpose, and elimination of overlap and duplication among Government services." Carter announced, "If a program does not work, we will end it, instead of just starting another to conceal our mistakes."[13]

He hoped his new budget planning process could optimize accomplishments available at alternative budgetary levels. Under zero-based budgeting (ZBB), agencies would start from scratch in justifying their spending plans each fiscal year rather than starting with the previous year's budget and building from there. The president expected each agency to set priorities based on the program results achievable at alternative spending levels, one of which was to be below current funding levels.

Less than a month after his inauguration, Carter ordered executive departments and agencies to establish ZBB. The February 14, 1977, order mandated agency heads use the ZBB process to prepare their fiscal year 1979 budgets. ZBB, the new president contended, would:

- cause managers to evaluate in detail the cost-effectiveness of their operations
- combine planning and budgeting into a single program
- expand management participation in planning and budgeting at all levels of the federal government
- focus the budget process on a comprehensive analysis of objectives and needs[14]

On January 20, 1978, the FAA submitted its fiscal year 1979 budget proposal. Like the other federal agencies, the FAA budgeters found the ZBB process confusing and arduous. Dan Aragona in the agency's Office of Budget admitted that because of a lack of experience in ZBB and with OMB's confusing instruction on preparing the budget, his office's first experience with the new system ended up being one of trial and error. In applying ZBB principles, the Office of the Secretary of Transportation divided the FAA's budget into twenty-six decision units to facilitate budget choices. Each organization responsible for justifying a decision unit then prepared a decision package, which included a two-page overview comprising a program description, long-range goals, primary objectives, and accomplishments to date.[15]

Each decision package reflected four different funding levels: 80 percent of the 1978 level, 90 percent of the current level, the current level, and an increased level. Each package described what could be accomplished at each level. Agency officials then ranked the packages. Despite an increased amount of paperwork required by the ZBB process, Aragona said that the process ultimately presented "the budget in a much more thorough and systematic fashion," making it easier for those responsible for the ultimate budget decisions. ZBB continued throughout the Carter years, but the Reagan administration discontinued it.[16]

Table 1-1: FAA Appropriations, 1976-1981

Fiscal Year	Appropriation
1976	2,816,679,000
1977	2,599,150,000
1978	2,792,500,000
1979	3,150,300,00
1980	3,273,900,000
1981	3,412,500,000

Source: *FAA Historical Chronology*

On March 1, 1977, following a campaign promise to limit the size of government, President Carter imposed a limit on hiring federal civilian workers. He asked agencies to limit the number of appointments to full-time permanent positions to fewer than 75 percent of vacancies occurring after February 28, 1977. He also forbade agencies to contract with firms to increase staffing to alleviate the effect of downsizing.[17]

This mandate and concerns about agency culture and attitude led Administrator Bond to undertake internal reforms. Soon after coming to the FAA, he imposed an agency-wide hiring and promotion freeze. Announced on May 12, 1977, the freeze affected internal and external hiring at the FAA's national headquarters in Washington, DC, and its Metropolitan Washington Airports office. Field offices, however, could fill vacancies from within the FAA as long as those positions did not involve promotions. The few exceptions to the rules included hiring required to meet air traffic training schedules. Managers and staff were equally unhappy with the freeze. Without the ability to add additional staff and with an indefinite end to the hiring freeze, many managers had to postpone or stop certain activities because of retirements, resignations, and other personnel attrition. When asked about the freeze, Bond answered, “There is a great deal of displeasure about it.”[18]

To further trim the number of employees at headquarters and the National Aviation Facilities Experimental Center (NAFEC) near Atlantic City, New Jersey, Bond instituted a field placement program that ran between March 27 and October 24, 1978. Under the program, field offices could not fill vacancies until managers determined whether or not they could find qualified candidates at headquarters or NAFEC willing to relocate.[19] Bond called the program a success, noting that with the more than 1,200 posted vacancies, managers selected 190 employees to move into regional positions.[20] Many employees and managers, unhappy with the field replacement program, referred to it as Operation Flush.[21]

With the field placement over, in May 1979, Bond announced plans to move two System Research and Development Service divisions from headquarters to NAFEC. The move, to be completed by early August, would consolidate similar functions shared between the two locations. The FAA planned to transfer forty to fifty mid-level and senior professional employees in the general schedule (GS) payscale GS-13 through GS-

17 to NAFEC.[22] The average age of the employees slated to move was forty-nine. The involuntary relocation angered some of the employees affected by the decision. It also confused many since the agency's field placement program purposely reduced the number of employees at NAFEC.

Several employees appealed to members of Congress. One of those employees wrote to Senator Charles "Mac" Mathias, Jr. (R-MD). The employee questioned the cost of moving so many employees. He also wrote, "Such a move, particularly during a school year, will have a harsh personal impact on the families involved." He noted, however, "It does reduce the people count in Washington, DC." In addition, he pointed out, "The move to NAFEC is contrary to the logic which established NAFEC as an independent and objective test center. Putting program management and development groups together with the test and evaluation function is directly opposed to a General Accounting Office report recommending isolation of the test and evaluation functions."[23]

In response to congressional inquiries regarding the relocation, Bond explained the move would "improve the timeliness of the product of our developmental programs, make more effective use of highly specialized and scarce skills, and improve utilization of specialized technical facilities."[24] In a letter to Senator Birch Bayh (D-IN), Bond provided a timeline of employee notification of their possible relocation. On September 29, 1978, the associate administrator for engineering and development met with employees to discuss potential relocation plans, which the administrator had not yet approved. Once the administrator approved the plan, he submitted it for the Secretary of Transportation's consent. That approval came on March 28, 1979. With the secretary's permission, the FAA notified the affected employees. Subsequently, headquarters personnel staff met with each employee to explain relocation procedures and their rights in accepting or rejecting the offer. In addition, the acting director of NAFEC met with the employees. The agency gave all affected employees three choices: relocate, resign, or retire.[25]

Four employees forced to move filed for an injunction in federal court to stop the transfers based on age discrimination. On July 25, U.S. District Court Judge Harold Greene granted the request. In his decision, he said the FAA had not "demonstrated that its decision was based on reasonable factors other than age." He warned the workers would most likely be able to prove their age discrimination claims if the case went to trial. Although the judge blocked the personnel moves, he said the FAA could allow individuals who wanted to transfer to do so.[26]

Although the employees scheduled to move asked the judge to block the functions and personnel moves to NAFEC, Greene's preliminary injunction secured just the personnel move. As a result, the FAA determined it had the authority to transfer the job functions.[27] The agency ordered affected personnel to report to NAFEC by August 12. On August 12, however, Judge Greene clarified his ruling and ordered the FAA to return the job functions to FAA headquarters and any employees who did not want to move. Before Greene's ruling, seven employees had already moved to New Jersey, and five opted to retire.[28]

The hiring freeze and field placement program greatly affected employee morale during Bond's early tenure as administrator. *Aviation Week & Space Technology*, which kept a close watch on the agency, reported, "Disturbed by an across-the-board job freeze still in effect that deters hirings, promotions and transfers, [FAA] officials maintain the federal agency is drifting without Bond in full control."[29] As the freeze wore on, the magazine reported the "months-long job freeze . . . appears part of an effort to trim the aviation agency's staff rolls without resorting to an official cutback in personnel." According to the reporter, the freeze initially described as a temporary step in a significant reorganization of the agency has "led to what officials call a 'dreadful' morale problem."[30] At congressional hearings in June 1979, Senator Barry Goldwater (R-AZ) asked Bond if he noticed any low morale problems. Bond responded: "Oh, there have been morale problems throughout headquarters of varying degrees. [Low morale] has been associated with the requirement that people leave Washington—or, for that matter, leave anywhere—because people would prefer not to do so. But we have been able to reduce our headquarters staffing in the way that it has been done without the requirement that one single person be laid off in the FAA."[31]

Bond's downsizing efforts resulted in a drop in full-time agency employees. After September 30, 1976, when FAA employment peaked at 55,991 full-time employees, it declined steadily, dropping to 55,760 in 1977, 55,221 in 1978, 54,444 in 1979, and 53,538 at the end of fiscal year 1980. Downsizing resulted in a 4.3 percent decrease in full-time employees between September 1976 and September 1980.[32]

One reason for the agency's downsizing came from the president, who entered office promising federal budget and civil service reforms. Carter insisted his Cabinet secretaries provide regular updates on the reform efforts at their agencies. In addition to the Carter mandates, Bond quickly came to see the FAA as top-heavy with too many managers and too little accountability.

When he assumed office, he found that twenty separate offices reported directly to him. He called that number “absurd” and vowed to “reduce it significantly.” He abolished the executive committee on August 31, 1977, the executive secretariat on September 9, 1977, and the agency review board on December 9, 1977. He also subsequently discontinued the agency’s regulatory council.[33]

Along with government reform and downsizing, on March 29, 1977, President Carter asked agencies to reduce the number of existing federal committees.[34] As a result of that mandate, on August 29, 1977, the FAA announced in the *Federal Register* the elimination of seven of its eleven advisory committees, including the Citizens Advisory Committee on Aviation, Microwave Landing System Advisory Committee, U.S. Advisory Committee on Obstacle Clearance Requirements, U.S. Advisory Committee on Visual Aids to Approach and Landings, U.S. Advisory Committee on Terminal Instrument Procedures, Flight Information Advisory Committee, and Southern Region Air Traffic Control Committee. These committees remained: Air Traffic Procedures Advisory Committee, Radio Technical Commission for Aeronautics, Technical Advisory Committee (terminated on March 1, 1978), and High Altitude Pollution Program Technical Advisory Committee (terminated on July 1, 1982.)[35]

As Bond explained, the “dog had too much tail and not enough tooth,” with too many managers and employees at FAA headquarters. “The span of control,” of the administrator, he said, “was excessive.” He recounted that the situation “is a typical circumstance with an organization which has been unmanaged for too long a period.” He justified his actions by saying, “the practical consequences of excessive span of control is no control at all . . . [employees] don’t get supervision at all. So, they go their own way, and they prefer that.”[36]

Hoping the FAA could become as well managed as technically run,[37] Bond contracted with Booz Allen Hamilton, a management consulting firm, in early 1978 to study the FAA's organizational structure.[38] Under the $200,000 contract, the agency required the firm to provide a preliminary assessment in forty-five days and a final report 164 days after it signed the contract. The two-phase organizational study recommended improvements in the agency's organizational effectiveness, management control systems, personnel, productivity, and level of service to the users of the national airspace system.[39]

After receiving the Booz Allen Hamilton report, on September 10, 1978, Bond ordered the following changes at the agency's Washington headquarters:

- abolished the Office of General Aviation and transfer the aviation education program to the Office of Aviation Policy
- renamed the Associate Administrator for Policy Development and Review as the Associate Administrator for Policy and International Aviation Affairs
- moved the Office of International Aviation Affairs under the executive direction of the new Associate Administrator for Policy and International Aviation Affairs
- retitled the position of Assistant Administrator for International Aviation Affairs as the Director of International Aviation Affairs
- renamed the Office of Environmental Quality as the Office of Environment and Energy to reflect the newly assigned responsibility for national aviation policy concerning energy matters[40]

Two months later, on November 2, the FAA officially established the Office of the Associate Administrator for Aviation Standards, with the Office of Aviation Safety, the Civil Aviation Security Service, and the Flight Standards Service placed under its executive direction. The agency retitled the head of the organization from the assistant administrator for Aviation Safety to the director of Aviation Safety.[41]

Further organizational changes resulted from Public Law 95-452, signed by the president on October 12, 1978. The new law established inspector general offices within the DOT and several other departments and agencies. The independent offices were responsible for audits and investigations of agency programs and operations. With the FAA's audit functions transferred to the DOT's new Office of the Inspector General, on November 2, Bond redesignated the Office of Accounting and Audit as the Office of Accounting. Since the fraud and abuse investigative functions of the agency's Office of Investigations and Security also transferred to the new Office of Inspector General, the agency ultimately closed the Office of Investigations and Security and moved internal security functions to the Office of Civil Aviation Security when that new office stood up.

More organizational changes came on June 13, 1979, when Bond:

- abolished the Office of Airport Programs and the position of Assistant Administrator for Airports Programs
- established a new Office of Associate Administrator for Airports
- established the Office of Airport Standards and the Office of Airport Planning and Programming and placed them under the executive direction of the Associate Administrator for Airports.
- placed the Metropolitan Washington Airports office under the executive direction of the Associate Administrator for Airports

On July 10, Bond again reorganized the offices and services under the Associate Administrator for Aviation Standards by:

- abolishing the Flight Standards Service
- establishing a new Office of Flight Operations and placing all functions affecting flight operations under it
- establishing a new Office of Airworthiness and moving all functions affecting airworthiness under it
- renaming the Civil Aviation Security Service as the Office of Civil Aviation Security
- establishing a safety regulations staff responsible for all flight standards safety regulation functions
- moving the Office of Aviation Medicine under the executive direction of the Associate Administrator for Aviation Standards[42]

Two weeks later, on July 25, 1979, Bond abolished the Europe, Africa, and Middle East Region. He assigned the executive direction of the former region to the associate administrator for Policy and International Affairs. On the same day, he transferred responsibility for the flight inspection program in the North Atlantic, European, African, and Middle Eastern areas from the Europe, Africa and Middle East Region to the Flight Standards National Field Office.[43]

In November 1979, Bond announced the establishment of lead regions to perform regional and national aircraft certification program functions that would otherwise be accomplished by more than one region or in the FAA headquarters. The first lead regions became operational on January 1, 1980: Central for aircraft under 12,500 pounds; Great Lakes for propellers; New England for aircraft engines; and Southwest for rotorcraft.[44] The New England region became the first certificating region, with certification authority for all foreign engines and all domestically manufactured turbojet engines producing at least 15,000 pounds of thrust. Later, in 1980, Bond designated two of the original lead regions as certificating regions: Great Lakes, effective July 1, 1980, and Central, effective January 15, 1981. On November 1, 1980, the Northwest Region became the lead for transport aircraft with a minimum gross takeoff weight of 12,500 pounds and the certificating region for foreign transport aircraft no matter what weight.[45]

Secretaries Sacked

While Bond succeeded in reducing overhead costs and personnel at the FAA and subsequently even gained the trust of his employees, Secretary of Transportation Brock Adams found himself increasingly out of step with many in the DOT and the White House. Although Bond worked well with Adams and readily assumed his role as a subordinate, Adams did not develop a similar working relationship with the White House staff. *National Journal* reporters Richard Cohen and Rochelle Stanfield described that relationship in late July 1977, "Preempted by presidential initiatives, originally ignored on energy policy and caught in the middle on mass transit funding, Adam's office often has been a beleaguered camp."[46]

In the early fall of 1977, the *Chicago Tribune* and *Wall Street Journal* reported President Carter seemed unhappy with many of his Cabinet officers. In particular, Brock Adams proved to be the biggest disappointment. The *Richmond Times Dispatch* subsequently quoted a White House insider who said Adams' "obsequious" manner bothered the president. In response to articles saying he found his Cabinet members disappointing, obsequious, and irascible, Carter responded, "he likes them all."[47]

After these reports, *Washington Post* reporter Douglas Feaver asked the secretary how he thought he was doing. Adams replied that he believed "he's doing well." According to Feaver, "Adams was furious" when the stories reported the president seemed unhappy with his performance. Adams claimed such stories created a "severe blow to the morale in the department." According to the secretary, the president called him after the publication of the articles. He "was most upset," Adams said. "He said, 'I have never criticized a member of this Cabinet.'"[48]

With the exception of economic deregulation, the Carter team came into office without a well-developed aviation or even transportation plan and entrusted planning to the DOT. Adams took a year to issue the administration's twenty-five-page transportation strategic plan. Released on February 6, 1978, "Transportation Policy for a Changing America" was little more than a public relations document. If the transportation industry hoped the paper would set concrete policies for the future, disappointment came early with this text, "Today, we have a national transportation system that appears to need no major expansion over the next ten or fifteen years."[49]

As for the aviation system, the first of just four paragraphs focusing solely on aviation revealed, "For the most part, the major airport and airways facilities that we will need for the foreseeable future are authorized or in place. Therefore, our policy must now change to emphasize the improved utilization and more effective management of these facilities." The remaining three paragraphs concentrated mainly on the need to reduce aviation noise. The document did express support for airline regulatory reform and expansion of the international air transportation system. The only specific mention of aviation safety came in a general paragraph:

> Safety efforts are directed toward the protection of vehicle occupants, improving the vehicle right-of-way, improving vehicle operator skills, and safeguarding the transport of hazardous materials. These include, for example, the efforts of the FAA, Coast Guard, and NHTSA relating to better communication systems and the provision of quick response medical aid to accident sites.[50]

President Carter meeting with the Cabinet at Camp David

Carter's relationship with his Cabinet, strained by the lack of concrete policy coming out of the departments and by continued White House staff disputes with many Cabinet secretaries, created trust issues between the president and some Cabinet members. Although criticism of the Cabinet eased for a while, things heated up again in early 1978. With his poll ratings sagging and public awareness of problems between White House staff and Cabinet secretaries, President Carter summoned key staffers and Cabinet officials to Camp David on April 22-23, 1978. According to *Newsweek*, the president was "particularly unhappy" with Secretary of Treasury Michael Blumenthal; Secretary of Housing and Urban Development Patricia Harris; Secretary of Health, Education and Welfare Joseph Califano, Jr.; and Secretary of Transportation Brock Adams. *Newsweek* quoted White House Press Secretary Jody Powell as saying, "We need to get our house in order . . . we need to make decisions more rapidly, further ahead of time, communicate better and follow through more."

According to the article's authors, "Carter believed some Cabinet departments, trying to operate independently, often embarrassed the administration. Carter's staffers, on the other hand, often failed to coordinate things properly." The magazine quoted an unnamed presidential aid explaining after the weekend meeting, "A noble experiment in Cabinet government has come to an end."[51] Despite media reports of a Cabinet shakeup, the Cabinet remained intact after the Camp David retreat. [52]

By July, however, rumors began again that Adams would soon leave his post. The *New York Times* reported Adams would probably leave by the end of 1978. The reporter said Carter's inner circle excluded the secretary and claimed a frustrated Adams perhaps hoped to go into private law practice. The article listed Alfred Kahn, Langhorne Bond, and John Sullivan as possible successors to Adams.[53] In response to the article, Adams called a news conference on July 17 to deny the report. "I like what I'm doing," he stated, and "I do not intend to resign."[54]

Carter continued to support his Cabinet publicly as media and public attention continued to question the competency of the administration's senior leaders. In October

1978, *U.S. News and World Report* polled White House aides, members of Congress and their staffs, career government employees, and citizens involved regularly with government agencies about the efficiency of Cabinet members. The magazine designed the survey not as a "scientific sampling but rather to determine a consensus of the performance of government's chief officers by those most familiar with their work." With a rating of one to ten, with ten being the top score, the final ratings were:

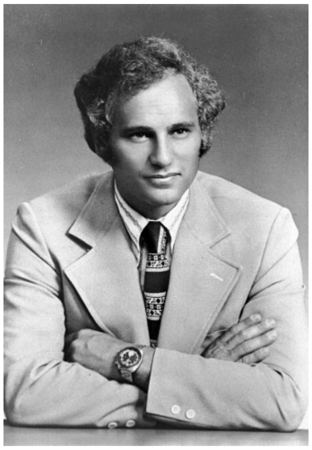
- Harold Brown (Defense) 8.5
- Cyrus Vance (State) 8.0
- Joseph Califano (HEW) 7.5
- Patricia Harris (HUD) 6.5
- Griffin Bell (Justice) 6.0
- Bob Bergland (Agriculture) 6.0
- Cecil Andurs (Interior) 5.5
- Ray Marshall (Labor) 5.0
- Michael Blumenthal (Treasury) 4.5
- Juanita Kreps (Commerce) 4.5
- James Schlesinger (Energy) 4.0
- Brock Adams (Transportation) 3.5[55]

Despite the administration's continued assertions of support for the Cabinet, as public perception of White House and Cabinet interactions continued to spiral downward, and with a reelection campaign underway, Carter began to clean house. Like most other presidential appointees, members of the Cabinet served at the pleasure of the president. In July 1979, Carter required all twelve Cabinet secretaries, plus twenty-one other officials, to resign. He accepted the resignations of Joseph Califano, Griffin Bell (who had long asked to leave), Michael Blumenthal, James Schlesinger (who submitted his resignation two times earlier[56]), and Brock Adams, all generally viewed by the White House staff as failing to be "team players."[57]

According to the *New York Times*, Hamilton Jordan, White House chief of staff, disliked Adams and told the secretary he could stay on if he fired Deputy Secretary Alan

Butchman (who was Adams' administrative assistant while in Congress) and if he sent Assistant Secretary for Congressional Liaison Terrence Bracy (formerly legislative assistant to Representative Morris Udall (D-AZ)) to the White House for a "talking to." Adams refused. Adams told reporters he had not decided whether to stay or go. When, according to the paper, Jody Powell "showed Carter a news account of Adams' comments, the President turned livid."[58] On July 19, Carter called Adams and told him to step down.[59] Adams subsequently told reporters Carter did not fire him—he quit. "Cabinet officers must work directly for the President—not for the White House staff," Adams said. Butchman and Bracy also resigned.[60] Department of Navy Secretary W. Graham Claytor, Jr., became acting secretary until the president could find a permanent replacement.

While Adams and the administration had policy differences, they also clashed over trust and access issues. In particular, Adams believed White House aides limited his contact with the president. Despite White House concerns, Adams did have successes as secretary. For example, after initially opposing the administration's airline deregulation efforts, he eventually helped the legislation succeed by lobbying his former congressional colleagues. The secretary reorganized the department in accordance with a Carter priority. Early in his tenure, he ordered that all passenger vehicles sold in the United States must include passive restraints by model year 1984. Adams raised fuel efficiency standards. He required grant recipients to include measures promoting minority businesses and established the Minority Business Resource Center within the DOT. He also proposed regulations mandating federally funded transportation facilities and programs be accessible to all, regardless of physical limitations.



Neil E. Goldschmidt
Courtesy: DOT

On August 15, 1979, Neil E. Goldschmidt succeeded Adams as Secretary of Transportation. Goldschmidt, the mayor of Portland, Oregon, at the time of his selection by President Carter, received a recess appointment. The Senate confirmed him on September 21, and he took the oath a second time three days later. Goldschmidt served the remainder of the Carter administration and resigned effective January 20, 1981, with the change of administration.

Well, the obvious first target was airline deregulation. –Simon Lazarus[1]

Chapter 2: Airlines Deregulated

Jimmy Carter came into office without a well-developed aviation or transportation plan. His staffers convinced the new president, who ran on a platform to loosen government regulation, that deregulating the airline industry would be a means of scoring an early legislative victory. Deregulation was not a new idea. It achieved academic credence in the late 1960s, especially among economists such as the University of Chicago's Milton Friedman and Cornell University's Alfred Kahn. It gained political momentum during the Gerald Ford administration.

The federal government regulated the airlines for almost forty years before the start of the Carter administration. The Civil Aeronautics Act of 1938 transferred responsibility for regulating civil aviation from the Department of Commerce's Bureau of Air Commerce to a new, independent agency, the Civil Aeronautics Authority. The legislation also allowed the agency to regulate airline fares and approve all air carrier routes. In 1940, President Franklin Roosevelt split the authority in two, creating the Civil Aeronautics Administration (CAA) and the Civil Aeronautics Board (CAB) and placing both in the Department of Commerce. The CAA was responsible for air traffic control, airway development, and civil aviation safety. The CAB's responsibilities included economic regulation of interstate airlines, determining airfares, deciding how many airlines and which of them could fly between cities, and conducting accident investigations.

New interstate airlines needed a certificate of public convenience and necessity before beginning operations. They needed CAB approval to serve any new locale and could not eliminate service without agency permission. They also required approval to merge with or buy other companies. Carter's domestic policy staff reported that between 1950 and 1977, the CAB granted none of the approximately eighty applications from new companies desiring to enter scheduled interstate service.[2]

Creating a free market by reducing government control of business had broad bipartisan appeal in both houses of Congress. Many in Congress believed airline deregulation could serve as a good test case for regulatory reform, especially since the fragmented airline industry would have trouble solidifying a unified front to protest legislation. Chairman of the Senate Judiciary Committee's Subcommittee on Administrative Practice and Procedure, Edward Kennedy (D-MA), aided by his assistant and former Harvard law professor Stephen Breyer, held hearings in February 1975 focusing on the CAB and its policies on airline routes and fares. The White House saw Kennedy's committee as a friendly forum to discuss deregulation rather than the more appropriate committee, the Senate Commerce, Science, and Transportation Committee's Aviation Subcommittee headed by Howard Cannon (D-NV).[3]

In April 1975, President Ford appointed John Robson chairman of the CAB when Robert Timm resigned. Timm allegedly accepted favors from an airline, and Kennedy's hearings placed the agency under critical review. Robson set the stage for deregulation by encouraging airline competition and relaxing price controls. As Robson later explained, "By the time President Gerald Ford appointed me CAB chairman in 1975, the CAB was the sole determiner of airline costs allowable for calculating fare levels and, therefore, fare levels themselves. And it seemed to me that if CAB cost controls were to continue to grow stricter and tighter to keep fares down, the airlines would become full-fledged public utilities. The alternative was to look to market forces to become the regulator of commercial aviation."[4]

One year after Robson's appointment, the CAB announced its support for airline deregulation, a move that would ultimately lead to the agency's abolition. As Robson explained, "The CAB's reputation as a first-class, non-political, impartial regulator, and the respect it enjoyed for its expertise in commercial aviation, made its embrace of deregulation a politically powerful statement for a major policy change."[5] CAB backing proved vital in convincing Congress, including Senator Cannon, the public would benefit from an airline industry governed by market forces rather than a strict regulatory structure. One of Cannon's top aides, twenty-six-year-old attorney Mary Schuman, would soon be in charge of President Carter's successful support for airline deregulation.

Stumbling Start

For the Carter transition staff, airline deregulation represented a quick "hit" for the new president. As Simon Lazarus, a Carter's domestic policy staff member, explained, deregulation was not the administration's first priority. "It was an important thing for the President, but for most of his staff, it was not the same thing as the energy legislation, civil service reform, or one of the two, three, four, or five most important measures of his next rung." It, however, represented the chance for a swift legislative victory for the new administration. As an early focus of the White House, President

Carter asked to remain fully informed and involved in pushing legislation through Congress.[6]

The administration's earliest public support for airline deregulation came before Carter's inauguration. During his confirmation hearing to become Secretary of Transportation on January 7, 1977, Brock Adams stated regulation "has discouraged price competition . . . denying air passenger's lower fares where they are possible." He emphasized air carriers should have flexibility in choosing new markets, and new airlines should be allowed to enter the market.[7] Interestingly, the White House staff, especially the domestic policy staff, never really trusted Adams's dedication to the president's goal of deregulation. They viewed Adams, who opposed deregulation while in Congress, as a hindrance rather than a help to achieving the president's objective, especially during 1977. Adams, for the most part, advocated a cautious approach to what he termed regulatory reform.

Before Carter's inauguration, the transportation transition team began drafting a paper on legislative options for the president-elect and remarks for Carter to give supporting congressional deregulation efforts. The group recommended the president provide the public with an "indication of our interest in early legislative action."[8] The options paper, not publicly disclosed during the transition, embarrassed the new administration shortly after Carter took office when the *Washington Star* reported its contents on February 3. Reporter Stephen Aug detailed the transition team's advice to Carter, including the idea that the president could get a quick political win by capitalizing on the groundwork already laid by Congress. According to Aug, Carter's advisors suggested he should "avoid endorsing" any of the regulatory reform bills pending "for fear he would alienate sponsors of those he didn't endorse." He also wrote the staffers suggested Carter not present a legislative package for airline deregulation because "drafting your own could offend congressional leaders who have brought the effort to its present posture."[9]

The options paper's authors, Schuman, Lazarus, and Harrison Wellford, expressed concern that with or without deregulation, several carriers, probably Trans World Airlines (TWA) or American Airlines, could go bankrupt in the next two or three years. The fact that Aug disclosed the transition team's recommendation to replace three members of the CAB—Republicans John Robson and R. Tenney Johnson and Democrat G. Joseph Minnetti—proved most disconcerting to the Carter team.[10] Lazarus firmly believed the leak came from the DOT. He recommended Jody Powell, White House director of communications, "Find an appropriate way of communicating to Secretary Adams our concern about restricting the circulation of such documents to himself and his staff."[11]

Senators Howard Cannon (left) and Edward Kennedy
Courtesy: University of Nevada, Las Vegas, Special Collections and Archives

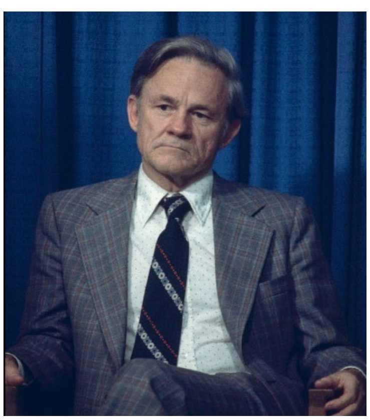
Senators Kennedy and Cannon joined forces early in the Carter administration and reintroduced an airline regulatory reform bill on February 10, 1977. The Senate Committee on Commerce, Science, and Transportation scheduled Air Transportation Regulatory Reform Act hearings for late March or early April. Carter and his staff did not publicly endorse the

Kennedy-Cannon bill. Instead, the administration worked behind the scenes to help pass the legislation.

In late February, the domestic policy staff sent a draft message to the president for approval, pledging the administration's support for airline deregulation. The DOT press office wanted to review the final draft message before it went to Capitol Hill. Carter's staff warned the president, "As you know, there may be some aspect of the message with which Adams disagrees."[12] A *Washington Post* interview with Adams published on March 3 highlighted the secretary's unwillingness to support the president's initiative fully. According to the newspaper, Adams appeared to be "reluctantly" going along with airline reform. The reporter said that Adams indicated he would support the president's measures and quoted him as saying, "I think reform is due, and you'll see me coming out along with the President on more specifics in the future." Adams, however, expressed concern "about the disruptive effects which I know will happen out of many of the changes that are proposed, and I want to be certain that they're addressed."[13]

After the *Washington Post* published the article, Stuart Eizenstat, Executive Director of the White House Domestic Policy Staff, worried about Adams's remarks. "Doubts about his support have been created by press stories," he explained. Eizenstat told Carter, "It is important that the Secretary affirm his support for your position and that he explicitly corrects the 'misimpressions' generated by press accounts." He also warned that it would probably fail if the administration did not actively promote deregulation legislation. Furthermore, he said, "If airline deregulation fails, there is little realistic hope of realizing our aim of eliminating anti-competitive regulation in other sectors." Eizenstat suggested that for the upcoming Senate hearings on deregulation, "it might be useful to supplement Secretary Adams' testimony with testimony from other concerned officials" to ensure Congress and the press understood that Carter supported the Kennedy-Cannon bill no matter what Adams said.[14]

On March 4, Carter sent such a message to Congress. Warned by his staff not to use the word deregulation because many viewed it as "a code word that some take to mean totally free entry and the abolition of the CAB," the president urged Congress to "reduce Federal regulation of the domestic commercial airline industry." Hoping Congress would pass legislation by the summer of 1977, he pledged "to cooperate fully with Congress throughout the legislative process."[15] Once the White House issued the statement, Jody Powell held a press conference with Adams, Eizenstat, and Schuman. The press conference went well, with Secretary Adams expressing the administration's views. This did not go unnoticed by the press. The *National Journal*, for example, ran a story on March 5 titled "Carter Shows Who's the Boss When It Comes to Airline Deregulation." In the article, Richard Cohen said that Carter and his aides "are more convinced of the need for changing airline regulation than are Adams and his aides."[16]


Charles Schultze

Staff concerns increased as the administration began coordinating testimony for the Senate hearings. In a memo to Charles Schultze, chairman of the Council of Economic Advisors, staffer George Eads complained that Secretary Adams "is insisting that he not appear until the last day of the hearings," even though all other administration witnesses would appear on March 22. In addition, Adams' staff refused to submit draft testimony or to submit answers to the Office of Management and Budget's (OMB) list of pre-hearing questions. Eads cautioned, "If Adams succeeds in separating himself from the other Administration witnesses, the division of views within the Administration will become glaringly apparent." He explained, "While other administration witnesses prepared their testimony based on an agreement among White House staff and Cabinet Secretaries, Secretary Adams' testimony was a 'flagrant violation' of those agreements and needed 'drastic modifications' to get it in line with remarks prepared for other witnesses. If he testifies last, there will be no chance for following Administration witnesses to 'clarify' his answers."[17]

When Adams finally did submit his draft testimony, administration officials condemned it as "silly" and "ludicrous," employing "bad economic reasoning," and predicted it would "prove embarrassing to the Administration." According to one reviewer, a "partial inventory of damaging remarks" in the draft testimony included:

- an unfounded fear of predation and an argument that excessive competition might result in a single remaining monopolistic airline
- fear of business failures and irrational management, which would result in loss of small community service.
- a suggestion that the CAB should have residual power to declare any rate increase unlawful when it involves predatory conduct[18]

The same day he received and reviewed DOT's testimony, Eizenstat returned it to Adams through Mary Schuman for revision because "it was totally negative, and spoke only of predation, bankruptcy, large carriers squeezing out small ones . . . as we had done with Adams before the press briefing, we said that the testimony must be positive, and that the negative aspects of the issues could be covered in questions and answers." Although all agencies involved in regulatory reform, except the DOT, wanted a quick phase-in of the legislation's pricing and entry sections, the Departments of Justice and

Treasury, the Council of Economic Advisors, and the Wage and Price Administration ultimately agreed to a longer phase-in time to appease the DOT.[19]

Stuart Eizenstat with Anne Wexler, special assistant to President Carter for public outreach

Conceding to one of Secretary Adams' demands did not ease tensions within the administration. After receiving Schuman's suggestions on how to rewrite his testimony, Adams called Eizenstat at home to complain Schumann had ordered him to circulate the DOT's list of possible questions and answers for the hearing. Eizenstat asked Simon Lazarus how to handle the situation. Lazarus suggested Eizenstat return Adams' call during business hours and explain the domestic policy staff offers courses of action necessary to carry out the president's objectives. Lazarus advised him to inform Adams, "We do not order any member of the Administration to do anything."

The staff believed circulation of draft testimony and questions and answers necessary because the president wanted to end division within the administration over deregulation. Without circulation, "it would be impossible to assure that the several Administration witnesses would concur, or appear to concur, on all points. Other witnesses have circulated their proposed answers to the draft questions prepared by OMB. DOT is no different than the other agencies." Lazarus asked Eizenstat to support Schuman concerning Adams, "Otherwise, we lose our ability to see that the President's policies are not undermined by DOT's day-to-day behavior."[20]

Although Adams rewrote his testimony, deemed “near great” by Schuman, concerns over the secretary’s support continued to distract from the administration’s effort to pass an airline deregulation bill. The question of support even came up during Adams’ testimony to the Senate on April 1. In his opening statement, Adams reported, “I want to say specifically that I worked with the President on the development of this message.” The first question Senator Cannon asked Adams centered on the secretary’s support for deregulation:

> There has been speculation in the press and elsewhere occasioned by seemingly contradictive speeches and interviews that you are at variance with the President’s position on airline reform. Inasmuch as you had extensive background in transportation before joining the administration, your personal views on this legislation would be of great benefit to the committee if they do not coincide with the general administration viewpoint. Would you care to comment on that?

Adams responded, “I have discussed this matter with the President. I helped draft the message . . . my personal views are in this statement.”[21]

The Kennedy-Cannon bill did not have the full support of the Senate because many senators raised concerns over labor protections and the airlines' possible abandonment of service to small communities. Labor unions, in particular, did not support the bill, fearing it might lead to pay reductions or at least lower annual raises. Some linked Adams’ intransigence to labor resistance. Adams, according to one editorial, “reflects this special interest priority. His boss, Jimmy Carter, wants deregulation by summer, but Adams is wobbling.” The editorial speculated Adams’ concern “is not with the philosophy of deregulation but with the cluster of aircraft unions in his home state of Washington. He wants to keep open the option of running for the Senate in 1980.”[22]

To gain congressional support for deregulation, Schuman asserted, “We are going to have to launch a good lobbying effort on the Hill” to convince the Senate to vote for the bill. As part of the lobbying effort, she tried to get Adams to agree to a series of visits to Senate members. She explained, “Industry pressure on Capitol Hill is intense, and unless we get up there to rebut the misinformation that the industry is claiming (massive unemployment, breakdown of the system, etc.), we are going to lose the bill.” Schuman believed the DOT’s absence in the lobbying efforts would be “too conspicuous.”[23]

In addition to providing only passive support for the bill, the White House worried Adams wanted to rewrite it rather than actively lobby for it. Furthermore, White House staff heard rumors the secretary backed an effort to add a noise financing package to the deregulation bill. This move would probably cause Senator Cannon to pull back his support for the deregulation bill.[24]

Noisy Numbers

The question of noise financing stemmed from a December 1976 FAA rule. It established deadlines for phased compliance of all jet transport aircraft with the 1969 noise standards for new aircraft types. The agency gave operators whose fleets included aircraft that did not meet the standards the option of modifying or replacing them. The FAA also required all two- and three-engine jets exceeding 75,000 pounds to comply within six years. Half of the total in each airline fleet would need to comply at the end of four years. Aircraft in this category included the British Aircraft Corporation (BAC)-111, Douglas DC-9, and Boeing 727, 737, and 747-100. Non-complying four-engine jets had to meet the standards within eight years, with 25 percent complying within four years and 50 percent within six years. This category included the Convair 990, Douglas DC-8, and Boeing 707.[25]

Since the life of an aircraft extended well beyond the years originally predicted, airlines would have to retrofit a significant number of planes if they wanted to keep them in service. The airlines lobbied Congress for legislation to help them defray the cost of the mandatory retrofit. House Public Works Committee members sided with the airlines and hoped to pass legislation to subsidize the airlines so they could meet the noise requirements. They made it clear that the passage of deregulation legislation would not happen unless Congress also passed a noise financing bill.

Representative Glenn Anderson (D-CA), chairman of the House Committee on Transportation and Public Policy, Aviation Subcommittee, introduced the Airport and Aircraft Noise Act, HR 4539, on March 7, 1977. The proposed legislation would require the Secretary of Transportation to establish a single system of measuring noise and the impact of noise on individuals at airports and their surrounding areas. It set eligibility standards for noise compatibility planning grants and authorized airport operators to collect a maximum two-dollar charge, directly or indirectly, from persons traveling in air transportation. Airport authorities could use 75 percent of the tax to carry out a noise compatibility program approved by the secretary. If passed, it directed the Secretary of Transportation to publish a list of aircraft owners who did not comply with the noise standards.[26]

The draft bill would require operators of noncomplying aircraft to impose a 2 percent surcharge on any rates for carriage of persons and property. The federal government would deposit those taxes into a separate account to pay for noncompliant aircraft retrofitting or replacement costs. It would authorize the secretary to make grants available to noncomplying aircraft operators when the surcharge amount was insufficient to meet the allowable retrofitting or replacement cost.[27]

When the House Committee on Public Works and Transportation invited Adams to testify at hearings on Anderson's bill, White House staff scrambled to produce an administration position. Despite rumors that he supported the bill, Adams suggested the White House oppose the airport noise planning requirement in the draft legislation. He believed the federal role in noise planning should be "encouragement rather than regulation." He also proposed a modified version of the noise abatement trust fund. Like the Anderson bill, Adams' plan involved a 2 percent surcharge on tickets offset by a similar reduction in the existing ticket tax. Unlike Anderson, however, the secretary would allow each airline to receive grants from the trust fund only in the amount of its contributions. Adams encouraged the airlines to replace rather than retrofit their aircraft. The Environmental Protection Agency (EPA), the Council on Environmental Quality, and the OMB agreed with Adams in opposing airport noise planning regulations. They also favored the establishment of a noise abatement trust fund. However, the EPA wanted to use the fund to retrofit aircraft to meet the more stringent noise requirements.[28]

While the House worked on a noise abatement financing bill, the Senate released a new draft of its airline regulatory reform bill.[29] The revised bill included a new provision to protect service to small communities and a timeline to phase in competition gradually to let airlines adjust to the new economic environment. White House staff met with key congressional members to maintain interest in the legislation. They held a press briefing on June 20, the day before the Senate began markup of its version of the bill. Carter's team fully understood the need for White House involvement to counteract heavy industry lobbying against reform since many predicted the markup might prove long and arduous.[30]

In a statement made at the beginning of the press conference, Carter reiterated his support for airline regulatory reform and, in a message directed toward the airlines, said, "There is always a fear of change, and I know that when there is a privilege that is now extant, that a chance of losing that privileged position is one that causes legitimate concern." However, he remarked, "There is a tremendous potential market among Americans for airline service use that hasn't yet been tapped. I believe that more competition, lower rates, higher use of airplanes, more entry into new markets, better protection for small communities all tie together in a very worthwhile pursuit."[31]

While the White House worked to encourage senators to support the draft legislation, the airline deregulation movement halted in the House of Representatives. The House, preoccupied with the slow-moving draft legislation to finance aircraft noise retrofits, temporarily pushed aside discussions of airline regulatory reform. When Anderson's original noise finance bill lacked the support to move out of committee, he rewrote the bill to appease opponents. He started the revised version through the legislative process on June 30, 1977, as HR 8124. As Mary Schuman reported, "The airline noise financing bill has returned to haunt us . . . they are asking for our support so 'they can get onto reform.'"[32]

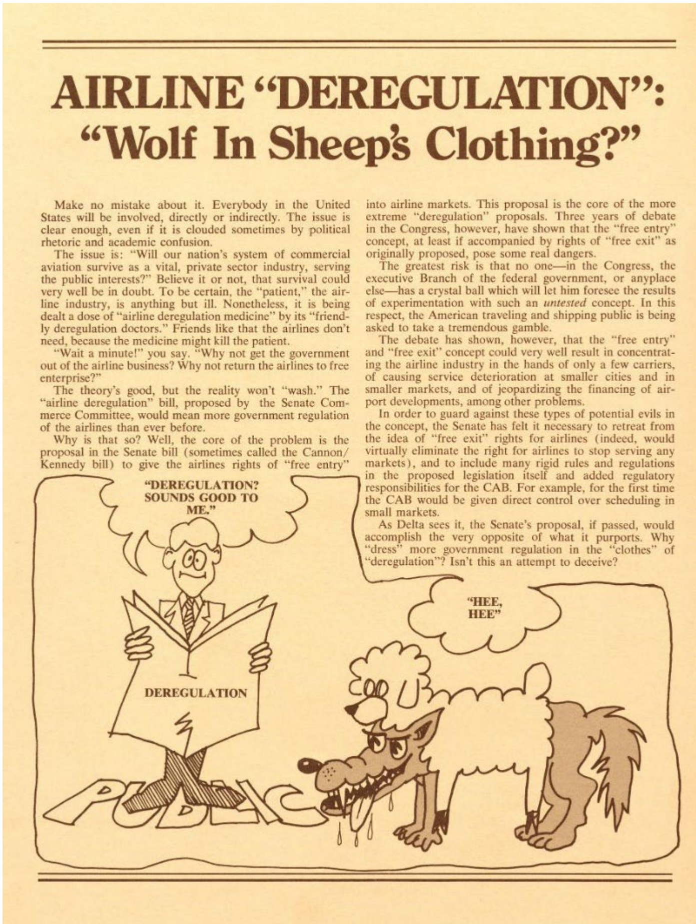
Anderson's redraft, however, increased White House concern rather than alleviated it. In a memo to President Carter, Stuart Eizenstat wrote the revised bill "is now even more unacceptable." The bill had already stalled in Anderson's committee for lack of support. "We have informed him that we cannot support his bill in its current form." Eizenstat had his staff work with Anderson on a compromise bill that would satisfy the White House. He suggested the president meet with Anderson "to urge him to get moving on the reform issue," especially since Secretary Adams informed the representative in May that the president would veto a noise bill not accompanied by a reform bill.[33]

Not only did the White House find Anderson's bill unacceptable, but it also found it challenging to come to an internal compromise the administration could support on the finance issue. The OMB and the DOT objected to Title I of Anderson's bill because it gave the federal government responsibility for setting noise standards. If the government establishes noise standards, it could create the potential for government liability in lawsuits relating to aircraft noise. Although the DOT proposed several options on how to rewrite Title I, the OMB rejected all of them. By the end of September, the DOT and OMB finally agreed on a compromise to use funds from the FAA's existing airport and airways trust fund for airport noise compatibility planning. With the OMB and DOT in agreement, the White House pitched the rewrite to Anderson.[34]

While the White House tried to find a way to get the noise bill and then the reform bill moving in the House, work on the Senate reform bill slowed to a crawl. Carter pressed Senator Cannon to "speed the pace of your deliberations so that a bill can be acted upon by the Senate this year." With controversy over automatic route entry and pricing stirring opposition, Carter reiterated his goals for the bill:

> Pricing flexibility must be accompanied by strong entry provisions. It is entry, or the realistic threat of it, that prevents price flexibility from being abused. Automatic price entry is especially important in keeping prices low . . . the presumption should be that competition is consistent with the public interest. . . . There is simply no justification for preventing new carriers from serving markets which other carriers are not using. . . . I

believe that entry provision and upward pricing flexibility are intimately related.[35]



AIRLINE "DEREGULATION": "Wolf In Sheep's Clothing?"

Make no mistake about it. Everybody in the United States will be involved, directly or indirectly. The issue is clear enough, even if it is clouded sometimes by political rhetoric and academic confusion.

The issue is: "Will our nation's system of commercial aviation survive as a vital, private sector industry, serving the public interests?" Believe it or not, that survival could very well be in doubt. To be certain, the "patient," the airline industry, is anything but ill. Nonetheless, it is being dealt a dose of "airline deregulation medicine" by its "friendly deregulation doctors." Friends like that the airlines don't need, because the medicine might kill the patient.

"Wait a minute!" you say. "Why not get the government out of the airline business? Why not return the airlines to free enterprise?"

The theory's good, but the reality won't "wash." The "airline deregulation" bill, proposed by the Senate Commerce Committee, would mean more government regulation of the airlines than ever before.

Why is that so? Well, the core of the problem is the proposal in the Senate bill (sometimes called the Cannon/Kennedy bill) to give the airlines rights of "free entry" into airline markets. This proposal is the core of the more extreme "deregulation" proposals. Three years of debate in the Congress, however, have shown that the "free entry" concept, at least if accompanied by rights of "free exit" as originally proposed, pose some real dangers.

The greatest risk is that no one—in the Congress, the executive Branch of the federal government, or anyplace else—has a crystal ball which will let him foresee the results of experimentation with such an *untested* concept. In this respect, the American traveling and shipping public is being asked to take a tremendous gamble.

The debate has shown, however, that the "free entry" and "free exit" concept could very well result in concentrating the airline industry in the hands of only a few carriers, of causing service deterioration at smaller cities and in smaller markets, and of jeopardizing the financing of airport developments, among other problems.

In order to guard against these types of potential evils in the concept, the Senate has felt it necessary to retreat from the idea of "free exit" rights for airlines (indeed, would virtually eliminate the right for airlines to stop serving any markets), and to include many rigid rules and regulations in the proposed legislation itself and added regulatory responsibilities for the CAB. For example, for the first time the CAB would be given direct control over scheduling in small markets.

As Delta sees it, the Senate's proposal, if passed, would accomplish the very opposite of what it purports. Why "dress" more government regulation in the "clothes" of "deregulation"? Isn't this an attempt to deceive?

Delta Air Lines article protesting deregulation

Courtesy: Delta Flight Museum

No matter how strong, support from the White House did not help Cannon and his committee members ignore vigorous lobbying efforts from the airlines and aviation industry. Delta Air Lines, in particular, fiercely opposed reform legislation. In a letter to Carter, Delta Chairman of the Board Tom Beebe said, "It is my intention for Delta to expend whatever energy and resources we have available to us to fight deregulation in its present form." He continued, "I am extremely sorry that we apparently are on opposite sides of this issue, but we expect to make our fight on the basis of the issue and to avoid any personality involvements." Beebe, a long-time acquaintance of Carter's, warned, "I notice with interest that you have Mary Schuman canvassing the country trying to sell deregulation in its present form, and we shall try to counteract effectively her mission and any and all such future efforts which we conceive as being very misguided."[36]

Schuman's nationwide presentations to chambers of commerce and business groups positively affected public opinion. In an opinion piece for the *Atlanta Journal*, for example, John Crown, "not usually a friend" of the administration,[37] wrote it "was a refreshing experience to listen to Ms. Schuman." She told us, "It made more sense for an airline executive to make a business judgment on what routes to fly and what fares to charge and what schedules to maintain than it did for a group of government regulators in Washington to decide what matters."[38]

By late October 1977, administration lobbying in the Senate and with business groups finally showed some signs of success. When the Commerce, Science, and Transportation Committee completed its review of the legislation, there appeared to be sufficient votes to report the bill to the full Senate. Unfortunately, the administration had to deal with one last issue. Senator Warren Magnuson (D-WA), chairman of the committee, uncomfortable with the bill, refused to call a vote. Magnuson, a champion of consumer protection, which generally depended on greater government regulation, seemed hesitant to support less airline regulation. Eizenstat warned the president, "If Magnuson continues to refuse to have a vote, members will stop attending markups, and we will be unable to get a quorum." The administration had come from a position of almost no support in June when the bill went to the committee for markup to one of great support. "If the delay continues, the momentum which we have been carefully constructing may be lost."[39]

Secretary of Transportation Brock Adams, who early in the legislative battle for deregulation had several well-publicized policy disagreements with the White House, helped break the Senate's deadlock. He eventually used his legislative experience and personal connections on Capitol Hill to help convince the Senate to introduce the bill, which it finally did on February 6, 1978 (S 2493). On February 24, Representatives Glen Anderson (D-CA), Harold Johnson (D-CA), Elliott Levitas (D-GA), and Norman Mineta (D-CA) introduced the Air Service Improvement Act of 1978, HR 11145, which then went to the House Committee on Public Works and Transportation and the House Committee on Rules. The bill did not make it out of either committee.

Cargo Consideration

Pan American Cargo aircraft
Courtesy: Pan Am Historical Foundation

When it appeared airline deregulation would not be the quick victory Carter hoped for, the White House turned to cargo airline deregulation as its first success story. Early in their tenure in office, the Carter staffers convinced Senators Kennedy and Cannon to remove air cargo deregulation from the larger airline regulatory reform bill. The cargo piece became part of another bill Glenn Anderson introduced in the House of Representatives in April 1977. “An Act to amend title XIII of the Federal Aviation Act of 1958 to expand the types of risks which the Secretary of Transportation may insure or reinsure, and for other purposes" was a catchall bill for dealing with several aviation-related items, such as aviation war risk insurance, retroactive subsidies to air taxi operators for transporting mail, U.S. registration of foreign aircraft, and waiver of emergency locator transmitter requirements. The bill also permitted "all-cargo carriers to obtain certificates to operate all-cargo services to any point within the United States." The legislation moved through the House and Senate reasonably quickly.[40]

Mary Schuman and Stuart Eizenstat recommended a public bill signing ceremony once it passed in the Senate and House of Representatives. They explained to the president, "This was originally part of the larger airline reform bill, but we split it off so there could be some deregulation victory this year." A signing ceremony would also provide the president a forum to "praise Senator Cannon, and 'lean on' Representative Glenn Anderson for the domestic airline bill" and "bring attention to the issue of airline deregulation."[41] Carter agreed with the recommendation and held the ceremony on November 9, 1977, at which he emphasized the need to pass airline deregulation legislation. Directing his remarks, in part, toward Anderson, Carter said the bill helped "with the first steps toward deregulation of passenger-carrying" airlines. Thanking the Senate for their ongoing work on airline deregulation, the president warned, "This is going to be a controversial measure, and I hope that the House will soon follow suit and that both Houses of Congress will move to approve this legislation."[42]

Agency Support

Interestingly, the deregulation debate evolved with scant input from the FAA, the one agency that would be most affected by the change in terms of workload and resources. FAA Administrator Langhorne Bond remained a loyal soldier, unquestionably supporting the administration's views in his public remarks. As he told the Commuter Airline Association in November 1977, the administration "considers the regulatory reform of our air transportation system a major goal. I fully support it."[43] Bond later explained that he had "no interest in economic matters."[44] Any concerns from the FAA's rank and file remained relatively muted until late 1977.

The week after celebrating victory with cargo deregulation, the White House received a letter from Representative John Burton (D-CA), chairman of the House Government Activities and Transportation, Subcommittee on Government Operations, raising concerns about aviation safety in a deregulated environment. Burton conducted hearings in September 1977 to explore the effects regulatory reform might have on FAA operations and aviation safety. During those hearings, Bond fully supported regulatory reform and assured the subcommittee that reform would not degrade safety.

Richard Skully, director of the FAA Flight Standards Service, accompanied Bond to Capitol Hill. Burton discovered that in preparation for the hearings, Skully asked several of his division managers to outline possible safety problems deregulation might cause. Burton requested copies of those responses and included them in the hearing record. He subsequently sent copies of the FAA staff reports to the president, saying they were "quite frankly, alarming" and "are in startling contrast to the testimony offered by the Administrator."

In his memo to Skully, for example, Paul Clark, chief of the Flight Standards Service evaluation staff, warned that in a deregulated environment, "to be competitive with other carriers in ticket prices, the carriers could be expected to cut economic costs wherever possible, and through past experience, the first corner to be cut is maintenance training." He noted the next cut after that could be maintenance personnel. Clark expressed concern that any aviation accident or incident after deregulation would require an increase in FAA surveillance and inspection, which, in turn, would require hiring additional inspectors.[45]

Most of those responding to Skully's query focused on insufficient inspector personnel. According to one manager:

> Depending on the experience of the operator/applicant, it takes from 3 to 9 months to certificate a Part 121 operator and requires continuing liaison between the applicant and the assigned FAA inspectors involving many man-hours. . . . After a new operator is certificated, the assigned FAA inspectors closely monitor its flight operations and maintenance activities for about 6 months to a year. This imposes an additional drain on manpower, particularly if the operator is marginal financially.

Since the primary duties of the safety inspectors focused on surveillance, enforcement, and investigation, they would give a lower priority to operator certification. As a result, "failure to certificate them has no affect [sic] on safety, we plan to give operator certification a low priority as we do not expect to receive authority for additional staff to handle a significant increase in applications for FAA operating authority."[46]

The FAA General Aviation Division predicted deregulation would significantly increase air taxi commercial operator applications for certification. The staff could not handle the increase. As another division manager lamented, "Even an authorized increase in personnel would be largely unproductive over the near term" because of the long lead time to hire and train new inspectors.[47]

Howard Cannon meeting with President Carter in the White House
Courtesy: NARA

On February 6, 1978, Howard Cannon finally introduced the Air Transportation Regulatory Reform Act (S 2493) in the Senate, which passed the bill on April 19 with a roll call vote of 83 to 9. However, getting a similar bill passed in the House proved more complex and required a full-court press by the White House. It also needed administration acknowledgment that deregulation and aircraft noise financing became inseparable in the minds of key House lawmakers. Furthermore, the president realized he needed to get his own house in order if the administration was going to present a united front in its push to get legislation through Congress.

Final Push

The long-rumored lack of communication and cooperation among Carter's Cabinet secretaries and between the White House staff and the Cabinet over policy issues became increasingly apparent in early 1978 over labor protection and airline deregulation. On January 26, 1978, Mary Schuman asked Stuart Eizenstat to inform the president that Labor Secretary Ray Marshall planned to meet with airline labor unions to draft labor protection provisions that could be added to airline deregulation legislation. Carter did not want labor protection included in the bill.

According to Schuman, Marshall pitched a provision requiring carriers to reach agreements with their labor unions, subject to the approval of the Secretary of Labor, before they could exercise any new authority granted by deregulation. She called the provision "deadly" and recommended the president and Secretary Adams talk with Marshall before he met with the unions. Eizenstat forwarded Schuman's memo to Carter with a cover letter saying that any such labor provision "may undermine the purpose of loosening government control of the airlines."[48] Although the staff succeeded in stopping Marshall from talking with the unions, friction within the Carter administration over control of policy and legislation on this and other matters continued to simmer.

After the Camp David meeting with the Cabinet in April 1978, and with hopes the Cabinet would fully support his legislative initiatives, Carter began a major push for regulatory reform. By June, domestic policy staffers realized that a House deregulation bill would only pass with aircraft noise financing legislation. While the White House succeeded in preventing the two legislative packages from being combined into one, something chairman of the Aviation Subcommittee of the Committee on Transportation and Public Policy, Glenn Anderson, had hoped for, House leadership made it clear that one bill would not succeed without the other.[49] Anderson reintroduced his noise financing bill on August 17, 1978, as HR 13908 and again on October 14, 1978, as HR 8729. In the meantime, Senator Jacob Javits (R-NY) introduced S 747, and Senator Howard Cannon introduced S 3064 as noise reduction financing bills.

Howard Cannon's Committee on Commerce, Science, and Transportation held hearings on May 24-25, June 13-14, and June 17, 1978, to discuss the various Senate and House bills. The bills had a common goal to establish a program to reduce aircraft noise through a surcharge imposed on the airlines. They did, however, have significant differences. Senator Javits' bill, for example, empowered the CAB to collect airline surcharges and to disburse those funds to the carriers to help fund expenditures to reduce noise. The bill would also establish a new grant-in-aid program of $300 million to support the retrofit financing of aircraft not meeting noise regulations. The House bill offered a different approach. It reduced the 8 percent airline ticket tax by 2 percent and created a 2 percent excise tax for noise reduction. The air carriers could claim a credit against the excise tax liability to retrofit, re-engineer, or replace noncompliant aircraft. Senator Cannon's bill would create a federally guaranteed loan program of $20 billion to aid carriers in replacing noisy planes.[50]

During his testimony on the opening day of Cannon's hearings, Langhorne Bond noted the administration did not support the Cannon or Javits bills and only liked Title III of the Anderson bill. The administration opposed the first two titles of Anderson's legislation because they would create new spending programs. It did support parts of Title III, which would divert 2 percent of the existing 8 percent ticket tax to be used by the airlines to replace or retrofit aircraft to meet federal noise standards.[51] The finance bill cleared the Commerce Committee but remained bogged down in the Finance Committee.[52] As it turned out, the high cost of the finance bills created dissent in Congress, and movement on the noise bill eventually stopped. Although many in the Senate tried to move the original legislation to the floor for a vote, they could only pass a much watered-down version. The Senate returned the bill to the House for consideration, where representatives failed to bring it to a final vote before the House adjourned on October 15.[53]

Alfred Kahn and Jimmy Carter
Courtesy: *New York Times*

While the noise bill died slowly, the administration continued to push for action on the deregulation bill. White House staffers met with key representatives in early August to get deregulation movement. The House Rules Committee, which determined how long and under what rules the whole body would debate a bill once a committee with legislative jurisdiction voted, began discussing the deregulation bill on August 10, 1978.

Hoping to renew and reinvigorate public support for deregulation, the White House held three briefings for business and nonprofit leaders on September 8 and 11. Brock Adams, Eizenstat, and Alfred Kahn participated in the two briefings on September 8, and Eizenstat and Kahn on September 11. Invitees included the Airline Passenger Association, American Association of Retired Persons, American Farm Bureau, Common Cause, National Taxpayers Union, and Young Americans for Freedom.[54]

House Majority Leader Jim Wright (D-TX) finally brought the deregulation bill to the floor for discussion in mid-September.[55] The House passed it on September 27 by a vote of 363-8. President Carter immediately issued a statement praising Congress:

> The deregulation bill will take decision-making out of the hands of five regulators and 800 government bureaucrats who sit here in Washington and put it back in the hands of the men and women whose job it is to run the airlines. It will cut inflation. It will let free market forces operate as they should. The Senate has already passed the bill. I hope it goes quickly to Conference and reaches my desk for signature as soon as possible.[56]

Despite the president's urging, Representative Harold Johnson, chairman of the House Transportation Committee, and Senator Howard Cannon agreed not to begin a conference on the bill until they had the president's commitment to sign a noise financing bill.[57] Presidential advisors Eizenstat and Frank Moore strongly recommended the president meet with Senate and House leaders. They assured him that they and Secretary Adams believed he should sign an "acceptable" compromise noise bill and, in exchange, request the Senate and House complete a deregulation conference within a week without waiting for a noise bill. They reiterated, "It is extremely important that the two bills not be tied together," and warned, "This is a crucial meeting for airline deregulation. Unless we can reach some agreement on the noise bill, especially with the House, it will be very difficult to get a final deregulation bill."[58]

President Carter signs the Airline Deregulation Act on October 24, 1978
Courtesy: NARA

The deregulation bill did go to conference quickly, and the conferees reported the bill on October 12, two days before Congress went on recess. Despite earlier warnings about the noise bill, the Senate did not consider the noise bill before the conference. The Senate approved the conference deregulation bill on October 14 by a vote of 82-4. The House approved the bill the following day by a vote of 356-6. President Carter signed the bill, Public Law 95-504, into law at a ceremony on October 24. The administration's "quick" victory took almost two years to achieve. By this time, the primary emphasis of deregulation had changed from a campaign against government regulation to a critical element in the president's effort to curb inflation. Carter's appointment of CAB Chairman Alfred Kahn as head of his anti-inflation program, announced the same day he signed the deregulation act, highlighted this fact.

CAB Logo
Courtesy: Wikipedia

The Airline Deregulation Act of 1978 allowed immediate fare reductions of up to 70 percent without CAB approval and the automatic entry of new airlines into routes not protected by other air carriers. The CAB's authority over fares, routes, and mergers would gradually phase out, and unless Congress acted, the CAB itself would shut down by January 1, 1985.[59] Passage of the bill also ended the weeklong vigil of twenty-two airline representatives who lined up outside the CAB headquarters to submit first-come, first-served applications for dormant airline routes under the terms of the new act. By the end of the year, the CAB awarded 248 new airline routes to applicants. The legislation guaranteed smaller communities abandoned by larger airlines essential air services for ten years, with a government subsidy if necessary.

The legislation also revived the aircraft loan guaranty program, raising the total amount that could be guaranteed for any eligible participant from $30 million to $100 million, expanding the participants to include charter air carriers, commuter air carriers, and intrastate air carriers, and extending the term of loans to fifteen years. However, Congress withdrew authority for the loan program in 1983, and the FAA ceased issuing new loan guarantees after June 30. The legislation included commuter airlines in discussions over the methods for establishing joint fares between air carriers. It also authorized the use of larger aircraft by commuter airlines. These special provisions for commuter airlines boosted their already booming growth rates.[60]

Deregulation immediately affected the aviation community. It fostered competitive business practices, with routes and fares controlled by profitability. This led to a new breed of airline managers who often had more knowledge of business practices than of aviation. Existing airlines developed new routes and added new kinds of services. Start-up airlines brought other innovative ideas. The numerous mergers and acquisitions increased pressure to focus on the financial bottom line. Between 1978 and mid-2001, nine major carriers (including America West, Braniff, Continental, Eastern, Midway, Northwest, Pan American World Airways, and Trans World Airlines) and more than one hundred smaller airlines declared bankruptcy—including most of the dozens of new airlines founded in deregulation's immediate aftermath.

Doing more with less became the byline for the airline industry. In the 1980s, airline maintenance departments became victims of the pressures of mergers and staff reductions. Fleet maintenance departments experienced significant cost savings as airlines reduced the number of maintenance technicians. Other new ways of conducting business included leasing aircraft and outsourcing maintenance.

While proponents of deregulation applauded the passage of the bill, especially with regard to lower fares and increased competition, opponents criticized it as going too far. Fears of poor service and, more importantly, unsafe operations resulted in growing public concern about the FAA's ability to adjust to the new competitive environment. In an era of downsizing and reduced resources, could the agency ensure safety and reassure the public that air travel remained safe?

You must start off with the assumption that it's your fault if things go wrong. The FAA must assume personal responsibility for failure . . . it must not ask anyone else to solve its problems. –Langhorne Bond[1]

Chapter 3: Commuter Safety in Doubt

With the passage of the Airline Deregulation Act, the FAA estimated an annual 7.5 percent increase in commuter operations over 1977.[2] Deregulation encouraged commuter airline growth as those operators gained opportunities when many larger airlines dropped service to smaller communities. By late 1979, after the first full year of deregulation, the commuter industry had grown 27 percent.[3]

Such rapid growth concerned regulators, Congress, and the public, who worried about the effects of deregulation on the safety of these smaller carriers, a segment of the aviation industry already criticized for lax safety. Many new post-deregulation commuter airlines operated on much lower budgets than the major carriers. They used smaller, more fuel-efficient, yet older planes. The operators provided few frills, relied on nonunion labor, and did not incur the costs from the same government regulations as the major airlines. The FAA certificated the commuter airlines under Federal Aviation Regulations (FAR) Part 135, which mandated less stringent safety measures than the larger carriers.

Industry Growth

Post-World War II saw a new type of general aviation service—the air taxi. This type of service generally included one pilot operating a small aircraft. The air taxi operator flew people and cargo on a regular and recurring basis on short-distance flights between small, outlying communities and large metropolitan airports. By the early 1950s, the air taxi became a separate entity rather than a part of a general aviation fixed-based operation. Within ten years, the air taxi business became the fastest-growing aviation component. On January 1, 1964, there were twelve scheduled air taxi operators, with seventy-two aircraft in use. By November 1, 1968, scheduled air taxi operators in the United States numbered 240, with 1,272 aircraft in service.[4]

The growth, as reported by the Congressional Office of Technology Assessment:[5]

> Resulted in part from the economic opportunity created by the service gap left by the withdrawing locals [local service providers]. Another important factor was the availability of new aircraft [i.e., Beechcraft Model 99, twin-engine, 17-passenger turboprop] that were small enough to be exempt from CAB economic regulation, yet large enough to carry economic loads in scheduled short-haul operations.[6]

In 1964, the increasing complexity and volume of air taxi operations led the FAA to prescribe operational and safety standards for commercial operators of small aircraft weighing 12,500 pounds or less. The new directive, FAR Part 135, defined safety mandates, such as higher pilot qualifications, operational procedures, and required aircraft equipment.

Air California Boeing 737-100 at Orange County Airport, 1969
Courtesy: Innapoy - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=81065657

In 1969, the Civil Aeronautics Board (CAB) created the designation commuter airline, which applied to an air taxi operator that performed at least five round trips per week between two or more points and published flight schedules giving certain specified information or transported airmail under a current Post Office contract.[7] A commuter aircraft had to be lighter than 12,500 pounds gross takeoff weight and could carry no more than nineteen passengers. On September 17, 1972, the CAB replaced the 12,500-pound gross weight limit for air taxi aircraft with a thirty-seat and 7,500-pound payload limit. The CAB hoped the change would help expand the services commuter airlines offered.[8]

Traveling on a commuter airline proved quite the experience for some. As one reporter described her experience on a Skystream Airlines flight in 1977:

> Traveling on Skystream is not at all like traveling on the larger carriers. The absence of Bureaucracy is striking: the employees appear almost interchangeable. The person behind the ticket counter at [Chicago] Meigs [airport] takes reservations over the phone, writes your ticket, and takes your baggage. Minutes later, he is placing the baggage in the plane. Then, he announces that the flight is ready for boarding; he checks tickets at the gate, helps people up the stairs to the plane, then boards himself. He starts up the plane, makes the proper FAA required announcement, and then, with co-pilot; flies the plane to its destination.[9]

As the commuter airline business grew, and in light of a number of accidents, many began to question the safety of this industry segment. A National Transportation Safety Board (NTSB) panel released a safety study of air taxi and commuter aircraft operations in 1972 and reported that from 1966 to 1970:

> Of the 1,028 accidents, there were 170 (16.6%) fatal accidents. Of the total of 3,662 persons aboard aircraft involved in FAR-135 accidents, 490 (13.4%) were fatally injured and 285 (7.8%) were seriously injured. Of those fatally injured, 181 were crew members and 309 were passengers. Of those seriously injured, 89 were crew members and 196 were passengers.[10]

The NTSB recommended more stringent safety standards for the industry. In particular, board members expressed the need for higher qualifications for air taxi and commuter pilots, more thorough training for maintenance personnel, and improved FAA oversight.

In 1972, the FAA began to revise the Part 135 regulations. The agency, however, did not complete the revision until 1978.[11]

Crash Risk

After the Airline Deregulation Act's passage, commuter airlines' accident rates remained high—five and a half times greater than large scheduled airlines. The year before deregulation, 1978, commuter airlines had sixty-one accidents, fourteen fatal with forty-eight deaths. During the first full year after deregulation, the commuter industry suffered fifty-two accidents, fifteen fatal with sixty-six deaths. In 1980, commuter airlines suffered thirty-eight accidents, eight fatal with thirty-seven deaths.

Table 3-1: Accident Rates: Commuter Air Carriers Operating under 14 CFR 135 All Scheduled Service[12]

Year	Accidents		Fatalities	Aircraft Hours Flown (000)	Accident rates per 100,000 Aircraft Hours	
	Total	Fatal			Total	Fatal
1977	44	9	32	1,150	3.83	0.78
1978	61	14	48	1,302	4.68	1.08
1979	52	15	66	1,170	4.44	1.28
1980	38	8	37	1,176	3.23	0.68

Source: *FAA Historical Chronology*, Appendix IX, Table 2

Table 3-2: Accident Rates: On-Demand Air Taxis Operating under 14 CFR 135 Nonscheduled Operations

Year	Accidents		Fatalities	Aircraft Hours Flown (000)	Accident rates per 100,000 Aircraft Hours	
	Total	Fatal			Total	Fatal
1977	158	31	118	3,304	4.78	0.94
1978	198	54	155	3,546	5.58	1.52
1979	160	30	77	3,684	4.34	0.81
1980	170	45	103	3,618	4.70	1.24

Source: *FAA Historical Chronology*, Appendix IX, Table 3

Alaska's commuter airlines and air taxis suffered more fatal accidents than any other state. The sheer volume of air traffic and Alaska's ever-changing weather conditions contributed to the high accident rate. As a 1980 NTSB study bluntly noted, Alaska "has an air safety problem."[13] On average, across all types of flying, Alaska witnessed an aviation accident or incident every day and a half. Most accidents occurred between June and September when private pilots began flying again after the long winter, and charter flights began taking guides and hunters into the bush. It was rare when Alaska aviation incurred no accidents on any given day. In June 1980, FAA Alaskan Region Spokesperson Cliff Cernick exclaimed, "A new aviation safety record was set in Alaska . . . when several days passed and not one aircraft accident was reported. . . . This is unprecedented."[14] The accident-free streak began on June 2, 1980, and ended on June 9. FAA staff in Alaska emphasized that going seven days without an accident in the summer had never happened before in the state.[15]

Attention-Getters

Downeast Airlines crash site
Courtesy: NTSB

With Congress, the NTSB, and the public raising concerns about commuter airline safety, the FAA faced increased criticism after some high-profile commuter, and air taxi, and charter accidents. For example, a chartered DC-3 carrying the University of Evansville basketball team crashed in Evansville, Indiana, on December 13, 1977, killing all twenty-nine people on board.[16] On September 2, 1978, the husband of actress

Maureen O'Hara, Captain Charles F. Blair, owner and a pilot of Antilles Air Boats, Inc., lost control of a commuter plane he was flying, killing four.[17] On May 30, 1979, a Downeast Airlines crash in Maine took the lives of seventeen people.[18] Other accidents also fueled media attention.[19]

The Downeast Airlines crash, in particular, generated a lot of poor publicity for the agency, especially after NTSB Chair James King made derogatory remarks about the FAA to the press. The agency, according to King, "has [safety] regulations coming out of their ears . . . but they don't bother to enforce them."[20] The NTSB cited the probable cause of the accident as the failure of the flight crew to arrest the aircraft's descent at the minimum descent altitude for the non-precision approach without the runway in sight. The board listed five factors contributing to the accident:

1. excessive management pressures
2. insufficient crew training and procedures
3. the captain's chronic fatigue
4. the captain's inadequate supervision of the flight
5. the first officer's marginal instrument proficiency

King remarked: "We've been from Alaska to the Caribbean investigating these [commuter] crashes and have found some operators' practices are just awful." Another board member criticized the commuter operators for hiring pilots with "very little time and experience," claiming, "they often don't have enough money to hire a mechanic of their own," so they rely on a mechanic working at the airport.[21]

Even greater public attention came on July 24, 1979, when a Puerto Rico International Airlines (Prinair) flight, the largest U.S. commuter airline, crashed, killing eight of the twenty-one people on board. A NTSB investigative team quickly determined the plane had a weight and balance issue when it took off. Robert Burgin, the investigator in charge, reported on July 27 that the back of the plane had too much weight compared with the front, pushing the balance "well beyond the [normal] limit."[22]

Prinair aircraft
Courtesy: https://www.antillesairboats.com/u-s-coast-guard

In its preliminary report issued in late August, the NTSB said the plane was 1,008 pounds overweight. During this early part of their review, NTSB investigators discovered two other Prinair flights had also taken off with severe gravity problems, but the pilots somehow landed safely. In addition, they cited reports of engine problems and fourteen separate issues of a "stall buffet at high gross weights between January 1 and May 1979."[23]

At the time of the July Prinair accident, the FAA's San Juan Flight Service District Office had seven principal inspectors, including two operations and two maintenance inspectors. They oversaw forty-four commuter and air taxi operators, three agricultural operators, and five schools. Their workload also included making en route inspections, managing fourteen FAR 91 general aviation operators, and initiating violation proceedings.

Soon after the Prinair crash, an FAA Southern Region inspection team began a special evaluation of air taxi operators in the Caribbean. After the inspections, carried out between July 29 and August 8, 1979, the team concluded, "All of the operators inspected in the Caribbean area appear to be deficient in several areas, but particularly in weight and balance.” During their inspection of Prinair, the team found most of the airline’s flights were two to four hundred pounds over manifest weight. The inspectors concluded that only frequent and constant surveillance of each Caribbean operator would improve safety.[24]

After the special inspections, the FAA helped Prinair correct some of its deficiencies, especially with regard to weight and balance. On September 26, 1979, Prinair and the FAA signed a letter of agreement in which the airline consented to check each flight for weight and balance before takeoff. FAA officials, however, subsequently discovered the airline had not been checking its flights. In another special inspection on October 25, agency inspectors found one plane seriously out of balance. In addition to the weight and balance problems, the inspectors discerned the airline had not complied with inspection schedules on propeller bolts and crankshaft counterweight liners. They also uncovered two instances of pilots flying under instrument flight rules (IFR) after filing a flight plan for visual flight rules (VFR) conditions.[25]

FAA suspends flights by Puerto Rican airline

SAN JUAN, Puerto Rico (AP) — The Federal Aviation Administration announced Thursday night it has suspended indefinitely all flights by Puerto Rico International Airways — Prinair — the largest commuter airline in the Caribbean.

The airline carries about one million passengers a year among the Caribbean Islands.

FAA spokesman Jack Barker told a news conference the suspension was ordered as a result “of recent special inspections of the carrier’s operations following the fatal accident in St. Croix, on July 24 of this year.” Eight persons, six of them from West Texas, died in that crash in St. Croix, one of the U.S. Virgin Islands.

“This suspension will remain in effect until Prinair is found to be in complete compliance with Federal Aviation Regulations,” Barker said.

Last week, the FAA fined Prinair $166,000 for 166 alleged safety violations found in special inspections between Sept. 16 and 26 in the wake of the July 24 crash. Jack E. Purcell, the agency’s flight standards chief, called the fine “one of the stiffest ever handed out to a commuter airline.”

“This was our way of saying to Prinair . . . and to other commuter airlines that they must comply totally” with federal standards, Purcell said.

Prinair has 10 days to appeal the suspension to the National Air Transportation Safety Board in Washington. The board, holding hearings to determine the cause of the St. Croix crash, has found the plane carried more than 1,000 pounds in excess weight.

Barker said the suspension “will require as a minimum a complete revision of the company’s air-worthiness directive compliance system,” and “a revision of the curent training program for aircraft loaders and all personnel authorized to load aircraft.”

Michael T. Fenn, manager of the FAA office here, delivered notice of the suspension to Prinair president Cesar Toledo at San Juan International Airport.

Toledo was not available for comment, but had protested the fine. “We are not satisfied. We will appeal,” he said last week.

Fenn said Prinair carried an estimated one million passengers this year, 400,000 more than in the past three years. “One-seventh of all the passengers that flow through San Juan International Airport, one of the top ten in the United States, is handled by Prinair,” he said. Nearly seven million passengers pass through the airport annually.

Fort Worth Star-Telegram, October 26, 1979
Courtesy: www.newspapers.com

Because of those violations, the FAA issued an emergency order of suspension and grounded the airline on October 25.[26] The grounding came during a three-and-a-half-day NTSB investigative hearing in San Juan, Puerto Rico. FAA inspectors quickly assisted the airline in its compliance efforts, and on October 29, the agency lifted the suspension order.[27] The following day, Administrator Bond sent a message to FAA Southern Region Administrator Louis Cardinali expressing his congratulations to the Southern Region's flight standards organization for "the firm and determined action taken in regard to Prinair." The administrator wrote, "Safety must come first, and the Congress and the public have urged us to use the authority that the FAA has possessed for many years to the fullest extent necessary to assure safe operation."[28]

Regulatory Reform

With the commuter and air taxi fatal accidents increasing, political and public pressure for reform remained. To improve safety, Administrator Bond, among other things, worked to finalize the commuter safety rule, which had been in development for almost ten years. He also instituted a much stricter enforcement policy and worked to ensure all agency organizations and field offices consistently applied regulatory mandates and civil penalty actions.

In anticipation of passing the Airline Deregulation Act, on September 26, 1978, Bond announced a program to upgrade commuter and air taxi safety. With over two hundred commuter airlines providing scheduled passenger, cargo, or mail service to more than six hundred communities and 2,300 air taxi operators providing on-demand or non-scheduled service, Bond's plan included raising safety requirements for these airlines.

As one part of that new safety program, on September 7, 1978, the FAA proposed Special Federal Aviation Regulation (SFAR) 41, Airworthiness Standards: Reciprocating and Turbopropeller Powered Multiengine Airplanes.[29] The final rule became effective on

October 17, 1979.[30] The regulation mandated new airworthiness standards for existing propeller-driven multi-engine small airplanes. In addition, the agency required planes certificated under the SFAR at weights over 12,500 pounds to meet updated interior material flammability requirements within one year of initial airworthiness certification.

The FAA issued the new certification requirements as an SFAR because of its interim nature. A manufacturer had to apply for aircraft supplemental or amended type certification under the new rule within two years after the rule's effective date. Production of airplanes certificated with maximum takeoff weights of more than 12,500 pounds was limited to ten years after the effective date of the SFAR. The agency intended the ten-year period to provide the time needed to develop a new rule, FAR Part 24, and for airplane manufacturers to demonstrate compliance with the new part.

FAA Convair 540 turboprop aircraft, N104
Courtesy: FAA

The FAA certified commuter aircraft under two categories: maximum takeoff weight of up to 12,500 pounds and maximum takeoff weight over 12,500 pounds. According to the administrator, that distinction impaired aircraft development to meet the commuter market's demands. Bond wanted to create a separate certification category for commuter aircraft with more stringent standards but less costly than those used for Part 121 aircraft—large commercial carriers.[31] To do so, he initiated the Light Transport

Airworthiness Review on December 28, 1978. He hoped to develop a separate set of airworthiness standards, FAR Part 24, for multi-engine aircraft with a suggested maximum passenger seating configuration of thirty seats and a maximum gross weight of 35,000 pounds, later revised to sixty seats and 50,000 pounds.[32] With Part 24, the agency wanted to tailor a set of regulations to the emerging class of small commuter aircraft. Its goal was to develop a less complex set of design standards to provide a level of safety equivalent to current design standards at a lower design and production cost.[33]

The agency met with industry representatives in Oklahoma City in early March 1979 for five days to discuss the proposed standards.[34] After consulting with domestic and foreign aircraft manufacturers and conducting cost-benefit analyses, the FAA canceled the program in late December 1980. Based on the information available, the agency found no cost benefit from issuing a new light transport airworthiness regulation. The agency explained its decision and reported it had "given considerable thought to all of the arguments advanced thus far regarding Part 24." However, the agency concluded that many of the same results achieved through a new Part 24 could be realized at a lower cost to the public by making related changes to Part 25, airworthiness standards for transport category airplanes.[35]

On October 10, 1978, two weeks before President Carter signed airline deregulation into law, the FAA issued a comprehensive revision of its Part 135 commuter regulations. Those regulations, in development since 1972, would bring the safety level of Part 135 operations closer to the major airlines operating under Part 121. The FAA issued a notice of proposed rulemaking in August 1977. It received more than 1,600 comments, most expressing concerns with the draft regulation.[36] Bond, however, touted the new rules, which went into effect on December 1, 1978, as the "largest and most comprehensive" regulatory action ever taken by the FAA."[37]

The new rules set stricter maintenance standards; upgraded pilot training, testing, and proficiency requirements; and required extra safety equipment on the commuter airlines. Under the new regulation:

- All aircraft certificated for ten or more passenger seats must have a continuing airworthiness maintenance program similar to that prescribed for trunk and local service air carriers, and smaller aircraft must meet strengthened maintenance standards.
- All aircraft with over nineteen passenger seats must have a public address and crew interphone systems.
- All multi-engine aircraft with ten or more passenger seats must carry thunderstorm detection equipment.
- Commuter operators must have FAA-approved flight crew training programs similar to those mandated for long-distance and local service carriers.
- Depending on their size and scope, some operators must have certain supervisory positions, such as a chief pilot, a director of operations, or a director of maintenance.
- Jet aircraft with ten or more passenger seats must have a cockpit voice recorder and a ground proximity warning system.
- Pilots on multi-engine commuter aircraft must have an airline transport certificate.[38]

FAA ramp check
Courtesy: www.aviationconsumer.com

After issuing the revised regulations, the agency launched a comprehensive recertification program for on-demand air taxis and commuter airlines. Certification and recertification of operators entailed large expenditures of FAA staff time to ensure operators had the ability, fiscal resources, and organizational structure to train crew members adequately and maintain the aircraft. The program required an inspection of the approximately 3,600 Part 135 certificate holders to ensure they implemented all the new regulations. In addition, on April 25, 1979, the agency issued Notice 8000.175, "Increased Surveillance for Operators under New Part 135," which sharply increased surveillance programs for the year following recertification.

The notice stated, "The upgrading of air taxi/commuter safety has the highest priority within FAA's Office of Flight Standards," and required inspectors to:

- conduct 25 percent of the pilot in command proficiency checks for pilots flying aircraft with less than ten seats
- conduct a ramp inspection on 50 percent of the multi-engine aircraft with nine or fewer seats
- conduct a spot inspection every six months for each operator using multi-engine aircraft and each year for operators using single engine aircraft
- conduct en route inspections on 25 percent of the pilots in command flying for each operator
- conduct pilot in command proficiency checks for pilots flying aircraft with ten or more seats
- conduct ramp inspections on 10 percent of the single engine aircraft
- place particular emphasis, during en route inspections, on the pilot's knowledge of weight and balance procedures, takeoff and landing performance data, cockpit procedures, and adherence to company standard operating procedures

In addition, if staffing resources permitted, the facility would extend the inspections to on-demand air taxis and scheduled all-cargo operators.[39] Between July and December 31, 1979, FAA inspectors reviewed the operations of the 280 passenger-carrying commuters certificated under the new Part 135. Those inspections included:

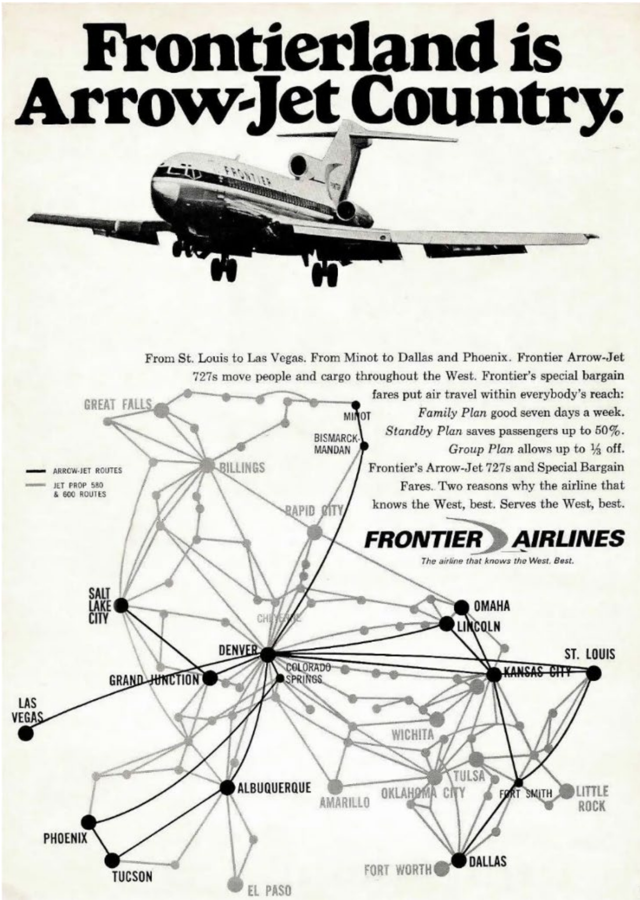
- 1,775 proficiency checks of pilots in command
- 1,577 ramp inspections of aircraft
- 1,087 en route inspections
- 723 spot inspections of aircraft
- 288 reviews of ground and flight training
- 198 reviews of the operator's approved weight and balance programs

- 130 reviews of operators' maintenance training[40]

On May 30, 1980, the FAA extended the notice until December 1, 1980.

The airlines believed the FAA conducted sufficient and thorough inspections. However, they expressed concern after deregulation about the need for more standardization from region to region and a lack of communication between FAA headquarters, the regions, and the airlines. To enforce standardized procedures, the agency issued a consolidated handbook in April 1979, effective July 1, which employees involved in the enforcement program would be required to use. Previously, the FAA had four separate manuals for its safety inspectors, security specialists, airport personnel, and attorneys. The new handbook not only provided consistency across all parts of the agency involved in enforcement, it also facilitated intra-organizational cooperation and enabled a greater understanding of the FAA's expectations of airline operations.[41]

After analyzing the fatal commuter airline accidents in 1979, on March 1, 1980 (later extended to December 1, 1980), a new FAA rule on experience requirements for commuter airline pilots became effective. The rule required the pilot in command of a two-pilot crew to have logged a certain amount of flight time under the supervision of a qualified check pilot according to the type of aircraft: ten hours for single-engine; fifteen hours for multi-engine, reciprocating engine-powered; twenty hours for multi-engine; and twenty-five hours for turbojet-powered. Pilots of commuter aircraft approved for single-pilot operations with the aid of an autopilot were required to have one hundred flight hours in the particular make and model of aircraft.[42] With regulatory reform and new safety standards, the FAA saw a "bright future" for commuter airlines.[43]



Ad for commuter operator Frontier Airlines
Courtesy: www.vintageairlines.com

The FAA convened its first Commuter Air Carrier Safety Symposium on January 16, 1980, to promote better communications with the industry. At the meeting, Bond told the nearly 250 participants, "No matter how you cook or juggle the statistics on commuter accidents, they add up to a safety record that is unacceptable." After outlining the FAA's measures to maintain a stricter enforcement policy, the administrator warned, "Such measures will not only continue but will intensify. I have directed our field division chiefs and safety office managers to use all available resources to ensure compliance with Part 135."[44] FAA officials also discussed the implementation of the new Part 135 regulation, the need for enhanced commuter safety, and a desire to achieve better communications with the Part 135 carriers. As a result of the symposium, the agency began holding quarterly regional meetings with commuter airline operators to discuss local problems and concerns.

FAA Criticized

Despite the new safety regulation and increased surveillance, many in Congress and the media continued to express concerns about commuter airline safety in the deregulated era. They questioned whether or not the FAA had the workforce, resources, and even skills to maintain safety in this new environment. Such questions were prevalent before the Carter team took office.

The House Committee on Public Works and Transportation, Subcommittee on Oversight Review chaired by Norman Mineta (D-CA), held hearings on commuter safety on February 26-29, 1980. Representative Barry Goldwater (R-AZ) bluntly stated at those hearings, "One mistake we made was letting the new FAA administrator tell us he could handle the rapidly expanding commuter surveillance job without needing more people. This, of course, seems ridiculous today, in hindsight."[45] Bond countered, however, that the FAA's new commuter safety program worked, and the accident rate was slowly declining. He did admit, however, it was too early to see the full effect of the rule since the new Part 135 regulations had been in operation for only three months.

Bond said the new rule comprised only part of the larger safety equation. He discussed the recent reorganization of the safety office. He also announced that he created the associate administrator position for the Office of Aviation Standards and moved responsibility for commuters from the division responsible for general aviation to the one overseeing scheduled airlines.[46]

As a political appointee, the administrator faced the daunting dual challenges of supporting the administration's cost-reduction and budget-balancing initiatives while, at the same time, ensuring safety in a rapidly expanding aviation system spurred by deregulation. As one British study pointed out, after deregulation:

> The workload of the FAA has increased dramatically from that needed to oversee the stable and predictable industry that existed in the days of entry control . . . the number of air carriers operating large aircraft rose by 150 percent. FAA resources were needed to provide initial certification of these carriers. In addition, approximately 4000 existing operators of small aircraft had to be recertified as commuter airlines or air taxis as a result of revisions in safety regulations adopted in 1978. Moreover, since there was a high turnover rate of these types of firms, the resources the FAA required for certification were even higher than the 4000 number would suggest. Certification of operators entails large expenditure of FAA time to ensure that firms have the ability, fiscal resources, and organisational structure to train crew members adequately and to programme the maintenance of aircraft effectively.[47]

Despite the increased workload, the decline in FAA staff that began in the early 1970s continued. One economist calculated that the “net result was a fall in the number of inspectors per airline from 4 in 1978 to 1.5 in 1985.” The FAA later admitted that to carry out commuter certification duties, "routine operations and maintenance compliance were mostly left undone."[48]

Bond proposed gradually increasing the number of inspectors from 1,642 in 1979 to 1,741 in 1980 and 1,800 in 1981. When Representative John Burton (D-CA) asked why he now wanted to hire more inspectors when he said earlier he did not need additional resources, Bond replied, “I changed my mind.”[49] Despite his intent to increase the workforce size, Bond continued to receive questions about workforce adequacy, especially in light of NTSB and congressional calls for greater surveillance. He argued that the current policy for random, rather than 100 percent inspections, proved more effective in enhancing safety. He believed random reviews “would persuade people not to have defects so that they won’t be caught on random inspections . . . random sampling combined with tough penalties, which we have not had, is a very sound way to increase the level of safety. It will work."[50] Bond did, however, upgrade administrative and data support for the inspectors so they could spend less time filling out and processing paperwork.

Despite the agency's ongoing actions to increase commuter airline safety, the media remained persistent in its criticism of the FAA. For example, Lawrence Mosher questioned the FAA's ability to keep pace with this growing segment of the commercial aviation industry. In an article in the *National Journal*, he said, "To most passengers, deregulation has meant nothing but good news: lower fares and more flights than ever before. But deregulation has applied new pressures to the nation's air transportation system—pressures that threaten the convenience and even the safety of air travel." He added, "Whether the FAA can adequately enforce recently tightened commuter pilot and aircraft safety standards remains to be seen."[51] An article in *The Economist* claimed, "Commuter lines, of which there are over 200 . . . [are] much less safe to fly than their bigger cousins. Using the most reliable measure [the number of fatal crashes per 100,000 landings], commuter lines crashed and killed passengers three times as often as the major airlines up to 1978. There are signs that they are now killing passengers even more frequently."[52]

Victoria Loe, in *Texas Monthly*, wrote:

> The lower reliability of commuters has been attributed to many factors, a couple of which have unsettling implications. Foremost, naturally, is the omnipresent matter of money—or the lack thereof. Commuters can't afford the most sophisticated guidance systems, so they're more vulnerable to the elements. Commuters can't afford to train their pilots on multi-million-dollar simulators. Commuters, in short, exist pretty close to the edge financially. They can't afford to have their planes grounded by bad weather; they've got to put them in the air, possibly under questionable conditions. Sure, unfortunate mistakes can happen, but how

> is management supposed to keep tabs on everyone and everything when the company is growing so fast?

Loe maintained that criticism of the FAA came “from every direction, from congressional committees to the National Academy of Sciences to the General Accounting Office. Their reports are rife with tales of safety programs hastily conceived, poorly administered, junked due to shifting political winds, or abandoned in the face of industry protests.” In her conclusion, she warned, “One common thread runs through the criticism, and it ought to give the flying public pause: that the FAA is a passive, disorganized, directionless body with only the vaguest notion of how to go about its job and without the resources to do the job even if it knew how.”[53]

Alan R. Stephen, director of operations for the Commuter Airline Association of America, continually defended the commuter operators. He argued the comparisons between the commuter and large scheduled airline safety statistics “are unfair because you're talking about such extraordinary levels of safety." He said, "We can give you statistics which show that commuters are far safer than certificated airlines. With the worst possible methods of comparison, you can show that commuters are about 180 times less safe. The problem with all the statistics is that you are comparing apples and oranges." Most commuter accidents occurred during takeoff and landing. Since those carriers flew shorter distances than the larger airlines, they made more takeoffs and landings. Because of that, Stephen said the commuters “may not be quite as safe as the certificated carrier, but you are still extraordinarily safe. Let's not argue relative safety. Let's find out the causes of the few accidents we do have and remove them."[54]

Board Recommendations

In 1978 and 1979, the NTSB recommended the FAA improve surveillance of some commuter air carriers. Even before it amended Part 135, the agency promulgated interim measures to correct commuter safety deficiencies the board identified, but the NTSB wanted more done quickly. In particular, it pressed the agency to increase surveillance of commuters and questioned if the agency's inspection force could keep up with the increasing workload.

The board also questioned inspector training practices. As the air taxi and commuter industry first developed in the 1950s and 1960s, the FAA assigned responsibility for its oversight to its general aviation district offices (GADO). With the air taxi and commuter industry booming in the 1970s and the subsequent Part 135 designation with more stringent regulations, the NTSB did not believe the agency's general aviation inspector workforce had the necessary training to oversee this growing segment of the aviation industry.

The NTSB claimed its accident investigations revealed how much work fell to the general aviation inspectors and how little commuter and air taxi surveillance the workforce could accomplish. For example, during the analysis of a 1977 accident, the NTSB found that the FAA principal operations inspector for the airline involved in the accident was responsible for fifty-eight commuter and on-demand air taxis. In another case, it reported the Houston GADO's inspectors had twenty-five activities to accomplish, such as surveillance of 13,037 certificated pilots, 4,222 aircraft, 1,000 certificated mechanics, 890 flight instructors, 264 executive operators, 160 repair stations, 120 pilot/ground schools, 84 agricultural operations, 71 air taxis, and commuters, and 59 pilot examiners.[55]

In a letter to the NTSB chair on September 25, 1979, Bond reassured the board the agency had sufficient resources to handle the commuter surveillance program. He reported that 712 inspectors oversaw the 258 commuters as part of their regular duties. The agency closely watched workload needs and adjusted as necessary. The board, however, obtained a briefing paper prepared by the FAA Southwest Region that seemed to contradict Bond's statement. The authors of the report stated:

> The air taxi/commuter expansion has had a direct effect upon the manpower requirements of each GADO. Specifically, the higher standards of the revised FAR 125 for management personnel, training programs, maintenance, and flight checks is demanding additional time for proper certification and surveillance of each operator. Manpower requirements are further extended by Notice 8000.176 that directs "Increased surveillance for operators under new Part 135." To meet those increased demands there is a need for 36 additional operations and airworthiness inspectors. All 36 of these positions will be assigned to the air taxi/commuter program.[56]

In October 1979, the NTSB announced it would begin a special study of commuter airline safety during which it would convene a four-day public en banc (all five members of the board present) from January 28-31, 1980. The board had conducted only one en banc inquiry since 1940. It wanted to examine evidence of "repeated safety deficiencies" and the FAA's "lack of safety surveillance and enforcement over commuters." Before the start of those hearings, the NTSB issued its 1979 annual report, which indicated that commuter safety declined from the previous year. In that report, the board said commuter airlines had an accident rate more than six times higher than the U.S. carriers and a fatal accident rate seven and one-half times that of the larger air carriers.[57]

In discussing the results of its safety study, NTSB Chair James King said one of the significant findings centered on the need for “better lines of communications between the FAA and the industry. Many commuter operators stated that FAA inspectors, offices, and regions often provide different interpretations of regulations and procedures, resulting in confusion and additional costs.” He continued: “The lack of communications is due, in part, to a significant lack of standardization within the FAA and a shortage of FAA inspectors in the field. The latter instance results in surveillance on a much less frequent basis.”[58]

King also noted the need for the airlines to improve flight control programs and provide training in weights and balance, dispatch control, and flight following programs. Maintenance practices needed to be improved, as well as mechanic training. In addition, he reflected on the need for better and deeper management capabilities in the industry.[59]

In August 1980, the NTSB sent seventeen safety recommendations to the FAA, most of which it had previously sent in earlier messages to the agency. In a letter to Bond, King wrote, “There is a need for special training of FAA inspectors to conduct surveillance of commuter airliner[s]. In addition, the staffing levels at FAA offices responsible for commuter airline surveillance and the workload requirements of the individual inspectors generally do not provide for the accomplishment of effective commuter airline surveillance unless other safety-related, general aviation activities are curtailed.” King also recommended the FAA expand its airport aid program to support the development of commuter airports and cover the costs of installing instrument landing systems at some of those airports.[60]

Airport Shortfalls

On February 13, 1980, the House Committee on Ways and Means, Subcommittee on Oversight held a hearing on commuter airports to assess whether airports serving smaller commuter aircraft had sufficient safety equipment for firefighting and rescue and precision landing. Representative Andrew Jacobs, Jr. (D-IN) presided over the meeting. In his opening statement, Jacobs explained that the FAA "says commuter airlines require greater scrutiny. Today we'll be asking whether commuter airports require more money as well."[61]

James King
Courtesy: NTSB

In his opening statement, NTSB's James King said commuter carriers used 604 airports in the United States, 242 jointly with air carriers, and 362 exclusively. In its survey of commuter airports, the board found four significant safety gaps between airports serving commuter air carriers and certificated air carriers. "Of the 362 airports used exclusively by commuters and other general aviation aircraft, only 33 percent have a precision approach. In comparison, of the airports serving the larger carriers exclusively, 67 percent have precision approach facilities . . . [and] In addition to an insufficient availability of [instrument landing system] or [microwave landing system] equipment, the Board has been concerned that a substantial number of commuter airports do not have visual approach slope indicators, VASI."[62]

King asserted that 420 commuter airports had no radar services. He testified that since the CAB did not require commuter operators to hold certificates of public convenience and necessity, the FAA did not require the airports they served to be certified. Without certification, they had no requirement to have firefighting and rescue equipment. In addition, King expressed concern that commuter airports lagged "substantially behind the larger air carrier airports [in] the provision of up-to-date weather information. Safety Board accident investigations have revealed that management pressure has resulted in inconsistent and improper weather reporting at some airports." A possible solution to this problem, he said, would be the installation of automatic weather observation systems at commuter airports.[63]

At those hearings, FAA Deputy Administrator Quentin Taylor argued the airlines themselves created safety problems, not the airport facilities. He told the committee, "The overall safety record of the commuters has not been good; in fact, I would go so far as to say that a continuation of the same rate of accidents should not and will not be acceptable to Congress, the FAA, or to the traveling public."[64] Taylor disputed that the lack of specific navigation aids at commuter airports made airport operations unsafe. Instead, if the commuter airlines complied with prescribed FAA procedures, safety would not be an issue. He asserted commuter operators "were apparently willing to sacrifice safety, by ignoring prescribed landing minimums or weight and balance requirements or other important safety requirements, in favor of economic gain. Such disregard of safe operations is a problem that will not be resolved by additional navigational aids or facilities."[65]

On February 11, 1980, the FAA convened a public meeting with the air carrier industry, airport operators, and the public to discuss extending airport certification regulation to airports serving commuter air carriers. Fiscal restraints made it difficult for the agency to fund airport upgrades. When asked about commuter airports at a congressional appropriation hearing on March 11, 1980, Bond answered, "Well, our budget, sir, is a financially constrained budget. The FAA does not operate on an entitlement program or an indexed inflation correcting program. We have presented to the Congress a budget that is tight. Within the limits of the money for commuter airport navaids [navigation aids] that we have available, we will do our best to provide the precision approach aids to commuter airports. The more money we get, the better we will be able to do with it."[66] The question of providing more navigation aids to commuter airports went unresolved, however, when authorization for the FAA's airport aid development program lapsed.

On June 12, 1980, the agency issued a notice of proposed rulemaking (NPRM) for commuter airports. The proposed rule would require commercial airports serving commuter aircraft using aircraft with twenty or more seats or enplaning 2,500 or more commuter passengers per year to obtain a limited operating certificate. The agency explained, "Today commuter air carriers may be using the same size aircraft over routes formerly used by" the large commercial carriers. The current rules, however, did not require commuter aircraft to use certificated airports.[67] Agency officials pointed out, "A member of the traveling public, using commuter air carrier service . . . might assume that the same level of service and safety will continue to be provided" as they get from the large scheduled carriers. The agency confirmed 455 of the 775 airports serving commuter airlines were already certified, and only eighty to one hundred additional airports needed certification under the new requirements.[68]

If adopted, the new rule would require firefighting and rescue equipment at the airports during commuter operations. The requirements related to the size and frequency of the aircraft using the airport, the size of the firefighting equipment, and the amount of extinguishing agent they must be able to dispense. With airports concerned about out-of-pocket costs, FAA officials acknowledged the equipment could range from a cart-mounted dry chemical fire extinguisher with at least 450 pounds of dry chemical and fifty gallons of water for aqueous foam generation pulled by a pickup truck or other lightweight vehicle to the use of local community fire services.[69]

Kent George, manager of the airport in Reading, Pennsylvania, warned, "The commuter airlines can't afford the extra cost, so that means the communities will have to subsidize it or lose their service. . . . We are already doing 90% of what you are asking, but to do more may be impossible." F. E. Wolf, director of the Wisconsin Bureau of Aeronautics, agreed. He said the cost of firefighting and rescue equipment could raise the price of an airline ticket. He predicted many commuter airlines could "go belly up" if the agency adopted the new requirements. Representatives from airport, airline, and pilot associations, such as the Airport Operators Council International, National Business Aircraft Association, Airline Pilots Association, Aircraft Owners and Pilots Association, American Association of Airport Executives, and the National Air Transportation Association argued the commuter airports did not need more regulations but instead needed navigational aids.[70]

On January 2, 1981, the FAA published a letter to Congress in the *Federal Register* regarding the status of the NPRM. Bond wrote, “Several commenters on the notice of proposed rulemaking have challenged the FAA's authority to adopt the proposed rule changes. After review of these comments and reconsideration of our own position, it must be conceded that our authority in this matter is not clear.” He continued, "After further analysis and review of the proposal in the light of comments received, the FAA has concluded that its authority to issue a rule in this area is sufficiently unclear and that rulemaking should not proceed until the statutory basis for such a rule is clarified." He intended the letter "to bring the problem to the attention of the Congress which will be giving early consideration to pending airport and airway legislation."[71]

Flight Service Footprint

Yakataga Flight Service Station, Alaska, 1975
Courtesy: www.atchistory.org

As the FAA worked to increase commuter safety through regulation, it also proposed removing some safety services offered to general aviation and small regional carriers. Since the 1930s, the one thing those carriers and pilots could count on was the safety-related services provided by the FAA's flight service specialists throughout the country. The proposed consolidation of the flight service stations (FSS) threatened some of the service's pilots flying under VFR came to expect.

By the mid-1970s, with new automation technologies, the FAA began planning to decrease the number of FSS using the latest computer technology. The agency estimated if the system remained unchanged, up to 11,500 specialists would be needed to operate it by 1995. In January 1978, the FAA and the Office of the Secretary of Transportation submitted to Congress a master plan[72] for the modernization of the FAA's 292 continental FSS,[73] later expanded to cover all 317 stations. The project involved a three-stage process to modernize and automate the facilities. The agency planned to install semi-automated computer equipment at the forty-three busiest stations in the first phase. During the second phase, the agency would either consolidate all 292 stations into twenty facilities co-located at the twenty en route traffic control centers or modernize up to 150 existing stations at their present sites. The third phase would add capacity for pilot self-briefings, thus wholly automating the most critical FSS function.[74] The FAA wanted to build and own the new FSS rather than lease them.

In congressional testimony in 1979, FAA Administrator Langhorne Bond[75] called the FSS structure "an obsolete, labor-intensive system," and the only "logical and reasonable" solution to the problem would be "a program of modernization, automation, and streamlining."[76] Bond placed a moratorium on FSS closures, remoting, and part-timing of FSS until he received congressional approval for the modernization program. In 1979, Congress approved initial funding for the FAA acquisition of the automation technologies needed to support the nationwide modernization and consolidation program.[77]

In January 1980, the FAA announced contract awards totaling $12.8 million to three companies to design computer systems for automating the FSS network. Contracts went to E-Systems for $3.7 million, LOGICON for $3.5 million, and Ford Aerospace for $5.5 million. The agreements called for a one-year design verification process in which the companies would demonstrate their technologies' capability to provide automatic weather and other information needed by pilots and flight service specialists. The FAA required a system of minicomputers that could store data for immediate call-up on the flight service computers. The system had to provide the same information to pilots using communications terminals and push button or rotary dial telephones. After examining the three designs, the FAA would select one contractor to proceed with production. However, by the time it signed the contracts, the agency had determined to modernize forty-three FSS sites and later update another eighteen facilities. As with the original plan, the hubs would be co-located with en route traffic control centers where possible.[78]

With congressional and general aviation community pushback on the plan, in early April 1980, Bond proposed a new strategy for FSS modernization. Rather than co-locating the facilities next to the en route centers, which served commercial traffic, Bond wanted to build new automated flight service stations (AFSS) at busy general aviation airports and replace the 317 FSS with sixty-one AFSS located in forty-five states and Puerto Rico. He envisioned building fifty-nine new facilities and modifying two existing FSS. Bond estimated implementing the plan would cost $495 million over the next eight fiscal years, but "$1.5 billion can be saved through 1995 by replacing the current labor-intensive system with a fully automated one."[79]

Hoping to garner support from the general aviation community and Congress, the administrator promised not to close any FSS until the FAA proved the new AFSS could provide equal or better service than the non-automated facilities.[80] The agency initially expected to have all sixty-one AFSS commissioned by fiscal year 1992.[81] The FAA published the plan in the *Federal Register* on April 17 and asked for comments by June 7, 1980.[82]

On November 13, 1980, the FAA announced fourteen of the sixty-one AFSS locations and tentatively identified the remaining sites. Under a phased plan, the agency expected to select twelve sites yearly. Regarding Alaska, the agency planned to reduce the number of FSS in the state from twenty-seven to three and proposed locating the new AFSS in Anchorage, Fairbanks, and Juneau.[83]

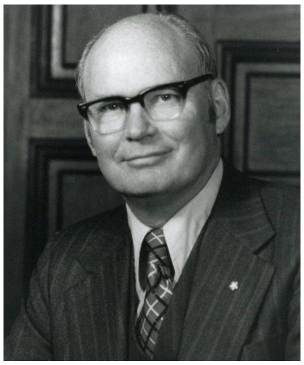
While updating its plans for FSS modernization, the agency publicized recent improvements to the existing FSS communication system. The FAA installed a new computerized communication system in Alaska to upgrade and replace the old service "A" and "B" low-speed circuits. When fully operational, the new satellite-enabled system could handle the transmission of all weather and flight planning data within the state and between Alaska and the lower forty-eight states. The new equipment consisted of a TV-type display and keyboard, which provided access to all information at the FAA National Communications Center in Kansas City, Missouri. The agency expected the system to be fully operational by the end of July 1982.[84]


J. Lynn Helms
Courtesy: FAA

When Ronald Reagan became president on January 20, 1981, his economic agenda differed from that of his predecessor. As a result, on May 28, 1981, FAA Administrator J. Lynn Helms directed a change in policy on the acquisition of buildings for the planned AFSS. In addition to building and owning the facilities, if it proved more economical than owning, the FAA would also lease space at airports from municipalities, airport operators, private parties, or government agencies at the state or federal level. The FAA would seek competitive bids to obtain the most favorable rates.[85] In July 1981, the agency began soliciting competitive lease offers for AFSS locations from local communities. The agency's regional offices would evaluate the proposals based on what the facility would cost the agency over twenty years. The costs covered communications, building leases, employee relocation, maintenance, and utilities.[86]

Air disasters are rare, fortunately, but when they occur, the shock waves can be felt far beyond the community most directly affected. –Senator Glenn Anderson[1]

Chapter 4: Airlines Under Scrutiny



John McLucas
Courtesy: FAA

In early January 1977, FAA Administrator John McLucas congratulated agency employees for completing "one of the safest years in commercial aviation history." He noted, "The airlines, with 45 fatalities . . . had the best safety record in more than 20 years, a record which is all the more remarkable when you consider that 1976 set a new record for the number of passengers carried by U.S. airlines." McLucas, however, warned safety records "are fleeting and no guarantee for success," and urged employees to "rededicate yourselves to the challenges" of the future.[2] McLucas' warning about the nature of safety records proved prophetic as the FAA witnessed increasing accident rates in commercial, commuter, and general aviation during the Carter administration.

In the early days of the new administration, and before McLucas left the agency, the worst global aviation accident to date occurred. On March 27, 1977, two Boeing 747s collided on a runway at Los Rodeos Airport in Tenerife, Canary Islands, under limited visibility conditions. Both jets were bound for Las Palmas in the Canary Islands when a bomb detonated in the terminal, closing the airport and forcing both planes to land at Tenerife. Refueled and ready for takeoff, controllers at Tenerife instructed one of the aircraft, a U.S.-registered Pan American World Airlines (Pan Am) jet, to move down the runway toward an assigned taxiway. Controllers ordered the KLM Royal Dutch Airlines


Accident site, Los Rodeos Airport in
Tenerife, Canary Islands
Courtesy: Dutch National Archives

jet to wait at the end of the same runway. The Dutch crew, approaching the legal flight duty time limit, apparently misinterpreted a message from the tower as clearance to take off. The KLM captain began the takeoff roll before the Pan Am jet cleared the runway.

Controllers instructed the Pan Am pilot to depart the runway at the C-3 exit, but the pilot passed that exit. A heavy fog made it impossible for the tower to see the two aircraft and for the pilots of the two jets to see one another in time to prevent a collision. The Pan Am pilot spotted the KLM's lights just as it approached the C-4 exit. The captain reached full power and turned left, hoping to avoid the oncoming plane. The KLM captain tried to climb over the oncoming plane but instead struck the top of the Pan Am aircraft. The KLM plane exploded into a deadly inferno. The collision killed all 248 people aboard the KLM jet and 335 of the 396 people aboard the Pan Am plane. Fire engulfing both aircraft caused most of the casualties.[3]

A few days later, on April 4, a Southern Airways DC-9 crashed near New Hope, Georgia. The pilot attempted an emergency landing on a highway, but the aircraft broke apart and caught fire. The accident killed sixty-two of the eighty-five people aboard and eight on the ground. In addition, one passenger and one person injured on the ground died about a month later from their injuries. The NTSB cited the probable cause of the crash as the total and unique loss of thrust after the engines ingested massive amounts of water and hail as the aircraft penetrated an area of severe thunderstorms. As contributory causes, the NTSB listed the failure of the airline's dispatch system to provide up-to-date severe weather data, the captain's reliance on airborne weather radar to enter a thunderstorm area, and the FAA's lack of a method for disseminating real-time hazardous weather warnings.[4]

Both of these accidents raised vital safety issues, such as the need for better fire protection in aircraft, explosion prevention systems for fuel tanks, and strict smoke and toxicity standards. Other problems, such as crew fatigue, weather minimums, the use of signal lights to verify takeoff clearances, and pilot/controller communications, also came to the forefront. The agency addressed weather as part of a broader effort to provide pilots with more en route weather information since the lack of accurate knowledge of hazardous weather, particularly thunderstorms, had contributed to several air crashes in the recent past.

Just over a month after the Georgia accident, on May 19, the FAA issued a rule requiring each air carrier to obtain approval by year’s end, a system of gathering and disseminating information on adverse weather. The existing regulation required airlines to supply flight crews with pertinent weather data but contained no provision for FAA approval of those weather information systems. Although the Georgia accident highlighted the need for such a rule, the agency had proposed such a rule on November 15, 1976, following a 1973 accident at St. Louis.[5] That regulation, however, had yet to be approved.

On April 17, 1978, the FAA signed an agreement with the National Weather Service (NWS) to establish center weather service units (CWSU) staffed by NWS meteorologists at thirteen of its air route traffic control centers. At each of those centers, three NWS meteorologists provided information on hazardous weather throughout the day to center controllers, FAA towers, and flight service stations. The FAA provided each center with new equipment for receiving data from NWS weather radar and satellites. The agency already had NWS meteorologists on duty at its national flow control center in Washington, DC, and by November 1980, all U.S. mainland en route centers had a CWSU.[6] In addition, in October 1978, with financial help from the FAA, the Public Broadcasting Service began airing aviation weather briefings five mornings a week. The fifteen-minute programs provided private pilots with pertinent weather information.[7]

While the weather remained an ongoing concern, fire safety became a priority. In February 1977, the NTSB released a statistical report on U.S. air carrier accidents involving fire between 1965 and 1974. The analysis showed during those years, fire was a factor in 141 accidents. Of the 7,042 people aboard those aircraft, 1,848 died, and an estimated 290 died from fire. The study concluded improvements in aircraft crashworthiness design, evacuation procedures, and airport firefighting and rescue operations could substantially reduce fire deaths and injuries. To improve fire safety, the NTSB recommended:

- further development of fuel inerting, fire suppression, and fire extinguishing systems
- improved mobility and effectiveness of airport firefighting and rescue facilities
- increased strength of environmental structures and occupant restraint systems
- suppression or elimination of toxic fumes from burning cabin materials[8]

Fire Research

The Tenerife and Georgia accidents, which demonstrated fire's destructive potential, added credence to the NTSB recommendations and helped spur FAA action.

From June 13-18, 1977, the FAA held a series of public meetings in Washington, DC, on aircraft system safety and techniques for reducing the hazards of fires and explosions in aircraft accidents.[9] On June 21, the FAA held the first in a series of full-scale fire tests on a wide-body aircraft at the FAA National Aviation Facilities Experimental Center (NAFEC) in Atlantic City, New Jersey. During the demonstration, researchers ignited four gallons of jet fuel in a pan outside a retired twenty-year-old Air Force Douglas C-133 cargo plane. A huge fan blew the flames and smoke inside a forward cabin door. The test lasted three and a half minutes, but officials said it simulated the first critical minutes of a crash where a fuel spill outside the aircraft traps passengers inside. Over two hundred sensors recorded temperature, heat density, drafts, toxic gas emissions, and smoke.[10]

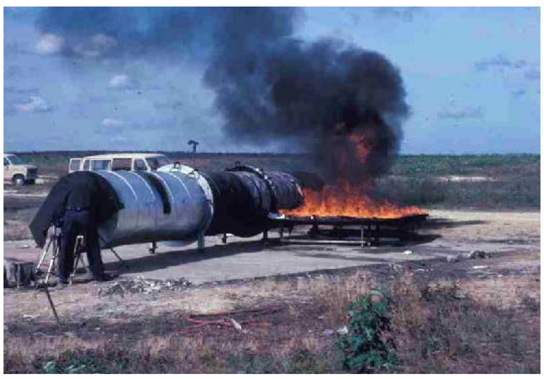
Subsequent tests included evaluating emergency lighting, exit markings, and the involvement of interior materials during a cabin fire. Researchers followed with a series of laboratory and large-scale tests that examined the flammability, smoke, and toxic gas emission characteristics of the polymer materials used in aircraft interiors. That set of tests required the installation of seats with cushions and upholstery, carpets, sidewall panels, overhead storage bins, and ceiling panels in the C-133. The FAA used white rats monitored by a closed-circuit television camera to watch how animals responded to a cabin fire environment during the tests.[11]

As part of its ongoing fire research efforts, in November 1978, the FAA announced plans to build a new $1.5 million indoor fire research laboratory at NAFEC. The FAA dedicated the facility on June 20, 1980. It was the largest such facility on the East Coast at 185 feet long, fifty feet high, and seventy-five feet wide.[12]

The FAA also contracted with the University of Dayton Research Institute to develop a semi-empirical computer model to simulate cabin fires in a wide-body aircraft. Using laboratory data on individual materials, the model considered cabin geometry, materials usage, and the nature of the ignition sources to predict smoke, toxic gas, and temperature levels in the cabin. FAA researchers at the Civil Aeromedical Institute studied the effects of heat, poisonous gas, and smoke on an individual's time to incapacitation.[13] The National Bureau of Standards, aviation companies, universities, and other government research programs worked with the FAA to study how to combat aircraft fire safety hazards.[14]

The FAA held a public hearing on compartment interior materials in transport category aircraft on November 14-18, 1977, in Washington, DC.[15] During the first two days, government presenters shared information on current regulations pertaining to interior materials and the interrelationship of flammability, smoke, and toxic gas emissions, as well as recent fire safety research. Public presentations and discussions followed.

At this and a previous meeting, industry representatives raised concerns regarding four notices of proposed rulemaking the FAA issued previously about fire safety. One of those, published on April 4, 1974, would have required fuel tank explosion prevention systems.[16] The other three proposed rules focused on the effects of fire on interior materials: toxic gas emission standards (published December 30, 1974),[17] smoke emission standards (February 12, 1975),[18] and replacement of existing materials that did not meet flammability standards (July 11, 1975).[19] The industry comments reflected a consensus that the issues addressed in the four rules were interrelated and should be handled systematically as one problem. The air carriers argued the need for such an approach to reduce the burden of first replacing aircraft materials to meet smoke emissions standards, then later upgrading or replacing those materials to meet new flammability standards, and again in the future to meet toxic gas emission standards. As a result of such comments, the FAA concluded, after further consideration, research efforts should focus on the interrelationship of the fire characteristics before acting on the proposed rulemaking actions.[20]



FAA fire test, c. 1970s
Courtesy: FAA

As the agency debated how to move forward with its fire safety research program, Continental Airlines Flight 603, a DC-10-10, with scheduled service from Los Angeles International Airport to Honolulu, Hawaii, overran the departure end of a rain-soaked runway during a rejected takeoff on March 3, 1978. The left main landing gear collapsed, and fire erupted from the aircraft's left side. Evacuation slides destroyed by the fire inhibited passenger egress. Two of the 186 passengers and fourteen crewmembers died because of smoke inhalation. Three crewmembers and twenty-eight passengers were seriously injured.[21]

To help formulate the best options for combating aircraft fire hazards, on June 26, 1978, the FAA chartered the Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee.[22] The committee's twenty-four members came from airlines, aircraft manufacturers, universities, and research organizations. Given the SAFER committee's establishment, on August 24, 1978, the agency withdrew the four rulemaking proposals that troubled the industry.[23] The FAA expressed confidence that it could develop comprehensive standards soon because of its ongoing fire safety research program and the SAFER committee's work. Despite an established two-year charter, however, the agency moved slowly to appoint members to the committee and, when fully staffed, delayed calling its first meeting until May 10-11, 1979.[24]

Representative Norman Mineta
Courtesy:
www.minetalegacyproject.com

Impatient because he believed the FAA should be more proactive, in March 1979, Representative Elliott Levitas (D-GA) called the agency's actions to improve fire safety a "shameful performance." During a floor debate on FAA research funding, Levitas criticized the agency for withdrawing the four notices of proposed rulemaking in favor of establishing the SAFER committee.[25] The following month, the House Public Works and Transportation Oversight and Review Subcommittee, chaired by Norman Mineta (D-CA), held hearings to discuss the FAA's delay in establishing fire safety standards. Mineta pointed out that in 1961, the FAA acknowledged toxic gases were killing airline passengers, but "18 years later . . . we have no standards for toxic gas emission or for smoke emissions from cabin materials."[26] During the hearings, NTSB Vice Chairman Elwood Driver accused the FAA of applying a "band-aid approach" to aircraft cabin safety. He claimed that despite twenty-one NTSB recommendations to improve safety, the agency delayed developing standards and rules for fire retardant and non-toxic materials for aircraft interiors.[27] Levitas asserted, however, the blame did not fall solely on the FAA, "I have the feeling that the NTSB has not done its full job. . . . The NTSB just can't sit up there in its ivory tower and wash its hands. And I have a feeling that is what has been done."[28]

After the SAFER committee's initial meeting, its technical support groups spent nearly thirteen months, through June 1980, examining the factors affecting the ability of aircraft cabin occupants to survive in a fire after a crash and the range of possible solutions. Committee members, technical support groups, FAA researchers, citizens, and private firms made presentations to and offered options to the committee. That information eventually formed the basis for the committee's findings and recommendations.[29]

The most promising approach to combating cabin fires appeared to be using fuel additives or modifiers to reduce the natural tendency of the fuel to form an explosive mist when released into the air during the dynamic phase of a crash. The FAA signed a memorandum of agreement with the United Kingdom Ministry of Defense in June 1978 to cooperate in developing and testing an anti-misting kerosene fuel known as AMK.[30] Among other actions, both countries agreed to regular meetings, held alternately in the United States and the United Kingdom (UK), to exchange information, share research results, and examine potential solutions to fire safety issues. At the same time, the FAA developed a six-year AMK research program to:

- assess the economic reasonableness in support of regulatory actions
- demonstrate the effectiveness of anti-misting fuel in a crash
- determine the feasibility of using anti-misting fuel
- develop recommendations for the introduction and use of such fuels[31]

As part of the UK agreement, in June 1979, FAA researchers demonstrated in tests that the anti-misting additive FM-9 reduced the spread of post-crash fires. Imperial Chemical Industries in Great Britain developed FM-9, a hydrocarbon-derived high-polymer fuel additive. Researchers used the agency's modified wing-mounted fuel tank test facility for the tests. A Pratt & Whitney TF33 turbofan engine generated high-wind velocities that passed over a wing tank, releasing the fuel.[32]

Researchers released the modified Jet A fuel at twenty gallons per second in wind speeds between 130 and 170 knots over two ignition points. Although momentary flashes of ignition occurred within the fuel stream during the tests, the anti-misting additive quickly extinguished the flames. According to the FAA's Aircraft and Airport Safety Division manager, Lawrence Langweil, the FM-9 prevented the fuel from dispersing into fine droplets that could ignite into a fireball.[33] The FAA planned more tests over the next few years in its search to find ways to reduce fuel fires.

Testing fuel additives was not new for the FAA. For over a decade, the agency encouraged the development of an additive to prevent fuel fires. Until 1971, agency efforts focused on the use of gels and emulsions. Those modified fuels, however, created insurmountable problems in aircraft fuel systems. Since 1971, the FAA focused on working with industry to develop and test anti-misting fuels.[34] FAA researchers subjected several such fuels to various fire tests, such as air guns and catapult jettisons, flame spread rates on liquid fuels, and fuel dumps from a wing section placed in a steady airflow. Those tests, however, proved unsuitable for reproduction at other laboratories. Because of the size and cost of such tests, FAA researchers developed an inexpensive, small-scale instrument they could use as a standard test for anti-misting fuels.[35]

While FAA research and the SAFER committee investigations continued, an August 1980 in-flight fire on a Saudi Arabian Airlines Lockheed L-1011 intensified concerns about post-crash fires. Smoke inside the aircraft prompted a return to Riyadh shortly after takeoff. The plane landed, but fire destroyed it on the taxiway. All 301 people aboard died in the fire.

The following month, the SAFER committee released its final report. Committee members reported that over the past fifteen years, fatalities caused by post-crash fires in U.S. scheduled air carrier operations averaged about thirty-two per year. The group urged the FAA to expedite the investigation and validation of anti-misting kerosene. Other recommendations included:

- developing fire-blocking layers for seats, radiant heat resistance standards for evacuation slides, and accelerating toxicity research
- developing improved fire-resistant cabin windows
- improving accident investigation and reporting
- maximizing the probability of engine fuel shutoff in potential fire situations
- requiring mandatory fuel tank vent protection
- researching lowering the flash point of kerosene fuels
- researching the contribution of interior cabin materials to the post-crash fire hazard[36]

The committee also suggested the FAA create a standing advisory committee to provide regular expert advice in fire and explosion research. The agency subsequently established working groups to examine the SAFER recommendations and propose rulemaking action when feasible. Despite public and congressional urging, rulemaking efforts did not occur until the Carter team left office.

Emergency Evacuation

The agency's focus on cabin safety also highlighted the need to ensure all passengers, especially those with disabilities, could safely evacuate an aircraft during an emergency. In 1961, Congress authorized carriers, “Subject to reasonable rules and regulations prescribed by the Administrator, any such carrier may also refuse transportation of a passenger or property when, in the opinion of the carrier, such transportation would or might be inimical to safety of flight."[37] Although enacted to combat air piracy, some air carriers used the law to deny passage to disabled passengers, require them to be accompanied by an attendant, or provide medical documentation of their fitness to travel, while others refused to carry them. On December 31, 1962, a CAB agreement with air carriers further exacerbated the issue. The agreement specified that carriers could reject passengers with "malodorous conditions, gross disfigurement, or contagious diseases, or persons who cannot take care of their physical needs without an attendant."[38]

As air travel increased during the late 1960s and early 1970s, dissatisfaction with the carriers' handling of disabled persons increased exponentially. An increasing volume of letters from disabled persons, disabled veterans groups, and other concerned organizations raised questions about discrimination and prejudice under the Federal Aviation Act of 1958 and a lack of uniformity in the carriers' interpretation of the CAB 1962 agreement with the air carriers.[39] Such complaints led the CAB and the FAA to try to remedy concerns.

On June 5, 1973, the FAA issued an advanced notice of proposed rulemaking to solicit public input on the air travel concerns of disabled passengers. In his announcement of the rulemaking effort, FAA Administrator Alexander Butterfield stated disabled people are "the victims of a great deal of indifference, as well as a certain amount of prejudice. Their special needs have been ignored far too long by society as a whole. I think all of us have a responsibility to do everything in our power to correct this situation."[40]

Besides asking for input on what the rule should include, the agency also asked for comments on the following questions:

1. For large groups of disabled passengers, what means of emergency evacuation might be employed to provide an acceptable level of safety?
2. How many unassisted disabled persons may be accepted as aircraft passengers traveling without a special attendant or non-disabled helper? Should this limit be a fixed number or a percentage of the total passenger seating capacity?
3. If you are disabled, considering the possibility of being involved in an emergency evacuation, does the notion that you could be the last passenger evacuated from an aircraft seriously concern you?[41]
4. If you are disabled, have you considered how you might evacuate an aircraft unassisted by other persons? Would you describe your functional limitations and any method by which you could affect an evacuation? (This information may help develop evacuation procedures and evacuation devices).
5. Should a regulation be adopted that would permit (or limit) the carriage of a specific number and type of disabled persons?
6. Should the length of the planned flight be considered when determining the number and type of disabled persons accepted as passengers?
7. What physical/functional disabilities or limitations should be allowed?
8. What types of physical/functional disabilities should be allowed if a special attendant or assistance is provided for an emergency evacuation?
9. Would an identification card that certifies the ability of disabled persons to perform specific physical tasks help eliminate uncertainties regarding their acceptance as unaccompanied passengers? If so, who should issue the card?

The FAA conducted public hearings in Miami Springs, Florida; Rochester, Minnesota; Boston, Massachusetts; Rosemont, Illinois; Long Beach, California; and Washington, DC, to get feedback.[42] After analyzing that input, on July 5, 1974, the agency issued a notice of proposed rulemaking to ensure equitable treatment of disabled people. Under the proposal, only those "who may need the assistance of another person to expeditiously move to an exit in the event of an emergency evacuation" would be considered disabled and subject to specific limitations in terms of numbers carried. The airlines could not refuse to accept blind or deaf people, anyone who presented a current medical statement affirming that they did not need assistance in any emergency evacuation, or any disabled person who could be carried by someone else.[43]

For those passengers requiring assistance in an emergency evacuation, airlines could carry only one disabled passenger per emergency exit. The agency also proposed that those who needed help during an emergency but did not have a personal attendant capable of assisting them would be limited to the number of floors on the aircraft. In the case of litter patients, only one would be permitted per flight and must be accompanied by a personal attendant. If the regulation passed, carriers would have to assign disabled passengers seats that would facilitate their evacuation without blocking others, require seat backs to be upright on takeoff and landing, and ensure the safe and accessible stowage of crutches and canes to assure ready availability. For charter airlines, the FAA would waive the limitations if the carrier obtained approval for an evacuation procedure.[44]

Disabled air travelers and advocacy groups, for the most part, opposed the proposed rule. Of the 1,551 comments received on the proposal, 1,380 opposed it. The main objections centered on the definition of a disabled person, the provision for a physician's statement, the restriction of the number of disabled passengers per flight, and the designation of specific seating locations for passengers with disabilities.[45] Among those against the proposal, David Williamson, executive director of the National Paraplegia Foundation, argued, "If approved, the regulations would allow air carriers to make discriminatory decisions as to a person's ability to function in an emergency evacuation."[46] According to Judd Jacobson, a board member of the American Rehabilitation Foundation and operator of a tour company specializing in arranging travel for disabled passengers, the proposals seemed to discriminate "against people with observable disabilities." He asked, "What about elderly people or pregnant women, small children . . . who might require assistance? Will they also be required to produce a doctor's statement?"[47]

Guided by research and tests by the agency's Civil Aerospace Medical Institute (CAMI)[48] and public input, the FAA adopted a more flexible approach in a rule announced on March 25, 1977, effective May 16, 1977. The agency ordered each air carrier to develop procedures appropriate to its particular aircraft and operations. The FAA would review those procedures and direct any safety or public interest changes. Airlines could not deny passage to anyone who met the criteria in its FAA-approved plan. The rule expressly prohibited airlines from barring passengers because of their inability to sit in an airline seat. It required individual briefings on evacuation procedures for all disabled persons before takeoff.[49]

To clarify language in the rule, the agency issued an advisory circular on March 25, 1977. The FAA identified handicapped traveler categories and provided air carriers advice on how to work with those individuals to ensure their safety:

- blind persons
- deaf persons
- persons with paralysis of arms and legs
- persons affected by stroke
- persons lacking muscular control
- persons with arms or legs in casts or splints
- persons with limited endurance[50]

The FAA originally proposed requiring canes and crutches to be readily available during evacuation. However, the agency ultimately decided against the requirement, citing CAMI research indicating that canes and crutches might hamper evacuation and puncture inflatable evacuation slides.[51] This policy aroused considerable opposition, particularly from the National Federation of the Blind (NFB). The NFB petitioned the

FAA on September 14, 1977, to revoke those provisions of the rule dealing with the storage of canes during takeoff and landing. The NFB claimed the removal of canes would create an "unreasonable hardship on the blind citizens of the United States in pursuit of their constitutionally protected activities" because it would:

- enforce humiliating, discriminatory, and unnecessary procedures to ensure safety, although there is no evidence that the safety hazards cited exist.
- fail to prohibit illegal discrimination by private air carriers carrying disabled passengers.
- require blind citizens to follow procedures set up arbitrarily by private air carriers, which methods are kept secret from those who must follow them.

The NFB also claimed the final rules bore so little similarity to the proposed regulations as to nullify the validity of the process leading to their publication. In addition, the FAA had not submitted the new rules for public comment.[52]

NBF pickets FAA headquarters
Courtesy: https://pasilc.org/independent-living/history-independent-living/

On July 5, 1978, one thousand people attending a NBF convention in Baltimore came to Washington, DC, and picketed in front of FAA headquarters to protest the cane policy. The protesters chanted, "Hey, hey, whatta you say? Please don't take our canes away," and carried signs proclaiming, "Fly Me, Cane and All," and "Canes are Not Baggage."[53]

The FAA denied the NFB petition on March 10, 1979. The NFB then asked the U.S. District Court of Appeals to review the agency's decision. On January 10, 1979, the court granted a FAA motion for extra time to reconsider the petition so the agency could, in part, conduct more tests "regarding the feasibility and safety of allowing blind persons to keep long rigid canes at their seats during takeoff and landing."[54] On January 18, 1980, the FAA granted the NFB petition and began a rulemaking effort.[55]

After further testing by CAMI,[56] the FAA, on November 13, 1980, proposed a rule permitting accessible storage of canes. The agency received thirty-one comments on the proposal, with thirty respondents supporting it. On July 23, 1981, after the Carter team left office, the FAA announced a final rule addressing the stowage of flexible canes.[57]

Mid-Air Mayhem

While the debate continued on fire safety and the carriage of persons with disabilities, two mid-air collisions shifted agency and public attention. On May 18, 1978, a mid-air collision between a Falcon Jet and a Cessna 150 over Memphis, Tennessee, resulted in the loss of six lives. The Falcon, flying on an instrument flight rule (IFR) plan, and the Cessna, flying on visual flight rules (VFR), had contact with controllers in the terminal radar approach control facility at Memphis International Airport. The NTSB's finding of probable cause cited the failure of controllers to maintain proper separation and the pilot's inability to see and avoid one another.[58]

Criticism of the FAA's air traffic control procedures intensified four months later when, on September 25, 1978, a collision over San Diego involving a Pacific Southwest Airlines (PSA) Boeing 727 and a Cessna 172 caused more fatalities than any previous civil aviation accident within U.S. airspace. All 137 people aboard the two aircraft and seven on the ground died from the accident. The two transponder-equipped aircraft collided at 2,600 feet in clear weather under local air traffic control. Air traffic controllers warned both pilots of the presence of the other aircraft. The PSA pilot, who was overtaking the smaller plane, received clearance for visual "see-and-avoid" separation procedures after reporting to controllers he had the Cessna in sight.

The Boston Globe

148 die in San Diego midair collision

Toll highest within US

Courtesy: www.newspapers.com

Immediately after the crash, media outlets showed photos of the PSA plane as it crashed and exploded. Access to real-time news had increased in the mid-1970s as new technologies facilitated round-the-clock cable television programming. During the period between 1978 and 1982, increased channel capacity allowed for more programming of news, sports, and topics for specific interest groups, such as children, families, women, and minorities.[59]

With photos and live reports from the accident scene beamed nationwide via satellite, the FAA and NTSB conducted their accident investigations with intense media coverage. Administrator Langhorne Bond explained, “An executive appointee cannot stop the Congress from holding a hearing, much less stop television or the courts. These were totally uncontrollable forces, which, I think, in their modern manifestations, I was the first FAA Administrator to have to deal with them. And I will tell you now that I did not find any good way to deal with it all.”[60]

As the FAA and NTSB investigated the San Diego accident, media attention, much of it negative to the FAA, kept the accident in the public eye. Adding fuel to the media frenzy, a congressional hearing scheduled before the accident to review FAA certification processes and regulation of illegal commercial operators occurred the day after the accident. The collision became part of the discussions at the hearing. In his opening remarks, Representative John Burton (D-CA), chairman of the House Committee on Government Operations, House Government Activities and Transportation Subcommittee, stated:

> All of us are aware of the tragedy that occurred yesterday over San Diego. More than 140 persons, including a personal friend of mine, lost their lives in the mid-air collision between a 727 and a small general aviation aircraft. I realize that that is partly why there is such an interest in these hearings this morning. There is a valid need for information about the accident, and about what Congress will do to prevent future accidents. The National Transportation Safety Board, which has statutory authority to investigate these accidents, commenced its investigation this morning. The Acting Chairman of NTSB will testify today and will provide us with whatever up-to-date, confirmed facts are available.[61]

With the investigation just beginning, Acting NTSB Chairman Elwood Driver could only provide cursory information at the hearing. FAA Administrator Bond testified before the subcommittee on September 28. In his opening statement, he pointed out:

> I have listened with great interest to the commentary that has followed this accident. It is only natural that people want to find an answer to the crash as quickly as possible. This, in turn, leads to speculation. A certain vocal segment of the community has engaged in a running commentary on the FAA. I am reminded of a statement made by Winston Churchill before the House of Commons on January 22, 1941, wherein he said, "I do not resent the criticism even when for the sake of emphasis it parts for the time with reality."[62]

Bond continued, "Given this tragic accident, criticism, which for the sake of emphasis parts with reality, does a great disservice to the American public. . . . It is a fundamental axiom . . . that it is much easier to be critical than to be correct." The administrator said that in the immediate aftermath of the accident, now was not the time "for finger-pointing or passing the buck. Now is the time to learn all we can so that if we find deficiencies in the system, we can correct them so that human life can be preserved in the future."[63]

While the NTSB conducted its investigation, on October 27, the Senate Committee on Commerce, Science, and Transportation held a one-day joint hearing in San Diego with the House Committee on Public Works and Transportation. Senator Howard Cannon (D-NV) opened the hearing by explaining Congress was not trying to identify the cause of the accident. That role belonged to the NTSB. He said, however,

Terminal Control Area (TCA) Background

On June 25, 1970, the FAA established the TCA concept to minimize the mid-air collision hazard around the nation's busiest airports. A TCA consisted of controlled airspace within which all aircraft would be subject to special operating rules and pilot and equipment requirements. Although the boundaries of each TCA would be determined separately, their general shape resembled an "inverted wedding cake" with its smallest layer touching the ground. TCAs were broken into two categories, with the most congested locations designated as Group I. The rules for Group I required:

- air traffic control clearance for all operations
- large turbine-powered aircraft to stay above the TCA's floor unless otherwise authorized by air traffic control
- the speed limit beneath the TCA's lateral limits to be 200 knots (230 mph)
- takeoffs and landings by solo student pilots to be banned
- aircraft to carry an operable two-way radio.
- fixed-wing aircraft to carry an operable receiver for VOR or TACAN (types of ground navigation aids), as well as a radar beacon transponder—the transponder requirement did not apply to instrument flight rules (IFR) operations to and from secondary airports within the TCA

For Group II TCAs, the rules were the same as for Group I except solo student operations were permitted, and aircraft using visual flight rules (VFR) did not need to carry transponders. Air traffic control would provide added separation service—separation from VFR as well as IFR traffic only when large turbine-powered aircraft were involved.

Because of varying local conditions, each TC would to be designated by a separate rule beginning with those in Group I. The FAA established the first TCA at Atlanta on June 25, 1970. It was followed by Chicago on July 23; Washington, DC, on February 4, 1971; and Los Angeles and New York City on September 16, 1971. Over the next three years, the FAA established TCA at Dallas-Fort Worth, Chicago, San Francisco, Boston, and Miami.

On January 1, 1974, the FAA established the first Group II TCA at St. Louis, and on August 1, 1975, established the last at Kansas City International Airport. The other locations were Cleveland, Denver, Detroit, Houston, Las Vegas, Minneapolis, New Orleans, Philadelphia, Pittsburgh, and Seattle.

"the NTSB investigation need not, and must not, delay the congressional responsibility to make a timely investigation of the institutional safety questions raised by the facts of this and similar collisions."[64] In addition to the FAA administrator, the members of Congress heard testimony from the NTSB, Professional Air Traffic Controllers Organization (PATCO), Air Line Pilots Association (ALPA), Airline Operators and Pilots Association (AOPA), and the Airline Transport Association (ATA), among others. Much of the information presented and questions asked revolved around the efficacy of the FAA creating more terminal control areas (TCA), installing more air traffic control equipment at airports, and understanding the long delay in developing and mandating a collision avoidance system.[65]

The NTSB held a five-day public hearing in San Diego beginning on November 27, with board member Francis McAdams presiding over the meeting. Witnesses at the hearing included officials from the FAA, PSA, Gibbs Flight Center, and eyewitnesses to the accident.[66] Deputy FAA Administrator Quentin Taylor testified on November 30. He

Terminal Radar Service Area Background

The FAA recognized potential reduced safety in a mixed VFR/IFR terminal environment. One of the major recommendations of the October 1961 *Project Beacon Report* on air navigation and air traffic control was that VFR and IFR traffic should be segregated around air terminals.

The FAA tested the concept during fiscal year 1963 in Atlanta, Georgia, with favorable results. As a result of those tests, the agency developed its three-staged national terminal radar program. Stage 1 represented the status quo at terminal radar locations, where controllers provided VFR pilots with certain advisory services when their workload permitted. Under Stage 2, controllers supplanted all Stage 1 services with radar-vectoring of VFR aircraft into landing sequences. Stage 3, as demonstrated in the Atlanta program, included a defined terminal radar service area. Pilot participation in any of the stages was voluntary.

The FAA individually approved airports for the service. The first five airports approved for Stage 2 service included Denver, Indianapolis, Los Angeles, Oakland, and Tampa.

In the FAA's *National Aviation Systems Plan, 1970-1979*, issued in January 1969, the plan's authors recommended expanded terminal radar services. "The intermixing of VFR and IFR arrival traffic in high activity terminal areas has always been a serious problem for the airport controller. There is a need to improve traffic flow in the terminal area and to aid pilots to see and avoid other traffic by providing radar traffic information on possible conflicting traffic. Expanded radar service consists of issuing traffic advisories to arriving and departing flights within terminal areas and sequencing, on a full-time basis, the VFR aircraft landing at the primary airport."

discussed FAA efforts to prevent mid-air collisions in the wake of the accident, such as the creation of TCA and terminal radar service areas (TRSA), as well as the introduction of new technologies into the system, such as conflict alert, minimum safe altitude warning systems, and precision landing aids. Taylor lamented, "It is not infrequently the case that deficiencies in the system are detected only after they are highlighted in the context of an accident." Taylor said the FAA was improving system safety by reviewing existing air traffic procedures and communication transfer practices and expediting the installation of BRITE (Bright Radar Indicator Tower Equipment) alphanumeric displays so tower controllers would have the same digitized radar displays available to radar controllers. He discussed the ongoing development of an alert and collision avoidance system, a soon-to-be issued notice of proposed rulemaking that would reduce the floor of the continental and Alaskan positive flight control area, and the creation of a new regulatory concept called controlled visual flight.[67]

While the NTSB carried out its accident investigation, the FAA undertook an internal study to address the specific circumstances of the San Diego tragedy and to determine ways to prevent similar accidents. As a result, on December 27, 1978, FAA Administrator Bond and Secretary of Transportation Brock Adams announced "A Plan for Enhanced Safety," a regulatory program to reduce the risk of mid-air collisions by 80 percent, which included:

- establishing new voluntary TRSA at eighty air carrier airports, beginning with San Diego
- establishing a new TCA at forty-four other airports
- lowering the floor of positive area control from eighteen to ten thousand feet over the states east of the Mississippi River and much of California and to twelve thousand feet over the rest of the forty-eight contiguous States
- establishing a new flight category, controlled visual flight rules, for positive airspace below eighteen thousand feet, which would allow non-instrument-

rated pilots to use the airspace above ten thousand feet with radar separation provided by air traffic controllers
- requiring all aircraft operating in TRSA and TCA to have altitude-reporting transponders installed by July 1981
- requiring all airliners and air taxi aircraft to carry an airborne active Beacon Collision Avoidance System (BCAS) by January 1985

All transponders installed after July 1982 had to incorporate the new Discrete Area Beacon System (DABS), providing an automatic data link with a ground-based collision avoidance system. The agency issued a proposed national standard for transponders in December.[68]

The FAA submitted its recommendations to the aviation community as a notice of proposed rulemaking on January 4, 1979.[69] The proposal elicited over 43,000 public comments, mostly negative, and much of it orchestrated by AOPA.[70] As a result of public concern, the House Committee on Public Works, Aviation Subcommittee held hearings on March 20-21. As expected, AOPA President John Baker harshly criticized the FAA's proposal at the hearing. He asserted, "The FAA proposal does not solve existing problems—it merely takes advantage of a catastrophic incident to engage in further empire building." Furthermore, he contended, "The NPRM appears to hold out false hope to the public that its proposals will all but eliminate mid-air collisions. This is a fallacy. As long as human beings are controlling the traffic and flying the airplanes, there will be human errors and there will be an occasional collision no matter what rules are enacted."[71]

In its April 20, 1979, accident report, the NTSB concluded the probable cause was the PSA crew's failure to comply with the provisions of a maintain-visual-separation clearance, including the requirement to inform the controller if they no longer had the other aircraft in sight. The board cited as a contributing factor the procedures that allowed controllers to authorize visual separation procedures when they could provide radar separation. The NTSB recommended immediately implementing a TRSA around Lindbergh Field to provide for the separation of aircraft and a review of control procedures for all busy terminal areas.[72]

NTSB member Francis McAdams disagreed with the probable cause finding. He believed the probable cause included visual air traffic control procedures rather than merely contributory. He listed several contributing factors, such as the inadequacies of the air traffic control (ATC) system, including the failure to resolve an automated conflict-alert alarm that the approach controller disregarded on the assumption the pilots maintained visual separation. (In August 1982, the NTSB adopted McAdams' viewpoint and an amendment that included ATC and pilot failings in the probable cause finding.)[73]

In early September 1979, Administrator Bond announced he had withdrawn all the en route proposals announced in December 1978: lowering the floor of positive control airspace and requiring pilots operating under visual flight rules to file flight plans, maintain communications with air traffic control, and adhering to air traffic control clearances and instructions. Bond withdrew the proposals after the agency reviewed the extensive public comments and analyzed other related data. He said the information indicated there might be more effective alternatives for achieving the agency's safety objectives.[74]

The agency continued its plans to increase the number of TCA. Agency officials held public meetings at the proposed TCA sites nationwide in 1980. While commercial aviation groups largely accepted the TCA proposal, general aviation pilots did not. General aviation pilots considered TCA a threat to their independence to fly wherever they wanted, and they complained about the high cost of purchasing and installing transponders in their aircraft. As a result of public outcry, the FAA began gradually withdrawing most of the proposed new TCA.[75]

However, congressional and commercial airline pressure pushed the FAA to create a TCA in San Diego. On March 20, 1980, the FAA issued a final rule establishing a Group II TCA at San Diego, effective May 15, 1980. This move brought the total of Group II TCAs to thirteen and nine Group I TCAs at the nation's busiest airports. The San Diego TCA required all aircraft, regardless of size, to operate under "positive radar control," a rule that mandated radar control for all aircraft operating in the airport's airspace.[76] At the time of the crash, Lindbergh Field was the only airport in San Diego County with an instrument landing system. As a direct result of the accident, the FAA installed the system at Montgomery and Gillespie fields and McClellan-Palomar Airport.[77]

Beleaguered DC-10

As the FAA worked to eliminate the threat of mid-air collisions, another airline tragedy occurred, further eroding public confidence in the safety agency. The McDonnell Douglas DC-10 suffered several in-flight accidents beginning in the early 1970s. Those accidents called into question the agency's oversight of the manufacturer and the roles and responsibilities of the agency's safety organization.

The agency certificated the DC-10 on July 29, 1971, and the aircraft entered scheduled service with American Airlines on August 5, 1971. The wide-body trijet had two turbofans attached with underwing pylons and a third engine at the base of the vertical stabilizer. The original twin-aisle layout accommodated up to 270 passengers in two classes. The aircraft had a 3,500 nautical mile range for transcontinental flights.

The jet's cargo doors opened outward instead of the conventional inward-opening doors. The configuration enabled an airline to use the entire cargo area since the doors did not intrude on the interior space when open. The outward-opening doors used heavy locking mechanisms to overcome the outward force from the pressurization of the fuselage at high altitudes. The door design, however, created a safety issue.

On June 12, 1972, American Airlines Flight 96 lost its aft cargo door shortly after takeoff from Detroit, Michigan, because, as later discovered, the door latches had not been fully closed. The lockpins, which should have prevented the latches from opening, had not fully engaged. When the aircraft climbed to about 11,750 feet, the door blew out, and the resulting explosive decompression collapsed the cabin floor, cutting control cables, which left the pilots with limited control of the aircraft. The crew, however, safely landed the plane. The NTSB investigators found the cargo door design dangerously flawed—the door could be closed without the locking mechanism fully engaged. The NTSB recommended modifications to make it apparent to baggage handlers and crew when the door was improperly secured. It also recommended adding vents to the cabin floor so the pressure difference between the cabin and cargo bay during decompression could quickly equalize without causing further damage.[78]

After this event, the FAA did not issue an airworthiness directive (AD), a legally enforceable rule distributed to correct an unsafe condition in a product, to modify the doors. McDonnell Douglas, however, agreed to issue a series of FAA-approved service bulletins designed to fix the problem. On October 25, 1973, the manufacturer issued a final service bulletin introducing a “closed-loop” system as a definitive solution. That system would make the cargo door almost impossible to open in flight. McDonnell Douglas also modified the cargo door, but the basic design remained unchanged.

On March 3, 1974, in an accident similar to American Airlines Flight 96, a cargo door blowout caused Turkish Airlines Flight 981 to crash near Ermenonville, France, killing all 346 people onboard the aircraft—the deadliest airplane crash to date. The accident investigation team, including FAA and NTSB representatives, determined that although the door appeared locked, the crew had failed to fasten it correctly. The aircraft had not yet received the closed-loop modification. Investigators also found the DC-10's relief vents too small to equalize the pressure between the passenger and cargo compartments during explosive decompression. As the cabin floor collapsed into the cargo bay, it severed cables needed to control the aircraft. The French accident report indicated the manufacturer failed to complete one of the earlier improvements contained in a service bulletin before delivering the aircraft in December 1972. The report concluded improper in-service modifications and adjustments resulted in the ground crew’s defective closing of the door before the flight.[79]

On March 6, 1974, ninety-six hours after the crash, the FAA issued advisory circular (AD) 74-08-04 to all operators of DC-10 aircraft. The AD directed them to modify the cargo doors described in the McDonnell Douglas service bulletins issued shortly after the American Airlines accident. The agency amended the AD on March 22, 1974, to require installation of the closed-loop system for locking the cargo doors.[80] Receiving criticism for not issuing an AD for fixes to the cargo doors after the 1972 accident, on April 9, FAA Administrator Alexander Butterfield announced the agency would issue airworthiness directives in all situations involving a design change to correct unsafe conditions.[81]

On July 7, 1975, the FAA issued an AD requiring all manufacturers of wide-body jets to reinforce aircraft floors to prevent the catastrophic effects of rapid in-flight decompression caused by a sudden opening of a hole up to twenty square feet in the lower deck cargo compartment. Manufacturers could strengthen the floors, install relief vents, or both between the passenger cabin and aft cargo compartment. Airlines had until December 31, 1977, to comply with the mandate.[82]

Grounded

The DC-10's problems, however, were far from over. On May 25, 1979, American Airlines Flight 191, a DC-10 aircraft, crashed into an open field just short of a mobile home park about 4,600 feet northwest of the departure end of Runway 32R at Chicago O'Hare International Airport. The crash occurred in clear weather with fifteen-mile visibility.

During takeoff, the left engine, pylon assembly, and about three feet of the left wing's leading edge separated from the aircraft and fell onto the runway. The left engine separation cut electrical power. That problem, in turn, resulted in the loss of aircraft systems and instruments, including the captain's flight instruments, left stall warning computer, stick shaker (stall warning) motor, slat disagree warning system, and parts of the flight control indicating system. The loss of hydraulic system No. 1, which locked the left wing slats in an extended position, caused the leading-edge slats to retract. With slats retracted, the left wing could not generate lift, and the aircraft entered an uncontrollable roll to the left. The subsequent fire destroyed the aircraft. Two hundred and seventy-one people on board the flight and two on the ground died.[83]

Passengers in the terminal, and FAA and airport employees at the airport, watched helplessly as the aircraft crashed. The horror they witnessed quickly played out over the nation's airwaves and in print media. An amateur photographer snapped photos of the plane as it crashed, and the press took pictures of the crash site as the fire still smoldered. Newspapers across the country printed the photographs along with shocking headlines, such as "Pieces of Plane Filled Field,"[84] "'It was Too Hot to Touch Anybody:' Witnesses Describe Tragic Plane Crash,"[85] "'It Exploded Like an Atom Bomb,"[86] "LA-Bound Jetliner Crashes; No Survivors,"[87] "'My God,'"[88] "Witnesses Relive Horrors of Crash."[89] A shocked nation wanted answers on how such a tragedy could have occurred.

Crash Investigation

NTSB Vice Chairman Elwood Driver holds the broken bolt.
Courtesy: Dan Casper/*Chicago Tribune* via
www.newspapers.com

Upon hearing about the crash, Secretary of Transportation Brock Adams informed President Carter: "I have just learned that a DC-10 fully loaded with fuel and passengers crashed on takeoff at O'Hare Airport. Our first reports are that an engine exploded and the plane is burning on the runway. I have talked to Federal Aviation Administrator Bond, and he will be on the scene within two hours and will report to me. I have instructed him to coordinate FAA efforts and to act as a single spokesman on this matter."[90] Bond and the FAA and NTSB investigative teams met in Chicago that evening. The NTSB, a non-regulatory agency, led the investigation and would determine the probable cause of the crash. FAA investigators supported the NTSB team and were responsible for determining if the accident stemmed from a structural, mechanical, procedural, or human failure the agency needed to address.

Two days after the accident, on May 27, NTSB accident investigators discovered a fatigue fracture of a pylon forward thrust link attach bolt. As a result, the NTSB recommended the FAA "issue immediately an emergency AD to inspect each pylon attach points on all DC-10 aircraft by approved inspection methods."[91] The next day, FAA's Western Region Director Leon Daugherty issued an AD temporarily grounding the U.S.-registered DC-10 fleet (138 aircraft operated by eight U.S. carriers) until the aircraft operators completed certain visual inspections per a McDonnell Douglas alert service bulletin issued the day before. The airworthiness directive required review and, if necessary, replacement of the bolts at the forward and aft ends of the thrust link assembly. It also mandated an inspection of the inside forward flange of each wing engine pylon aft bulkhead for cracks.[92] At a news conference later that day, FAA Administrator Bond explained, "I have no choice but to ground all U.S. DC-10s immediately. . . . The entire pylon will have to be inspected."[93]

The next day, after learning the inspections had found potentially dangerous deficiencies in the pylon mountings, Daugherty issued an amended directive. The amendment provided more inspection details and required checks to be repeated at intervals not to exceed one hundred hours in service since the last inspection or ten days since the previous review, whichever occurred first.[94] Operators quickly complied with the directives and returned their DC-10s to service.

Consumer advocate Ralph Nader called for grounding the DC-10 fleet as the accident investigation began.[95] Once the DC-10s started flying again, on June 4, Nader argued the plane should remain grounded. That same day, the Airline Passengers Association, comprising an estimated fifty thousand members,[96] asked U.S. District Court Judge George Hart to ground the aircraft until the FAA learned precisely why an engine broke off the airplane. The association's counsel, Windle Turley, explained the group asked the FAA to ground the plane the previous Friday. When the agency failed to respond, the association requested a restraining order. Judge Hart turned down the request. He said air travelers would suffer an "absolutely tremendous" impact if the FAA grounded the planes before investigators determined the accident's probable cause.[97] After the judge's ruling, the association urged its members to boycott air travel on DC-10s.

The agency issued another amendment to the AD on June 4 after evidence the cracks may have been caused by American Airlines' non-standard use of a forklift to dismount and remount the engine and pylon as a single unit during maintenance. Maintenance workers found similar cracks on DC-10s operated by Continental Airlines, the only other carrier using the forklift method. The new instruction added a requirement to inspect all aircraft with the pylon or engine pylon removed and reinstalled after the plane's last inspection, as specified in the first airworthiness directive.[98]

After the FAA issued the directive, the Airline Passengers Association appealed Judge Hart's decision. U.S. District Court Judge Aubrey Robinson, Jr., ruled in favor of the association and, on June 5, ordered the FAA to ground the jets that night. As the FAA prepared to issue the grounding order, federal attorneys asked the U.S. Court of Appeals to block the grounding order. After a day of legal wrangling, Judge Robinson rescinded his order at 9:30 p.m. Eastern Daylight Time (EDT) before the FAA carried out his earlier directive.[99]

While the agency fought the judge's grounding order on June 5, inspectors discovered cracks on some DC-10s seemingly unrelated to the forklift procedure. FAA officials learned of the finding around 11 p.m. EDT on June 5. As FAA chief spokesperson Jerome Doolittle explained: "We're not just finding a broken bolt or a bolt that's halfway out and needs to be torqued down again. What we're finding is the appearance of cracks for reasons we don't understand. We had to find out why the cracks were appearing."[100]

After examining the damage reports, a group of executives at FAA headquarters called Administrator Bond, who was in London for a series of meetings. It was early morning on June 6 in Washington, DC. They explained the evidence to Bond, who agreed the FAA needed to ground the DC-10 fleet. According to Doolittle, Bond "listened without saying anything until we poured out our bag of technical stuff and he realized that the information was hard. Then he said, 'I don't see that we have any choice but to go ahead and ground them.'"[101] FAA attorneys immediately went to work drafting the order of suspension. Doolittle explained the only issue with the grounding "was procedural. Nobody ever put down a fleet of this size before. You want to be damn sure that what you're doing can't be overturned in court."[102]

On June 6, at approximately 5:45 a.m. EDT, Bond suspended the DC-10 type certificate indefinitely—the first grounding of an American-made jetliner.[103] The order stated, in part:

> The Administrator has reason to believe that the Model DC-10 series aircraft may not meet the requirements of Section 603(a) of the Federal Aviation Act for a Type Certificate in that it may not be of proper design, material, specification, construction, and performance for safe operation, or meet the minimum standards, rules, and regulations prescribed by the Administrator. Therefore, the Administrator finds that safety in air commerce or air transportation and the public interest require the suspension of the Type Certificate for the Model DC-10 series aircraft issued to McDonnell Douglas Corporation until such time as it can be ascertained that the DC-10 aircraft meets the certification criteria of Part 25 of the FAR and is eligible for a Type Certificate.[104]

When questioned at a press conference on the day of the grounding about why it took so long to ground the entire fleet after the accident, Bond responded:

> If I had all the information in hand that we have now, based on almost two weeks of investigations, we would not have done it the same way. But what we have turned up in our investigation, as each day went by, was more information, and we have acted as best we could on what was in hand. So, I think the FAA's response has been correct based on the information that was available to us, and I don't know what else to act on. I don't know that speculation is sound. We have to work with the facts that we have, as does the Safety Board, I might add.[105]

The decision to ground the DC-10 angered some in the aviation community. As one reporter observed, "If Bond was unpopular with the aviation industry . . . he assured himself of undying enmity yesterday when he grounded the controversial DC-10 jetliner."[106] The grounding, the reporter continued, would force McDonnell Douglas to spend "untold amounts to assure" the aircraft was safe. "The airlines stand to lose money" because they had to remove the plane from their fleets. Passengers would "face inconveniences, reroutings and hassles over seating because of Bond's decision."[107]

Aviation writer Robert Sterling, in a letter to the editor of the *Washington Post*, claimed, "Bond's . . . contradictory and confusing statements during the DC-10 crisis merely underline his basic ignorance of aviation." He, however, called Bond "more a victim than a perpetrator, for he is but one of several top government aviation officials lacking technical knowledge in jobs demanding at least *some* technical knowledge."[108]

Newspapers nationwide ran stories about Bond's decision and criticized the agency for overreacting to the accident. However, Bond, generally unfazed by the negative press, believed his action was correct and necessary.

On June 15, McDonnell Douglas appealed the grounding to the NTSB. In such cases, a company had to appeal to the NTSB before taking other actions, such as filing an appeal in federal court. McDonnell Douglas claimed the grounding order was "not supported by substantial, reliable, and probative evidence." The company asked for a hearing before an administrative law judge. After several delays, the NTSB's Judge William Fowler began the hearing on July 2.[109] During the noon recess, however, he received an order to halt the proceedings from NTSB members. The case became moot once the FAA rescinded the grounding order on July 13.

As the NTSB and others continued looking for the probable cause of the accident, the FAA administrator established three investigative teams. Bond tasked one team to determine whether the design, manufacture, or maintenance of the DC-10 could have contributed to the accident. Raymond Bisplinghoff, an aeronautical engineer and the University of Missouri chancellor, headed the team. Bisplinghoff divided the team into five groups. One worked at FAA headquarters, reviewing the operational history of each DC-10 in the U.S. fleet. Four other groups deployed to the McDonnell Douglas plant in California. One of those studied the DC-10 pylon design to ensure it met FAA standards. A second team examined the company-issued service bulletins. A third reviewed FAA DC-10 airworthiness directives and service difficulty reports. The fourth assessed McDonnell Douglas manufacturing quality control processes.[110] The team's job included investigating the pylon failure, drawing conclusions from the investigations underway by the FAA and McDonnell Douglas, and recommending measures to ensure the structural integrity of the DC-10 pylon assembly.[111]

Another team examined the DC-10 maintenance practices. John Cyrocki, a retired FAA regional director, led that team. Four groups of FAA employees on the team—a team leader, an attorney, an engineer, and two maintenance inspectors—deployed nationwide. One group, based in Los Angeles, worked with Western and Continental Airlines. Another group worked in San Francisco with World Airways, Trans International Airlines, and United Airlines. A third group went to the American Airlines maintenance base in Tulsa, Oklahoma; the fourth group split their time between Minneapolis with Northwest Airlines and Miami with National Airlines.[112] The groups spent over four thousand hours investigating the maintenance and airworthiness procedures followed by the eight U.S. carriers flying the DC-10.[113]

The third team, the design review team, led by James Robinson, FAA's chief of the Engineering and Manufacturing Division, and Carl Shellenberg, FAA's assistant chief counsel for regulations and enforcement, investigated the DC-10's manufacturing and assembly processes. Twenty-two FAA engineers, lawyers, and safety specialists from across the country met in Los Angeles near the McDonnell Douglas plant. The team grew to over one thousand participants, including McDonnell Douglas engineers and airline representatives. Team members reviewed the pylon design, DC-10 service bulletins, airworthiness directives, service difficulty reports, and quality control standards. They examined more than 1,500 field service reports and 2,365 service difficulty reports issued from 1971 to 1979.[114]

In addition to the three teams, four FAA engineering test pilots and four jet-rated FAA air carrier operations inspectors participated in the investigation. They flew takeoffs in flight simulators to reenact the problems faced by the crew of the crashed aircraft. McDonnell Douglas crews and FAA technicians flew specially instrumented DC-10s to measure stresses. They did this to revalidate the original data on the design and strength of various parts of the engine pylons.[115]

Congressional Hearings

As the FAA teams began work, Representative John Burton, chairman of the House Government Operations Committee, Government Activities and Transportation Subcommittee, held a hearing on the FAA's response to the accident and its certification process. Burton had previously held a two-day hearing on the FAA's certification process in late September 1978.[116] Burton and others used the June 11 hearing to condemn the FAA's and Administrator Bond's actions regarding the DC-10. Representative Robert Walker (R-PA) accused Bond of putting "unsafe airplanes back into the air" after he issued three limited ADs requiring inspections. Representative Robert Matsui (D-CA) charged Bond "demonstrated a pattern of ineptness" in his DC-10 actions. Burton claimed the FAA's "yo-yo-like actions" created a "loss of confidence" in the airline industry.[117]

Bond responded to the criticism, arguing the FAA acted promptly and correctly, "All we can do when we search through a tragedy is act on the best information we have." He continued that after an accident, the agency will "gather information, we analyze it, and we take action. As every layer was peeled back in this investigation, the

FAA acted." He reiterated the DC-10 fleet would remain grounded until "I am convinced that safety will not be compromised."[118]

In response to critics who claimed the FAA acted too slowly in grounding the aircraft, Bond outlined the FAA's steps since the accident.

- May 25: The FAA and NTSB investigators arrived in Chicago at 10:35 p.m. EDT.
- May 26: Investigators found a bolt near the taxiway, and an investigation began to determine if it was related to the DC-10's structural failure.
- May 27: The FAA met at its headquarters to analyze emerging facts. At 3:30 p.m. EDT, investigators discovered another broken bolt near the separated engine. The agency ordered its Western Region to concentrate its efforts on the forward thrust link assembly design to determine what action needed to be taken to preclude the possibility of another accident. At 7 p.m. EDT, the NTSB recommended the FAA issue an emergency Airworthiness Directive "to inspect all pylon attach points on all DC-10 aircraft by approved inspection methods."
- May 28: After analyzing the data from investigators, at 1 p.m. EDT, the FAA issued an emergency AD ordering all U.S. DC-10 operators to inspect the pylon aft bulkhead and thrust link bolts per a McDonnell Douglas alert service bulletin issued earlier in the day. The AD required the inspections by midnight Pacific Daylight Time (PDT). Any DC-10 not inspected by then would be grounded.
- May 29-31: The FAA received information from the inspections indicating problems with the pylon structure, aft bulkhead attach fittings, huck bolts, fasteners, loose monoball bolts and fittings, some loose thrust link bolts, and damaged thrust bolt bushings. Based on those findings, at 1 p.m. EDT, the FAA grounded all U.S. DC-10s until the airlines completed a more comprehensive inspection per a second AD that expanded inspection requirements. The AD also required recurrent checks at one hundred-hour intervals or ten calendar days, whichever occurred first. The FAA increased compliance inspections, and FAA inspectors monitored reviews of ninety-five of the DC-10s, about 70 percent of the 138 jets in the fleet.
- June 1-2: The FAA continued to receive information from the ongoing inspections. Analysis indicated cracks in the aft pylon attach structure, possibly related to maintenance handling procedures. NTSB subsequently informed the FAA of findings at the American Airlines maintenance facility in Tulsa, Oklahoma, which indicated a problem with the airline's maintenance procedures.
- June 2: The Airline Passengers Association notified the FAA it planned to file a petition in the U.S. District Court on Sunday, June 3, for a temporary restraining order to prohibit operations of DC-10 aircraft.

- June 3: At 3 p.m. EDT, the district court held a hearing on the petition. The FAA issued a general notice at 4:07 p.m. EDT directing principal maintenance inspectors to assure compliance with the DC-10 manufacturer's recommended engine/pylon removal/reinstallation procedures. At 4:30 p.m., Judge Robinson denied the petition for a temporary restraining order.
- June 4: Based on a NTSB recommendation, at 10:33 p.m., the FAA issued a third AD for the airlines to inspect the aft pylon attach structure area if a reinstallation occurred. Later that evening, the Airline Passengers Association served the FAA a second petition for a temporary restraining order.
- June 5: A U.S. District Court judge issued a temporary restraining order, prohibiting the FAA administrator from allowing continued operation of the DC-10 until the agency identified the accident cause and took action to prevent a similar accident. The FAA began reviewing the possible methods to implement the judge's order. At 9:30 p.m., the FAA received word the judge stayed his order pending a rehearing the following day. Later that night, the FAA's headquarters staff confirmed the existence of new cracks on American Airlines aircraft in California. In addition, investigators raised questions about the fail-safe analysis of the DC-10 mounting structure.
- June 6: At 6:48 a.m. EDT, the FAA grounded the DC-10 fleet. At 9 a.m., at the district court rehearing, the FAA withdrew its motion to reconsider the temporary restraining order.
- June 7: The FAA's Chief Counsel issued two formal orders of investigation. One order directed a study of the certification basis for the DC-10 and required McDonnell Douglas to produce relevant documents. The second order required the eight U.S. operators of DC-10 aircraft to provide material on their maintenance of DC-10 aircraft. The agency also issued a special federal aviation regulation prohibiting the operation of DC-10 aircraft in U.S. airspace, except for foreign-registered planes en route to the United States or departing from the United States without passengers or cargo. At 5:30 p.m., Judge Hart modified his order to allow operators to move their aircraft for maintenance, inspections, and experimental flight testing.[119]

The European aviation community, which also grounded DC-10s, proved not as patient as Bond. When Bond grounded the DC-10 fleet, he also banned DC-10 flights in U.S. airspace. On June 12, the twenty-one-member European Civil Aviation Conference condemned the FAA's continued grounding as "irresponsible and frivolous." Air New Zealand's chief executive officer, Morrison Davis, said conference members were "convinced of the integrity of our Series 30 DC-10s." Citing financial losses, they planned to begin flying their DC-10s the following week.[120] On June 18, they voted to allow DC-10 planes to fly again with more robust inspection and maintenance measures. The FAA agreed to allow the DC-10s to fly over but not land in the United States.[121]

As the FAA and NTSB teams continued their investigations, Congress called Bond and other FAA executives to testify and answer questions at several hearings. The House Committee on Public Works and Transportation, Subcommittee on Aviation and the Subcommittee on Oversight and Review held joint hearings on the crash on June 19-20. To a large degree, the hearings centered on the FAA's maintenance and inspection rules and practices. The representatives wanted to know why an airline could change an FAA-approved maintenance procedure. In particular, they wanted to understand how American Airlines could deviate from its approved maintenance manual and instead adopt an approach that removed the pylon and engine using a forklift.

As the FAA's principal maintenance inspector, or PMI, for National Airlines, John Bartell, explained, "By regulation, any major repair or modification in an engineering change order, the data must be approved by the FAA." However, "minor changes and modifications are not submitted to FAA for approval." The airline decided what constituted significant and minor changes, and American Airlines deemed the forklift method as minor and, hence, did not submit the change to the FAA for approval.[122]

The representatives and senators frequently questioned the FAA's use of designated engineering representatives (DER) in aircraft certification. The FAA appointed the DERs, generally private citizens, often working for a manufacturer. They acted on behalf of the FAA administrator in a designated area of responsibility, such as examination, inspection, and testing of aircraft, equipment, and people to issue airman and aircraft certificates.

Agency Mandates

As the accident investigations proceeded, it became evident that a maintenance procedure used by American Airlines and Continental employing a forklift to remove the engine and pylon as one unit caused damage to some of the DC-10s. United Airlines used a method that employed an overhead crane and sling. McDonnell Douglas specified the engine be disconnected from the pylon before mechanics removed the pylon from the wing. American Airlines wrote an engineering change order (ECO) that reduced the number of wire disconnects and the number of hours needed for the job. The change allowed mechanics to disconnect the engine and pylon as a single unit and lower it with a forklift. McDonnell Douglas engineers reviewed the procedure and advised against it, but American Airlines instituted it anyway. Two months before the accident, during required maintenance on the plane that crashed, the maintenance crew failed to follow the steps outlined in the ECO. Rather than removing the pylon's forward bearings, they removed the aft bearings.

Investigators also found other issues. For example, they discovered cracks in the upper wing spar, a structural part of the wing designed to react to wing bending and shear loads.[123] Another concern focused on the DC-10 slats. According to the FAA, "As Flight 191 climbed with one engine gone, the slats retracted on the left wing and remained extended on the right. This caused the left wing to stall (a condition in which the wing loses lift)." A computer system on the aircraft is programmed to shake the pilot's control column when a stall is imminent. The power to operate the stick shaker on the DC-10 that crashed came from the engine that fell off, so the stick shaker did not work.[124]

The FAA's formal investigation resulted in three reports:

1. "Report to the Administrator on the Investigation of the Matter of Maintenance and Airworthiness Procedures Concerning the Model DC-10 Aircraft," issued June 25, 1979—John Cyrocki's team
2. "Presiding officer's Report to the Administrator on the Investigation of the McDonnell Douglas Corporation and the Model DC-10 Aircraft," July 9, 1979—James Robinson's and Carl Shellenberg's team
3. "Report to the Administrator on Investigation of Compliance of the DC-10 Aircraft Leading Edge Outboard Slat with Type Certification Requirements, under Asymmetrical Slat Conditions," July 9, 1979—Raymond Bisplinghoff's team

In its report, the maintenance and airworthiness review team concluded, "Any procedure which provides for installation and removal of the engine and pylon as single unit increased the potential for inflicting damage to the aircraft pylon assembly." Team members pointed out:

> The pylon design is such that difficulties arise with establishing sound maintenance practices, procedures, and methods related to removal and installation of the pylon assembly and in inspections of key sections of the assembly. A high degree of confidence can be established in ensuring that the potential for damaging the assembly during installation or removal is minimized if certain FAA-approved procedures are implemented and, further if damage is inflicted, then a high degree of confidence can be established that such damage will be recognized through the implementation of a comprehensive inspection procedure.[125]

The team recommended three immediate actions:

- McDonnell Douglas should reevaluate the design of the entire pylon assembly and related wing structure to minimize design factors that result in sensitive and critical maintenance and inspection procedures. An evaluation of this type should include, but not be limited to, clearance tolerances between the aft pylon bulkhead flange bolts and the wing attach fitting clevis, torquing of bolts, installation of stacking preloaded indicating washers, removal, and installation of aft pylon monoball bearing and bushing, grinding or countersinking aft pylon bulkhead bolts, tolerance build-up in a longitudinal plane of all close tolerance areas in the pylon assembly, etc.

- Operators should follow McDonnell Douglas's procedures for removing and installing the pylon assembly. If the guidelines do not provide explicit instructions for the removal/installation step, McDonnell Douglas needs to provide clarity.
- The FAA should adopt a comprehensive inspection procedure to ensure the constant integrity of the engine pylon assembly structure.[126]

Other recommendations included:

- Operators should consider a cable support lifting device instead of a rigidly held support type of lifter to allow ease of movement of the pylon in aligning it to mate with the attached fitting points during the final steps of attaching the pylon to the wing. They should also implement a comprehensive, repetitive inspection procedure to ensure the integrity of the engine pylon assembly.
- The FAA should amend pertinent regulations to define clearly a major alteration or repair.
- The FAA should become more involved in reviewing, evaluating, and approving changes or deviations from the manufacturers' accepted practices.
- The FAA should issue an AD to require an inspection of all pylons that have been removed or installed to determine if the bulkhead flange has sustained damage.[127]

The team studying the DC-10 certification requirements found that under asymmetric slat conditions, the aircraft had adequate speed margins and controllability to continue safe flight and landing with an uncommanded asymmetrical slat retraction during takeoff or landing. Team members recommended the installation of takeoff and stall warning systems on the DC-10 that could indicate the positions of both outboard slat groups. They also advocated requiring a second stick shaker powered by an electrical source other than that which powered the captain's stick shaker.

On January 11, 1980, the FAA issued an AD, effective February 21, 1980, requiring increased redundancy in the DC-10's stall warning system. The directive mandated the installation of two autothrottle/speed control computers, each of which must receive information from both outboard wing slat groups. In addition, it required the installation of a stick shaker at the first officer's position, with both stick shakers actuated by either autothrottle/speed control computer following FAA-approved design data.[128]

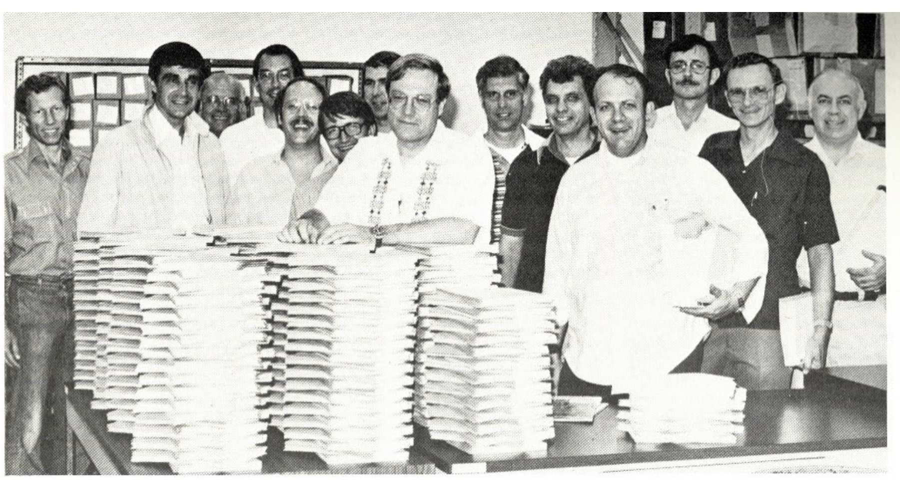
The Robinson/Shellenberg design review team submitted the most extensive report, publishing its findings in two volumes. Team members studied the initial certification of the DC-10, quality control at McDonnell Douglas, and measures the team regarded as essential before putting the aircraft back into operation. They found the basic loads in the DC-10's pylon accurate and the methodology for determining such loads to be state-of-the-art. However, the original data submitted for type certification contained multiple deficiencies:

- McDonnell-Douglas did not sufficiently review the DC-10 aft bulkhead to provide a proper fail-safe analysis.
- The fail safe analysis for the aft pylon bulkhead failed to take into account a failed thrust link.
- The fail safe analysis for the aft pylon bulkhead failed to consider thrust loads due to improper aft wing attach clevis tolerances.
- The fail safe analysis for the thrust link failed to take into account a failed bushing.[129]
- The manufacturer had not updated the fail safe analysis when it installed heavier engines in 1976.

In the quality control area, the team discovered the pylon assemblies produced at the McDonnell Douglas facility in Huntington Beach, California, had numerous conditions of nonconformance to approved design data. McDonnell Douglas moved the pylon production line from Santa Monica to its Huntington Beach facility in October 1974. FAA investigators discovered that thirty-one aircraft had pylons with loose, failed, or missing fasteners. Fifteen aircraft had pylons produced at the Santa Monica plant, the others in Huntington Beach. McDonnell Douglas personnel believed the transfer of the production line on worker experience, morale, and productivity had first caused the production breakdown in Santa Monica, then later at Huntington Beach.[130]

The FAA team agreed with a McDonnell Douglas assessment that the effects of facility relocation, personnel turnover, experience-level losses, and parts shortages disrupted the manufacturing process. They also recognized that one or more of these conditions, as well as increased production rates, had occurred since the company moved production to the Huntington Beach facility. Once the FAA team discovered the production problem, the agency quickly recommended all pylons produced at the Huntington Beach facility be re-inspected.[131]

All three of the FAA's investigative teams agreed the forklift procedure damaged the crashed aircraft. That practice also caused the other cracks found in the pylons of DC-10s operated by American and Continental. (The two airlines later received and paid civil penalties of $500,000 and $100,000, respectively, for using the procedure and McDonnell Douglas paid a $300,000 fine for a failure to maintain its quality control program.)[132] Other findings of the teams and the resolution of those issues by the manufacturer and operators led to the decision to return the DC-10 to service.



An exhausted Langhorne Bond and members of the FAA review teams
Courtesy: FAA

The agency's investigations provided the legal basis for the FAA to rescind the grounding order on July 13. Before flight, however, operators had to comply with several new airworthiness directives.[133] Airworthiness Directive 79-13-05 made mandatory the inspections set out in McDonnell Douglas Alert Service Bulletins 54-70 and 54-71 and established recurrent inspections of wing-mounted pylons on the DC-10 airplane. Within one hundred hours of time-in-service after the initial inspection, and at intervals not to exceed one hundred hours after that, operators had to inspect the pylon aft spherical bearing and verify the security of the nut and bolt. They also had to check the thrust link attachment lugs and thrust link hardware every one hundred hours.[134]

In addition, within three hundred hours of the initial inspection and at intervals not to exceed six hundred hours of time-in-service, operators had to inspect the upper surface of the pylon aft bulkhead horizontal flange. Further requirements called for a visual inspection of the wing clevis for cracks and the lower wing area surrounding the wing clevis for evidence of fuel leaks. Also, within three hundred hours, operators had to inspect the upper forward spherical bearing using ten-power magnification and visually inspect the upper forward spherical bearing installation.[135]

The FAA required more inspections of the entire pylon area. The agency's directive contained a requirement to inspect ultrasonically the pylon attach lug and wing clevis exposed surface without disassembly within nine hundred hours after initial inspection and at intervals of six hundred hours after that. The agency mandated extra checks of the pylon area within 1,500 and 3,000 hours of the initial assessment and at the same intervals after that.[136]

Advisory Circular 79-15-04 R1 required, before further flight, an inspection of leading edge slat drive components and reporting of any discrepancies to the FAA.[137] Before additional flight, AD 79-15-05 required the installation of two autothrottle/speed control computers to provide stall warning based on the right and left angle of attack sensors and wing slat positions and to modify the stall warning system to give the required sensor information. It also required a new flight manual limitation relative to the slat function of the takeoff warning system and its operability for takeoff.[138]

Several other FAA directives followed. Issued on July 15, AD 79-18-08 required, before further flight, inspection for and replacement of cracked barrel nuts in the aft engine mounts.[139] Five days later, on July 20, AD 79-20-01 R1 required inspection and replacement of the four main aft mount pylon bulkhead bolts if necessary.[140]

After lifting the grounding order, Bond described the pressure from Congress, the airlines, trade associations, and the public since the Chicago accident. He pointed out, "The second hardest decision I ever made was the one to ground the DC-10. The hardest was to lift that grounding." He explained:

> During the approximately six weeks the DC-10s were on the ground, I was criticized for grounding the DC-10 when the evidence didn't justify action that strong. In other words, I was what you might call too decisive. I shot from the hip. On the other hand, when I finally let the DC-10s fly again, I was criticized for using the traveling public as guinea pigs before the plane was proven safe. According to this theory, then, I was reckless, irresponsible and in bed with the industry. In other quarters, I was criticized for not having let the planes back in the air much more quickly, as so many foreign countries had. According to this theory, I was over-cautious, and not responsive enough to the financial problems of the industry. After a while, I began to find something encouraging in this confusing crossfire. If I was under attack from both extremes, I must be doing something right.[141]

Once the DC-10 began flying again, the FAA started an in-depth technical study of the fundamental structural integrity of the pylon. Conducted by McDonnell Douglas under FAA supervision, the company completed over five thousand pages of FAA-mandated calculations of the pylon assembly's structural integrity. A team of FAA, Air Force, and non-government experts reviewed and approved the results. In their conclusions, made public in late January 1980, they wrote, "The DC-10 wing pylon is of sound design, material, specification, construction, and performance, and as such, meets all the applicable criteria and certification requirements set forth in the Federal Aviation Regulations." The FAA said the pylons would be safe for the twenty-five-year life of the aircraft if operators practiced approved maintenance.[142]

Almost two months after the agency allowed the DC-10 to fly again, Administrator Bond provided an update on the FAA's safety actions. He noted the agency's investigation resulted in eighty-four safety recommendations: forty-seven on maintenance practices, twenty-five on engineering and manufacturing concerns, two for leading-edge wing slats, and ten miscellaneous. In response to the accident, Bond noted the agency completed 32 percent of the recommendations. It planned to achieve 48 percent by mid-September, 64 percent by mid-October, 88 percent by mid-November, and 100 percent by the end of the calendar year.[143]

The FAA issued its final safety mandate as a result of the accident on April 2, 1980. Directive 80-11-05 R1 required the installation of two flush head bolts in place of the two raised head bolts adjacent to the pylon aft bulkhead upper flange centerline, per McDonnell Douglas DC-10 Service Bulletin 54-78, dated April 2, 1980. The agency required the installation of a device to ensure the rear bulkhead of the pylon fit the wing without damaging the wing or bulkhead. In addition, the FAA mandated the replacement of the titanium thrust links with steel thrust links.[144]

Probable Cause

Although the FAA finished its investigation, the NTSB had not. Beginning on July 30, 1979, that agency held a ten-day public meeting as part of its investigative process. The board released its accident report on December 30, 1979. Board members determined the probable cause of the accident:

> . . . was the asymmetrical stall and the ensuing roll of the aircraft because of the uncommanded retraction of the left wing outboard leading edge slats and the loss of stall warning and slat disagreement indication systems resulting from maintenance-induced damage leading to the separation of the No. 1 engine and pylon assembly at a critical point during takeoff. The separation resulted from damage by improper maintenance procedures which led to failure of the pylon structure. Contributing to the cause of the accident were the vulnerability of the design of the pylon attach points to maintenance damage; the vulnerability of the design of the leading edge slat system to the damage which produced asymmetry; deficiencies in Federal Aviation Administration surveillance and reporting systems which failed to detect and prevent the use of improper maintenance procedures; deficiencies in the practices and communications among the operators, the manufacturer, and the FAA which failed to determine and disseminate the particulars regarding previous maintenance damage incidents; and the intolerance of prescribed operational procedures to this unique emergency.[145]

The NTSB recommended the FAA:

- issue an airworthiness directive to require an immediate inspection for damage to the wing-mounted pylon aft bulkhead, including its forward flange and the attaching spar web and fasteners, of all DC-10 aircraft in which an engine pylon assembly has been removed and reinstalled. Require removal of any sealant that may hide a crack in the flange area and employ eddy current or other approved techniques to ensure detection of such damage
- issue a Maintenance Alert Bulletin directing FAA maintenance inspectors to contact their assigned carriers and advise them to discontinue immediately lowering and raising the pylon with the attached engine
- Incorporate in the type certification procedures consideration of:
  a. factors that affect maintainability, such as accessibility for inspection, positive or redundant retention of connecting hardware, and the clearances of interconnecting parts in the design of critical structural elements
  b. possible failure combinations resulting from primary structural damage in areas through which essential systems are routed
- ensure the design of transport category aircraft provides positive protection against asymmetry of lift devices during critical phases of flight; or, if certification is based upon demonstrated controllability of the aircraft under

the condition of asymmetry, ensure that asymmetric warning systems, stall warning systems, or other critical systems needed to provide the pilot with information essential to safe flight are entirely redundant

- revise 14 CFR 121.707 to more clearly define "major" and "minor" repair categories to ensure that the reporting requirement will include any repair of damage to a component identified as "structurally significant"
- Expand the scope of surveillance of air carrier maintenance by:
  a. revising 14 CFR 121 to require that operators investigate and report to a representative of the Administrator the circumstances of any incident wherein damage is inflicted upon a component identified as "structurally significant" regardless of the phase of flight, ground operation, or maintenance in which the incident occurred
  b. requiring appropriate FAA personnel to evaluate damage reports to determine whether an unsafe practice caused the damage and ensure the dissemination of relevant safety information to other operators and maintenance facilities[146]

Audit Results

Amid multiple investigations into the Chicago crash, on February 29, 1980, the General Accounting Office (GAO) issued a report, "How to Improve the Federal Aviation Administration's Ability to Deal with Safety Hazards." Harold T. Johnson (D-CA), House Committee on Public Works and Transportation chairman, and Elliott H. Levitas (D-GA) requested the study in late 1978 after the San Diego mid-air collision. The GAO concluded that aviation had a good safety record compared to other transportation modes. The FAA, however, "has not been timely or effective in dealing with some safety hazards . . . [and] does not have effective systems for identifying safety hazards, a comprehensive planning process to address safety issues, an adequate system for planning and approving individual safety programs, a proper system of controls to govern the implementation phase of safety projects, or sufficient evaluation of safety programs and projects." The GAO investigators criticized the agency for not being "effective or timely in developing systems to identify safety hazards because it has not recognized the importance of hazard identification systems, emphasized information gathering and analysis, or undertaken long-term planning for comprehensive identification systems."[147] In response to the report, the FAA noted the GAO study was done before "a major change in the structure and philosophy of the FAA and, therefore, does not accurately reflect the way the agency currently is functioning." The GAO study team acknowledged the FAA had "taken steps to improve its system for hazard identification and analysis, observing that a 'new climate' appeared to exist at FAA."[148]

Congress Responds

On May 7, 1980, the House Committee on Government Operations issued a scathing 134-page report on the FAA's certification processes. The committee's eighteen-month investigation, which began before the Chicago accident, involved eight days of hearings. It also covered field investigations at the FAA Western Region headquarters, airline maintenance facilities, and FAA field offices in Tulsa, Oklahoma, and San Francisco, California, as well as the McDonnell Douglas aircraft headquarters and its Long Beach manufacturing facility. In the report, "A Thorough Critique of Certification of Transport Category Aircraft by the Federal Aviation Administration," committee members remarked, "Long before the May 25, 1979, crash of an American Airlines DC-10 at Chicago's O'Hare Field, the committee recognized that deficiencies in the certification process have and could continue to create serious hazards to aviation safety."[149]

They identified what they called "severe regulatory problems" within the FAA, claiming, "The regulatory system has broken down and now fails to assure the public of the highest degree of safety. The FAA has thus far failed to resolve these problems." The committee provided twenty-four recommendations to improve the regulatory and certification processes. Some of those included:

- clarify and enforce greater personal and corporate accountability for designated engineering representatives (DER)[150]
- develop a plan or proposal to open the certification process to interested and qualified third parties
- develop and use a wider variety of sanctions, including fines and certificate actions, commensurate with the seriousness of the defects in an air carrier's maintenance program
- develop employee training and incentive programs to ensure the highest possible level of expertise among its personnel
- establish a formalized and intensive spot-checking system for evaluating DER performance and that of a manufacturer's engineering design departments
- mandate quality control departments are involved in the management of training programs for mechanics
- reassert and expand approval authority over design criteria
- require airlines to conduct a formalized risk analysis of maintenance procedure changes as part of any engineering change order
- review the maintenance functions of each air carrier and establish a standard inspector-to-mechanic ratio for each process and hire additional inspectors to stop the declining percentage of inspectors to airline maintenance activity[151]

The committee also recommended legislation to change the FAA's dual statutory mandate to promote air commerce and ensure safety to one focused solely on safety. Administrator Bond did not believe such a change necessary. He argued that ensuring safety promoted air commerce. (The Federal Aviation Reauthorization Act of 1996, passed on September 30, 1996, specified safety as the agency's highest priority. The FAA remained responsible for encouraging and developing civil aeronautics, but Congress eliminated references to a promotional role from its statutory mandate.)[152]

Review Panel Recommendations

In December 1979, Secretary Neil Goldschmidt asked the National Academy of Sciences to appoint experts to evaluate how the FAA regulated aircraft design, production, and maintenance safety. The academy selected George Low, president of Rensselaer Polytechnic Institute and a former director of NASA's Apollo space program, to chair the panel. The thirteen-member committee of experts included former FAA Administrator John McLucas among its members. In announcing the panel, Goldschmidt said, "We want to be able to assure the flying public that our procedures are sound, and we want to improve them where improvements are warranted." The panel had to submit its final report by June 30, 1980.[153]

In his opening remarks to the panel, Administrator Bond asked panel members to provide guidance on how the agency could maintain technical currency in new and emerging aviation technologies. He wanted them to study the agency's reliance on DERs in its certification work. He asked, "Are there enough checks and balances in our DER system for us to gauge the performance of the DERs?" He also suggested the panel look at the relationship between design and maintenance. Members of the Committee on FAA Airworthiness Certification Procedures, popularly known as the Blue Ribbon Panel on Aircraft Certification, began work in late January 1980 with three days of briefings from government, industry, and aviation and consumer groups. They then toured aircraft manufacturing, airline, and FAA facilities.[154]

The panel members believed the FAA's certification process was good and recommended it not be changed significantly. As United Airlines' vice president for maintenance operations, Richard Tabery, pointed out, "The most sophisticated and comprehensive system can be defeated by the momentary carelessness of one individual, but it is the total merits and accomplishment of the [certification] system that should determine the system's effectiveness, not any single incident."[155]

Comments from safety groups, however, strongly disagreed with that assessment. For example, Jack Howell from ALPA exposed what he considered long-standing deficiencies in the FAA's processes and procedures. He criticized the agency for its inability to keep up with technological developments and its lack of standardization in how the regional offices interpreted safety regulations. An Association of Flight Attendants representative claimed the agency did not enforce some of its certification and design requirements.[156]

The Blue Ribbon Panel issued its findings on June 24, 1980. In releasing the report, George Low said, "The present good safety record of the nation's transport aircraft warrants full public confidence." He continued, "One conclusion we wish to stress above all else is that the excellent safety record of the manufacturers of large aircraft and the domestic airlines speaks for itself. . . . Nothing our committee discovered should undermine public confidence in today's commercial air travel."[157]

While less critical than the congressional report, committee members came up with similar recommendations. They concluded the agency's system of assuring the airworthiness of U.S.-built aircraft worked satisfactorily in the past but believed the FAA should upgrade its certification staff's technical proficiency and familiarity with current developments.[158] Specifically, the task force members expressed concerns about the FAA's certification organization and the quality of its personnel. They believed the workforce no longer had the necessary expertise and knowledge to oversee an industry continually adopting new technology and aviation innovations. Blaming the agency's organizational structure for its difficulty in recruiting expert talent, they also mentioned, "A factor contributing to the lack of initiative by FAA staff, both engineers and inspectors, is their expressed concern that if they attempt to go beyond the precise letter of the regulation in overseeing the industry, they will not be supported by their supervisors or by the Washington headquarters staff."[159]

Task force members said the FAA needed to improve maintenance inspections. They noticed regional discrepancies in the frequency of direct observation of aircraft, the level of maintenance inspection activity, and general assertiveness. They worried the current system of maintenance inspection allowed and even encouraged FAA inspectors to view their role as passive. Low said the FAA should "move many of the engineering functions, now dispersed among 12 FAA regional offices, to a single centralized location." He explained, "Several years ago, going into the FAA was an exciting challenge to young engineers . . . but by decentralizing, the agency has decreased its overall engineering competence. There are still some highly competent engineers in the FAA, but in the broad spectrum, the staff is less competent than the engineers in the industry that it regulates."[160]

Among its recommendations, panel members encouraged the establishment of a central engineering organization staffed with technical personnel of the highest competence, responsible for type certification and participation in rulemaking. In addition, the FAA should improve its type certification process through a series of milestone reviews of the design data to examine fundamental concepts and to assure compliance with the full intent of safety regulations. Perhaps more importantly, the agency must take more initiative in identifying the need for new rules and establishing objectives, priorities, plans, and schedules for rulemaking.[161]

They also proposed that the Secretary of Transportation appoint an independent aviation safety policy board to advise on significant aviation safety and policy issues. The committee would help oversee the FAA and recommend candidates to fill the FAA administrator and deputy administrator positions.[162] In addition, task force members wanted the FAA to increase surveillance of airline maintenance operations by making frequent and unannounced inspections. Air carrier inspectors should make random on-site visits during all shifts. The FAA should also reassign its inspectors periodically to work with different manufacturers and carriers.[163]

The panel recommended the agency review and update the licensing and training certification requirements for airline maintenance personnel and consider designating avionics as a separate area for licensing. The FAA must ensure that the manufacturer (type certificate holder) has knowledge of an operator's maintenance procedures. Similarly, they recommended the agency confirm that manufacturers conducted a formal review before authorizing an operator to make any significant deviation from the approved design. They wanted each firm involved in designing, producing, or maintaining commercial transport aircraft to consider having an internal aircraft safety organization.[164]

Other recommendations to the FAA were:

- accelerate the development of an effective information-gathering and data system that includes access to the appropriate elements of the manufacturers' and carriers' records
- appoint a senior advisory committee of experts from government, industry, and universities to provide advice on the adequacy of technical programs and the direction of future developments

- continue to use a DER to perform the function now delegated to them but provide greater oversight. (FAA Order 8110.37, "Designated Engineering Representatives Handbook," issued on October 1, 1979, listed the procedures, technical guidelines, limitations of authority, and tools and resources for DERs. The order prescribed the working procedures to be used by aircraft certification office staff and the DERs they appoint to represent the FAA administrator.
- develop a rule to ensure an aircraft can continue to fly after a structural failure unless that failure itself prevents the plane from flying
- increase its emphasis on quality assurance in all phases of the production process by increasing the frequency of Quality Assurance Systems Analysis and Review team visits to all production certificate holders and by expanding the responsibilities of FAA inspectors and quality assurance team to include the observation of actual hardware
- publish a notice in the *Federal Register* on the availability of the FAA-approved preliminary regulatory and certification information for new aircraft type design with subsequent publication of changes, and permit timely review and comments by the public and response from the FAA
- require the operator to report any damage to the primary structure of an aircraft regardless of what caused the damage[165]

In response to many of the recommendations, on November 2, 1979, Langhorne Bond reorganized the agency's safety and certification functions. On October 23, 1979, he established the National Resource Specialist Program.[166] The specialists served as a cadre of technical experts in various disciplines. They worked with the agency, industry, and foreign civil aviation agencies in the "design and development of aircraft and in the application of regulatory policies and practices for certification of state-of-the-art technology."[167] Bond designed the program to "cultivate expertise in highly specialized areas such as aeroelasticity, fracture mechanics, engine design, and the like, to foster a climate in which employees selected for the program will maintain a continuing awareness of significant technological advances and techniques."[168] The agency announced the selection of the first three national resource specialists in late 1980: Thomas Swift, Raymond Malatino, and Joseph Soderquist. The FAA could not fill the other nineteen specialist openings quickly because of a lack of qualified candidates for the GS-14 and GS-15 positions.[169]

As a result of the recommendations, the administrator established the lead and certificating region concept.[170] He explained that under the lead region concept, the certification "expertise of the FAA will be centered in the region having the greatest experience with a particular aircraft type. This special expertise will be used to develop and manage national certification procedures and practices."[171]

DC-10 Defended

Airlines and passengers lost confidence in the DC-10 after the Chicago accident. Many passengers no longer wanted to fly on the jet, and some operators canceled orders for the aircraft, especially after two more deadly DC-10 crashes in 1979. Those two crashes, however, resulted from pilot error, not mechanical failure. On October 31, a Western Airlines jet crashed in Mexico City after it tried to land on a closed runway. The aircraft hit a truck and a building, killing seventy-one people on the plane and two on the ground. On November 28, an Air New Zealand DC-10 crashed into a volcano during a sightseeing flight. All 257 people onboard died.[172] On December 31, a Northwest Airlines DC-10 en route from Fort Lauderdale, Florida, to Minneapolis, Minnesota, lost power in one engine and made an emergency landing in Tampa, Florida. There were no injuries.[173]

McDonnell Douglas vigorously defended its aircraft and blamed the Chicago accident on the airlines employing the forklift procedure to remove the engine and pylon as one unit. In April 1980, Stanford N. McDonnell, president and chief operating officer of the company, told attendees at the company's annual meeting:

> If there are in America or the world people who hesitate to fly the DC-10, those people are, like our airplane and our company, victims of a great mass of misinformation and baseless speculation. They have been misled, as we have been maligned, by so much falsehood that the truth, when it finally emerged was scarcely recognized.[174]

As part of a multimillion-dollar public relations campaign to woo flyers back onto DC-10s, in June 1980, the company issued a twelve-page booklet extolling the virtues of the aircraft. In the brochure, company officials pointed out that the extensive post-crash investigation proved the DC-10 met the "toughest standards of aerospace technology." It noted the grounding of the aircraft "had been an unnecessary act based on incomplete information." Furthermore, "teams of experienced, respected, independent technical experts using rigorous, objective methods" proved the plane's safety. However, the brochure explained:

> But good news often doesn't travel as far or as fast as bad. The vindication of an airplane, especially when it's based on thousands of pages of mathematically precise data, isn't as dramatic a story as a calamity. It lacks the human-interest appeal of a grounding that disrupts the world's air travel system.[175]

McDonnell Douglas eventually overcame the series of accidents and public wariness. The company manufactured the DC-10 until 1989, delivering 386 of them to the global airline community and sixty KC-10 tankers, the military version used by the Air Force. Bangladesh Biman Airlines made the last DC-10 commercial passenger flight on February 20, 2014. The aircraft remained in cargo service.[176]

Out at Age 60

While dealing with airline deregulation and significant safety issues, the FAA became embroiled with pilots regarding crew complement, the Age 60 Rule, aircraft certification, and safety. ALPA and its president, John J. O'Donnell, in particular, opposed many agency rules. The fight became personal between Bond and O'Donnell.

According to O'Donnell, when Bond became administrator, "He seemed bright enough, seemed politically astute, so I figure we [ALPA] wouldn't have any trouble, wouldn't get stepped on by him." That impression quickly changed. The union president recounted, "He wasn't in there three months when we started having trouble, stupid, insignificant stuff that the agency shouldn't have made a Federal case out of."[177]

Regarding his dealings with external unions and associations, Bond recounted, "We had our moments of affection and hostility." He said one of the "most difficult continuing relationships during my term was with the unions, with the airline pilots union." He explained the FAA is a regulatory agency, "the decisions that we make that affect ALPA are taken strictly on the basis of safety evidence. Productivity and cost are of no consideration to us. And I find that the tougher we are in the field of personal accountability—that is enforcement, penalties, fines, certificate revocations and anything else that affects the pilot community—the more critical the union becomes of the FAA."[178]

Bond's controversy with pilots became heated and spilled over into congressional hearings and media reports. The battle between Bond and the pilot's union began as a result of Bond's confirmation hearings and lasted throughout his tenure. The first scuffle began over the agency's Age 60 Rule.

Doubtful Determination

In June 1959, the FAA proposed sixty as the upper age limit for pilots of large commercial aircraft. At the time, the agency explained, "Because of the relatively recent development of large-scale air carrier operations, and the emphasis on youth in the original selection of pilots, the matter of age of the pilots, and its effect on the skills of piloting, has not until now become of critical importance." The agency reported in 1947 that there were no pilots over sixty but predicted there would be eighty by 1962 and 250 by 1967. It believed an age requirement for transport pilots was necessary because of the new aircraft and technologies being introduced into the national airspace system. The agency reasoned the ability to learn declined with age. Old pilots, therefore, would have difficulty understanding and retaining information on how to fly newer aircraft. FAA officials hypothesized certain physiological and psychological functions deteriorated with age, so one could not accurately predict whether an individual might become suddenly incapacitated. Studies showed sudden incapacity due to medical defects became more frequent in any group reaching age sixty.[179]

The agency received a number of comments on the proposal. The Air Transport Association (ATA), representing major scheduled air carriers, approved the age limit. ALPA, however, opposed the rulemaking effort. That group argued pilot qualifications should be determined on an individual basis, not on an arbitrary age. After considering the comments, on December 1, 1959, the FAA issued the rule, commonly known as the Age 60 Rule, effective March 15, 1960.[180] The regulation prohibited individuals sixty or older from serving as captains or first officers on large scheduled passenger aircraft. Not concerned about aging per se, the FAA believed that after age sixty, pilots could face an increasing frequency of medical conditions likely to be associated with sudden incapacity or impairment of judgment, specifically heart attacks and strokes.[181]

Because the agency knew of no scientific measurements to determine the extent of deterioration in physiological and psychological functions associated with age, it believed a cutoff age was necessary. The rule initially did not apply to commercial pilots who flew planes operating under 14 CFR Part 135, which governed small aircraft with a maximum passenger capacity of twenty-nine and a payload of less than 7,500 pounds. Most commuter and taxi operator aircraft fell within the purview of Part 135. It also did not apply to noncommercial pilots, such as private and student pilots operating under 14 CFR Part 91. The rule allowed pilots over sixty to serve in other aviation capacities, such as flight engineers or instructors. In 1963, the International Civil Aviation Organization's (ICAO) member states adopted the Age 60 Rule for their pilots.

Over the years, in response to public controversy and congressional interest, the FAA periodically reexamined the Age 60 Rule to determine whether it should be amended or exemptions granted. However, the agency consistently concluded that no method or psychological age index adequately assessed the loss of skills caused by individual age-altered physiological functions or their cumulative effect. The agency recognized the rule imposed an arbitrary age for prohibiting individuals from flying large commercial aircraft but repeatedly rejected proposed amendments and exemptions to the regulation because of the lack of any viable alternative based on science.[182] According to the FAA, aging was a subtle event, difficult to monitor. The courts upheld the rule's validity and the agency's denials of petitions for exemptions.[183]

As Stanley Mohler, the director of the FAA's Civil Aeromedical Institute, explained in 1962:

> At ninety miles per hour, the corrugated aluminum Ford Tri-motor airliner would drone over its destination airfield, enter the pattern, and glide in at seventy-five miles, per hour, to a gentle full stall landing having a roll of three hundred feet or less. So long as the pilot was in reasonably good health for aviation activities, his age made little difference in his ability to land these low-performance aircraft. Today, the jet airliners have to be greased on at about one hundred and forty miles per hour, or so, and leave little margin for reflex error. Pilot aging, a process, having a wide variation in rate within the pilot population (as in all populations); ultimately has a detrimental effect on the ability of pilots to handle these demanding airliners.[184]

Rule Revisited

At his confirmation hearing, when asked about the rule, Langhorne Bond responded that although he was unfamiliar with the details of the Age 60 controversy, he would "examine it to satisfy myself as to its correctness" and "will promise to reopen" an investigation of the rule.[185] On August 4, 1977, Bond signed a policy paper reaffirming the Age 60 Rule and continued denying pilot petitions for exemptions until a psychophysiological age index could be readily applied to pilots.[186] Citing a new study by the agency's Office of Aviation Medicine, the policy paper concluded a medical examination could not sufficiently predict the future health and functional capacity of a pilot who reached age sixty.

According to the study's authors, "The process of aging is of a greater significance for pilots than for most other occupational groups because of the exacting demands of their job. As a pilot grows older, the alterations in physical and mental fitness may greatly influence his professional efficiency." They concluded: "Human aging is a biological process with profound implications on performance and proficiency. Although there is evidence that the occurrence of cardiovascular incapacitation and the number of accidents and deaths in aviators increase drastically after age 60, the actual cutoff point of the pilot's career due to aging has not been scientifically established." Furthermore, "abilities to perform highly skilled tasks rapidly, to adapt to new and changing environmental situations, to resist fatigue, to maintain physical stamina, and to perform effectively in a complex and stressful environment begin to decline in early middle life and continue to decline at a fairly steady rate thereafter."[187]

Bond's decision infuriated many pilots, especially after a 1978 recommendation by ICAO to permit first officers to fly until their sixty-fifth birthday. U.S. pilots, encouraged by ICAO's decision, applauded the passage of the Age Discrimination in Employment Act Amendments on April 4, 1978, which moved the legal retirement age for most non-federal workers from age sixty-five to seventy, except when prohibited by law or statute, such as law enforcement, air traffic controllers, and commercial pilots.[188] As a result of the ICAO decision and age discrimination legislation, the Pilots Rights Association, a group of about three hundred older airline pilots, began a public campaign against the rule. The issue came to a head because more airline pilots were reaching their sixtieth birthday than ever before, a trend expected to increase.

By the late 1970s, ALPA members became divided, with many members—especially the younger ones—favoring the Age 60 rule.[189] Part of the conflict stemmed from economic concerns as younger pilots wanted their older peers to retire, opening up career opportunities for them. More senior pilots wanted to keep flying because inflation and airline disruptions affected their pensions, especially after President Carter signed the 1978 Airline Deregulation Act. And they could not receive full Social Security benefits until they reached sixty-five. (ALPA's board endorsed the Age 60 Rule in a November 1980 vote that reversed the union's longstanding position.)[190]

Unable to convince the FAA to change the regulation, pilots nearing retirement appealed to Congress. The House Select Committee on Aging held hearings on the rule on March 21, 1979. The seventy-eight-year-old Claude Pepper (D-FL) chaired the hearing. A strong advocate of eliminating age restrictions on workers, Pepper opened the hearings by saying, "Since 1959, there have been great advances in medicine, in airplane techniques, and in technology. There has certainly been a changing attitude on the part of the people of this country toward the matter of age as a criterion of the right to work."[191] Three older airline captains testified at the hearing.

Captain Jack Young, legislative vice president of the Pilots Rights Association and an Eastern Airlines pilot, championed Pepper's statement, "Research data on commercial pilots backs up the fact that experience is the single most important factor in air safety. By definition, older experienced pilots are more qualified in this respect than are younger pilots."[192] Young argued experienced crews were the safest. He illustrated his point by discussing the March 13, 1979, incident on Braniff Airlines Flight 502, a Boeing 747 inbound from Honolulu to Dallas. When the pilot suffered a fatal heart attack, the senior co-pilot successfully landed the aircraft. Young explained the Braniff incident "very dramatically" illustrated the "fail-safe crew concept" on aircraft.[193]

When asked about the incident, Young explained, "Somewhere near the west coast . . . the stewardess asked [the pilot] if he wanted a cup of coffee, or anything, and he did not respond. They found out later that he had had a heart attack and died." Eliciting laughter from hearing attendees, Representative Mario Biaggi (D-NY) asked Young, "He was dead when she asked him the question?" and later, "What would have happened if the stewardess had not asked him if he wanted coffee?" Incredulous the co-pilot did not know the pilot had died, Biaggi later, tongue-in-cheek, suggested that if a pilot became incapacitated, the airline might need a "stewardess who is going to ask if you want coffee." Representative William Ratchford (D-CT) wryly replied, "Perhaps that should be written into the regulations."[194]

The panelists quickly refocused the hearing on the Age 60 Rule. They reasoned that instead of an age ceiling, a pilot should be declared fit as long as he passed medical and proficiency exams. They contended there should not be a biological age set for pilot retirement. During his testimony, FAA Deputy Administrator Quentin Taylor said the FAA lacked "the tools, in an aviation sense, that would guarantee a high level of performance in an over-60 pilot."[195] However, he hoped "The scientific tools someday would be available to give, with acceptable reliability, a rational index of pilot future performance."[196]

In general, the panelists all agreed an individual approach to determining retirement was preferable to an arbitrary rule based on chronological age. However, the FAA maintained that no feasible test or protocol existed to protect the public from the risk of declining functional capabilities, increased cardiovascular issues, or other problems associated with aging. Others believed such a protocol feasible.

Legislative Support

Following the Select Committee's hearing, the House Committee on Public Works and Transportation, Subcommittee on Aviation, held hearings on July 18 and 19, 1979, to debate HR 3948, which, if passed, would raise the mandatory age limit for commercial pilots from sixty to seventy and require frequent and comprehensive tests to confirm their good health and ability to continue flying. The proposed legislation would direct the National Institutes of Health (NIH) to determine whether pilots should have an age limit. Representative Glenn Anderson (D-CA) chaired the hearings.[197]

Testifying before this committee, Jack Young argued the Age 60 Rule was illogical. “The Age 60 Rule presumes that all 59-year-old pilots flying at one minute before midnight prior to their 60th birthdays are healthy and capable, but at the stroke of midnight, they suddenly become health risks.” Other pilot panelists examined the rationale behind a rule that set a specific retirement age rather than focusing retirement on a pilot’s competence in the cockpit.[198]

Walter Jensen, vice president of operations and engineering for the ATA, posited that any legislative proposals designed to change the retirement age should focus on safety.[199] He conjectured the Age 60 Rule was “not an issue of discrimination, economics, or pension plans, but safety . . . the question is whether aviation safety is better served by retaining the age 60 limitation for airline pilots or by permitting them to fly until they are 65, 70, or possibly even older.” He said thirty of the thirty-two airlines ATA represented supported the rule (Frontier and Republic Airlines did not).[200] Jenson suggested, “The present safety record of the scheduled airlines should attest to the validity of the current medical certification system, and we feel strongly that to abolish it or modify it without more reliable and meaningful scientific evidence would significantly compromise our obligation to perform our services with the highest degree of safety in the interest of the flying public.”[201] He pointed out that Congress mandated that air traffic controllers retire at age fifty-six to ensure the traveling public's safety. At the same time, it wanted the airline pilots to work to age sixty-five or seventy. He concluded, “We believe it is safer to retain the Age 60 Rule rather than to raise the age limit and embark upon some undefined additional testing of each pilot.”

Testimony from those in favor and those opposed to revising the Age 60 Rule provided conflicting medical evidence supporting their viewpoints. Subcommittee members also differed on whether or not the rule should be modified. After the hearings, the subcommittee spent two days debating the draft legislation. The revisions, sent to the House Committee on Public Works and Transportation, differed drastically from the original bill. The legislation now called for raising the maximum retirement age for airline pilots to sixty-one and a half years for eighteen months. The requirement applied to all commercial pilots, including air taxi and commuter pilots. For those new groups who would now be subject to the law, anyone over sixty had a ninety-day delay before they had to retire. The draft bill required the NIH to conduct a twelve-month study of pilot medical criteria in support or against the rule and deliver it to Congress for action. Pilots over sixty must have a medical examination every three months.[202]

Pilots protest Age 60 Rule
Courtesy: Library of Congress

Public Works and Transportation Committee members hotly debated the bill but accepted the subcommittee’s version. They sent the bill to the full House for consideration on September 25. The House decided to vote on December 5. In anticipation of that vote, on November 27, approximately 145 members of the Pilots Rights Association marched to the U.S. Capitol in support of the legislation.[203]

After a lengthy discussion on December 5, the representatives received an amendment introduced by Representative James Howard (D-NJ) that stripped the bill of all actions except the requirement for NIH to study the issue.[204] The House accepted the amendment and sent it to the Senate for consideration. Senators proved just as divisive on raising the age limit as the congressmen but passed the Howard amended bill on December 18.

On December 28, Carter's advisors recommended the president sign the legislation. They explained, "The bill represents a compromise between strong and contradictory views on this issue. The fair treatment of older airline pilots must be weighed against the responsibility to protect passengers. The bill allows additional time for study and careful consideration of the issue."[205] The president signed the bill on December 29, 1979. Public Law 96-171 required the NIH director, in consultation with the Secretary of Transportation, to review existing procedures for the medical certification of airline pilots and conduct a study to address several questions:

- Was an age limitation that prohibited all individuals older than a particular age from serving as pilots medically warranted?
- Was an age limitation that prohibited all individuals sixty years of age or older from serving as pilots medically warranted?
- Were rules governing the frequency of first and second-class medical examinations, listed in Part 67 of Title 14 of the Code of Federal Regulations (as in effect on the date of enactment of this Act), adequate to assure that a medical doctor monitors an individual's physical condition?
- Were the rules governing eligibility for first and second-class medical certifications, as outlined in Part 67 of Title 14 of the Code of Federal Regulations (as in effect on the date of enactment of this Act), adequate to determine an individual's physical condition in light of existing medical technology?

- What effect did aging have on the ability of individuals to perform the duties of pilots with the highest level of safety?[206]

Five More Years

With public and congressional pressure to revise the Age 60 Rule, in June 1979, FAA's Office of Aviation Medicine awarded a $24,365 contract to Goddard and Associates to convene a panel of experts to determine whether the FAA should uphold the Age 60 Rule. James L. Goddard, a former FAA civil air surgeon and a member of the FAA advisory group who assisted in formulating the Age 60 Rule in 1959, chaired the panel.[207]

The FAA tasked the group to submit within one year a report that included:

- a discussion of the psychophysiological changes in the aging process that cause subtle impairment of pilot performance
- a discussion of the medical problems that cause acute impairment of pilot performance
- an assessment of whether the basis of this rule was still valid and, if not, provide specific recommendations for acceptably determining an aging pilot's continued freedom from risk to aviation safety to support modification of the rule[208]

When later questioned by a congressional committee why it contracted for a study, the FAA responded, "Congressional hearings and the introduction of legislative bills which, if enacted, would change or eliminate the regulations, made it necessary for the FAA to prepare its position as soon as possible. Aviation safety could conceivably be compromised if the Congress modified or eliminated the rule without the opportunity for the agency to prepare an authoritative, impartial medical evaluation to support its position."[209] Goddard's panel of experts reported in 1980 that they found no reason to eliminate the Age 60 Rule.[210]

In response to the legislative mandate included in Public Law 96-171, NIH contracted with the National Academy of Sciences' Institute of Medicine to prepare the required study. Released to the public on April 2, 1981, almost one year late, because of the difficulty in collecting data for such a study, the panel made no recommendations about retaining or abandoning the Age 60 Rule. However, it did suggest that the FAA institute "a more rigorous and comprehensive medical examination" if it discontinued the rule.[211]

Although it contracted for the National Academies study, in August 1981, the National Institute on Aging decided to conduct its own research. Although the authors of the NIH study found no medical basis for the rule, they offered three basic recommendations: retain the Age 60 Rule for airline pilots, extend the regulation to all other pilots engaged in carrying passengers for hire, and require the FAA to conduct a systematic program to collect the medical and performance data necessary to consider relaxing the rule.[212]

None of the studies offered a way for medical doctors to assess a pilot's psychophysiological age. As a result, the agency retained the Age 60 Rule. However, the rule routinely came under reevaluation. On December 13, 2007, President George Bush signed the Fair Treatment for Experienced Pilots Act into law. The law amended federal transportation law to allow a pilot who has attained sixty years of age to serve as a passenger airline pilot until the age of sixty-five.[213]

Two-Person Crew

The Age 60 Rule proved one of the most contentious issues between the agency and the pilots. The other big concern, the size of the cockpit crew, or crew complement, also sustained tensions. Between 1947 and 1965, the FAA and its predecessor agencies required a three-person crew on all transports with a takeoff weight of over 80,000 pounds. In April 1965, the FAA issued a new rule that set forth workload criteria as the standard for determining the size of the cockpit crew. The FAA type-certificated the first U.S. aircraft for operation with a two-person flight crew, the McDonnell Douglas DC-9, in 1965.

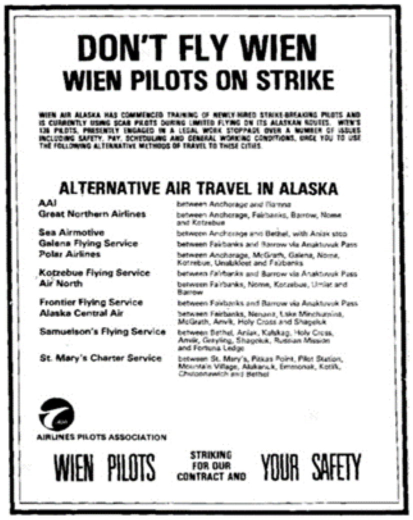
In November 1966, ALPA's board of directors at its nineteenth biennial meeting adopted Article XX to its constitution and bylaws providing, "All future turbine-powered transports . . . excluding 'stretch' basic models of the turbine-powered, twin-engine aircraft presently certificated, will be manned by a minimum crew of three pilots."[214] It did not take long before the airlines found ways to challenge Article XX. For example, on July 21, 1969, 370 Piedmont Airlines pilots walked off the job when the company moved to reduce its Boeing 737 cockpit crew from three to two. Boeing built the 737, and the FAA certificated the jet to be flown by a two-person crew.[215] The airline secured a federal injunction on August 14 from a U.S. district court ordering its pilots back to work. ALPA filed an appeal in the U.S. Fourth Circuit Court of Appeals.[216] On September 30, 1969, the appeals court affirmed the injunction but with some modifications. The appeals court reinstated the three-person cockpit crew.[217] The dispute between the airline and pilots, however, raged for months. The parties eventually resolved the conflict when the pilots accepted a two-person cockpit crew in exchange for higher pay. ALPA refused to sign the agreement, although it took no action against Piedmont pilots for violating its constitution.

Two years later, in November 1971, a federal arbitrator approved a two-person cockpit crew for Aloha Airline's Boeing 737 flights. The arbitrator based his decision on the low-density, fair-weather conditions under which Aloha operated and because Aloha's 737s had more extensive onboard communication and navigation systems than the other airlines.[218] Again, ALPA did not penalize its affiliated pilots.

However, when ALPA-affiliated pilots voted not to strike against Frontier Airlines in February 1976 over delayed contract negotiations, ALPA threatened to terminate the pilots' ALPA membership. The talks stalled over the two- versus three-person cockpit crew.[219] On February 21, the pilots signed a new contract with the airline, agreeing to fly 737s with a two-person crew along with a pay raise. That same day, ALPA withdrew its representation of Frontier's pilots.[220] The pilots took the union to court and blocked their ouster.

Wien Strikes

ALPA's enforcement of Article XX lost even more influence when the pilots of Wien Air Alaska went on strike when their contract expired. The collective bargaining agreement between ALPA-represented pilots of Wien Air Alaska and the airline expired on November 30, 1976. The parties exchanged proposals dealing with a wide range of issues, but the negotiations failed to bring agreement on the terms of a new contract. The two sides agreed to invoke the services of the National Mediation Board to aid in the negotiations. However, meditation also failed to bring about an agreement. Under the



Courtesy: *Fairbanks Daily News- Miner* via www.newspapers.com

provisions of the Railway Labor Act, as amended, the National Mediation Board then offered to arbitrate the open issues. Both sides refused the offer.

With contract negotiation mired, on May 7, 1977, 133 Wien pilots walked off the job when, among other things, the company determined to reduce its Boeing 737 cockpit crew to two pilots. Since the airline operated critical intrastate routes between the Alaskan cities of Barrow, Nome, Kotzebue, and points in between,[221] the CAB granted emergency authority to Alaska Airlines to cover Wien's routes. When Alaska Airlines pilots refused to cross the picket line, Wien tried to get a temporary restraining order to force the pilots to work its routes. A district judge refused to issue the order and granted the Alaska Airlines pilots the right to honor the strike.[222]

As explained by Douglas Hebbel, assistant attorney general for the State of Alaska and counsel to the Alaska Transportation Commission, when U.S. District Court Judge James von der Heydt ruled he could not issue such an injunction, many communities in Alaska lost air service. In his memorandum and order in civil case A77—96, District Court of Alaska, May 13, 1977, von der Heydt said, "This Court is not unaware of the compelling public interest involved in this controversy. However, this alone cannot alter the laws as the Court must find it. The unique problems of airline service in Alaska are those divined by the Civil Aeronautics Board, and unfortunately, this Court possesses no magic wand whereby the situation may be changed."[223]

Wien subsequently hired eleven replacement pilots and sent them for training at the Boeing Commercial Airplane Company.[224] In response, pilots from United, Western, Northwest Orient, and Alaska Airlines joined Wien strikers outside the Boeing facility in Seattle to protest.[225] Wien contracted with Alaska Island Airways and Northern Air Cargo to handle freight operations during the strike.

When Wien contracted with Evergreen Airlines to handle some of its passenger flights to Nome and Kotzebue, Evergreen flight attendants replaced Wien flight attendants on those routes. Evergreen flew Lockheed Electras, and the Wien attendants had no training on those planes. Facing layoffs, the flight attendants engaged their union, which petitioned for and received a restraining order to require Wien to stop using contract planes staffed by non-Wien union flight attendants. The airline ultimately agreed to have two Wien flight attendants on the crews of Evergreen's Lockheed Electra flights and two Evergreen flight attendants. The Wien attendants provided essential services, and the Evergreen attendants remained on standby in case of an emergency.[226]

With the strike affecting Alaskan air transport, Alaska's U.S. congressional delegation worked to resolve the issue in Congress. When President Carter signed the Airline Deregulation Act on October 24, 1978, it contained an amendment regarding the ongoing strike. Section 44 of the legislation required that within ten days after the act became law, the president had to create an emergency board to investigate and report on the dispute between Wien and ALPA. The board would have thirty days from its creation to provide its findings to President Carter.

Per the law, on November 2, 1978, President Carter established a presidential emergency board to help settle the dispute.[227] Three months later, on February 9, 1979, it reported that both parties agreed to accept a two-person crew for Boeing 737 operations. After twenty months, the strike ended on March 1, 1979.[228]

Downsized

The Wien settlement left United and Western as the remaining U.S. airlines with a three-person crew for the 737. Despite significant challenges and changes, the aviation industry proved unwilling to bend to ALPA's desires. As Nick Komons relayed in his book on the controversy during the Carter administration:

> The most powerful of these forces was the competitive environment created by the Airline Deregulation Act of 1978. Competition, besides spawning new airlines to challenge established carriers on their previously secure routes, exposed the weaknesses of the old line—their high wage scales, their low productivity levels, and their gross inefficiencies. Meanwhile, an unprecedented rise in the price of petroleum fanned the flames of inflation, shrank profit margins, and eventually slowed down the entire U.S. economy. That put additional pressure on the established carriers to improve their productivity. These forces, in combination, skewed the crew complement issue in favor of the two-man cockpit.[229]

ALPA, however, remained determined to make one last stand to keep the larger crew complement. In March 1977, shortly after President Carter took office, ALPA president John J. O'Donnell convinced outgoing FAA Administrator John McLucas to establish an interagency task force to study pilot workload and crew complement. The FAA expected to certify the McDonnell Douglas DC-9 Super 80 in 1980. If ALPA could convince the FAA and McDonnell Douglas the plane needed a three-person crew, it might persuade Airbus that its forthcoming A310 and Boeing that its 757 and 767 should also be certified for a three-person cockpit. Instead of simply arguing the safety benefits of a three-person crew, ALPA attacked the process the FAA used to certify aircraft.

ALPA argued that an open certification process, which allowed all interested parties to participate, would be the only way to assess the safety of new aircraft.

The task force presented its findings to the FAA on March 17, 1978. The agency invited O'Donnell to the briefing. Task force members disagreed that an open certification process would be of benefit. Its members aptly pointed out, "A certification procedure where parties other than the FAA have access to the manufacturers' data presents several complex problems, the most obvious of which concern manufacturers' proprietary data. Under existing regulations in the aircraft certification process, the FAA has access to all the manufacturers' design secrets, production processes, and performance data. If the FAA held open certification hearings," they posited, "there appears to be no way to protect the proprietary data from disclosure to competitors, foreign manufacturers, and foreign governments, all of whom are seeking to supply transport category aircraft."[230]

They argued that under the law, the airworthiness certification process "remains the sole responsibility of the FAA, with the FAA exercising the power to hold public hearings only, if necessary, in particular instances as determined by the FAA." They also explained, "The FAA does not design or dictate the design of an aircraft, an engine, wing, or other part of an aircraft, or the size of the crew. These design decisions are properly the province of the aircraft manufacturer, who normally makes design decisions in consultation with prospective customers and user groups." The specific role of the FAA, the task force members said, "is to collect and examine data, and to test the aircraft to make a judgment, separate from the previous judgments made by the manufacturer, that the new aircraft does meet established standards of airworthiness."[231]

Regarding crew cockpit size, the report's authors agreed, "It is not the province of the Task Force to offer a judgment as to how many pilots should comprise the flight-crew complement of any given airline aircraft. It is incumbent upon the Task Force, however, to state a judgment on the allegations that two crew member air carrier aircraft are not operated as safely as three crew member aircraft." After studying accident statistics, they concluded: "Our judgment is, simply, that the full accident record does not support the claim that three crew member aircraft have a better record. The total record actually favors the class of two crew member air carrier aircraft, but this may be explained by a variety of factors unrelated to crew size."[232]

In response to the task force report, William Cotton, chairman of the ALPA Air Traffic Control Committee, disagreed with the information in congressional testimony. Cotton said ALPA's "reaction to the statements in the report of the FAA task force was one of such profound shock that we found ourselves unable to respond immediately." Crew workload, especially in the new jet aircraft, he surmised, dictated a three-person crew to maintain safety. ALPA subsequently hired Dr. Deanna Kitay, a neurophysiologist from the University of Virginia, to review the task force findings. According to ALPA, Kitay "quickly uncovered serious flaws in the FAA report and contacted a number of scientists conducting research into many aspects of human workload." She then organized a symposium titled "Man-System Interface: Advances in Workload Study," sponsored jointly by ALPA and the Aerospace Medical Association, held in Washington, DC, on July 31 and August 1, 1978.[233]

While ALPA prepared its response to the task force report, O'Donnell kept up his public outcries for an open certification process. Bond accurately identified O'Donnell's pleas as a means of keeping the crew complement controversy on congressional minds. In congressional testimony, Bond explained, “I am greatly concerned by the fact that ALPA has chosen to raise the issue of the ‘openness’ of the certification process in its quest for a three-man DC-9-80 crew.” He added, "Opening the certification process by inserting ALPA will not enhance safety. The certification of U.S.-manufactured aircraft depends upon the free flow of proprietary data between the FAA and the manufacturers. By inserting ALPA or any other third party, the protection afforded by law to the U.S. manufacturer's proprietary data will be lost.”[234]

Bond took his fight with O’Donnell to the media. After his testimony, the FAA issued a press release on September 28, 1978, recounting the administrator’s testimony: “Bond said ALPA was not really concerned with the certification process per se but rather with the issue of employment for its members. He noted that the union has committed itself to the certification of the DC-9-80 (also known as the MD-80) with a three-pilot crew, and its present lobbying campaign is directed toward that end.” The press release emphasized that a public certification process "Would have an adverse impact on safety and seriously undermine this country's leadership position in world aviation by making the proprietary data of U.S. manufacturers available to their foreign competitors.”

Bond claimed the current certification process is "the foundation of the tremendous safety record achieved by U.S. aircraft manufacturers" and is responsible for "the preeminence of the U.S. in the sale of aircraft throughout the world." The press release summarized Bond’s testimony, “The interjection of third parties in the certification process—especially those with recognized vested interests like ALPA—would be disruptive to a system that now works quite well."[235]


AP photo
Union members, citing concerns about air safety, walk the picket line at the White House

Pilots battle ruling on 2-man crews

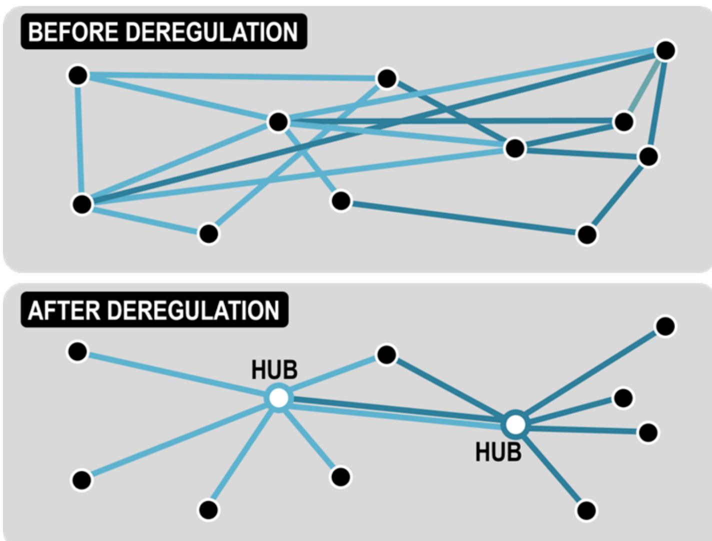
Arizona Daily Star, October 22, 1980
Courtesy: www.newspapers.com

On March 27, 1980, Boeing revealed plans for flight decks that accommodated two-member crews for the fuel-efficient new generation of 757 and 767 twin-engine jets. The new cockpits would include an engine indicating and crew alerting system to centralize all engine displays and automatically monitor engine operation. On August 26, 1980, the FAA type-certificated the DC-9-80 for operation with two pilots. After Boeing's announcement and the Super 80 certification, ALPA intensified its protests. The union challenged the certification process in a lawsuit without success, and four hundred union members picketed the White House in protest. During the October 21 protest, union members wearing uniforms carried signs that read "FAA Administrator Bond Must Go" and "No Compromise with Air Safety."[236]

As the Carter administration approached the end of its tenure, on December 29, 1980, ALPA organized a "public awareness" campaign called Operation USA (Unity for Safe Airtravel). The union threatened a general one-day work stoppage in March 1981 unless the incoming Reagan administration appointed a panel of independent experts to examine the question of crew complement. ALPA hired a public relations firm to help make its case. On March 5, 1981, President Ronald Reagan appointed a three-person task force headed by former FAA Administrator McLucas to review the FAA's certification of the DC-9-80 for operation with a minimum cockpit crew of two pilots. On July 2, the task force called the agency’s certification of the aircraft proper and concluded a third crew member would not enhance safety. The task force upheld the certification of the Boeing 757 and 767 and the Airbus A310 with a two-pilot crew. Acknowledging defeat, on July 14, 1981, ALPA's executive board voted unanimously to accept the task force's findings.

The rapid growth of air traffic activity in the past half century has required major improvements in the capabilities and performance of the air traffic control (ATC) system maintained and operated by the FAA. –William Fromme and John M. Rodgers[1]

Chapter 5: Modernization



Source: *The Geography of Transport Systems*

The new competitive environment created by airline deregulation resulted in a greater demand for service, a change in flying routes as airlines formed hubs in major cities, and growing congestion throughout the aviation system. Congestion resulted from the interaction of many factors. The combination of fare decreases and hubbing led to increased air travel. However, the limitation of air traffic control equipment and long lead times for airport expansion stymied increases in system capacity. As system complexity increased, so did calls for better technologies to keep the aviation system safe and efficient.

Research and development of new systems was often complicated, time-consuming, and costly. The exploratory nature of research did not always result in successful production. For the Carter team, as with its predecessors, modernization of the national airspace system faced budgetary and political concerns and, in some cases, created international issues.

Although the FAA had deployed a semiautomated air traffic control system in the mid-1970s, many believed only full automation could compensate for increasing system complexity and lessen controller workload. The agency had been fielding new technology incrementally as new tools and resources became available. However, FAA officials realized they needed a systematic, long-term plan for modernization. Only system modernization could address the safety concerns raised by the increasing commercial and general aviation accident rates.

By the time Langhorne Bond became administrator, the FAA had achieved a semiautomated air traffic control system based on radar and computer technology. Despite its initial effectiveness, the system required constant enhancement to keep pace with the increasing traffic volumes. With research and development activities underway, the FAA succeeded in fielding some upgrades during the Carter administration, while others remained in the development phase, and at least one was canceled because new technology provided a better solution.

Enhancement Required

In 1969, the Department of Transportation (DOT) Air Traffic Control Advisory Committee (ATCAC) determined the capabilities of the modernization program then underway, the third-generation air traffic control system, would not be able to meet the increase in demand forecasted for the late 1970s and beyond. However, committee members concluded that the third-generation program then underway could be upgraded to meet future needs. The ATCAC report authors recommended several technology upgrades, revalidated in subsequent studies, some of which were already underway when the Carter administration began its tenure.

The planned upgraded third-generation ATC system (UG3RD) consisted of nine major projects:

1. a cooperative international transoceanic aeronautical satellite development, known as AEROSAT
2. a high-performance radar beacon system with an integral data link (referred to as DABS for Discrete Address Beacon System)
3. a method of safely assuring separation between aircraft flying on instrument flight rules (IFR) and those operating on visual flight rules (VFR), such as an airborne collision avoidance system or a combination ground-based airborne system tied into the DABS development and known as automatic intermittent positive control
4. a microwave landing system (MLS) to replace the VHF instrument landing system (ILS)
5. additional automation of center and tower air traffic control functions
6. automation and modernization of the services performed by the over three hundred flight service stations[2]
7. development of a wake vortex avoidance system allowing closer aircraft spacing while avoiding the hazards of wake vortices generated by large aircraft
8. development of an airport surface traffic control system to provide tower controllers at major airports the capability of locating and controlling all transient surface aircraft in any weather
9. widespread implementation of area navigation routes (RNAV)[3]

Planning Changes

In addition to working with the ATCAC, in 1969, the FAA began holding annual planning conferences to gather information for its ten-year "National Aviation System Plan."[4] The first plan explicitly identified systems development requirements for people, facilities, research, and airports. The FAA solicited input from industry and system users in preparing the document at its first Aviation Review Conference. Community input helped the agency balance system improvements and modernization plans with the introduction of new technologies into the national airspace system (NAS), facilitate the transition from R&D to implementation, and minimize "panic reactions" by working on identified needs rather than reacting to public and congressional pressure. The agency hoped the public input process would help establish a strong industry consensus to help guide congressional budgetary decisions. The method of internal planning, public review, and publication continued annually.[5]

When the Carter administration took office, the draft 1978-1988 "National Aviation System Plan" had been fully coordinated and nearing publication. However, the plan's format had changed for the first time since its inception. As explained in the introduction to the draft, it provided "an assessment of future requirements and identifies the broad range of resources and programs needed for efficient system development and operation. It represents the direction the FAA intends to move in meeting its responsibilities." The plan focused on conserving energy, increasing FAA productivity, meeting safety and capacity requirements, and protecting the environment.[6] The new format received significant internal and external criticism for insufficient information on the actual R&D programs.[7]

On February 8, 1977, the FAA's executive committee (EXCOM)[8] met to discuss whether or not to publish the plan before clearing it with the new administration. Agency executives and program managers expressed concern over possible reactions from the Office of the Secretary of Transportation (OST) and the Office of Management and Budget (OMB) if the agency published the plan without administration concurrence. As Director of the Office of System Plans Thomas Messier explained, "In the course of routine contacts with OST/OMB regarding plan contents," there is "uncertainty of both OST and OMB over the possible new directions to be charted by the Carter administration." Hence, those agencies might be reluctant to endorse the plan. The EXCOM, according to Messier, had two choices: delay completion of the plan until endorsement from OST and OMB or publish the plan without approval.[9]

Messier recommended publishing the plan because it would assert the FAA's role in shaping the national aviation system and meet the agency's commitment to user groups to document its long-range direction. Although waiting for OST and OMB approval would minimize the possibility of criticism from those two offices, such a delay, according to Messier, would concede planning direction to organizations outside of the agency.[10] While the FAA management team debated whether or not to release the plan, on February 23, Deputy Secretary of Transportation Alan Butchman told FAA Administrator John McLucas not to publish the plan. McLucas appealed the decision to Secretary of Transportation Brock Adams. Adams responded on March 15 (sixteen days before McLucas left office) and affirmed Butchman's decision. He thought it was inappropriate to proceed with a plan that "reflects policies and programs developed by the previous administration."

On March 31, 1977, the DOT issued a press release announcing the Aviation Review Conference had been "deferred until such a time as the new administration policies and programs can be properly addressed."[11] Two months later, on May 27, 1977, a few weeks after becoming FAA Administrator, Langhorne Bond informed Adams the agency would not publish the plan.[12] That day, the DOT announced the cancellation of the Aviation Review Conference, saying the department "will study a revised format for presenting aviation-related policies and programs which reflect the National Transportation Policy statement now under development."[13]

With the annual conference and plan update canceled, Bond instructed agency planners to begin work on the 1980-1989 version of the plan. With time to focus on the next version of the plan, FAA Deputy Administrator Quentin Taylor initiated a "broad discussion of the agency's approach to long-range planning." In early July, the EXCOM asked the system plans office to prepare a study on how the FAA's long-range planning process could be improved and brief the study results at the August 29 EXCOM meeting.[14]

With planning underway, the FAA continued efforts to upgrade the ATC system. While some programs received accolades for improving safety, others were controversial. Congress, the air traffic controllers union, the pilot union, and international partners provided public opposition and criticism about some system enhancements. As with previous administrations, Carter's team did its best to continue modernization efforts while holding down costs and appeasing its most vociferous critics.

Microwave Landing System

Even as it finalized the development of the instrument landing system (ILS) in 1940, Civil Aeronautics Administration (CAA) engineers began considering the advantages of a microwave landing system (MLS). Understanding the limitations of the ILS, the agency reported:

> It is generally agreed that the systems which can now be commercially installed and used are not ideal and their principal faults lie in limitations on the glide path, on size of antenna equipment, and on portability. It is agreed that the microwave glide path equipment, which has recently been under intensive study and development, offers great promise for improving these aspects of the system and that it also offers promise of advantages in lesser weight of plane equipment, decreased aerodynamic drag of antenna systems, and freedom from error due to alteration of receiver sensitivity. It agreed, however, that the microwave system is not now ready for extensive use and that it requires further developmental work, experimental installations, and field experience.[15]

The International Civil Aviation Organization (ICAO) adopted the U.S.-developed ILS as the global standard in the 1940s. The ground-based system used a very high frequency (VHF) and ultrahigh-frequency (UHF) radio band to provide lateral and vertical guidance to an aircraft approaching and landing on a runway. The combination of radio signals enabled safe landings during instrument meteorological conditions, such as low ceilings or reduced visibility. As conceived, the MLS would work in those conditions and at airports where the ILS could not. In addition, the new system would make more flight paths available because of its wide-angle scanning beam, allowing for curved approaches to airports.

After World War II, the CAA began development of the MLS. In 1946, the CAA and Army Air Corps[16] conducted tests of a MLS developed by the Sperry Gyroscope Company. The system differed from the ILS in that it used microwaves rather than VHF radio signals, resulting in frequencies ten to fifteen times the VHF glide path frequency. As the CAA explained, "Fundamental benefits derived from the use of microwaves in landing systems are numerous. The higher the frequency, the more easily beams can be focused, and the radio waves behave more like light waves." According to researchers, "The beams that produce the landing path become sharp and narrow. They are directed entirely into space like searchlight beams. Focusing is not dependent or affected to any practical extent by ground reflections or surface conditions as are beams of lower frequencies. This means that weather conditions, wet or snow-covered ground, and the presence of nearby hangars or other reflecting objects have no measurable effect on the landing path."[17]

The FAA hoped the MLS would ultimately replace the ILS. The ILS, which remained unchanged since its introduction in the 1940s, suffered from limitations, including dependence on a reasonably smooth airport surface to transmit an acceptable signal. For example, the construction of a new hangar or airport building or snow accumulation on the runway adversely affected the system. It also suffered from frequency congestion in the Northeast Corridor. The ILS had forty channels, and with the density of airports increasing, those channels began interfering with one another. The ILS also had difficulty meeting the requirements of Category II and III low-visibility landing operations.[18]

Conversely, the MLS would provide precision, high-integrity guidance relatively insensitive to the effects of terrain, structures, other aircraft, and weather. It could operate at airports where the conventional ILS could not because of terrain irregularities. Moreover, the system would make more flight paths available because it would employ a wide-angle scanning beam instead of the unidirectional beam of the ILS.

The Army Air Corps purchased the Sperry MLS for operational testing at some of its air bases while the CAA continued its research and development efforts.[19] In addition, the National Aeronautics and Space Administration (NASA) began experimenting with MLS for use in the space program, and the Department of Defense's (DoD) research program initiated a study to see if the MLS could improve weapons telemetry. Commercial shipping companies examined the possible use of MLS for water navigation, while communications companies looked at it for potential use for telephones, televisions, and radios.

The Federal Aviation Agency (FAA), created in 1958 as a successor to the CAA, awarded a one-year $186,500 contract to the Bendix Corporation in July 1965 to install an MLS at its National Aviation Facilities Experimental Center (NAFEC) in Atlantic City, New Jersey, for testing. The equipment consisted of eight microwave beacons installed on the runway and special airborne equipment installed in a FAA plane that received the signals from the beacons. The receiver in the aircraft converted the ground-based beacon signals onto a television-like display in the cockpit. On the screen, the pilot saw a runway outlined in electronic lights and the approach angle.[20]

As interest in microwave technology grew internationally in 1967, the Radio Technical Commission for Aeronautics (RTCA) established Special Committee 117 to develop operational requirements for a new landing system and determine which of the various technical proposals would satisfy future needs. The committee comprised representatives from the Air Transport

Association (ATA), Air Line Pilots Association (ALPA), Aircraft Owners and Pilots Association (AOPA), National Business Aircraft Association (NBAA), electronics manufacturers, and other federal agencies, as well as from Canada, United Kingdom, France, the Netherlands, West Germany, and Australia. The group reviewed twenty-three different MLS versions submitted by U.S. and foreign companies. In 1970, the committee recommended further developing the Doppler and the scanning beam MLS technologies.[21]

While the committee examined various microwave technologies, the FAA pursued such systems. During the spring of 1969, the FAA awarded the Laboratory for Electronics a contract to develop a low-cost solid-state MLS for short takeoff and landing aircraft. The system, equipped with a variable glide slope, allowed a pilot to preselect the desired airborne approach angle. The equipment incorporated distance measuring equipment with a range of ten nautical miles and 360-degree coverage. The FAA began testing the system in late 1969.[22]

With interest in MLS growing, the DOT, which began operations on April 1, 1967, tasked the ATCAC to examine MLS as a possible replacement for ILS. In its December 1969 report, the committee expressed concern that if the agency expected to accommodate an anticipated growth in air traffic, it had to find solutions for three critical problems: the shortage of terminal capacity, the need for a new means of assuring separation, and the increasing cost of air traffic control. The committee believed significant improvements in airport capacity could be achieved through parallel runways, high-speed turnoffs, advanced terminal automation, and reduced longitudinal separation between aircraft on the final approach for landing. The report noted that a higher level of automation would enable the system to handle perhaps two or three times the 1969 traffic with the same controller workforce. The rapid development of the MLS might achieve this higher automation.

In response to the report, Secretary of Transportation John Volpe established the Interagency Microwave Landing System Planning Group on June 19, 1970. With FAA Administrator John Shaffer as chairman, the group included DOT, DoD, and NASA representatives. The secretary charged the group with preparing a five-year plan for developing and implementing the MLS for civil-military use.

As the group began preparing the plan, private companies started to market and sell such systems to airports nationwide. In 1970, the Singer Company began marketing its Talar system to small airports. Developed for the Air Force, the system consisted of two small electronic boxes in the aircraft and a transmitter on the ground. The transmitter had a built-in telescope with crosshairs to permit an accurate visual check of runway alignment.[23]

Prototype Development

On June 21, 1971, the FAA requested proposals for MLS technology. Bendix immediately announced it would pursue MLS development. The company saw a potential $50 million market through 1976 and a $2.5 billion need over ten years.[24] Singer announced it had partnered with Boeing, Sierra Research Corporation, and Westinghouse Electric to bid on the FAA's proposal request.[25] ITT Gilfillan also intended to pair with Honeywell to develop a system.[26] With multiple companies announcing their intent to submit MLS proposals, in July 1971, the agency awarded a grant to Cornell Aeronautical Lab of $630,125 to develop an analytical and experimental program to assist in selecting the system.[27]

The DOT's interagency planning group issued its national plan for civil-military MLS development in July 1972. The group recommended two developmental efforts. One focused on an industry program, which would quickly produce prototype equipment for flight tests and evaluation. The other would be a concurrent series of government programs undertaken by the FAA, DoD, and NASA to validate the system, investigate subsystem concepts and techniques, and determine the best means to apply the MLS to civil-military aircraft operations. The FAA would pay for the five-year costs of the industry program, estimated at $41 million, from its R&D program appropriations. The interagency group estimated the cost of the government programs at $50 million.[28] Several countries, including Australia, France, Germany, and the United Kingdom, also established MLS development programs.

On January 27, 1972, Secretary of Transportation John Volpe announced the FAA had awarded contracts to six companies, worth roughly $3 million, for the initial phase of the five-year development program:

- ITT Gilfillan, $500,000
- Hazeltine, $499,500
- Airborne Instruments Laboratory, $498,000
- Texas Instruments, $498,000
- Raytheon, $475,000
- Bendix Corporation, $462,770

Under the terms of the contracts, Airborne Instruments Laboratory, Bendix, Texas Instruments, and Raytheon would work on the conventional scanning beam technique, and Hazeltine and ITT Gilfillan on a Doppler scanning technique.[29] The conventional scanning beam technique would provide angular guidance information with ground-generated beams that scanned azimuth (a horizontal angle measured clockwise from North) and elevation. The Doppler technique would produce lines of constant frequency shift in space and would be proportional to the angular position of the aircraft relative to the ground station.[30] Both systems would operate in the microwave region with two hundred channels spaced 300 kilohertz (kHz) apart between 5.031 and 5.0907 gigahertz (GHz). On July 26, 1972, Shaffer gave responsibility for overseeing system development to a newly formed microwave landing system branch within the FAA's Systems Research and Development Service.

In 1972, the ICAO All Weather Operations Panel proposed operational requirements for a MLS. The international representatives at the Seventh Air Navigation Conference reviewed and approved those requirements. When the FAA began Phase II of MLS development on March 14, 1973, its contractors had to meet the ICAO mandates. The agency selected four of the original companies to continue system development. During the eleven-month Phase II, ITT Gilfillan received $4,765,760, and Hazeltine received $4,401,000 to continue work on the Doppler technique. Bendix received $3,196,090, and Texas Instruments received $3,063,000 to continue work on the conventional beam scanning technique. In this phase, the FAA required each contractor to demonstrate the feasibility of its proposed system to meet the full range of civil and military requirements, including the fabrication and testing of MLS ground stations. The requirements included delivering one full capability ground station to demonstrate Category III performance and a transportable military configuration to meet military requirements. Each contractor also had to demonstrate a low-cost receiver to meet the needs of general aviation.[31] In the meantime, the U.S. Air Force procured a British-made Doppler system to test.[32]

In late 1973, the FAA hosted a three-day symposium to encourage an open exchange of information on national and international MLS developments. Two hundred and fifty people attended the seminar, including fifty international attendees and representatives from most segments of the U.S. aviation community. During the meeting, Australia, France, the United Kingdom, the United States, and West Germany provided updates on their MLS developments.[33]

Shortly after this meeting, Australian representatives invited a U.S. technical mission to Australia to see its Interscan MLS and work out a possible U.S.-Australia collaboration on MLS development. The U.S. delegation visited Australia in early 1974 to see the MLS system being developed there. The tests impressed the U.S. researchers, who invited an Australian team to the U.S. to help assess the U.S. MLS prototypes.[34]

The FAA established the Central Assessment Group (CAG) to help determine whether U.S. development efforts should select the Doppler or scanning beam technique for further development. The 140-member CAG included international representation from Australia, France, Canada, and the United Kingdom. The group also requested input from the Netherlands, West Germany, and the Soviet Union. The group began deliberations in September 1974.[35]

The CAG's deliberations over the two different systems lasted four months. The group found the Doppler and scanning beam systems capable of meeting international requirements. By the end of the year, however, based on small discriminants between the two systems, the CAG selected the scanning beam technique, which incorporated the Australian Interscan technology, later called the time reference scanning beam (TRSB) in the United States. The CAG did not review the British Doppler system during its review because it was too immature to evaluate.

The FAA also asked the DOT's MLS advisory committee to assess the Doppler and TRSB MLS versions. The agency requested the group review the FAA's selection process to ensure it was fair and objective. In February 1975, the committee endorsed the CAG's recommendation.[36]

Interim Standard

With interest growing in MLS technology, especially by those airport authorities where an ILS could not be used, the FAA announced plans to select an interim standard microwave landing system (ISMLS), pending the development and implementation of an internationally approved MLS. On May 30, 1973, the agency requested proposals for a complete technical and economic data package for an ISMLS for domestic use. The statement of work provided, for a fixed price of $25,000, the successful contractor would furnish a complete data package for future government and non-government procurement of ISMLS ground stations and airborne equipment. This package would include the necessary licensing agreements and royalty provisions to enable other manufacturers to build and sell ground and airborne subsystems to the winning contractor's specifications.

Phase I of the ISMLS evaluation called for a review of the technical and economic data package required to accomplish the statement of work. During the Phase II evaluation, the selected contractors would furnish, install, and maintain their complete ground systems within seven calendar days after notification by the contracting officer. The offerors also had to provide all airborne components of the ISMLS required for installation and maintenance by the government in a DC-3 type aircraft, along with an engineering consultant to furnish technical advice for the installation and maintenance.[37]

The FAA received proposals from Boeing Electronics, Singer Company, and Tull Aviation Corporation, and all three proceeded into Phase II testing of their systems. During that phase, the companies delivered all airborne components to the NAFEC for installation on the FAA's DC-3. They also installed complete ground systems at Richard Evelyn Byrd International Airport in Richmond, Virginia, for testing. The FAA subsequently moved the ground equipment to NAFEC for additional testing.[38]

On August 28, 1974, the FAA announced the selection of Tull Aviation Corporation's ISMLS after evaluating the prototypes in terms of performance and cost. The FAA awarded Tull a $25,000 contract stipulating it make its design data available at no charge to anyone desiring the information. The agency's contract with Tull stipulated non-exclusive licensing arrangements to avoid creating a monopoly, which permitted other companies to build the interim MLS using Tull's patents.

In announcing the selection, the FAA assured the aviation community that "limited application of the Interim MLS will not detract from the National MLS program."[39] The FAA installed the first ISMLS system at the Antrim County Airport in Bellaire, Michigan, for testing in October 1975 and commissioned it two years later.[40]

International Competition

In late August 1974, the FAA hosted a meeting to brief government and industry representatives on the progress of the national MLS program. The agency, NASA, and DoD hoped to make the final design decision by January 1975. Once they decided, the FAA would award contracts to two companies to build prototype models for test and evaluation. In addition to briefings from the FAA's four Phase II contractors, attendees received briefings on the United Kingdom and Australian development efforts.[41]

On October 25, 1974, the DOT's MLS advisory committee held a public meeting to discuss the MLS technique development progress—Doppler or conventional beam scanning. Representatives from Australia, France, and the United Kingdom attended the gathering, along with approximately one hundred other attendees from industry and the U.S. government. In its presentation, the FAA described its selection process to choose the best technique and associated signal format for further development in Phase III. "It is not necessarily the government's intention to select the full system as proposed by any one contractor or contracting team," agency officials said, "but to use the experience from the testing of several system approaches to postulate an optimum system technique . . . [to] be the U.S. candidate for international standardization."[42]

After discussions with the Australian technical team, in December 1974, the FAA partnered with Australia to develop an MLS based on a time-based reference system.[43] On February 27, 1975, the Microwave Landing System Executive Committee, a group of experts representing various federal agencies, formally agreed with the FAA's decision. The action by the committee cleared the way for the submission of the TRSB technique to the ICAO as the U.S. candidate for adoption as the future international precision landing system. The ICAO planned to select the winner of the international MLS competition by mid-1976.

The FAA believed the first systems could go into operation as early as 1978. Agency officials foresaw a need for approximately 1,600 MLS installations by the year 2000. According to officials, the merits of the MLS centered on the fact it "is less susceptible to terrain interference and will have two hundred radio channels available to it. It will offer a choice of glide-slope angles ranging up to twenty degrees, permitting a two-segment approach with greater safety." The FAA claimed its system "would keep aircraft farther from the ground for a longer time during landing approaches to further reduce noise impact near airports or avoid obstructions." Furthermore, it "will permit the long-sought curved approach to a runway. Thus, the circus elephants of the sky—the long nose-to-tail strings of aircraft on landing approaches—finally can be dispersed. Pilots will no longer need to align aircraft with a runway many miles out."[44]

On July 22, 1976, the FAA announced contract awards to Bendix and Texas Instruments to build, test, and evaluate MLS prototypes under Phase III of the development program. During this phase, each contractor would build two models of the system—the small community airport configuration and the basic configuration—using the TRSB format.[45] Ultimately, the companies would develop six MLS configurations:

1. Small community: An austere system for the lowest cost avionics and ground system applications. The MLS would provide for multiple glide paths within two to nine degrees elevation, usable to 150 feet elevation, with precision information within ten degrees on either side of the runway center line.
2. Basic: The predominant MLS system for civil use. Two versions of the basic system would be available: narrow aperture and wide aperture. The basic narrow performs to Category II accuracies, and the basic wide will enable autoland under visual flight rules conditions using a radar altimeter.
3. Expanded: This system required a higher level of system monitoring and redundancy for Category III operation and incorporated a flare glide path transmitter, back azimuth, and primary glide path angles up to fifteen degrees.
4. Joint tactical: A system to fulfill the Army, Marine Corps, and Air Force requirements. It would be a transportable system that provided performance comparable to the basic narrow system.
5. Shipboard system: A configuration designed to compensate for ship motion and other special needs of aircraft carrier operations.
6. Air transportable: A system to support Air Force forward operating bases and Marine Corps expeditionary airfields.[46]

The FAA received delivery of the first basic narrow prototype, designed for Category 1 landings in May 1976 from Bendix, and installed it at NAFEC for testing.[47] The agency demonstrated the system for an international group appointed to make recommendations to the ICAO.[48] On May 18, the FAA and NASA hosted the media at NAFEC to publicize U.S. MLS efforts. A NASA crew flew reporters on its research Boeing 737 equipped with onboard MLS equipment.[49] While it continued to test the basic prototype, the FAA also began testing a Texas Instruments basic narrow prototype at Crows Landing Naval Air Station in California.[50] The agency accepted the delivery of small community prototypes from both companies and began testing them at NAFEC in mid-1976.[51]

As the United States continued its MLS efforts, so did ICAO members. In 1974, the ICAO established the All-Weather Operations Panel, a working group composed of ten members, one each from Australia, Canada, France, West Germany, the Netherlands, the United Kingdom, the United States, and the Soviet Union, and one member each from the International Air Transport Association (IATA All-Weather Operations Division) and the International Federation of Air Line Pilots (IFALPA) associations. Working as a technical forum free of national policies and prejudices, the panel would recommend a MLS candidate to the thirty members of the ICAO's All-Weather Operations Division.

The All-Weather Operations Panel's preliminary vote in late January 1977 resulted in a tie between the U.S. and U.K. versions. The U.S., Australia, Soviet Union, and the IATA representatives voted in favor of the TRSB, and the U.K., Canada, the Netherlands, and the IFALPA representatives favored the U.K.'s Doppler version. The West German panel member recommended the distance measuring equipment prototype developed by Germany, and the French representative wanted the panel to reconsider his country's proposal.[52]

Before a second vote scheduled for March, the panel asked all representatives to submit a written evaluation of each system. The FAA contracted with Lincoln Laboratory to evaluate the British system to simulate Doppler-MLS operation at the Brussels airport. Based on a 1973 airport map, the simulation showed three buildings at the right of the 07L runway that might cause multipath problems. The buildings planned but not yet built caused the British to accuse Lincoln Laboratory of falsifying data.

On March 16, 1977, the All-Weather Operations Panel recommended the adoption of the U.S.-Australian TRSB technique as the world standard. Of the ten panel members, six voted for the U.S.-sponsored system, one for the British Doppler system, and Great Britain, France, and West Germany abstained. Great Britain protested the decision as biased and technically flawed, claiming its Doppler-based MLS was superior. The debate over Doppler versus TRSB continued pending a final ICAO decision in April 1978.

With the panel's recommendation, the FAA took its MLS prototype on a demonstration tour, hoping to convince ICAO member states to give final approval to its system. In August 1977, at the invitation of the Argentine government, the agency demonstrated its MLS at Aeroparque Airport in Buenos Aires during the Organization of American States Communications Conference, held from October 31 through November 4.[53] For the tests, an Air Force C-5A carried 82,000 pounds of equipment to Argentina, including the basic narrow and small community MLS, ancillary equipment, a van with calibration equipment, and eleven FAA electronics engineers.[54]

The British also exhibited their system during the conference.[55] "According to the *Daily Press* in Newport News, Virginia, "This South American demonstration is public-relations oriented in connection with the battle between the United States and Britain over standardization of microwave landing systems. Both countries have prototypes, but mass production can't begin until one of the systems is selected" by ICAO. "Britain reportedly is prepared to charge the U.S. with unfairly manipulating previous tests of the two systems. Britain also claims the U.S. system is not economically feasible for mass production and problems are likely to develop after more research is completed. The U.S. has made similar charges against Britain's system."[56]

In late November, the FAA moved its unit from Argentina to the Tegucigalpa, Honduras, Toncontin International Airport at the invitation of Honduras, El Salvador, Nicaragua, Belize, and Costa Rica during a meeting of Corporación Centroamericana de Servicios de Navegación Aérea on November 24.[57] According to FAA technicians, the only issue found in the Honduran tests of the small community MLS was "the pigs, chickens, dogs, and little children crawling under the security fence to watch the activities."[58]

Hoping to sway votes in its favor, the developer of the British Doppler MLS, the Plessey Company, hired a lobbyist based in the United States to tout the benefits of their system, question the validity of the simulations the FAA had done of their system, and accuse the United States of withholding performance data of its system.[59] The FAA also began a public relations campaign to ensure the ICAO member states voted for its MLS. As FAA Administrator Bond told a congressional committee, "Since considerations other than technical may play a role in the adoption of an international standard, we intend to take other actions to assure there can be no doubt about the superiority of our TRSB." The agency furnished FAA personnel abroad with "briefing papers and information kits, including a motion picture on MLS-TRSB with the soundtrack done in various foreign languages." It also provided the materials to U.S. civil air and commercial attaches and personnel stationed in foreign countries.[60]

Hoping to quell ongoing British accusations, in November 1977, the FAA invited the United Kingdom to conduct comparative tests of each country's MLS at New York's John F. Kennedy International Airport. Bond hoped the tests would "increase the available knowledge of the systems in operational situations" and "relieve tensions that have arisen between the two countries." The FAA demonstrated its MLS on Runway 13L December 5-9, 1977, and the British showed its system on the same runway on February 22, 1978.[61]

With British complaints about the U.S. system ongoing, in late January 1978, a House Government Operations subcommittee, headed by John Burton (D-CA), held hearings to investigate allegations leveled at the United States by Britain's Civil Aviation Authority. In his opening testimony, Senator Barry Goldwater (R-CA), the ranking minority member of the Senate Science and Technology's Transportation, Aviation, and Weather Subcommittee, testified, "I am totally convinced that our allies, the United Kingdom, have not been treated fairly and equitably in this MLS business. They have been wronged, and it is to our discredit that the wrong has been perpetrated." He reasoned, "We owe it to the future of safety of aviation and to the continuing strong tie with our allies to arrive at the truth and act accordingly."[62]

During the hearing, FAA Administrator Bond claimed the British were conducting "a last-ditch stand in an attempt to overturn, in favor of Doppler, the results of the long and arduous ICAO process."[63] He accused the British of "using the press and other news media to deliberately mislead and confuse the world aviation community" about the U.S. MLS. In the agency's defense, FAA officials submitted affidavits from members of ICAO's All-Weather Panel supporting the selection of the FAA/Australian MLS, as well as other documents sustaining the FAA's claims.[64] The U.S. and British feud garnered attention from newspapers around the world. As one Canadian paper reported, "A quiet battle over rival multimillion dollar systems . . . has developed into an open feud. . . . At stake are the millions of dollars poured into research in both countries and contracts for the production of the winning system."[65]

Doppler MLS demonstration in Kristiasand, Norway
Courtesy: https://atchistory.wordpress.com/2023/04/03/microwave-landing-system-flight-trials/

With the hearings underway, the FAA continued displaying its MLS to ICAO member states and agreed to additional comparative tests of the U.S. and British systems in Brussels, Belgium, and Kristiansand, Norway.[66] After the New York demonstration, the FAA shipped three versions of the MLS overseas for demonstrations in Europe and Africa. The agency installed two versions, one designed for small community airports and the other for airports with intermediate-length runways, at the

Kjevik Airport in Kristiansand, Norway, on January 23-24, 1978. It then moved the same models in early February to Yoff Airport in Dakar, Senegal, and then to the Nairobi Airport in Kenya. With those tests underway, the agency operated the expanded MLS at the Brussels airport and the small community model at Gosselies Airport in Charleroi, thirty miles south of Brussels, from February 1-3.[67] The expanded model included approach and landing capabilities, allowing pilots to land automatically when weather ceilings and visibility were reduced to zero.[68]

In its continuing campaign to demonstrate its least expensive configuration, the United States exhibited its MLS at Shiraz, Iran, on March 7-8.[69] The agency moved the system to Montreal, Canada, and demonstrated it there from March 29-April 15 to coincide with the ICAO meeting in that city April 4-21. The FAA showed two of its six MLS systems in Montreal. The agency demonstrated the full-capacity system at Montreal's Dorval International Airport. Known as the basic-wide system, it was designed for large international airports.[70] It operated the simpler, small community system at the downtown Victoria STOLport. During the same period, the agency tested the basic narrow system in California. NASA tested this system for short takeoff and landing operations at the Navy's Crow's Landing facility.[71]

The FAA's efforts paid off, and on April 19, 1978, the ICAO's All-Weather Operations Division voted to adopt the TRSB MLS for future use at the world's airports by a vote of thirty-nine to twenty-four, with eight abstentions.[72] Even after the vote, the British contingent hoped the ICAO decision would be reversed. As London's *Guardian* newspaper reported, Great Britain's civil aviation authority and the developer of the Doppler MLS "lobbied relentlessly in an effort to persuade the Americans of the superiority of the British system in technological terms." However, "There is still considerable confusion about the implication of the . . . vote in Montreal. . . . The vote in favour of the American-Australian proposal was won on political rather than on technological grounds."[73]

Development Completed

After the ICAO decision, in June 1978, the FAA published an updated plan for MLS development.[74] The plan called for a wrap-up of the prototype development and testing phase by the end of 1982. The FAA already completed work on two of the six MLS configurations, the small community airport version and a basic system for most commercial airports. The agency continued work on an expanded version for use at large hub airports and various tactical systems for the military. In addition, the FAA prepared MLS standards and recommended practices (SARPS) for adoption by ICAO.

The SARPS would prescribe the technical and operational characteristics of MLS to ensure the quality of system performance and the global compatibility of the air and ground components of the system.[75] Based on a January 1978 study, the FAA estimated it would take twenty years to transition from ILS to MLS (1980-2000). The agency hoped to deploy 380 MLS systems by 1985 and approximately 1,250 MLS systems by 2000, with MLS ground system costs exceeding $280 million. It estimated avionics equipment costs to civil users at about $510 million.[76]

In August 1978, the FAA awarded a $1,989,193 contract to the Bendix Corporation for prototype development of the more advanced MLS that would meet the requirements for precision all-weather approach and landing guidance at large airports. The agency installed the prototype system at NASA's flight test center in Wallops Island, Virginia, during the summer of 1979. Critical components of this more advanced system included an azimuth antenna that provided approaching aircraft with horizontal guidance to the runway at the proper descent angle. A distance measuring equipment unit provided continual information on the horizontal distance to the runway with one hundred-foot accuracy.[77] On February 8, 1979, the agency announced it would test the prototype at National Airport in Washington, DC. Engineers installed the system on Runway 18, and the evaluation flights began in mid-February.[78]

On November 16, 1981, Valdez, Alaska, officials dedicated the country's non-federally owned MLS. The system belonged to the city, which purchased it for $800,000 from Bendix.[79] The first MLS, paid for in part by a federal grant, went into operation on April 4, 1984, at the Wexford County Airport in Cadillac, Michigan. Paid for by the federal, state, and local airport authorities, the state also purchased the $350,000 system for airports in Sturgis and Bellaire, Michigan.[80]

The FAA completed prototype development during the Reagan administration. On January 12, 1984, the FAA awarded Hazeltine Corporation a $9.6 million contract to procure and install 178 MLS units. The contract required Hazeltine to install MLS at 172 airports within five years, beginning in the summer of 1985. The first airports to receive the equipment in Alaska, Boston, Denver, and Washington, DC, would be operational by 1986.[81]

Program Canceled

By 1986, however, Hazeltine had not delivered any MLS systems. According to the press, "To get the contract, Hazeltine unrealistically underbid everybody and already had to take a $12 million pretax write-off at the beginning of the program.[82] After Hazeltine lost an approximately 1 billion dollar Air Force contract and faced increasing pressure from the FAA, including a $400,000 fine for delays in the program, Hazeltine accepted an estimated $189 million buyout offer from Emerson Electric.[83] With deliveries of MLS behind schedule, on May 20, 1987, FAA Administrator Donald Engen announced that the agency had formally adopted a new policy that permitted ILS to be installed at some hub and reliever airports. The agency earlier imposed a freeze on installing ILS in favor of MLS. Engen explained more ILS would help address the problem of limited airport capacity in the short run.[84]

Despite delivery delays and cost overruns, the FAA commissioned the first permanent federally funded MLS at a commercial airport on April 6, 1989, at the Lebanon Regional Airport in New Hampshire.[85] According to the FAA, the commissioning represented a "symbolic turnaround" of its MLS program. Although the larger airlines and general aviation groups complained about the eventual need to install MLS equipment on their aircraft, smaller regional airlines welcomed MLS at small airports, such as that in Lebanon "where short runways, bad weather, and hilly terrain impede service."[86] That airport, however, became the only airport to receive an FAA-funded MLS. In July 1988, with only one MLS system installed, FAA spokesman John G. Leyden admitted the program remained three to four years behind schedule because of software issues. He lamented, "That has not been one of our more successful programs."[87]

On August 7, 1989, the agency notified Hazeltine it was terminating its $79 million contract because the company failed to meet the specified delivery schedule.[88] The company was three years behind schedule with significant cost overruns. Hazeltine threatened to file suit against the FAA, saying it viewed "the FAA action unsupportable and will aggressively contest the issue." Hazeltine claimed the contractual issues "were caused by massive changes unilaterally imposed by the FAA and by maladministration of the contract." The FAA warned the company in June that it faced contract cancellation.[89]

In August 1989, Hazeltine filed suit appealing the FAA's decision to deny the company's claim for $37 million in completed work. That same month, the FAA terminated the contract. In December 1990, the FAA and the Esco Electronics Corporation, earlier spun off from Emerson Electric, agreed to settle the dispute. Under the settlement, the FAA took ownership of Hazeltine's inventory of MLS units and testing equipment and made a cash payment of about $7.5 million to the company. Each side paid its legal costs. Esco did not reveal its total loss on the MLS program, but estimates showed the company lost nearly $47 million. The two sides concluded the settlement agreement in January 1991.[90]

Saying it was still committed to installing MLS units at major airports in 1998 and all airports by 2000, the FAA planned to award a new contract to purchase twenty-six systems to another vendor. If the vendor fulfilled the agreement, the FAA would commit to purchasing additional units.[91] On June 21, 1991, the agency awarded a contract to Bendix for two systems. The contract included an option for twenty-six more units, which the agency subsequently ordered.[92] One year later, in June 1992, the agency awarded the Wilcox and Raytheon corporations contracts to design and develop advanced MLS versions. Those contracts called for each company to produce six to twelve test systems. Following the successful completion of this phase, the FAA planned full-scale production with the same contractors in 1996.[93]

FAA Administrator David Hinson (left) and AOPA President Phil Boyer
Courtesy: https://www.aopa.org/news-and-media/all-news/2019/february/21/early-adapter#

On June 2, 1994, however, FAA Administrator David Hinson announced the FAA would halt further MLS development after a twenty-seven-year development program, which cost the agency almost four hundred million dollars. The agency canceled the contracts with Raytheon and Wilcox. Hinson explained, "Continuing the [microwave] development program is not an economically sound strategy." The administrator said the agency would instead focus on developing the Global Positioning System (GPS). On July 16, Hinson and AOPA President Phil Boyer landed a small plane at the Frederick, Maryland, airport using the first FAA-approved public GPS instrument approach. On October 17, the administrator formally offered free use of GPS for ten years to ICAO member states.[94]

Aeronautical Satellites

AEROSAT

The use of GPS for aviation use had its roots in a 1974 international program to test, evaluate, and demonstrate the use of aeronautical satellites to improve communications and air traffic services over the North Atlantic. The aeronautical satellite program, known as AEROSAT and jointly operated by the ten countries of the European Space Research Organization (ESRO),[95] Canada, and the United States, was designed to provide necessary information to develop an operational system. On August 2, representatives from Canada and ESRO signed a memorandum of understanding with the United States.[96] Under the agreement, the twelve countries would share the cost of stationing two satellites over the North Atlantic. The United States and ESRO agreed to pay 47 percent each and Canada 6 percent of the estimated cost of the research, development, and test program—approximately $150 million spread over ten years.[97]

The AEROSAT nations used NAFEC's Experimental Oceanic Air Traffic Control Laboratory as the ground test facility for the first program demonstrations. On November 12, 1974, a controller at NAFEC gave an aircraft routine air traffic control instructions via


ATS-6 satellite
Courtesy: NASA

aeronautical satellite relay for the first time in history. The controller issued a route change to an FAA Boeing KC-135 aircraft during a test using the ATS-6 satellite.

Despite the successful test, the project suffered controversies over shared ownership, radio bands, and costs. The program's cost worried many in Congress and the airline industry, who believed that the current levels of air traffic in the North Atlantic did not justify the program.[98] Early in the Carter administration, FAA Administrator John McLucas agreed in congressional testimony that "IATA and ATA are not strong supporters [of AEROSAT], and in fact, some people would say they are against the program. . . . Certainly, you don't like to proceed with a program when the principal beneficiaries thereof aren't convinced that they will benefit."

McLucas, who supported the program, suggested a wait-and-see approach before Congress decided whether or not to cut program funding. "It would be desirable from that standpoint to await whatever it might take to get their support, and that might mean some change in the program, it might be further air traffic growth, to the point where they were being pressed to have this type of capability," McLucas said. "We think that if they [airlines] used it and saw how it worked, they would gradually warm up to the idea that this is a good capability. Then a decision to go operational could be made at a time when traffic growth projections indicated it would be necessary. So in that sense, I think it is a good program."[99] As a result of user concerns and growing costs, however, Congress cut the 1978 authorization for the FAA's AEROSAT research program, and the U.S. pulled out of the international development program.[100]

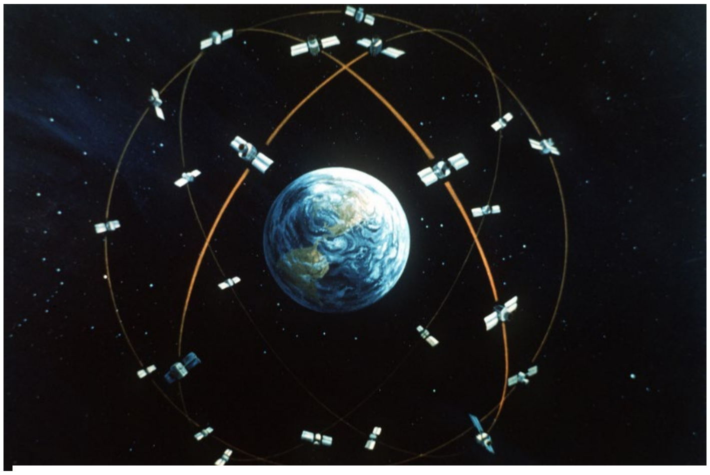
NAVSTAR and GPS

After ending its role in the AEROSAT program, the FAA turned its attention to the DoD Navigation System with Timing and Ranging (NAVSTAR) program. In 1974, the DoD initiated the satellite research program to enhance global weapons delivery. As Jeff Cochran, FAA associate administrator for engineering and development, explained to Congress in 1977, the FAA had reoriented the satellite research program from AEROSAT to a program "to determine the role of satellites and what satellite alternatives might play in providing future aeronautical services."[101]

VOR
Courtesy: FAA

According to the FAA, NAVSTAR, once developed, could provide highly accurate altitude, latitude, velocity, and time, allowing for other uses, such as air traffic control. Adopting the system for civil aviation use could enable the FAA to eliminate its ground-based, very high-frequency omnidirectional range (VOR) air navigation system and distance measuring equipment (DME) facilities, which could result in cost savings and improved efficiency in the national airspace system. The DoD expected to deploy a constellation of twenty-four NAVSTAR satellites by the mid-1980s.

The Government Accountability Office (GAO) agreed with the FAA's estimation. In a 1978 report, GAO investigators said NAVSTAR had the "potential for replacing VOR and DME as the primary navigation system for aviation worldwide." The system would "provide superior accuracies and coverage for all aircraft and will allow aircraft to fly the shortest paths to their


Artist's conception of NAVSTAR constellation
Courtesy: NARA

destinations with resultant time and fuel savings." Furthermore, "NAVSTAR could provide an aircraft surveillance system over ocean areas comparable to that provided by ground radars over land areas."[102]

The GAO touted the value of NAVSTAR in another report released in 1979, "If coupled with data link . . . NAVSTAR has the potential, provided that safety is insured, to do the surveillance now done by FAA's en route radar." The report noted NAVSTAR could offer "many cost and operational benefits to civilians." A key operational benefit of using NAVSTAR for civil aviation would be the ability to allow pilots to fly direct routes. Instead of requiring aircraft to fly on established airways between VORs that can zigzag across the nation, a satellite navigation system would permit the development of straighter routes (called area navigation or RNAV), saving airlines time and operational costs. Other benefits included increased safety, improved controller productivity, more efficient use of airport capacity, and reduced emissions.[103]

The FAA's early concerns regarding using the NAVSTAR constellation and Global Positioning System (GPS) centered on the need for the civil aviation community to have access to NAVSTAR's signals and the development of low-cost GPS receivers for aviation use. The FAA's research and development work and its coordinated efforts with the DoD led to the U.S. cancellation of the MLS program and the adoption of GPS navigation in the 1990s.

Airport Surface Detection

To enhance airport safety, the FAA commissioned its first airport surface detection equipment (ASDE) at the Newark, New Jersey, airport in September 1960. Initially developed for the Air Force, the civil aviation version, ASDE-2, provided air traffic controllers with information on the position of aircraft and other vehicles on the ground, even during darkness and fog, and displayed the data on a radarscope in the airport tower. The agency based its specifications for ASDE-2 largely upon a developmental model operated at John F. Kennedy International Airport. In April 1969, when the agency installed the system at Los Angeles International Airport, Gene Kropf, the FAA's regional public affairs officer, proclaimed the "new surface detection radar will be so sensitive that it will be able to detect two people standing at arm's length at the farthest corner of the airport, regardless of weather conditions."[104]

Ultimately, the FAA installed ASDE-2 at twelve airports. Despite providing controllers with increased situational awareness, ASDE-2 had limitations. It did not work well during rainfall and had poor reliability. In addition, because it did not provide a target identity label, the system required controllers to ask some pilots for their positions to help maintain target identity.

To overcome ASDE-2 limitations, in 1976, the FAA requested proposals for a prototype ground surveillance radar system. In the interim, in April 1977, the agency ordered display enhancement units for the ASDE-2 as an interim measure in a $563,949 contract to Cardion Electronics. Three months later, on July 5, the FAA announced a contract award of over $1.5 million to Cardion for an engineering model of a new generation of airport surface detection equipment, designated the ASDE-3. The new system would provide more precise outlines of runways and taxiways while at the same time suppressing radar returns from buildings and rainfall.[105] The agency ordered the ASDE-3 engineering model a few months after the March 27, 1977, ground collision in the Canary Islands, which resulted in 583 deaths.

ASDE-3
Courtesy: FAA

Cardion delivered a prototype ASDE-3 to NAFEC in August 1979 for testing and evaluation. The agency completed testing in May 1980.[106] The results formed the basis for the first ASDE-3 technical specification, which the FAA completed in October 1982. [107] After an accident at the Anchorage International Airport on December 23, 1983, FAA Administrator Donald Engen, President Ronald Reagan's first appointed administrator, ordered the prototype system moved from NAFEC to Anchorage for operational use. During that accident in heavy fog, a Korean Airlines cargo DC-10 attempting to takeoff collided on the ground with a Piper Navajo operated as a commuter by South Central Air. The accident seriously injured three persons and destroyed both aircraft.[108]

In addition to ordering the ASDE-3, Engen directed the agency to speed up the development and procurement of the ASDE-3 system. On October 10, 1985, the FAA announced a contract for seventeen ASDE-3 units, with an option for thirteen more. In February 1990, the agency installed a test unit at the Pittsburgh airport. The agency formally accepted ASDE-3 for operational use in December 1991. On December 3, 1993, the agency commissioned its first ASDE-3 at the Seattle-Tacoma airport. [109]

Advanced Radar

On May 24, 1965, the FAA announced the start of the first field appraisal of a prototype alphanumeric air traffic control automation system. ARTS (advanced radar traffic control system, later changed to automated radar terminal system), a ground-based system designed for medium-density air traffic terminals served by a single radar, electronically tagged aircraft targets on the controller's scope with luminous letters and numbers, indicating the identity and altitude of each target aircraft equipped with a transponder. The electronic tags moved with the corresponding aircraft blip across the controller radarscopes.[110] The prototype, ARTS I, underwent an eighteen-month evaluation at the Atlanta Hartsfield International Airport air traffic control tower from April 1965 to August 1966.[111] The prototype for en route traffic, called the stored program alphanumeric system (SPAN), went through a ten-month evaluation at the Indianapolis Air Route Traffic Control Center (ARTCC). The field tests played an essential role in the FAA's program to replace an essentially manual air traffic control system with a semiautomated system.

The agency transferred the SPAN equipment, renamed beacon alphanumerics (BAN), to the New York ARTCC for further testing in March 1966. While the system could handle the en route traffic assigned to the Indianapolis ARTCC, it could not manage the higher traffic levels at the New York en route center. In New York, BAN could cover nine of the center's thirty-seven sectors, so aircraft flew out of sectors with automation into sectors without automation and vice versa. In 1968, the agency moved the equipment to Atlanta's airport, where it augmented the ARTS I in that terminal area. (ARTS and BAN hardware components were virtually identical.)[112]

On December 12, 1978, the FAA's first production model of the ARTS II began operating at the airport in Toledo, Ohio. The agency developed this version for airports whose traffic volume did not warrant the more costly ARTS III used in major hubs. Designed around a minicomputer, the ARTS II lacked the full-scale system's ability to predict where a target would be on the radar scan and calculate its ground speed. Like the next generation ARTS III being developed, however, it provided controllers with alphanumeric tags indicating the transponder-equipped aircraft's identity, heading, and altitude. In addition, ARTS II allowed controllers to receive and record flight data from adjacent air route traffic control centers. Developed by the Burroughs Corporation under contracts awarded in 1974, the FAA installed ARTS II at over eighty airports.[113]

In early 1969, the FAA awarded an over $35 million contract to the Univac Federal Systems Division of the Sperry Rand Corporation to build the more advanced ARTS III radar tracking system. Once deployed, the system would provide the altitude, identity, and speed of transponder-equipped aircraft in the terminal airspace on the controller's radar screen.[114] With the contract awarded, the agency continued to test the ARTS II system. On June 26, 1970, the agency completed the first field evaluation of ARTS II at the Knoxville, Tennessee, airport. The second-generation ARTS could be used at low- and medium-density terminal control facilities.

ARTS-III air traffic controller screen
Courtesy: Georgia State University Labor Archives

The FAA commissioned the first ARTS III on October 4, 1971, at Chicago's terminal radar control (TRACON) facility at O'Hare International Airport. August 13, 1975, marked the completion of the ARTS III program. On that day, the FAA had commissioned all planned ARTS III systems in the contiguous states, as well as in Hawaii, Puerto Rico, and the FAA's Technical Center. However, the agency needed to upgrade the ARTS III to keep up with increasing air traffic.

The FAA announced a contract to enhance ARTS III on August 10, 1976. The agency planned to upgrade twenty-nine of the sixty-five ARTS III systems to the ARTS IIIA version with new capabilities. ARTS IIIA would provide radar tracking of aircraft not equipped with transponders and enable controllers to automatically place alphanumeric data tags on the scope to report identity and altitude for these targets. The ARTS IIIA would also possess improved computer efficiency, capacity for more radar displays, and continued operations with reduced capabilities in the event of component failure. In addition, the contractor agreed to upgrade all sixty-five ARTS installations to permit air traffic control operations to be continuously recorded on magnetic disks.


New York Common Radar Room
Courtesy: FAA

The contract called for installing a unique ARTS IIIA system in the New York TRACON room. Ground-breaking for the building to house the TRACON occurred in July 1976 at Long Island's Mitchel Field. The new facility replaced the Common Radar Room at Kennedy International, which controlled traffic approaching and departing New York's three major and several smaller airports.[115] Finally, the contract provided for installing four en route automated radar tracking systems (EARTS) at air route traffic control centers in Alaska, Hawaii, and Puerto Rico, as well as at Nellis Air Force Base in Nevada.[116]

In March 1978, the first ARTS IIIA became operational at the FAA Academy in Oklahoma City. Over a year later, in December 1979, the agency installed the first operational ARTS IIIA at Minneapolis-St. Paul International Airport. The system initially used the same software package employed at ARTS III facilities, pending the completion of computer programs able to realize the full potential of the new equipment. While software development continued, the FAA in November 1980 awarded a contract to upgrade the other thirty-four operational ARTS III units to the IIIA hardware level.

Almost two years later, in October 1982, Seattle-Tacoma International Airport became the site of the first operational ARTS IIIA with the upgraded software, allowing controllers to track aircraft not equipped with transponders. The FAA completed the ARTS IIIA installation in 1985. The FAA began operational testing an ARTS IIIA that used all-digital processing at Tampa International Airport in December 1978. The agency commissioned this unique system on September 7, 1982, but it was not used at other locations.[117]

ARTS III and IIIA, designed as modular hardware and computer program packages to facilitate further improvements, quickly led to the development of additional modules. Examples of the add-on packages to improve safety included automatic monitoring of aircraft altitudes, automatic monitoring of aircraft positions relative to other controlled traffic in terminal airspace, automatic calculation of metering and spacing commands to provide an efficient flow of traffic into the airport, and an information processing and display system to replace the labor-intensive methods used to perform the present flight and control data distribution.

EARTS

Sperry Rand began delivery of the EARTS system in the spring of 1978. The system was an expanded ARTS III modified for en route operations that employed short-range and long-range radars, full digital radar displays, and a fail-safe design. The FAA commissioned the first EARTS at the Anchorage ARTCC on August 4, 1980. The FAA commissioned Hawaii's EARTS in July 1982. EARTS collected information from remote radar sites at Mount Kaala, Kokee, Haleakala, and Paho. Those sites collected signals from transponder-equipped aircraft within 250 miles of any radar. The system compiled and recorded information on the plane, such as size, identity, speed, altitude, longitude, and latitude, a job formerly done by a controller. The agency commissioned the system at the San Juan center in December 1982. The center had been using the ARTS III component of its EARTS package for approach control functions of the airports at San Juan, St. Croix, and St. Thomas in the U.S. Virgin Islands.

Altitude Warning

The FAA began developing the minimum safe altitude warning system (MSAW) for low altitudes in August 1973 as an add-on package to the ARTS III. Following a thirty-day operational field test at Denver's Stapleton Airport, the agency researchers tested the system at NAFEC. In April 1975, the agency awarded a $2.9 million contract to Sperry Rand's Univac Division to procure hardware and software.[118]

When the ARTS III radar picked up the aircraft, which could extend as many as fifty-five miles from the airport, MSAW monitoring began. It automatically alerted the controller when an IFR aircraft entered the airspace. It warned a VFR aircraft only if the pilot requested the service.

In either case, the plane had to be equipped with a transponder and an altitude encoder for MSAW to function.[119]

The system monitored aircraft altitudes and compared them to terrain maps stored in the computer's memory. If an aircraft descended dangerously close to the ground, a five-second aural alarm sounded, and the words "LOW ALT" would appear on the controller's radarscope above the appropriate aircraft target. The controller could then radio a warning to the pilot.[120]

The FAA commissioned the first MSAW system on November 5, 1976, at Los Angeles International Airport, followed by Washington National and Dulles International Airports that same year. The agency completed MSAW installation at all sixty-three major airports on October 28, 1977.

Conflict Alert

While developing and deploying MSAW, the FAA also developed technology to warn terminal air traffic controllers of potential mid-air collisions. As another add-on to ARTS III, the conflict alert system issued warnings if two aircraft appeared too close to one another in terminal airspace. The development program had three phases. In the first phase, the system could identify a conflict between any two controlled, radar-tracked, transponder-equipped aircraft with automatic altitude reporting capability on board. When the agency completed the program's second phase, the computer could identify conflicts between a controlled plane with an automatic altitude reporting transponder and any non-controlled aircraft with an automatic altitude reporting transponder. During the third phase, the FAA planned to deploy a fully automated conflict resolution system for all aircraft within radar range whether or not the plane had an altitude transponder.[121]

On January 10, 1978, the agency commissioned the first phase conflict alert system at Houston International Airport in Texas. By April 1980, the FAA had commissioned the system at sixty-two terminals nationwide. The system detected traffic conflicts above certain altitudes. A computer program made a forty-second projection of aircraft flight paths based on current speed and direction and then searched for conflicts. A buzzer sounded if it predicted two aircraft would pass with less than four hundred feet of vertical separation and 1.2 miles of horizontal separation. The data tags identifying the plane on the controller's radarscope would begin to blink and display the letters "CA" for conflict alert, giving controllers time to analyze the system and issue any necessary instructions to the pilots.[122]

Airport Surveillance

One of the technology programs inherited by the Carter administration, the airport surveillance radar, already faced budgetary and delivery issues when Bond became FAA administrator. On January 12, 1973, the FAA awarded an $18,174,437 contract to General Dynamics Electronics for thirty-seven advanced new airport surveillance radars (ASR-8). The ASR-8 incorporated a dual-beam antenna, which improved the detection of light aircraft, reduced ground clutter on the radarscope, and provided expanded low-angle coverage. Its klystron transmitter tube provided twice the power output of older airport surveillance radars. Other features included a solid-state design, integrated circuitry, and modular construction to facilitate repairs and upgrades. As a result, the equipment had a high reliability rating and shortened maintenance downtime.[123]

Of the thirty-seven units originally ordered, DoD would receive two for use at military airfields, and the others would go to civil airports—first to Detroit, Seattle, Dallas, Pittsburgh, Minneapolis, and Miami. One unit would go to the FAA Academy in Oklahoma City for training purposes, and one to NAFEC for research and development.[124]

In June 1974, however, when the General Dynamics contract costs rose to $33.7 million and deliveries were delayed for nine months, the FAA canceled the contract and awarded a contract to Texas Instruments to produce and deliver the ASR-8.[125] On September 23, 1974, the FAA agreed to procure the ASR-8 from Texas Instruments at $360,000 for each unit.[126] The FAA subsequently ordered additional radars from the company. In June 1975, the agency received the first of the new ASR-8 systems.[127]

On October 17, 1978, the FAA announced another $3.6 million contract with Texas Instruments for five additional ASR-8s. The company began delivery under that contract in June 1979 and completed it in March 1980. This action brought the number of ASR-8 units to eighty-six.[128] By the end of 1980, the agency had commissioned fifty-seven of the eighty-six radars it had purchased.[129] In 1983, the FAA awarded a contract to Westinghouse Electric Corporation for the new ASR-9 systems.

En Route Surveillance Radar

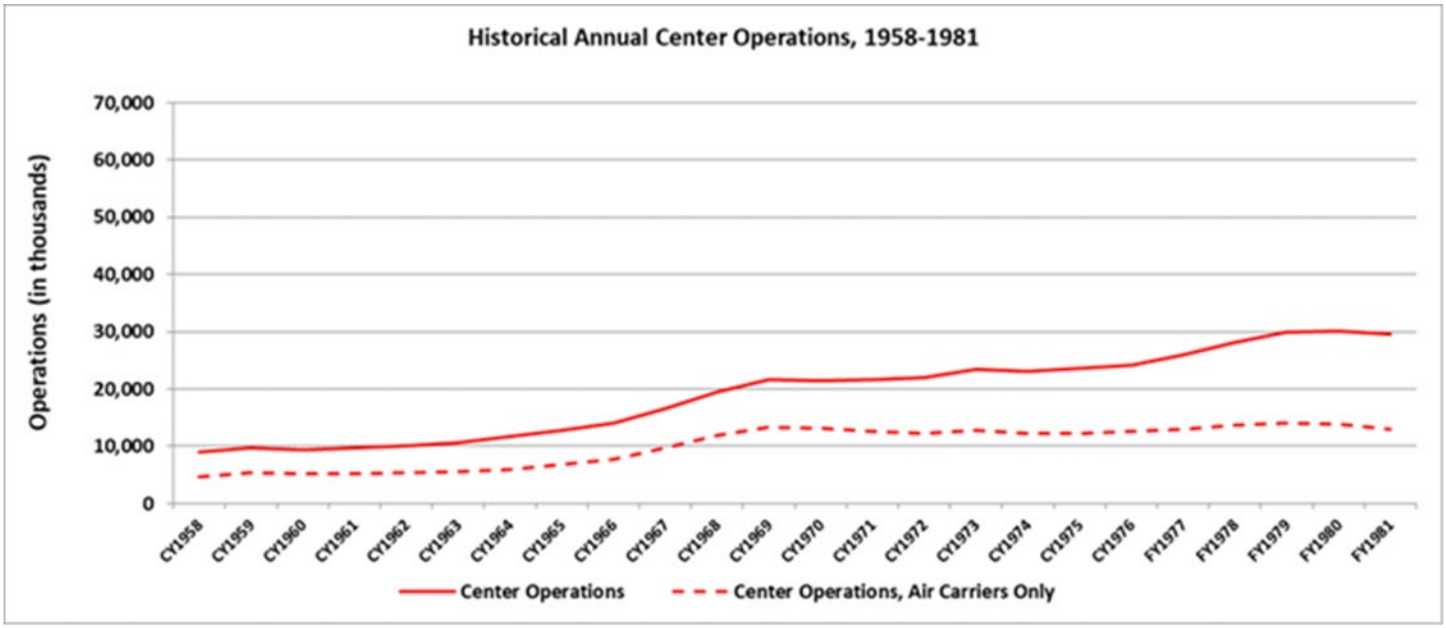
While the ASR systems used radar to detect aircraft position and later weather near an airport, air traffic controllers at the FAA's ARTCCs used radar to detect and display an aircraft's position en route between terminal areas. The air route surveillance radar (ARSR) program, inherited from the previous administration, represented a state-of-the-art improvement over the prototype ARSR-1 and the deployed ARSR-2 radars developed in the 1960s. The ARSR-3,

Yakataga Flight Service Station, Alaska, 1975
Courtesy: www.atchistory.org

designed for use in high-density traffic areas, would incorporate the latest radar technology to improve the extent of coverage, improve target detection, and reduce clutter. It would include a dual-beam antenna, digital signal processing, improved weather detection, and antenna radome design, and it would measure the range and azimuth of aircraft within a two-hundred-mile radius. The radar would include solid-state construction features and built-in test equipment to increase reliability and facilitate maintenance.[130]

In January 1973, the FAA awarded Westinghouse Electric Company a cost-plus-incentive-fee contract estimated at $3.5 million to develop an ARSR-3 prototype. Under the agreement, Westinghouse would design, fabricate, install, and field-test one prototype ARSR at the FAA Academy in Oklahoma City. The contract stipulated a twenty-four-month project completion.[131]

Development costs ran higher than expected, and in September 1973, the FAA provided $615,000 to Westinghouse to complete and test the prototype.[132] In March 1974, when the FAA found out Westinghouse required an extra $3.8 million to complete the project, the FAA determined the company's specifications for the prototype mature enough to go into production. Hence, it canceled the contract for the prototype work and contracted for procurement of the actual radar. On June 30, 1975, the agency awarded a production contract to Westinghouse at a fixed price of approximately $3.2 million for sixteen ARSR-3 systems plus spares and instruction books. The contract also contained an option at a fixed price of almost $11 million for ten additional systems and ancillary equipment.[133]



Source: 1958-1963: Civil Aeronautics Administration, *CAA Statistical Handbook of Civil Aviation*, various; 1964-1981: Federal Aviation Administration, *FAA Statistical Handbook Aviation*, various.

By late 1977, after some thirty-five contract modifications, the price for the ARSR-3s rose to an estimated $51 million for twenty-seven radar units. The FAA originally wanted installation, checkout, field-testing, and reliability/maintainability demonstrations for the first ARSR-3 radar completed in July 1977.[134] After a host of procurement and operational issues under the production contract, in 1978, the FAA began testing the radar. When it completed the operational assessment, the FAA hoped to commission one ARSR-3 radar per month starting in 1979 and complete installation over two years.[135]

The first of these new generation ARSRs went into operation on June 25, 1979, the first new en route radar system acquired by the agency in twenty years. It improved radar tracking range by 25 percent and could track aircraft flying as high as 61,000 feet. The radar also displayed weather information. The agency eventually deployed twenty-two ARSR-3s along high-density segments of the en route system, commissioning the last radar in January 1983. The

FAA also purchased four mobile units. Their antennas could operate from a flatbed truck, so they could be rushed to any location where the existing radar had failed.[136]

Wind Shear Detection

FAA LLWAS test
Courtesy: FAA

The FAA launched its low-level wind shear alert system (LLWAS) program following the 1975 accident of Eastern Air Lines Flight 66 at John F. Kennedy International Airport in New York. On its final ILS approach, the Boeing 727 flew into a microburst caused by a severe thunderstorm. As the aircraft descended, it struck approach lights about a half nautical mile from Runway 22L and crashed. Six crew members and 107 passengers died. At the time, it was the deadliest single plane crash in U.S. history. In determining the accident's probable cause, the National Transportation Safety Board noted, "the flight crew's delayed recognition and correction of the high descent rate were probably associated with their reliance upon visual cues rather than on flight instrument references." The board also said, "The adverse winds might have been too severe for a successful approach and landing even had they relied upon and responded rapidly to the indication of the flight instruments."[137]

EMR Telemetry[138] developed the first LLWAS in 1976 under contract to the FAA. After months of testing, the first systems became operational in September 1978 at seven major airports: Tampa, Atlanta, Oklahoma City, Houston, Denver, Boston, and John F. Kennedy in New York. The system used a center field anemometer and five pole-mounted anemometers around the airport's periphery. It detected the severe downdrafts and wind changes associated with wind shear using sensors on the airport periphery that measured wind speed and direction. A minicomputer compared the information from the detectors with readings at the center of the airport, and when it found significant differences, it sounded an alarm in the tower. Once the system alarmed, controllers contacted the pilots to warn them of the problem.

The FAA awarded EMR Telemetry a second contract in September 1978 for an additional seventeen LLWAS, which it planned to install at airports in St. Louis, Washington National, Pittsburgh, New Orleans, Dallas-Fort Worth, New York LaGuardia, Memphis, Fort Lauderdale, Kansas City, Detroit Metropolitan, Minneapolis, Cleveland, Philadelphia, Indianapolis, and Newark. In October 1979, the agency announced it had contracted for thirty-four more systems at $2.3 million. By 1987, the agency had installed the system at 110 FAA towered airports.[139]

Weather Observation

In 1959, the FAA and the Department of Commerce National Weather Bureau began discussing how to develop technology that could relieve FAA personnel from the burden of observing weather. That year, the agency listed as one of its aviation weather requirements, "A complete remote reading observing system is necessary to preclude FAA personnel from leaving their important operating positions in order to take observations." Subsequent annual weather needs statements changed the emphasis from a "remote reading system" to the concept of an "automatic meteorological observation station."[140]

In 1971, the Department of Commerce determined such a system could not be realized because of the unavailability of technology to measure two parameters of significant interest to aviation: ceiling and prevailing visibility. However, the FAA's flight service station (FSS) automation program, which included a plan to close multiple crewed stations, intensified the need for automatic weather observation. The availability of new sensors for ceiling and visibility in the mid-1970s made the attainment of automated weather observing capability a possibility.[141]

FAA R&D activities focused on designing equipment allowing pilots to access a computerized national weather database tailored for briefing purposes. The aviation automatic weather observing system (AV-AWOS), a wholly automated, crewless weather station, would save costs since the agency would no longer need to hire specialists to observe weather at its FSS facilities. AV-AWOS could also serve small to medium-sized airports and, with more sensors and processing equipment, could be used at larger airports then staffed by National Weather Service (NWS) observers.

1983 AWOS testing
Courtesy: FAA

In early 1978, the FAA began testing AV-AWOS at Patrick Henry International Airport in Newport News, Virginia. During the test, researchers fed data from standard commercial off-the-shelf meteorological sensors into a computer, which resulted in an on-the-spot real-time weather broadcast to pilots by a computer-generated voice broadcast. After four months of testing, the concept proved successful, but researchers noted the need for better sensors.[142]

The FAA continued research and development activities in coordination with the NWS and DoD. In 1982, the agency awarded contracts for demonstration systems. On January 26, 1983, the agency announced a yearlong demonstration of the system, now called the automated weather observing system (AWOS), at selected airports to begin later in the year. The agency completed the demonstration program in 1984.[143] On April 11, 1986, the FAA issued an advisory circular containing standards for AWOS systems for non-federal acquisition.[144] The agency's first AWOS began service on February 28, 1989.

Collision Avoidance

Before the San Diego accident, the FAA installed the conflict alert system on the automated terminal radar system (ARTS III) to warn controllers of potential mid-air collisions in busy terminal areas. While most in the aviation community applauded the conflict alert system, the San Diego mid-air collision set off intense criticism of the FAA's air traffic control program and the pace of the agency's development of an airborne collision avoidance system.

Early Development Efforts

The controversy over the lack of a collision avoidance system, brewing since the mid-1950s, centered on the FAA's inability to develop and mandate an effective, low-cost onboard system. The airline industry, through the ATA, had been working on the development of an airborne collision system since 1955. The mid-air collision over the Grand Canyon the following year led to calls for immediate technological solutions. In 1959, the FAA established a collision prevention advisory group with representatives from ATA and the avionics industry.

In the years following the creation of the advisory group, the FAA and the aviation industry cooperated to define, develop, and test collision avoidance systems using various concepts and technologies. Developmental efforts in the 1960s and early 1970s focused on developing equipment designed around interrogator/transponder and time/frequency techniques, generally called airborne collision avoidance systems (ACAS). In 1971, during congressional hearings, the FAA agreed to test all available ACAS concepts—Honeywell's AVOIDS (avionic observation of intruder danger systems), McDonnell Douglas's T/F ACAS (time/frequency airborne collision avoidance system), and RCA's SECANT (separation and control of aircraft using nonsynchronous techniques) system.[145] The three systems functioned adequately during tests but required all aircraft—commercial, military, and general aviation—to have transponders. In addition, these early technologies had unacceptable nuisance alarm rates and created electromagnetic interference with other equipment. As a result, the FAA and the airlines deemed these systems impractical for normal airline operations.[146]

In a February 9, 1976, letter to Senator Howard Cannon, FAA Administrator John McLucas provided the results of the ACAS evaluation. He noted the agency's concern with the false alarm rates of the three systems and the questionable compatibility with the air traffic control system. He reported, "We have concluded that the desired increase in separation assurance protection can best be achieved by alternatives other than ACAS." He said the agency intended to proceed with a system then being developed by the Department of Defense and FAA called the beacon collision avoidance system (BCAS).[147]

A Different Approach

In 1972, the Air Force contracted with Litchford Electronics to develop a passive BCAS. That system used responses only to ground interrogations and not aircraft transmissions. In 1974, the FAA adopted the Air Force's BCAS concept. In late 1975, the FAA awarded a $527,000 contract to Litchford for two experimental models of a mid-air collision avoidance system for civil aviation use.[148]

Research indicated that most collisions occurred in terminal areas and identified the greatest collision danger as one aircraft overtaking another. Researchers found that simply warning a pilot about potential collision danger did not provide sufficient information to prevent a collision. Instead, pilots had to know the relative bearing of the threat so they could maneuver away from it. The key to successful avoidance proved to be time and distance. Tests showed that when a pilot initiated a sudden climb in a jet aircraft traveling at four hundred knots, the plane would fly approximately one mile before responding and starting to climb. Hence, researchers had to discover a way to provide an early warning so pilots of rapidly converging planes could take evasive action.

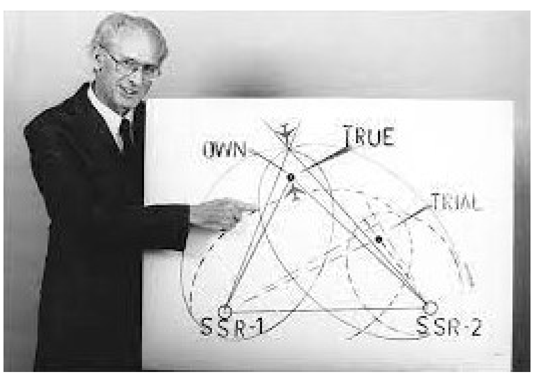
Under the FAA contract, Litchford enhanced his original design. The system incorporated hardware already installed on all airline, military, and most general aviation aircraft that used reply data from the FAA's air traffic control radar beacon system (ATCRBS) transponders to determine intruder range and altitude. This approach seemed a practical solution to the mid-air collision problem. A transponder would protect a plane against most other aircraft without imposing additional equipment requirements. However, the system resulted in numerous false alarms that distracted pilots and would not work with the next generation of air traffic control equipment under development—the discrete address beacon system (DABS).

Adopting some of the Litchford techniques, in 1975, the FAA and the MITRE Corporation developed a prototype beacon collision avoidance system. The agency's technical center and MIT Lincoln Laboratory tested the prototype system in FAA and MITRE aircraft.[149] On September 8, 1978, the FAA canceled its contract with Litchford after determining to proceed with developing its design, which would work in concert with DABS.[150]

Congressional Involvement

Hoping to speed development efforts, the House Committee on Government Operations, Government Activities and Transportation Subcommittee held contentious hearings on December 7-8, 1978. In announcing the hearing, Subcommittee Chair John Burton said he "seriously questions the commitment of the FAA's top management [to] implementing a collision avoidance system."[151]

The hearings focused on why the agency had yet to mandate a viable collision avoidance system. In his opening testimony at the hearing, NTSB Chair James King criticized the FAA for not requiring a collision avoidance system. "It is unfortunate, but often true," King said, "that it sometimes takes a major disaster for the aviation community to reexamine whether past actions have reflected a maximum effort on the part of all concerned with safety in commercial air travel. In the area of collision avoidance, we are not sure that everything possible has or is even now being done in the most timely manner to assure aircraft separation."[152]



George B. Litchford
Courtesy: *New York Times*

In his testimony at the hearing, George B. Litchford, Sr., put the issue into perspective. He noted, "Had we been able to solve this problem, we would have solved it 20 years ago." He explained that "it is impossible for one airplane to detect another airplane unless that airplane is transmitting to you some form of standardized signal. He emphatically told the committee, "Until you have the standardized signal transmitted by nearly all aircraft, you are not going to have a collision avoidance system. I don't care how many laws you pass or how many people come up here" to testify.[153]

According to Langhorne Bond, in earlier testimony before the House Committee on Public Works and Transportation:

> The development of a Collision Avoidance System has proven over the years to be technologically elusive. In fact, despite the intense efforts of the aviation industry and the FAA over a long period of time to build such a system, there is still not a safe, efficient, and reliable Collision Avoidance System available for aircraft use. . . . The problem of developing an independent but compatible pilot alerting device has proven to be extremely difficult and complex. Over the past ten years, various electronic devices have been developed and proposed using the technology available at the time. One-by-one these relatively simple proposals have been tested and shown to be deficient. The reasons for this span [of] a broad spectrum of problems ranging simply from poor performance to annoying 'bells and whistles' in the cockpit.[154]

Bond explained the FAA's collision avoidance system development program then underway consisted of three types of equipment: active BCAS, full BCAS, and the automatic traffic advisory and resolution service (ATARS).

Decision Made

On March 4, 1976, the FAA announced a contract to develop three engineering models of the new DABS ground sensors and install thirty compatible transponders. This new advanced radar beacon system would replace the ATCRBS, which provided the controller with identity, range, altitude, and azimuth information from all altitude-reporting transponder-equipped aircraft. DABS would include enhanced surveillance, a digital data communication capability for improved surveillance quality, and a discrete aircraft addressing function providing the technical base for a digital communication exchange system.[155]

The chief advantage of DABS (later known as Mode S) was its ability to interrogate and receive a transponder reply from a specific aircraft rather than from all aircraft in the zone of coverage.[156] This would help eliminate the problem of overlapping and garbled transponder replies from aircraft flying close to one another. Since DABS would individually address aircraft, it would also provide a vehicle for automatic communications between aircraft and the ground. FAA engineers saw this data link capability as the basis for the future implementation of a ground-based collision avoidance system. In part, the decision to move to DABS led to the FAA's decision to move forward with the development of BCAS, initially called the single-site collision avoidance system or SS-CAS.[157]

The FAA's E. J. Koenke first documented the work leading to the SS-CAS concept in a February 1977 patent disclosure, "A Passive DABS-CAS Design."[158] A paper co-written by the FAA's P. V. Hwoschinsky and Koenke and presented at the Institute of Navigation meeting in Costa Mesa, California, further explained the concept outlined in the patent. The engineers described their unique beacon collision avoidance system that worked with the current and next-generation ground-based air traffic control surveillance systems. In its passive mode, SS-CAS could listen to target replies from only a single ground-based ATC interrogator (ATCRBS or DABS) to obtain the three-dimensional position of the target and user aircraft.[159] Active BCAS used radar transponders and proved more compatible with the ground-based air traffic control system than other collision avoidance technologies. The FAA issued a draft engineering requirement for BCAS on November 11, 1977.[160]

The principal functions of the BCAS collision avoidance algorithms included threat detection, resolution, and communication and coordination. BCAS considered all aircraft as possible intruders and potential collision threats. It evaluated each intruder through a prescribed sequence of tests to declare the intruder a threat or a non-threat. The software evaluated the characteristics of an intruder, its range and range rate, altitude and altitude rate, and the current sensitivity level of its own BCAS to determine if it was a threat. The system generated resolution advisories for all intruders it declared as threats. It processed each threat individually to select the minimum safe resolution advisory based on track data and coordination with other BCAS-equipped aircraft.

In March 1980, the FAA contracted with Dalmo Victor Operations of Bell Aerospace Textron to identify any possible issues inherent in the active BCAS concept. The agency expected the company to complete tests by March 1981 and undertake extended tests on in-service air carrier aircraft. On June 23, 1981, Administrator J. Lynn Helms, appointed by the Reagan administration, announced the FAA's decision to adopt the threat alert and collision avoidance system, soon renamed the traffic alert and collision avoidance system (TCAS), which canceled the BCAS program. The TCAS system represented an improvement over BCAS. Like BCAS, TCAS would work in conjunction with the ATCRBS transponder, already in wide use since the late 1960s. It would also be compatible with the next-generation transponder, DABS.[161]

Direct Access Radar Channel

Shortly before Langhorne Bond became the FAA administrator, the agency began looking for a computer-driven backup system for the en route center's IBM 9020 computers. When controllers faced an outage with that system, they had to switch from the narrow-band computer system to a broadband, manually operated system. To do so, they had to reposition their radarscope from vertical to horizontal. They then prepared, by hand, a transparent plastic marker for each controlled aircraft that included the identity, altitude, and other essential flight information. They pushed each marker manually across the scope to keep it as close as possible to the moving radar blip. Accomplishing this transition in busy airspace frustrated controllers, who demanded more sophisticated equipment.

Hoping to capitalize on computers for air traffic control, the agency awarded the Raytheon Company an $11.2 million contract in November 1977 for backup equipment for the ARTCC automated systems.[162] The contract called for twenty-two direct access radar channel (DARC) en route air traffic control subsystems. A unit would be delivered to the twenty en route centers, NAFEC for systems support, and the FAA Academy for the instruction of student controllers.

Using specially designed minicomputers and associated software and hardware computer components, DARC, a narrowband and digitized radar data processing system, would take over if the primary system failed or had been removed for maintenance. DARC provided a limited data bloc that gave a discrete code for each aircraft equipped with a transponder and the altitude of those fitted with an altitude-encoding transponder. The code helped controllers quickly identify the targets during a changeover from the primary system. Like the primary system, it gave the controller an automatic alphanumeric readout display of aircraft identity, position, and altitude.[163]

On July 30, 1979, the FAA deployed the first DARC unit at the Salt Lake ARTCC for testing.[164] The agency commissioned that system on February 2, 1981. By June 28, the agency commissioned DARC at the Minneapolis ARTCC, completing deployment to all twenty en route centers within the contiguous United States.

Our strong commitment to research will prove ever more vital in the years ahead as the FAA continues to bring diverse scientific, medical, engineering, and technical partners together to develop the innovative tools, products, and procedures that will significantly enhance aviation safety and efficiency into the future.
–Theresa L. Kraus[1]

Chapter 6: Technical and Aeronautical Centers Come of Age

During the Carter administration, the FAA, as it had done in the past, relied on its two research and development (R&D) and training facilities to carry out the necessary activities to modernize the air traffic control system and provide enhanced safety to the flying public. FAA Administrator Langhorne Bond worked to upgrade and modernize both centers to increase the productivity and efficiency of the agency's research programs. During Bond's tenure, the R&D programs at the Aeronautical Center and the Technical Center included research, testing, and evaluation of new air traffic control equipment, airport and aircraft safety technologies, as well as human factors and aviation medicine programs to enhance human performance. Center employees also conducted long-range planning for developing innovative aviation systems and concepts, new air traffic control equipment and software development, and modifying existing systems, policies, and procedures.

Technical Center

On May 29, 1939, Robert Hinckley, chairman of the Civil Aeronautics Authority (CAA) formally dedicated the CAA's Indianapolis Experimental Station (later renamed the Technical Development and Evaluation Center and then the Technical Development Center). In 1938, the CAA received funding to establish an aviation research center. The CAA acquired a site in Indianapolis, Indiana, through a long-term lease arrangement with the city. The

CAA Indianapolis Experimental Center
Courtesy: FAA

facility, which the City of Indianapolis built in one year under contract to the CAA for $800,000, sat on a one-thousand-acre tract of land adjacent to the Indianapolis Municipal Airport (later called Weir Cook Airport).[2]

After the 1956 mid-air collision over the Grand Canyon, which resulted in the deaths of all passengers and crew on both aircraft, President Dwight D. Eisenhower signed the Airways Modernization Act in August 1957. The act established the CAA Airways Modernization Board and charged it with the development and modernization of the national system of navigation and air traffic control facilities. The board served as an interim organization until a permanent agency could be established to oversee civil aviation. With a clearly defined mandate and sufficient funding to undertake an expanded aviation research and development program, the board established a new technical center. It selected a site near Atlantic City, New Jersey, from over 1,800 proposed sites to develop the National Aviation Facilities Experimental Center (NAFEC).[3]

When the new Federal Aviation Agency superseded the CAA and took over the duties of the Airways Modernization Board in December 1958, NAFEC became the technical arm of the new agency, and the Indianapolis center closed. Upon taking over as the first FAA administrator, Elwood "Pete" Quesada freely admitted that the CAA had been weak in research and development. "It was to be expected since they were not a research-and-development-conscious group," he explained. Despite his desire to create a first-class aviation R&D center, Quesada had difficulty attracting capable R&D personnel to the FAA. The facility's closure in Indianapolis and transfer of its personnel to NAFEC brought a one-shot influx of scientific and engineering talent into the new agency. However, it faced continuing competition for engineers from the newly created National Aeronautics and Space Administration and the Atomic Energy Commission.[4]

Located on a 5,059-acre site, NAFEC boasted an all-weather airport and 184 structures. Most scientists and engineers worked in temporary buildings dating from World War II. The facilities lacked modernity and new equipment, making it challenging to undertake various experiments. According to an interview in 1980 with the building program manager Thomas Brennan, in those early years, "studies showed we were losing 100 man-years per year because of people just traveling among these buildings." Bob Yannetti added in the same interview, "The old buildings leaked, were cold in winter and hot in summer." For example, NAFEC engineers used a reconfigured warehouse for the center's first computer lab. Yannetti explained that every time researchers set up a new piece of equipment in that lab, "we would ask . . . Will the floor hold up? Is there enough a/c [air conditioning] in the building? Can we generate enough power?"[5]

In 1963, the FAA's second administrator, Najeeb Halaby, approved in principle a three-phased building program that would improve and modernize the center's facilities. In 1964, Halaby funded Phase I of the project, the construction of a modern aircraft maintenance facility, fire/crash stations, and a central utility plant. Although the agency completed Phase I construction in 1968, it did not have sufficient funding to modernize other facilities.[6]

In 1973, the expense and inconvenience of continuing to work in dilapidated buildings led Administrator Alexander Butterfield to consider closing NAFEC. The administrator strongly believed modernization and cost reduction could be achieved by combining NAFEC with the

FAA's Aeronautical Center, the agency's large technical and training facility in Oklahoma City. Butterfield appointed a review team to study the question. In their 1974 report, the team concluded that moving NAFEC to Oklahoma would save $66 million over ten years compared to continuing at the present site.[7]

Local citizens quickly responded to the threatened closing, arguing such a move would be a severe blow to a region already suffering from chronic unemployment. The "Save NAFEC Committee," supported by a former Atlantic City mayor, NAFEC's first director, William Cowart, and others such as freshman Representative William J. Hughes (D-NJ), proposed developing a construction and lease agreement between the city and the FAA. Once this committee had the FAA's attention, the Atlantic County Improvement Authority (ACIA), an organization of volunteers empowered to follow up on the recommendations of the "Save NAFEC" group, entered into the discussions.[8]

Despite the protests and the work of local citizen groups to keep NAFEC open, Butterfield remained convinced that closing the center represented the best option. He reported to Secretary of Transportation Claude Brinegar that the potential savings and operational advantages of consolidation of NAFEC and the Aeronautical Center outweighed any cons. Brinegar, however, delayed his decision, and the issue remained unresolved until after Butterfield and Brinegar left office.[9]

ACIA continued work to save NAFEC. With the help of investment advisors, ACIA secured financing for a new building complex through the Irving Trust Company and Prudential Insurance Company of America. With funding, ACIA coordinated with an architect, construction manager, interior designer, Egg Harbor Township officials, and the federal government to bring the project to fruition.[10]

Unlike his predecessor, Acting FAA Administrator James Dow believed the Aeronautical Center and NAFEC could pursue their differing missions more effectively in separate locations. He doubted that the cost savings to be achieved by the move would outweigh the disruption and possible loss of efficiency. Agreeing with Dow's views, in May 1975, Secretary of Transportation William Coleman announced that NAFEC would remain in New Jersey.[11]

President Carter, at the podium, during the groundbreaking ceremony for the Tech Center's new headquarters building.
Courtesy: FAA

On September 20, 1978, President Jimmy Carter broke ground for the new $50 million technical and administrative headquarters building, being constructed by the ACIA for lease to the FAA for twenty years at an annual rent of $5.8 million. That day, President Carter told the crowd: "Throughout its 20 years of existence and service, this facility has led the way in developing new technologies for civilian enterprise, which has given our nation the safest possible record in the air of all modes of transportation. Its experiments here have made possible innovations such as crash-avoidance techniques, rescue techniques, fire safety, airway-runway designs, lighting systems, structural stress, turbulence, radar, and many others of a similar benefit to the American people."[12] Phase II of the construction envisioned by Najeeb Halaby in 1963 had begun.

To the two thousand FAA employees working at NAFEC in World War II-vintage buildings, the groundbreaking ceremony marked the beginning of a two-year construction project that signaled the permanence of NAFEC in New Jersey. As construction began, NAFEC was celebrating its twentieth anniversary. It brought renewed hope and vigor to the center. As a

NAFEC brochure stated in 1978, "The 20th birthday starts a new era of permanency. Gone forever are the continual recurring rumors that the Center will be shut down and moved elsewhere, damaging employee morale and creating uncertainty in the community." The commemorative pamphlet not only proclaimed a new era for NAFEC but also proudly announced, "As the FAA's test center, NAFEC will continue to grow in importance and will play" an even more significant role "in the safety and progress of aviation."[13]

On May 29, 1980, Vice President Walter Mondale, New Jersey Governor Brendan Byrne, and FAA Administrator Langhorne Bond dedicated the new headquarters building. During the ceremony, in a testimony to the local community's efforts to save NAFEC, Mondale called the new building a "symbol of cooperation and of government doing things right."[14] That day, Bond formally changed the facility's name from the National Aviation Facilities Experimental Center to the FAA Technical Center. (In 1996, the FAA renamed it the William J. Hughes Technical Center.) The day before the ceremony, the agency dedicated a new heliport at the facility, and on June 20 dedicated a new fire research building.[15] The center had finally come of age.

As predicted in 1978, with new facilities and invigorated funding, the center now had sufficient resources to make an even more significant impact on the aviation community. Beginning in the 1980s, it expanded its R&D efforts in safety, air traffic control, and security technologies. At any given time, center employees had more than 150 active projects underway, including testing and evaluation in air traffic control, communications, navigation, airports, aircraft safety, and security. Activities involved long-range development of innovative systems and concepts, new equipment and software development, and in-service modification of existing systems and procedures. In particular, the center became a unique and critical tool for the agency as it began its air traffic modernization program because of its ability to conduct total system testing and integration.

Aeronautical Center

FAA Mike Monroney Aeronautical Center
Courtesy: FAA

In January 1941, the CAA opened its Standardization Center at the Houston Municipal Airport in facilities vacated by a National Guard squadron sent overseas as part of the war effort. The CAA planned to use the center for aviation inspector training. For the previous three years, the agency trained inspectors at Wayne County Airport in Michigan, covering its employees and members of the Army, Navy, and aviation industry. When, as the CAA explained, "fast-moving aviation developments rendered these facilities inadequate," the agency moved its training operations to the larger facility in Houston. The agency's three hundred inspectors received two weeks of standardization work each year to keep them abreast of the newest developments and practices.[16]

The agency used the center as a training facility to promote uniformity in the agency's inspection and instruction methods and examinations for all types of pilot certificates. It provided mandatory refresher courses for all flight inspection personnel and required classes for new employees before they went to their regular duty posts. The agency also trained its supervisors overseeing the Civilian Pilot Training Program there. With the outbreak of war, the center expanded its regular program to instruct multi-engine pilots for ferrying duty with the Army Air Forces. It trained flight officers and instructors for the Link Trainer, a flight simulator.[17]

Knowing the move to Houston would be temporary—the National Guard unit would return after the war—the CAA began looking for a more permanent home for the Standardization Center. On September 11, 1940, Administrator Donald Connolly announced the City of St. Petersburg, Florida, had agreed to lease, on a dollar-a-year basis, the Grand Central Airport for the new permanent center. Connolly explained the need for such a center: "We have learned from experience that much more uniform standards can be achieved by inspection personnel in such a rapidly expanding program if inspectors are given demonstrations and tests annually at a center specially equipped for this purpose." The contract with the City of St. Petersburg would be for the airport, the administration building, the hangar, and other facilities. The agency liked the location because of its favorable year-round weather, its land and seaplane facilities, and because the city agreed to spend $70,000 to purchase an additional seven hundred acres to meet CAA requirements for new or upgraded facilities.[18] Until the agency and city completed the new facility, the CAA would operate from the Albert Whitted Airport in St. Petersburg.[19]

While negotiations between the St. Petersburg city council and the CAA continued, the Army Air Forces caught wind of the CAA plans. The Army contested the move because its air corps training base at MacDill Field was less than forty miles from the proposed center site.[20] Unable to overcome Army objections, the CAA canceled plans to move to Florida and began looking for a new location.

Three men from Oklahoma—Bennett Hill Griffin, director of the CAA Standardization Center; Stanley C. Draper, manager of the Oklahoma City Chamber of Commerce; and Representative Almer Stillwell “Mike” Monroney (D-OK)—spearheaded the CAA’s eventual move to Oklahoma City. Before the U.S. entered World War II, the Army Air Corps took over the Oklahoma City airport, renamed the Will Rogers Airport. After the war, the airport returned to municipal control. On March 15, 1946, the CAA announced the selection of Will Rogers Field for the location of its new aeronautical center.

The agency began moving personnel to Oklahoma City on May 1, 1946. It took over the Army's hangars and other facilities, and the Oklahoma City council agreed to build an administration building and two new hangars for agency use. The agency relocated the Standardization Center from Houston, the general aircraft maintenance base for the Midwest, and the Signals Division School, which had been based at the Signals Training Center in Fort Worth, Texas, to the new location. The agency eventually planned to move all federal airways schools and similar agency activities, such as its parts and overhaul base to repair CAA aircraft and a school for training tower operators.[21]

The Aeronautical Center continued to grow after its relocation to Oklahoma. The agency held a groundbreaking ceremony on February 13, 1957, to expand the facility. Financed by the city with a $10,665,000 bond issue, the new buildings replaced temporary ones, mostly World War II metal barracks. The CAA ultimately concentrated the shop and warehousing activities of its continental regions and many of its new training programs at the enlarged facility. On June 30, 1958, the agency moved its civil aeromedical research program to the center.

On October 31, 1959, the Federal Aviation Agency, which superseded the CAA in 1958, announced plans to construct a new building for the Civil Aeromedical Research Center (later named the Civil Aeromedical Research Institute) to carry out its assigned responsibilities for research in aviation medicine. Almost three years later, on October 21, 1962, FAA Administrator Najeeb Halaby dedicated the new $8.5 million custom-designed building. Programs carried out in the new facility were investigation of topics such as the "true" age of pilots as opposed to their chronological age, effects of certain prescription drugs on aircrew members, crash-impact survival, methods for selecting trainee controllers, stress experienced by controllers, and the bearing of such stress on the desirability of an early retirement program. On September 30, 1966, the FAA consolidated its aeromedical research function into one location by transferring its activities from the Georgetown Clinical Research Institute in Washington, DC, to the then-named Civil Aerospace Medical Institute (CAMI) in Oklahoma City.

The FAA dedicated the Aviation Records Building on October 18, 1964, and on October 30, 1969, dedicated its new Systems Training Building at the center. In addition to classrooms for air traffic control and systems maintenance personnel training, the building contained simulators, computers, and other equipment for training FAA personnel. In July 1970, the agency announced an expansion of the air traffic controller training facilities. A new building would expand office space and bring more air traffic control training classrooms. Almost a year later, the Secretary of Transportation established the Transportation Safety Institute (TSI) at the center. Initially operated by the FAA, the school provided training in investigating accidents and incidents in all modes of transportation and related regulatory matters. In 1977, TSI became part of the Department of Transportation's new Research and Special Programs Administration.

President Jimmy Carter signed a law on June 19, 1978, renaming the center the Mike Monroney Aeronautical Center. Monroney represented Oklahoma in both houses of Congress for thirty years and served as chairman of the Senate Aviation Subcommittee from 1955 until his retirement in 1969. He had been a principal sponsor of the Federal Aviation Act, the Airport and Airways Development Act, and many other pieces of aviation legislation. At that time, the

Aeronautical Center was the largest FAA facility, incorporating the FAA Academy, a records center for aircraft and airmen's certificates, a FAA supply depot, and CAMI.

Mary Ellen Monroney (wife of Mike Monroney) and FAA Administrator Langhorne Bond renamed the Aeronautical Center after Senator Monroney. Courtesy: FAA

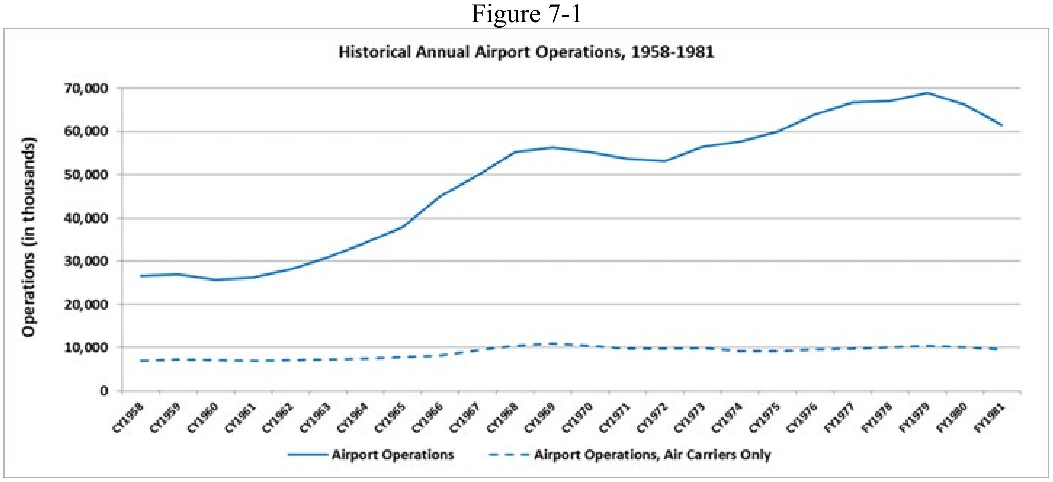
On October 13, 1978, Administrator Langhorne Bond presided over ceremonies rededicating the facility in Monroney's honor. Monroney did not attend the ceremony because of ill health, but his wife, Mary Ellen, traveled to Oklahoma City. She remarked the center "is what Mike dreamed about long ago. If he could see this, it would be way beyond his expectations."[22] Monroney died on February 13, 1980, and per his wish, some of his ashes were spread over the Aeronautical Center campus.

The projected growth in future airport demand is a central concern which we will investigate . . . we want to . . . explore the potential for instituting operational and other low capital improvements at the existing airports as a means of increasing the capacity at these airports which, in turn, could delay the need for constructing proposed new airports. –Deputy Secretary of Transportation Alan Butchman[1]

Chapter 7: Attention to Airports

The month before President Carter's inauguration, the FAA issued its annual aviation forecast. The report, published on December 2, 1976, predicted the number of passengers carried by U.S. scheduled airliners would double over the next twelve years. When airline deregulation became a reality, the report's authors predicted it would have a substantial impact on its air traffic facilities and airports. For example, they believed takeoffs and landings at the nation's airports would increase from 62.5 million in fiscal year 1976 to 107.7 million by 1988.[2] They predicted that as many as ten new airports might be required to handle the increasing traffic by 2000. Cities in critical need of new airports included Atlanta, Chicago, Denver, Minneapolis, Seattle, and St. Louis.[3]

Figure 7-1



Source: 1958-1963: Civil Aeronautics Administration, *CAA Statistical Handbook of Civil Aviation*, various; 1964-1981: Federal Aviation Administration, *FAA Statistical Handbook Aviation*, various. Administration, of FAA Statistical Handbook Aviation, various.

Lambert in Limbo

The FAA realized the cost of planning and addressing environmental, public, and political concerns could delay or even prohibit the construction of new airports. The case of building a new airport in the St. Louis metropolitan area highlighted some of the issues surrounding new airport construction. For decades, many in the aviation community predicted St. Louis would need a new major airport because of St. Louis Lambert International Airport's limited capacity.

New airport advocates believed a new facility should be built on the east bank of the Mississippi River in the vicinity of Waterloo and Columbia, Illinois, where it would have a more negligible environmental impact. However, Missouri politicians and community representatives argued that Lambert should be revitalized and expanded to handle more traffic, or a new airport could be built on the west bank of the river in Missouri. The FAA officially recognized the need for a new air carrier airport in the St. Louis area in 1968 when it included it in the National Airport System Plan.

During Senate hearings on the Department of Transportation (DOT) appropriations in 1975, Senator Charles Percy (R-IL) explained, "The battle over whether a second St. Louis airport should be built in Illinois or Missouri has raged since 1944." He said, "Lambert Field may have the dubious honor of being the most studied airport in the Nation. Due to the controversy, 38 studies have been made . . . costing the American taxpayer nearly $3 million. $3 million is a lot of money when there is a site in Columbia/Waterloo, Ill., which is ready for development."[4]

Naturally, Senator William Stuart Symington (D-MO) disagreed with Percy's views that Lambert could not be improved. He cautioned his Senate colleagues not to pursue awarding grant money to purchase property at the proposed Illinois airport site until consultants finished preparing an airport master plan and an air traffic forecast for Lambert. Symington alluded that a new airport would be "an expensive and possibly unnecessary replacement" for the St. Louis airport.[5]

On September 1, 1976, Secretary of Transportation William Coleman approved a grant to acquire land for a new airport near Waterloo, Illinois. In the eighty-eight-page document justifying the decision, he recognized, "The aeronautical, economic, environmental, social and institutional aspects of this decision are complex and controversial."[6] A coalition of supporters favoring expanding Lambert filed suit in federal court, hoping to overturn the decision. They claimed Coleman exceeded his statutory authority and acted arbitrarily and capriciously in approving the grant for the Illinois site. On November 3, 1976, the DOT agreed to freeze until December 15, the dispersal of funds for the Illinois airport project, requesting a temporary restraining order moot. On November 17, 1976, the court denied the Missouri coalition's motion for a preliminary injunction and imposed a stay on discovery. On February 8, 1977, the court rejected the coalition's motion for reconsideration and granted the motion for summary judgment, deciding to uphold the Coleman decision.[7]

The court decision, however, did not end the dispute, which became a hot political issue for the incoming Carter administration. In a memo to the president on February 11, 1977, Secretary of Transportation Brock Adams listed high-visibility issues pending at his department. Adams recorded the St. Louis Airport as the third most important issue, behind Concorde landing rights and a new bilateral agreement with Great Britain. As he explained:

> . . . the District Court upheld Secretary Coleman's decision to approve a Federal grant to the Illinois chartered airport authority to acquire land. . . . An initial grant of $100,000 was awarded prior to January 20, 1977. The State of Missouri strongly opposes the Illinois airport and considers its own facility

> adequate for the foreseeable future. . . . I have agreed to meet with Senators [Adlai] Stevenson [D-IL] and [Thomas] Eagleton [D-MO] on this issue and I believe it is important not to make any commitments until after those meetings have been completed.[8]

On February 25, Adams met with a group of Missouri politicians, including the state's congressional delegation—Senator Eagleton and seven additional senators and representatives—as well as Missouri Governor Joseph Teasdale and other state officials. In a lengthy presentation, the group argued why the FAA should not fund a new airport in Illinois. After hearing the delegation's concerns, on March 16, FAA Administrator McLucas suggested to Adams that, based on current data, the secretary should continue with the land acquisition efforts for a possible new airport in Illinois "and decide later when to go any further on the [Illinois] project."[9]

Despite McLucas's recommendation, on March 30, 1977, Adams announced the withdrawal of federal support for the Illinois site. In reversing his predecessor's decision, Adams called the Coleman decision premature. He acknowledged the strong political opposition in Missouri to the project and the recent signing of long-term leases by major airlines at the existing Lambert-St. Louis Municipal Airport influenced his decision. McLucas, however, told Adams that although the airlines extended their leases, they "are not bound by virtue of this lease extension to serve Lambert and Lambert exclusively through 1995." Perhaps the fact that Senator Eagleton served on the Senate's powerful Appropriations Committee's Transportation Subcommittee at the time of the decision, while Adlai Stevenson served as the chairman of the less powerful Select Committee on the Senate Committee System, helped influence Adams' decision.

Although the issue did not arise during Brock Adams' confirmation hearings, it did for FAA administrator nominee Langhorne Bond. He was a leading advocate of the Illinois site while serving as that state's secretary of transportation and had lobbied Congress to support the Waterloo site. Bond agreed during his confirmation hearings not to take part in any decisions regarding a new St. Louis airport. When asked if he would speak out if it became apparent Lambert Field could not meet air service needs, Bond tactfully replied, "Whenever you're caught between two Senators, the best thing to do is to hand the question off to somebody else, and I'll defer to [FAA deputy administrator] Quent Taylor."[10] Although the controversy did not die after Adams' announcement, construction never began on the Illinois airport, which, if built, would have dwarfed Lambert in size and capabilities.

Development Assistance

On July 12, 1976, President Gerald Ford signed the Airport and Airway Development Act Amendments of 1976 (PL 94-353), ending a one-year lapse in authorization for federal airport aid. The legislation marked the third time Congress amended the act since 1970. The new law raised Airport Development Aid Program (ADAP) funding levels to $2.73 billion for fiscal years 1976-1980. It increased the federal share for ADAP grants from 50 percent to 75 percent for the nation's sixty-seven largest airports. For smaller airports, the federal share rose from 75 percent to 90 percent for 1976-1978 and 80 percent for 1979-80. The federal share for planning grants rose from 66.6 percent to 75 percent, with some exceptions.[11]

The new law simplified funding procedures and expanded the types of projects eligible for ADAP assistance, such as snow removal equipment, equipment, barriers, landscaping, and land acquisition for noise reduction. In addition, the legislation authorized appropriations from the Airport and Airway Trust Fund during fiscal years 1976-80 of $1.3 billion for establishing and improving federal air navigation facilities, $1.5 billion for maintaining such facilities, and almost $1.3 million to assist the states in developing their own general aviation airport standards. The law established commuter service airports, a new class of air carrier airports not served by carriers holding CAB certificates of public convenience and necessity. Other provisions of the law authorized the Secretary of Transportation to select four states to receive demonstration grants for administering the general aviation portion of the ADAP program. If not reauthorized by Congress, the airport aid program would end on September 30, 1980.[12]

On March 31, 1977, the Carter administration announced grant agreements worth $5.8 million with Arizona, Michigan, Pennsylvania, and South Dakota as part of the new general aviation airport demonstration program. The agency selected the four states from a pool of twenty applicants based on factors such as location, the significance of general aviation to the state, and the scope of the state's general aviation development program. Under the program, each state agreed to assume all administrative costs for its program.[13]

Besides initiating the demonstration program, the Carter administration quickly began drafting legislation extending ADAP past the September 1980 authorization deadline. In 1978, Secretary of Transportation Brock Adams created a task force led by the FAA Assistant Administrator for Airport Programs, Robert Aaronson, to draft that legislation. He asked task force members to develop options for continuing the ADAP program and determine how best to use the Airport and Airway Trust Fund money. The FAA held a conference on June 1, 1978, to start the public planning process. It asked the conferees to provide the following:

- estimates of future airport and airway system needs
- ideas for financing programs that could support the level of estimated needs
- opinions on FAA-developed alternatives or options
- recommendations on particular legislative provisions, such as program requirements, administration, and items eligible for funding
- the appropriate roles for local, state, federal governments, and airport sponsors in planning, capital development, and operations and maintenance[14]

Task force members held a series of meetings across the country to obtain information from aircraft manufacturing firms, airports, and other aviation facilities. Those meetings began in Wichita, Kansas, then moved to Chicago, Illinois; Madison, Wisconsin; Los Angeles, California; San Diego, California; Phoenix, Arizona; and Las Vegas, Nevada.[15]

The agency hoped to submit its legislative proposal in early 1979, but it took longer to write than anticipated. Adams sent the proposal, largely written by the FAA on behalf of the Carter administration, to Congress on April 24, 1979. The proposal included $6.6 billion to improve the nation's airport and airway safety system for five years beginning in fiscal year 1981.[16]

In identical letters to President of the Senate Walter Mondale (D-MN) and Speaker of the House Thomas "Tip" O'Neill, Jr. (D-MA), Adams emphasized the nation's dramatic growth in air transportation, stimulated in part by deregulation, required a "reemphasis on aviation safety" regarding airports. Under the 1970 legislation, the FAA administered airport development and planning funds to four categories of airports: air carrier, air commuter service, reliever, and general aviation. If passed, the draft bill would eliminate the four categories, giving all grant applicants access to the funding pool. It would also include public-use airports, which could be privately owned, in the grant program. Writing, "Our current experience causes us to believe that . . . categorization of airports is neither useful nor desirable," Adams argued that a consolidated program would give airport sponsors access to a larger pool of funds to meet their development needs.[17]

The draft legislation called for increased authorization levels for airport modernization and upgrading of airway facilities for fiscal years 1981-1985. The authorization would rise from $250 million in 1980 to $350 million in 1981 to $490 million by 1985. Airport improvement grants would grow from $700 million in 1981 to $900 million in 1985. In addition, the proposal included increases in facilities and equipment funding to finance the acquisition, establishment, and improvement of radars, navigation aids, instrument landing systems, and the hiring of air traffic controllers. A gradual increase in research, engineering, and development funding would lead to new advanced technologies to improve safety. The bill also would allow federal airport grants to soundproof schools, hospitals, and public health facilities near airports and to acquire noise monitoring equipment.[18]

Perhaps the most controversial section of the proposal focused on restructuring the aviation user-tax structure. The draft bill called for replacing the current seven cents per gallon tax on aviation fuel with a 10 percent tax on the retail sale price of the fuel. It also proposed a 6 percent excise tax on the sale of new aircraft and avionics for use in noncommercial aviation.

According to Adams, the two changes "would result in an appreciable increase in cost recovery from the general aviation sector, which contributed approximately 14 percent of the costs incurred by the FAA for providing services for general aviation's benefit." He pointed out that air carriers paid over 90 percent of the costs.[19] In a press conference, FAA Administrator Bond called the draft legislation neither anti-business nor anti-general aviation. He commented the agency believed general aviation should "pay their fair share" but acknowledged there would be "an uphill fight in Congress" to pass the bill.[20]

The proposal recommended establishing a block grant program for states to administer the airport improvement funds. According to the FAA, the program would allow those states with demonstrated capability to participate voluntarily in administering airport grants for use at smaller air carrier and general aviation airports. For a state to qualify, it would have to:

- collect safety data on the public use airports within the state
- give notice to airport sponsors within the state that it intended to apply for a block

grant
- have a state airport system plan consistent with federal criteria
- have an agency capable of administering the block grant
- submit a federally approved consolidated improvement plan and an annual expenditure program to monitor compliance with federal airport regulations[21]

In addition, the draft bill included funding for reliever, or satellite airports, under a new funding category called primary hubs. This new apportionment category would provide funds for approximately forty development projects at airports within the hub area. The FAA defined a primary hub as a collection of airports that enplaned 0.5 percent or more of the total number of passengers annually at all commercial service airports within the hub. In other words, about 1,375,000 passengers would have had to be enplaned by the airports in the calendar year 1979 to qualify as a primary hub in fiscal year 1981. A primary hub would get fifty cents for each passenger enplaned.

The aviation community, for the most part, opposed the draft bill for various reasons. For example, the General Aviation Manufacturers Association (GAMA), with an intense lobbying effort on Capitol Hill, opposed increased taxes on general aviation. The organization's president, Edward Stimpson, testified, "General aviation is willing to pay reasonable and fair user charges for modernization, expansion, and operation of the airport-airways system." He pointed out, however, that the "administration's proposal would have a very detrimental impact on the general aviation marketplace. The [excise tax] would not in any way be related to use in the system."[22]

Legislative History of Federal Aid to Airports

May 13, 1946: The Federal Airport Act established the federal aid airport program. The act authorized appropriations of $500 million for the contiguous United States and $20 million for Alaska and Hawaii over a period of seven years, beginning July 1, 1946. Federal allotments were to be matched by local funds.

June 30, 1961: The Federal Airport Act Extension, Public Law 87-255, extended the Federal Airport Act for three years. It authorized a total of $225 million, with $75 million available for obligation each year. It earmarked $7 million a year to provide separate facilities for general aviation; restricted construction of terminal buildings to costs directly related to the safety of persons; prohibited the approval of any project, which did not include provision for installing certain specified landing aids, such as high-intensity runway lighting; increased the federal share of the installation of such aids from 50 percent to a maximum of 75 percent; provided that funds allocated to a state under the apportionment formula, which are not obligated within two fiscal years, shall become available for use in any state at the discretion of the administrator; and required publication by January 1 each year of the proposed program for airport development during the next fiscal year.

May 21, 1970: Public Law 91-258, which included Title I, the Airport and Airway Development Act and Title II, the Airport and Airway Revenue Act of 1970, created the Airport and Airway Trust Fund. Its revenues came from aviation user taxes: an 8 percent tax on domestic passenger fares; a $3 surcharge on passenger tickets for international flights originating in the United States; a tax of 7 cents per gallon on gasoline and jet fuel used by aircraft in noncommercial aviation; a 5 percent tax on airfreight waybills; and an annual registration fee of $25 on all civil aircraft, plus (1) in the case of piston-powered aircraft weighing more than 2,500 pounds, 2 cents for each pound of maximum certificated takeoff weight, or (2) in the case of turbine-powered aircraft, 3.5 cents for each pound of maximum certificated takeoff weight. Under the act, the trust fund could be used to pay capital costs, and when excess funds existed, could also help cover the FAA's administrative and operations costs.

November 27, 1971: An amendment to the Airport and Airway Development Act of 1970, specified: No trust fund money could be appropriated to carry out any program or activity under the Federal Aviation Act other than acquiring, establishing, and improving air navigation facilities.

- Any excess of trust fund receipts over airport-airway capital investments could be applied toward the cost of administering the airport and airway development programs.
- Funds equal to the minimum amounts authorized for each fiscal year for airport and airway development had to remain available in the trust fund until appropriated for airport-airway development.

June 18, 1973: The Airport Development Acceleration Act of 1973 (Public Law 93-44) for the second time amended the basic Airport and Airway Development Act of 1970. It increased the annual funding level of the Airport Development Aid Program (ADAP) from $280 million to $310 million; raised the federal share for development of general aviation airports, reliever airports, and the smaller air carrier airports from 50 percent to 75 percent; and obligated the federal government to pay 82 percent of the costs of safety equipment required for airport certification, as compared to the previous 50 percent. The amendment also prohibited states and localities from levying a "head tax" on passengers.

June 30, 1975: The original five-year funding authority for the Airport and Airway Development Act of 1970 lapsed.

July 12, 1976: The Airport and Airway Development Act Amendments of 1976 raised ADAP funding levels to a total of $2.73 billion through 1980. It increased the federal share of the grants from 50 percent to 75 percent for the nation's 67 largest airports. For smaller airports, the federal share rose from 75 percent to 90 percent for fiscal years 1976-78 and 80 percent for 1979-80. The federal share for planning grants rose from 66.6 percent to 75 percent, with some exceptions. The new law expanded the types of projects eligible for ADAP assistance to include snow removal equipment as well as equipment, barriers, landscaping, and land acquisition for noise abatement. It also authorized appropriations from the trust fund during fiscal years 1976-80: $1.3 billion for establishing and improving federal air navigation facilities, $1.5 billion for maintaining such facilities, and $1.275 million to assist the states in developing their own general aviation airport standards. Other provisions of the law included authorizing the Secretary of Transportation to select four states to receive demonstration grants for administering the general aviation portion of the ADAP program. The law also established commuter service airports, a new class of air carrier airport not served by carriers holding Civil Aeronautics Board certificates of public convenience and necessity.

Robert Monroe, representing the Aircraft Owners and Pilots Association (AOPA), a general aviation group, attacked the objectivity of the FAA cost allocation study, which the agency used to draft the legislative proposal. He claimed the study's assumptions were erroneous. He worried that "in no way, based on any patterns of use, would it be possible for general aviation not to be saddled with the major share" of the cost of operating the national airspace system. He said general aviation represented 98 percent of the aircraft using the system and accounted for the highest number of operations, but the system was "not established for us." He argued that the national airspace system evolved from responding to the legitimate needs of commercial aviation. To saddle the general aviation community with the lion's share of operating the system, he said, would be "unrealistic and unfair."[23]

With the submission of the draft legislation, the aviation community joined efforts to develop alternatives to fund airport and airway development. Unlikely partners, such as the National Business Aircraft Association (NBAA), Air Transport Association (ATA), AOPA, American Association of Airport Executives (AAAE), Commuter Airline Association of America, GAMA, and the National Air Transportation Association, fueled by mutual concerns about capacity and safety, established a user group called the Aviation Community Coalition for Efficient National Transportation, (ACCENT), chaired by NBAA President John H. Winant. As Winant explained, the members of ACCENT became "alarmed by the shortcomings of effective existing development programs and by longstanding administration policies which prevented use of aviation trust fund monies for their intended purposes." AOPA, an original ACCENT partner, left the group over a fundamental disagreement over the ADAP proposals. ACCENT thought the basic concept of the 1970 ADAP was good but advocated for changes. AOPA, on the other hand, wanted a new approach altogether.[24]

Congress did not immediately act on the legislative proposal. Instead, Representative Glen Anderson (D-CA) introduced another version of the legislation in the House of Representatives on April 10 (HR 3599), and Harold Johnson (D-CA) introduced another bill on April 25. Senator Howard Cannon (D-NV) proposed his version (S 1581), which he presented on July 26. The Senate Committee on Commerce, Science, and Transportation, Subcommittee on Aviation, and the House Public Works and Transportation Committee, Subcommittee on Aviation, held hearings on airport and airway legislation in September 1979.

Cannon's bill, in many respects, proved similar to the administration's draft legislation. In one of the significant differences, however, Cannon proposed to eliminate federal funding for all but smaller airports. He wanted to pull seventy-two large and medium airports out of the government system, allowing them to get development money directly through increased user fees. According to Cannon, doing so would "eliminate the middle man [the federal government], reduce the red tape for airport development, and speed up the implementation of needed capital improvements."[25] In addition, Cannon recommended reducing the passenger ticket tax to 2 percent, while the administration's bill left the tax at 8 percent.

The Carter administration disagreed with defederalizing large airports and vehemently opposed the lack of a general aviation tax. With Cannon's increased emphasis on establishing more reliever, commuter, and satellite airports, Bond stated, "It seems to me that this argues for their paying a proportionately greater, and thus more equitable, share of the program's costs."[26]

Aviation Week & Space Technology, in the issue published after the hearing, outlined the testimony of the various aviation groups. According to the magazine, none of the aviation groups supported the administration's proposal, and all had varying concerns about the Cannon bill:

- AAAE expressed concern about defederalization and suggested a phased approach for dropping airports from access to federal grant money.

- ACCENT opposed the administration's bill and supported Canon's concept of using the $2.5 billion surplus in the aviation trust fund for smaller airports and reducing the ticket tax from 8 to 2 percent. It feared the bill moved too quickly toward defederalization.
- AOPA supported provisions of both bills but overall favored the Cannon bill. The organization expressed concerns that dropping large and medium-sized airports from the federal funding mechanism would free those airports from having to serve general aviation since the FAA would no longer be able to deny future grants to force compliance. The organization urged Congress to include the enforcement section in the FAA-proposed and Cannon bills.
- ATA preferred Cannon's bill, but with a modification that eliminated block grants to states for smaller airports and allowed the federal government to administer those funds instead.
- GAMA applauded the Cannon bill but worried the increased fees airports would charge to replace the amount lost with the reduction of the airline passenger tax from 8 to 2 percent would be so high as to exclude general aviation from the larger airports. The organization called for the federal government to invest more in small general aviation airports.
- National Association of State Aviation Officials favored the Cannon bill but expressed concern that defederalization of the large airports could cause unforeseen problems. They proposed a new version of the draft legislation written by their members.
- ALPA supported the Cannon bill but expressed concern over whether funding smaller airports with airline service could help them meet safety requirements.[27]

Despite lengthy hearings and public debate regarding federal aid to airports, the 1980 presidential and congressional election campaigns halted much of the congressional activity. ADAP funding lapsed on September 30, 1980, because Congress failed to extend or replace legislative authorization. Congress also did not authorize the collection of user taxes paid into the Airport and Airway Trust Fund. As a result, congressional inaction resulted in the expiration of some taxes, with others reduced to the levels collected before July 1, 1970. Taxes eliminated included the 5 percent air cargo tax, the three-dollar international departure fee, the aircraft use tax, and the jet fuel tax. The 8 percent passenger ticket tax, reduced to 5 percent, went into the Department of Treasury's general fund. The general aviation gasoline tax, reduced from eleven to four cents per gallon, went into the Highway Trust Fund, which also received revenues from continuing taxes on aircraft tires and tubes.

Although it no longer received any tax revenues, the Airport and Airway Trust Fund continued to exist and receive interest payments on the Treasury bills in which it invested its liquid assets. While the FAA ceased to award grants from the fund, the agency continued to liquidate obligations previously made under the program. The trust fund continued supporting FAA facilities and equipment and the agency's research, development, and engineering program.[28] Congress considered other versions of legislation to continue an airport grant program in modified form after the lapse, and new proposals remained on the agenda for the incoming 97th Congress.[29]

The 97th Congress renewed discussions on the airport grant program but initially failed to pass any legislation. Most aviation special interest groups still opposed certain parts of the proposed bills. However, on August 13, 1981, President Ronald Reagan signed the Fiscal Year 1981 Airport Development Authorization Act, which briefly renewed ADAP. The law authorized $450 million in grants from the Airport and Airway Trust Fund for airport planning, development, and noise compatibility projects in fiscal year 1981. It specified that the FAA use at least $25 million for noise compatibility grants and forbade future authorization of over $600 million for the fiscal year 1982. The FAA had only until September 30, 1981, to allocate the $450 million plus another $9 million resulting from adjustments to the prior year's grants.[30]

Growing Trust Fund

In addition to the conflicting concerns of the aviation community regarding the ADAP provisions, congressional questions regarding the Airport and Airway Trust Fund also compounded the lack of action on airport funding. The Airport and Airway Revenue Act of 1970 created the trust fund to provide a dedicated funding source for the U.S. aviation system, independent of the Department of Treasury's general fund, which funded most government operations. Congress periodically had to reauthorize the authority of the FAA to collect aviation excise taxes and use trust fund monies. If the agency's authorization expired without an extension, the agency could not spend any fund revenues.[31]

Trust fund revenue came principally from various taxes paid by users of the national airspace system. Revenue sources for the trust fund included taxes on airline passenger ticket sales, segment fees, air cargo fees, and aviation fuel taxes paid by commercial and general aviation aircraft. From the establishment of the trust fund in 1970, revenues deposited into it generally exceeded spending commitments from FAA appropriations, resulting in a growing uncommitted balance. Even with the lapse in ADAP funding, the monies in the trust fund continued to accrue interest. The FAA estimated the uncommitted balance would reach $3.5 billion by the end of fiscal year 1980.[32]

According to Senator Cannon, "the Office of Management and Budget, under both Republican and Democratic administrations, has consistently sought to keep aviation trust fund revenues high and expenditures low."[33] Cannon argued, "The trust fund is not a general treasury account. It is a separate fund with its own revenue, its own expenditures, and its own $3.7 billion surplus. But because we mistakenly include such accounts as part of the Federal Unified Budget, the trust fund's annual excess revenues over expenditures gives the illusory image of reducing the Federal deficit, even though the trust fund revenue cannot be used to offset the debts of other accounts."[34]

Amid growing criticism of the uncommitted surplus, the Carter administration's draft legislation proposed gradually decreasing the surplus. Secretary Adams wanted to sharply increase the number of capital programs financed by the fund. In addition, instead of paying for the costs of maintaining and operating the airway system from the general fund, he proposed using the trust fund monies to finance those costs.[35] The Carter administration, as had previous administrations, failed to resolve the trust fund issues.

Supported Satellites

Frederick County Municipal Airport (MD)
Courtesy: D. Talabac via Wikimedia Commons

The increasing activity at airports, especially after deregulation, and the growing public concern about airport safety after the mid-air collision near San Diego, California, compelled the FAA to seek ways to relieve congestion at major hubs. On August 9, 1979, Administrator Bond outlined a new satellite airport development program to improve safety at eight-six small airports in fifty-six metropolitan areas in thirty-four states (see Table 5-1). The program goal, according to Bond, "is to relieve congestion and reduce the mix of commercial and non-commercial aircraft at major hub airports by making neighboring satellite fields more attractive to private and business fliers. . . . The growth in commercial air travel and general aviation has been enormous, and we've got to do something to reduce saturation at the hubs."[36]

The $100 million, four-year program would fund short-term development projects that would quickly yield safety and capacity benefits at the satellite airports. Projects could include the installation of instrument landing systems (ILS), visual landing aids, and automated weather reporting equipment, as well as improvements to aircraft parking aprons, taxiways, and runways.

Bond said the twenty-four ILS then on order would be diverted to the satellite fields.[37]

Criteria for selecting airports for the new program included limited capacity or instrument training relief at neighboring airports, proximity to large airports with more than twenty thousand annual air carrier operations, sponsor willingness to provide financing, and community and environmental acceptance of the satellite airport into the program. Although Bond explained he could not estimate how many aircraft would choose to divert to satellite fields, he said agency officials believed the "satellites will be immediately saturated" because the aviation community supported the program.[38]

Dependent on funding, the FAA's long-term plans called for improving as many as 236 reliever fields in seventy-five metropolitan areas. About $60 million for the new project would come from the agency's Airport Development Air Program (ADAP) and $40 million from the FAA's facilities and equipment fund. Bond subsequently announced the agency allocated $64.6 million in the fiscal year 1979 ADAP funds for 109 projects at ninety-two satellite airports in fifty metropolitan areas. In November 1980, Bond reported the agency allocated $111.1 million for 178 projects at 118 satellite airports in fifty-seven urban areas, exceeding his initial goals. He explained that Congress increased the funding available to the program by increasing the amount of discretionary funds the agency could allocate under ADAP. Bond expected the second phase of the program, scheduled to start in fiscal year 1983, to be funded solely through ADAP.

Table 7-1: Metropolitan Areas Selected for Satellite Airports during Phase I

Metropolitan Area	**Satellite Airport**
1. Albuquerque, NM	White Mesa, NM
2. Anchorage, AK	Birchwood, Alaska
3. Atlanta, GA	Atlanta Charlie Brown; Atlanta DeKalb Peachtree; Lawrenceville, and Newnan, GA
4. Baltimore, MD	Frederick, MD (ILS); Baltimore Glen Martin

5.	Birmingham, AL	Bessemer, AL
6.	Boise, ID	Caldwell, ID
7.	Boston, MA	Bedford, Beverly, Lawrence (ILS) and Norwood, MA
8.	Buffalo, NY	Genesee, NY
9.	Charlotte, NC	Monroe, NC
10.	Chicago, IL	Gary, IN; Aurora, Kankakee (ILS), and Waukegan, IL
11.	Cleveland, OH	Lorain, OH
12.	Dallas Fort Worth, TX	Denton, McKinney, and Waco, TX
13.	Dayton, OH	Dayton General
14.	Detroit, MI	Detroit Willow Run
15.	Denver, CO	Arapahoe County, Fort Collins (ILS), Greeley, and Jeffco, CO
16.	El Paso, TX	Las Cruces, NM
17.	Eugene, OR	Corvallis, OR
18.	Fort Lauderdale, FL	Fort Lauderdale Executive (ILS)
19.	Hartford Windsor Locks, CT	Brainard, CT
20.	Honolulu, HI	Oahu, HI
21.	Houston, TX	Houston David Wayne Hooks, and Brazoria (ILS), TX
22.	Indianapolis, IN	Mt. Comfort, IN
23.	Jacksonville, FL	Jacksonville Craig, IN
24.	Kansas City, MO	Richards Gebaur, MO
25.	Las Vegas, NV	Henderson, NV
26.	Little Rock, AR	Pine Bluff, AR (ILS)
27.	Los Angeles, CA	Brackett and Chino (ILS), CA.
28.	Louisville, KY	Elizabethtown, KY
29.	Memphis, TN	West Memphis, AR
30.	Miami, FL	Miami New Tamiami (ILS), FL
31.	Minneapolis, MN	Airlake, MN
32.	Nashville, TN.	Smyrna (ILS), TN
33.	New Orleans, LA	Baton Rouge, Hammond (ILS), Slidell, LA
34.	New York City, NY	Brookhaven, NY
35.	Oklahoma City, OK	Page, OK
36.	Orlando, FL	Sanford (ILS), FL
37.	Philadelphia, PA	Chester, PA (ILS) and Wilmington, DE
38.	Phoenix, AZ	Chandler (ILS), Mesa, and Scottsdale, AZ

39.	Pittsburgh, PA	Butler and Latrobe, PA
40.	Portland, OR	McMinnville (ILS) and Hillsboro, OR
41.	Providence, RI	Providence North Central State, RI
42.	Raleigh Durham, NC	Smithfield, NC
43.	Reno, NV	Carson City, NV
44.	Sacramento, CA	Yuba, CA (ILS)
45.	Salt Lake City, UT	Salt Lake City No. 2 and Provo (ILS), UT
46.	San Antonio, TX	San Antonio Stinson Municipal, and Castroville (ILS), TX
47.	San Diego, CA	San Diego Brown, San Diego Montgomery (ILS), and San Diego Gillespie, CA
48.	San Francisco, CA	Oakland, Livermore (ILS), and San Carlos, CA
49.	San Jose, CA	Palo Alto and Tracy, CA
50.	Shreveport, LA.	Shreveport Downtown
51.	Spokane, WA.	Coeur d'Alene, ID (ILS)
52.	Tampa, FL	Lakeland, FL (ILS)
53.	Tulsa, OK	Okmulgee, OK (ILS)
54.	Tucson, AZ	Ryan, AZ
55.	Washington, DC	Leesburg and Manassas, VA
56.	Wichita, KS	Newton, KS (ILS)

Source: Associated Press, Washington Dateline, August 7, 1979

Securing Slots

The administration’s draft ADAP proposal included a provision to authorize the Secretary of Transportation to prescribe limitations on the number of aircraft operations at an airport for safety, efficient use of the airspace, and the control of congestion.[39] Passage of the Airline Deregulation Act allowed a significant number of new airlines to enter service. As a result, airports faced increasing demands for airport takeoff and landing slots (landing or takeoff times). Without the legislation, the FAA had to juggle growing disputes among the new entrants, existing airlines, and airport authorities.

In a letter dated November 16, 1978, Civil Aeronautics Board (CAB) Chairman Marvin

Cohen wrote to Secretary Adams, saying the CAB had "given a good deal of thought to the relationship between the post-1980 Airport and Airway Development Legislation, which the DOT is now drafting, and the Administration policy of developing an air transportation system shaped by competition rather than regulation." Cohen noted the success of airline deregulation depended on whether the "facilities created with ADAP funds are available on a rational basis to all airlines who use them." He continued, "It is futile for Congress and the CAB to authorize increased competition among air carriers unless new entrants have a fair opportunity to gain access to landing and takeoff slots, gates, counter space, customs processing areas, and other facilities at airports." Cohen proposed that airport landing and takeoff slots could be better distributed among airlines using some variant of market pricing. He believed market pricing would reduce congestion by encouraging operators to schedule airline traffic to off-peak hours.[40]

On the same day Adams received the letter from Cohen, he had Deputy Secretary of Transportation Alan Butchman contact FAA Administrator Bond. In a memo to Bond, Butchman explained in light of the CAB's concerns, "This Department is presented with a broad and complex problem of assuring that airspace and groundside constraints to airport access by aircraft do not hinder the free development by economic market forces of the nation's air transportation system."[41]

Butchman asked Bond to establish an airport access task force to assemble current and forecast data to determine the current and expected future extent of the access problem. He wanted the task force to suggest legislative and regulatory actions to meet air carrier airport needs. Butchman asked for a preliminary report by March 1, 1979, and final recommendations by April 1, 1979. Bond responded on December 28. He appointed FAA's Assistant Administrator for Airport Programs Bob Aaronson and FAA Chief Counsel Clark Onstad to lead the new task force. Bond scheduled the first task force meeting for January 12, 1979.[42]

In particular, the High-Density Traffic Airports Rule, commonly called the High-Density Rule, raised serious airport access concerns. That rule limited the flights at five capacity-constrained airports—New York LaGuardia and John F. Kennedy International Airports, Newark International Airport, Washington National Airport, and Chicago O'Hare International Airport. With more airlines hoping to gain access to those airports in the post-deregulation era, the FAA faced an untenable job of finding a solution to allocating slots.

High-Density Rule

During the summer of 1968, rising demand and work slowdowns brought on by tensions between the FAA and the new air traffic controllers union, the Professional Air Traffic Controllers Organization (PATCO), led to a 30 percent increase in airport delays. The issue was compounded by limited airport capacity, overscheduling by airlines, and unlimited access to airports by general aviation. To help ease congestion at those airports with significant delays, the FAA issued the High-Density Rule on November 27, 1968, which limited slots at LaGuardia, John F, Kennedy, Newark, National, and Chicago airports.[43]

Effective April 27, 1969, the rule placed quotas on instrument flight rules (IFR) operations at the five airports between 6 a.m. and midnight. In a February 24, 1969, amendment to the regulation, the FAA delayed implementation until June 1, 1969. The amended rule assigned the following hourly quotas: Kennedy, eighty (seventy for air carriers and supplemental operations, five for scheduled air taxis, and five for general aviation); O'Hare, 135 (115 for air carriers and supplementals, ten for scheduled air taxis, and ten for general aviation); LaGuardia, sixty (forty-eight for air carriers and supplementals, six for scheduled air taxis, and six for general aviation); Newark, sixty (forty for air carriers and supplementals, ten for scheduled air taxis, and ten for general aviation); and National, sixty (forty for air carriers and supplementals, eight for scheduled air taxis, and twelve for general aviation).[44]

The rule did not count other scheduled air carrier flights (such as hourly shuttle flights) against the established quotas except at Kennedy. The agency permitted the airport ten extra air carrier operations per hour during the peak traffic between 5 p.m. and 9 p.m. Until the FAA issued the rule, airports allocated slots on a first-come, first-served basis. As a result, during peak-demand periods, air carriers queued on the ground waiting to take off or remained stacked in the air waiting to land.[45]

As a result of the rule, the FAA required pilots flying on IFR to reserve each operation into one of the five designated airports. Pilots obtained IFR reservations by contacting the FAA's Airport Reservation Office (established May 30, 1969) in Washington, DC, or any FAA flight service station. Under visual flight rules (VFR), aircraft had to reserve their arrivals about thirty miles from their destination. Air traffic control facilities serving the five high-density airports handled the departure reservations for VFR aircraft. The agency initially planned to discontinue the rule on December 31, 1969.[46]

The FAA, however, extended the rule to October 23, 1970. On that date, the FAA suspended the hourly limitations at Newark, where peak operations during fiscal year 1970 averaged eighteen less than the assigned quota of sixty. At the same time, the agency extended the quotas for another year at the other four airports.[47] On August 18, 1971, the FAA extended the rule to October 25, 1972. Flight limitations remained unchanged at LaGuardia and Washington National, but at O'Hare and Kennedy, the FAA increased the quota time to between 3 and 8 p.m.[48]

LaGuardia Airport, 1970
Courtesy: Shutterstock

An October 20, 1972, change continued the rule until the same date in 1973 when the FAA published another amendment indefinitely extending the regulation. At the same time, the agency eliminated the requirement that VFR pilots at the four airports file a flight plan. The requirement was no longer necessary since those airports now operated under the terminal control area concept, which required pilots to establish radio communications with the tower to receive permission to enter the terminal airspace.[49]

Each of the four airports affected by the High-Density Rule established an airline scheduling committee consisting of all certificated air carriers with CAB authority to serve the respective airport. In 1968, the CAB granted antitrust immunity to these committees, subject to the conditions, among others, that all air carriers with CAB authority to serve the airport be permitted to participate in the committee meetings; all scheduling agreements of the committees must be voluntary; city pairs, rates, fares, and charges must not be discussed at the committee meetings; and immunity had to be renewed annually.[50] The High-Density Rule did not prescribe how to allocate the slots to specific carriers. The airline scheduling committee agreements provided an allocation mechanism for the certificated air carriers. Committee members met twice a year to negotiate the slot allocations. Scheduling agreements had to be unanimous. If a committee failed to reach an agreement, the allocation decision rested with the FAA.[51]

Antitrust Immunity

Before deregulation, because only a few carriers held certificates of public convenience and necessity for the high-density airports, those airports had limited competition for slots. After deregulation, however, any licensed carrier could service any airport. As a result, airline scheduling committees at the high-density airports had difficulty reaching agreements acceptable to prospective new entrants and incumbent airlines wishing to expand operations. In particular, incumbents resisted parting with their slots if it resulted in potential competitors possibly undercutting their fares. The capacity limits imposed by the rule to ease congestion and how the airlines managed those restrictions seemed incongruent with deregulation's calls for greater competition and access to the national airspace system.

Even before Congress passed airline deregulation legislation, the CAB began reexamining its antitrust immunity waivers for the airline scheduling committees. In July 1978, the agency announced plans to reconsider immunity. CAB officials explained, "At the outset, we indicated that we were reexamining the need for and desirability of continued approval of the Airline Scheduling Committee Agreements, which are due to expire this fall. We believe that these agreements may be significantly anticompetitive. Airport congestion is a straightforward problem of resource allocation. At times, the demand for landing slots exceeds supply. As a general rule, rationing by agreement among competitors should be permitted only where more competitive alternatives are impractical."[52]

In February 1979, the Justice Department became involved in the slot discussion when its antitrust division asked the CAB to investigate the scheduling agreements. In his letter to the CAB, John Shenfield, assistant attorney general for antitrust, wrote, "The competitive pros and cons of these agreements and possible alternatives should be fully explored in a formal hearing since the new [airline deregulation] act requires the board to rely principally on competition to meet air transportation needs."[53] That same month, the CAB announced its intention to review airline scheduling committee immunity.

The CAB and the FAA jointly commissioned a consultant, Polinomics Research Laboratories, Inc., of Pasadena, California, to study pricing mechanisms as an alternative means of allocating slots. According to its report dated August 1979, Polinomics' study team found, "The current method of allocating slots at the four high-density airports (the slot committee process) is inadequate in almost all dimensions of economic efficiency." The report's authors indicated that "allocations are very sensitive to the regulatory political climate." As a result, the process:

- allows entry independent of the efficiency of the entering airlines and possibly at the expense of more efficient operators
- inhibits the ability of scheduling committees to coordinate operations at the systems level (the multi-airport level)
- is generally unresponsive to changing economic conditions
- places pressure on the carriers with the largest number of slots at a given airport to reduce prices
- prevents the growth of large and medium-sized airlines even if the economics suggest growth
- provides a forum in which possible anticompetitive agreements can be forged and enforced
- provides no vehicle for the economic expansion of airport capacity[54]

To overcome such issues, they offered some possible solutions:

- a computerized aftermarket to enable users to buy and sell slots
- a gradual introduction
- a sealed-bid slot auction
- a separate market for small communities
- funds generated in an auction would be used to expand airport capacity, where possible. If not possible to expand capacity, funds should be used to subsidize less desirable off-peak traffic
- sanctions to prevent the nonuse of substantial numbers of slots
- varying slot definitions to reflect individual airport capacity problems[55]

On October 26, 1979, the FAA and the CAB began providing the Polinomics report to external customers for comment. In the transmittal letter accompanying the study, the two agencies explained, "It is our intent that this report focus public debate on the important airport access questions facing the national air transportation system. . . . The CAB and the FAA are committed only to finding a solution to these proposals, and it should be understood that the Polinomics Study does not represent the views of either Agency."[56]

Industry reaction to the report came fast and furious. Three of the forty-four responses—the Department of Justice, California Department of Transportation, and Frontier Airlines—supported the Polinomics recommendations. The other responses from national and international airlines, aviation associations, and other aviation industry representatives strongly objected to the plan. Their questions and concerns focused on the following:

- abuse if airlines could buy and sell slots
- how and by whom would the open market system be policed
- legal and international treaty issues
- the possibility that small operators could not compete with large operators, which would limit service from small communities to the larger hubs
- possible disadvantage to smaller carriers if large airlines bought slots and then did not use them
- would foreign carriers subsidized by their governments and U.S. carriers receiving subsidies for essential air services have an unfair advantage in bidding against unsubsidized carriers

The respondents also expressed fears the plan would inhibit airport expansion efforts because slot allocation could lead some to believe the capacity problem was resolved. In addition, many believed slot allocation could cause severe scheduling problems and asked why the FAA could not just increase the number of available slots.[57]

The same month it received the Polinomics report, the FAA contracted with Econ, Inc., of Princeton, New Jersey, to analyze further slot allocations by auction. The contract included a mandate for a weeklong evaluation. From February 11-15, 1980, Econ conducted the exercise during which participants used the Massachusetts Institute of Technology/Flight Transportation

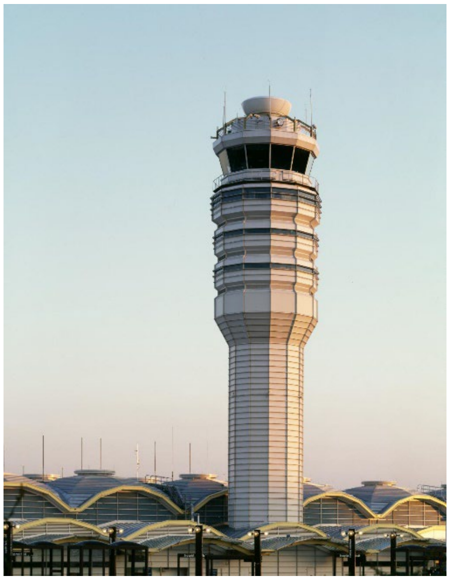
Associates Airline Management Game to auction a slot. The computer game permitted competing airline teams, comprising eight airlines' management and professional staff, to schedule hypothetical air transportation networks and estimate carrier performance by simulating resulting traffic flows, load factors, costs, and revenues. The exercise proved slot auctions could work.[58] In addition to auctions, federal officials also considered lotteries, peak hour surcharges, and administrative assignments by the FAA.

On October 1, 1980, the CAB instituted an investigation to determine whether it should continue to approve the antitrust immunity granted to the airline scheduling committees. The purpose of the agreements "has been to achieve a voluntary division of take-off and landing rights (or slots) among certificated airlines serving four major metropolitan airports whose flight operations are curtailed under the High-Density Rule imposed by the FAA." The CAB had not previously tested the scheduling agreements using the pro-competitive standards of the Airline Deregulation Act and the International Air Transportation Competition Act of 1979. As part of its examination, the CAB wanted public input on four possible options for the existing slot agreements:

- administrative allocation, using a formula to distribute slots
- allocation of slots through a price mechanism that permitted air carriers to sell them in an aftermarket
- application of FAA's general policy of first-come, first-served landing rights
- approval of the existing agreements with modifications[59]

Washington National

During policy discussions over slot allocation at the high-density airports, the issue of slots and access to the FAA-owned and -operated Washington National Airport became a hot congressional issue in 1979-1980 as more airlines worked through their senators and



National Airport, 1980
Courtesy: Library of Congress

representatives to gain access to the airport. At National, air taxi and commuter carriers had a separate slot allocation system from the larger airlines. Carrier longevity at the airport determined commuter access to slots, and the Washington National Commuter Airline Association based seniority by the date the carrier applied for a slot.[60]

The airport allocated forty slots per hour among the air carriers serving National by an agreement through the airline scheduling committee comprising all air carriers operating there. In October 1980, the scheduling committee failed to reach an agreement for the six months beginning on December 1, 1980. The problem centered on new carrier New York Air's request for twenty slots at peak operating hours (early morning and late afternoon). In the past, new entrants requested fewer slots, and other air carriers accommodated them through minor adjustments. New York Air, hoping to compete with Eastern Air Line's New York to Washington shuttle, refused to reduce its request.

On October 14, National Airport's scheduling committee informed the FAA it could not agree on slot allocations. If the committee did not reach an agreement, beginning on December 1, 1980, slot reservations at National would revert to the first-come, first-served system in effect at the non-high-density airports. Reliance on such a system at National, where demand exceeded the number of slots available, would result in acute congestion problems in the air and on the ground.

To help resolve the issue, on October 16, Secretary of Transportation Neil Goldschmidt issued a notice and request for comments in the *Federal Register* (published on October 20, 1980), asking the public for suggestions on how to allocate IFR reservations or slots for carrier operations at National for the period from December 1, 1980, to April 26, 1981. Because a rule had to be issued by November 30, the public had only until October 23 to provide comments.[61]

After reviewing the comments, on October 21, 1980, Goldschmidt issued a notice of proposed rulemaking (NPRM) proposing several procedures for allocating long-term slots at the airport. The secretary submitted for public comment three alternatives: an auction, an administrative or formula allocation, and the current slot committee approach. He also solicited comments on the continued use of the airline scheduling committee. He planned a public hearing on the proposals and gave the public ninety days to provide comments.[62]

Since the FAA would not complete the NPRM process in time for the December 1 slot allocation deadline, on November 3, Secretary Goldschmidt issued Special Federal Aviation Regulation (SFAR) 43. Stating that the airline scheduling committee for National almost unanimously decided to provide New York Air eighteen slots instead of the twenty requested, the FAA would impose that schedule for the six months beginning December 1.[63] Under SFAR 43, several air carriers received fewer slots than they previously had, and the FAA required the twelve airlines with the most slots under the previous schedule to move one to the less desirable 10 p.m. hour. The new entrants and several other carriers received slot allocations from the yielded slots. The SFAR expressly provided any adjustments and exchanges could be made under any future scheduling agreement, subject to CAB authorization. On November 19, 1980, the Secretary issued Notice 80-14a, implementing the slot allocation set forth in SFAR 43.[64]

Unhappy with the mandate, Northwest Airlines filed a motion in the U.S. Court of Appeals for the Eighth Circuit requesting a stay of SFAR 43. Following oral arguments on November 21, 1980, the court denied Northwest's motion pending review. Northwest, claiming

SFAR 43 was unlawful, argued the secretary had no statutory authority to allocate slots among air carriers. Airline officials also believed the secretary had not complied with specific procedural requirements before issuing the SFAR. They argued the mandate did not represent reasoned decision-making, resulting in an arbitrary and capricious decision. After review, on April 2, 1981, the court conceded SFAR 43 went beyond the FAA's safety regulatory mission. However, it found the action within the bounds of the Airline Deregulation Act because the legislation gave the DOT authority over safety and the efficient use of airspace.[65]

Washington Planning

An even more significant policy issue had a major influence on the question of slots at National. Since the opening of Dulles International Airport, the FAA struggled to establish a coherent metropolitan Washington airport policy to guide long-term planning for its two owned- and operated-airports. As early as 1973, the agency published a notice of policy decision for the two airports. However, the agency could not overcome industry, public, and congressional criticism of the policy because it proposed cutbacks in certain types of air service at National. While the agency reviewed comments, the Metropolitan Washington Council of Governments began a study funded partly by a FAA grant to assess local views of the airports. The council issued its report in December 1975. That report highlighted the fact the local populace preferred National over Dulles, and public use of National would likely continue to grow.[66]

Dulles Design and Policy Considerations

On November 17, 1962, a ceremony marked the opening of the FAA's Dulles International Airport (renamed Washington Dulles International Airport in 1984) to commercial

Dulles International Airport c. 1970
Courtesy: Roger Wollstadt, https://commons.wikimedia.org/w/index.php?curid=33596432

air traffic, the first U.S. airport designed to handle jet aircraft. The airport opened after twelve years of planning, controversy, and construction. The FAA contracted with renowned architect Eero Saarinen to design the terminal building. The design was radically different from contemporary terminals. It was a sleek, two-story building 600 feet long and 150 feet wide. Saarinen called the terminal “the best thing I have done.”

Saarinen’s design won one of three "first honors" awards for architectural excellence presented by the American Institute of Architects in 1966. The awards jury cited the terminal for conveying the "free and graceful movement that we associate with flight." It stated that the entire project set "a new high in architectural achievement by the Federal Government." The building was also widely recognized in professional publications as exceptionally important in the history of American architecture. A 1976 American Institute of Architects poll selected the terminal as the third most significant building in the nation's first two hundred years.

The FAA’s 1977 plans for an addition to accommodate increased operations, inconsistent with the terminal’s original design, ignited public concern about the agency’s aesthetic stewardship of the Dulles terminal. To protect Saarinen's original master plan, lobbying efforts by architectural and historical groups encouraged the FAA and the DOT to nominate the terminal building for the National Register of Historic Places. Inclusion on the register guaranteed any future modifications had to be reviewed by the President's Advisory Council on Historic Preservation, an independent agency. Under the 1966 Historic Preservation Act, the advisory council reviewed all changes to registered historic buildings and those declared eligible by the Secretary of the Interior for inclusion on the register.[67]

The FAA initially refused to nominate the building. As a commentator in the *New York Times* explained: "It is not surprising, then, that the idea of Dulles as a protected national landmark has been causing considerable discomfort and consternation at the FAA, which is far more interested in expanding the terminal's facilities than in immobilizing it as a historic shrine." The DOT and the FAA resisted placing the Dulles terminal on the register because they feared such a designation would interfere with airport operations and slow needed improvements.[68]

With public pressure growing, on February 22, 1978, Secretary of Transportation Brock Adams reversed course and nominated the terminal building for the register. According to the department, "Adams' action supports a DOT policy announced last fall to encourage greater use of design, art and architecture in transportation. At the time, Adams cited Dulles Airport as one of the finest examples of the integration of outstanding architecture and function in a transportation facility."[69] Before placing the Dulles terminal on the register in May 1978, the Secretary of the Interior granted it a special exception from a rule excluding buildings under fifty years of age.

The nomination to the register triggered the requirement that the Advisory Council on Historic Preservation had to review any proposed alterations to the building. On May 12, 1978, the FAA announced a $6 million contract award to expand the terminal building. The FAA said the Commission of Fine Arts, the National Capital Planning Commission, and the Advisory Council on Historic Preservation found the proposed construction acceptable.[70]

Policy Proposal

Perhaps Adams' change of mind on nominating Dulles for the register was spurred by a need to get approval for a new Washington airports policy. In June 1976, a citizens group known as Virginians for Dulles (VFD) sued in the U.S. Court of Appeals for the Fourth Circuit over the FAA's policy for its two airports. The judge held the vastly expanded use of those airports over recent years required the agency to file environmental impact statements (EIS) concerning the operations at the airports. On March 23, 1978, the FAA issued a draft EIS, which included a draft metropolitan airports policy proposal.[71]

The draft EIS analyzed the current environmental impacts at the two airports and the expected results of the proposed new policy. The almost five-hundred-page document examined thirty-two alternative policy scenarios as well as the secondary effects of the policy on the Baltimore-Washington International Airport. The approach allowed for approximately sixty IFR operations per hour at National, of which forty were allocated to and fully used by the air carriers and twenty to other aircraft operations. In addition, the following mandatory and voluntary restrictions would remain at National:

- distance limitations on nonstop flights
- no four-engine jet air carrier aircraft
- no wide-body aircraft
- restrictions on scheduled jet operations after 10 p.m. and before 7 a.m.[72]

Growth at National, already facing capacity limitations, became one of the FAA's primary concerns in developing a metropolitan airports policy. Struggling with how to manage traffic at National, the agency hoped to:

- achieve fuller use of existing and planned capacity at the airports
- ensure the compatibility of the airports with the changing demands and expectations of the community, especially concerning environmental quality
- rationalize the role and use of the two airports from an overall transportation viewpoint
- reduce unnecessary constraints on the use of the equipment at the airports[73]

To accomplish these objectives, the agency proposed to:

- impose a strict ban on flights at National after 10:30 p.m. by all aircraft that did not meet the lowest levels of the new federal noise standards
- lift the ban on wide-body aircraft such as the DC-10, L-1011, and A300, which were only half as noisy as the Boeing 727, the plane most commonly used at the airport
- limit the number of passengers accommodated at National to sixteen million in 1985 and eighteen million in 1990—the 1977 total was under thirteen million
- permit arrivals at National to only those two- and three-engine aircraft types and models creating a noise level of no more than 98 effective perceived noise in decibels (EPNdB) and departures by only those aircraft types and models creating a noise level of no more than 89 EPNdB
- prohibit scheduled airline flights at National after 9:30 p.m. instead of after 10 p.m., which would eliminate thirty-seven jet operations[74]

In announcing the plan, FAA Administrator Langhorne Bond said, "This proposal will provide significant relief from the noise problem at National Airport. It will also set a clear course for a new and more convenient terminal there." Dulles would provide all types of airline service for the Washington area. On the other hand, National would function primarily as a short-haul facility with a 650-mile perimeter restriction for nonstop airline service remaining in effect except for seven grandfathered cities: Memphis, Miami, Minneapolis-St. Paul, Orlando, St. Louis, Tampa, and West Palm Beach. The FAA gave the public forty-five days to comment on the policy but extended the deadline to July 1, 1978.[75]

The agency held several public meetings and received numerous comments from various constituencies, including Congress, the airlines, local governments, and the aviation community. In light of public input and subsequent passage of the Airline Deregulation Act, the agency proposed a revised policy on January 21, 1980. If adopted, the policy would necessitate amendments to existing federal aviation regulations.[76]

The new draft contemplated modifying the hours of operation, scheduling hours, nonstop service, and aircraft equipment restrictions at National. The FAA proposed to modify Part 93 of the Federal Aviation Regulations to change the hourly allocation of operations at National from forty per hour for air carriers, eight for commuter air carriers, and twelve for general aviation to thirty-six per hour for the air carriers, and either twelve for commuters and twelve for general aviation, or fifteen for commuters and nine for general aviation. The total hourly allocations would remain at sixty. The agency also proposed to define the users of the slots by the number of seats on the aircraft to promote efficient use of those slots and to assure that smaller aircraft did not use slots allocated to the users of large transport aircraft.[77]

While the FAA finalized the metropolitan Washington airports policy, VFD sued the agency. On August 15, 1979, after the agency failed to file an EIS by the stipulated date, VFD filed a motion in federal court to hold the FAA administrator in civil contempt. During the contempt hearing on September 8, 1979, the agency faced the wrath of U.S. District Court Judge Albert V. Bryan, Jr. Bryan criticized the agency for the three-year delay in producing a final EIS for National and Dulles. The judge exclaimed: "It is outrageous . . . what possible excuse can the government have for failing to produce an impact statement?" He criticized Department of Justice attorney David Redmon, saying: "You assert it takes three and a half years to produce" an EIS, "that's appalling." After federal officials asked for five more weeks to produce a timeline for the completion of the EIS, the judge ordered the FAA to deliver within one week the exact dates and times for delivery of the EIS. On September 26, 1979, VFD said it would withdraw its charge if the FAA agreed to prepare a final EIS and an updated airport policy.[78]

The FAA published a supplement to the 1978 draft EIS on January 15, 1980, to accompany the revised policy. It considered three basic alternatives. In August, another EIS refined and expanded the options under consideration because of continued FAA study and comments from various federal, state, and local agencies, community groups, the aviation industry, and the general public. The alternatives for National considered included:

- controlled growth to sixteen million passengers annually
- controlled growth policy to eighteen million passengers
- development of an expanded growth policy
- no policy change
- reduced activity policy

The FAA assessed each alternative. The update included placing a seventeen million annual passenger limit on National, specifying operating and scheduling hours, allocating slots among the classes of aircraft activity, considering new types of aircraft allowed to operate at National, and defining a maximum nonstop operating limitation for National.[79]

Unhappy with the proposed policy and EIS iterations, on June 10, 1980, the day before the House of Representatives began hearings on the proposed policy, Representative Marilyn Bouquard (D-TN), along with sixty other members, introduced a resolution to express opposition to any action resulting in reduced flights into National. The next day, the House Public Works and Transportation Aviation Subcommittee began a three-day hearing to discuss the policy. Representatives heard from an extensive list of witnesses, including federal and local governments, the aviation community, and local public interest groups. In his opening statement, Glenn Anderson, chairman of the subcommittee, succinctly identified the issues with instituting a policy for the FAA's two airports:

> In formulating a Washington airport policy, the FAA must reconcile a number of competing interests which are not always fully compatible. The competing interests include the desire of the airlines and their passengers for service at convenient close-in National Airport, and the sometimes

> conflicting desire of homeowners near the airport to reduce the noise created by National's operations. Another important factor is the interest of the Federal Government in ensuring development of Dulles Airport, which has fallen short of the levels of traffic anticipated when the airport was opened. On the other hand, restriction designed to force the airlines to use Dulles may be inconsistent with the spirit of the Airline Deregulation Act.[80]

In explaining why the FAA needed a metropolitan airports policy, FAA Associate Administrator for Airports[81] Robert Aaronson stated, "DOT has for almost 10 years been seeking to establish an appropriate policy to guide the FAA's management and operation of DCA [National] and IAD [Dulles]. Once a policy defining a role for each airport is in place, it will be possible to move ahead with long overdue improvements to DCA facilities while continuing to make improvements to Dulles." Aaronson mentioned three commercial airports serving the Washington metropolitan region—National, Dulles, and Baltimore-Washington International. Of the three, National handled approximately seven out of every ten passengers. To ease congressional concerns about unilateral regulatory action, Aaronson described the extent of public involvement in developing the proposal:

> . . . during the past decade, we have met with virtually every segment of the community, including airlines, the Council of Governments, National Capital Planning Commission, elected officials, and citizens groups. For example, in 1977, we held six public hearings in which we heard from hundreds of persons about local noise problems. In 1978, when we issued a draft environmental impact statement concerning a proposed Metropolitan Airports policy, we distributed that draft widely; we held four public hearings attended by approximately 400 persons; we received nearly 1,000 written comments. All those comments were assessed before we issued the current proposal. With the current proposal, we have held three public hearings attended by nearly 300 people; have received approximately 500 written comments, all of which will be carefully reviewed before a final policy is issued.[82]

On August 15, 1980, Secretary of Transportation Neil Goldschmidt issued a statement based on the FAA's proposed metropolitan Washington airports policy. Pointing out the "continuation of the present uncontrolled operating conditions" at National was "intolerable," Goldschmidt agreed on the need for a new approach. He explained that since the FAA never enunciated a policy for its two airports, National's "operations are governed by a patchwork of informal rules developed in the '60s." In addition, the terminal buildings "date back to the days of propeller-driven aircraft."[83]

He said that when he took office, determining a policy for the future of National became one of his priorities. Goldschmidt suggested a new approach for National:

- Carriers can schedule operations, consistent with the hourly slot limitations, between 7 a.m. and 9:30 p.m. In addition, a curfew will halt late operations. All aircraft departures between 10:30 p.m. and 7 a.m. will be prohibited. There will be a similar curfew on all aircraft arrivals between 11 p.m. and 7 a.m.
- Carriers can use two- and three-engine wide-body aircraft.
- Certificated air carrier slots will be available only to scheduled carriers using aircraft with fifty-six or more passenger seats. Carrier aircraft with fewer than fifty-six seats can use all their slots.
- The airport cannot accommodate more than eighteen million passengers annually.
- The FAA will immediately undertake to develop, with public participation, a master plan for the physical redevelopment of National, including improved access to public transportation, and will then proceed with such a redevelopment program.
- The hourly scheduling limitations will be in force each day between 7 a.m. and 8:59 p.m. Between 9 p.m. and 9:30 p.m., each user category will be permitted one-half the hourly allowances, eighteen slots for certificated air carriers, six for commuter carriers, and six for general aviation.
- The nonstop service perimeter for National will be established at 1,000 miles with no exceptions. This policy will permit airlines to add nonstop service to cities such as Birmingham, Fort Lauderdale, Kansas City, and New Orleans to the more than fifty cities receiving such service under the current system.
- The total number of National slots will remain at sixty per hour. The portion of that total available to certificated air carriers will be reduced to thirty-six per hour, the air taxi allowance will be increased from the current eight per hour to twelve per hour, and the category of carriers entitled to use them will be changed to commuter. The allowance of twelve per hour for general aviation activity will remain unchanged.

In addition, Dulles would continue to provide all types of aviation services to the Washington area at all hours of the day.[84]

As a result of public comment and FAA analysis, the FAA had made two modifications to the proposed policy:

- A reduction in the passenger ceiling from eighteen to seventeen million. The ceiling would limit growth at National without causing sudden disruption to existing air service patterns. A continuing decline in passenger traffic growth meant the reduced cap would not be reached until approximately 1983.
- The proposed policy set a 10:30 p.m. absolute curfew for operations into National. Experience showed that flights scheduled for 9:30 p.m. occasionally arrived after 10:30 p.m. To minimize the inefficiency and inconvenience caused by the diversion of late flights to Dulles or Baltimore, the arrival limitation would be extended to 11 p.m.[85]

On August 15, the FAA published a final rule implementing the policy. The agency set the rule's effective date for January 5, 1981, providing the air carriers a few extra days to serve holiday weekend traffic without sudden flight reductions.[86] On October 27, however, the agency issued a notice indicating the recently passed Department of Transportation and Related Agencies Appropriations Act (PL 96-400) prohibited the full implementation of the DOT/FAA policy and regulations until April 26, 1981. A rider to the bill also stopped the FAA from reducing the number of Part 121 airline slots until April 26, 1981.[87]

Shortly after his inauguration, President Ronald Reagan pushed the effective date back again by a February 17, 1981, executive order that postponed the final approval of pending regulations until the issuing agencies reconsidered their actions. Because of that order, the new Secretary of Transportation, Drew Lewis, on March 25, ordered a review of the Goldschmidt policy and postponed its effective date until October 25, 1981. The air traffic controller's strike, which began on August 3, 1981, again delayed action on a new policy.[88]

On December 6, 1981, a new metropolitan Washington airports policy became effective. The approach differed only in a few respects from the policy proposed by the Carter administration. The Carter and Reagan policies hoped to reduce the noise impact of operations at National, maintain the airport's longstanding status as a short-haul airport, and promote the use of Dulles. The policy placed no restrictions on Dulles while putting the following limitations on

National:

- a sixteen million cap on the number of passengers enplaning and deplaning per year (compared to seventeen million under the Carter plan)
- a maximum of sixty landing slots per hour distributed as follows: Part 121 air carriers, thirty-seven; Part 135 commuter air carriers and air taxis, eleven; general aviation, twelve (compared to the Carter plan, this gave Part 121 operators one more slot and Part 135 operators one less)
- extension of the nonstop service perimeter rule from a radius of 650 miles to 1,000 miles

Whereas the Carter plan would have lifted the ban on two- and three-engine wide-body jets at National, the Reagan plan retained the ban. The new administration also eliminated the restrictions on nighttime arrivals and departures. It instead limited operations at National between 10 p.m. and 7 a.m. to aircraft that generated no more noise than seventy-three decibels on takeoff and eighty-five decibels on approach. The noise limitations, which became effective on March 1, 1982, initially excluded jet operations at the airport during the specified hours.[89]

The arrival of the [supersonic transport] is a national and international problem, and more importantly, it is a very personal, human problem. –Representative Leo Ryan[1]

Concorde is a very noisy brute. However much you juggle with it, the noise is intolerable. –Lord Timothy Beaumont[2]

Chapter 8: Aircraft Pollution

With the number and size of airports growing, public complaints about aircraft noise and emissions increased exponentially. Beginning in the late 1960s, airport authorities, citizen groups, and local communities struggled with questions about how to address aviation environmental issues. Local neighborhoods and activist groups brought civil suits against the airports for noise pollution, which, they claimed, caused lower housing values and even affected the health of homeowners. Some airport authorities tried to set curfews, limiting flights over neighborhoods, especially at night. The airlines fought the curfews and other restrictions. All parties looked to the White House and the FAA to help solve the growing problem. With a president promising to protect the environment,[3] the FAA had to find a way to meet the challenge.

Bongo Boom

Shortly after its establishment in 1958, the FAA became embroiled in a noise pollution controversy. By the late 1950s and early 1960s, the FAA, Department of Defense (DoD), and the National Aeronautics and Space Administration (NASA) began coordinated work to develop a commercial supersonic transport (SST) aircraft. In 1961, the FAA became the lead agency for commercial SST development. Since public reaction to the sonic boom made by SSTs could make or break development efforts, the FAA, NASA, and the Air Force decided to test public reaction.

The three agencies believed, although informative, a survey previously conducted for St. Louis left some unanswered questions about SST public opinion. From July 1961 through May 1962, the agencies decided to conduct a demonstration in St. Louis airspace nicknamed “Bongo.” During the operation, the Air Force sent Boeing B-58 bombers on 150 supersonic flights over the city.

A homeowner shows damage from sonic boom tests.
Courtesy: Lucas, Jim, Oklahoma Historical Society

To learn more, they decided to conduct a second test.[4] Oklahoma City seemed the perfect location since the region depended economically on the FAA's aeronautical center and Tinker Air Force Base. On February 3, 1964, the FAA launched Bongo II to test sonic boom effects on buildings and structures and assess public opinions about living with the noise. During the test, Air Force jets delivered sonic booms over Oklahoma City eight times per day, seven days a week for twenty-six weeks, with another thirteen weeks of follow-up activities. The aircraft flew a total of 1,253 supersonic flights. The FAA publicized all flights ahead of time.[5]

To collect data on the sonic booms, the FAA instrumented nine control houses scattered throughout the metropolitan area to measure structural effects. NASA instrumented three residences and set up additional sensors to record overpressures and wave patterns. During the test period, people complained of interruptions to their sleep, conversations, peace of mind, and an occasional plaster or glass crack. Beyond property damage, some complained their chickens had stopped laying eggs, and horses and turkeys had supposedly died or gone insane. By the end of the Bongo II test:

- Seventy-three percent of those surveyed felt they could live with the number and strength of the booms experienced.
- Forty percent of respondents believed the booms caused some structural damage, although the FAA's control houses showed no effects.
- Twenty-seven percent of those questioned reported they could not accept booms.
- About 3 percent of respondents were upset enough to write, phone, sue, or take action against the government to protest the experiment.[6]

The FAA, NASA, and the Air Force conducted more tests over the next few years but found no way to ease public concern. As a result, in 1971, the federal SST program ended with a lapse in funding. The end of the program, however, did not stop the controversy. The development of the Concorde, a joint venture between Great Britain and France, renewed the dispute.

Commercial Viability

Great Britain and France developed the world's only successful SST through a November 29, 1962, treaty. The Concorde, built by the British Aircraft Corporation and Aérospatiale, first flew on March 2, 1969, and entered commercial service on January 21, 1976, with simultaneous takeoffs from London and Paris for flights to Bahrain and Rio de Janeiro, Brazil. However, the commercial viability of the aircraft depended on permission to fly long distances into U.S. airports. As Claude Abraham, French director of Air Transport, Civil Aviation Department, explained, "Service to the United States is essential if we are to realize the benefits of the resources we have invested."[7]

During the summer of 1974, the British and French governments informally notified the FAA that they contemplated using the Concorde to serve the United States beginning in 1976.

The FAA started preparing the required environmental impact statement (EIS) based on that information. The 1970 National Environmental Policy Act required agencies to use an EIS to assess how proposed actions would affect the environment. The process involved public participation and documentation on the risks and benefits of federal decisions.

FAA and Department of Transportation (DOT) officials met with British and French representatives in Washington, DC, on January 23-24, 1975, to discuss the EIS. The FAA expected to issue a draft in early February 1976 but stated it would supplement the EIS later if data from Air France's and British Airways' endurance and route-proving flights, scheduled for July 1976, differed from data already gathered. Agency officials also said that they could not issue a final EIS, necessary for flights to begin, until well after the January 1, 1976, date the two airlines hoped to begin service. FAA officials suggested the airlines apply to fly into a limited number of airports for demonstration purposes rather than submit a request for an unlimited number of Concorde flights to the United States. In addition to FAA approval, the airlines would need to obtain any necessary authorizations from the airport operators whose airports they proposed to serve before any flights could begin at those airports.[8]

On February 14, 1975, Air France notified the FAA it planned to apply for an amendment of its operations specifications to cover the use of the Concorde in scheduled commercial services to and from the United States beginning on January 1, 1976, on a limited trial basis. British Airways sent a similar notification on February 19, 1975.[9] Both airlines wanted to initiate an average of two daily flights to New York's John F. Kennedy International Airport (JFK) and one to the FAA-owned Dulles International Airport. On August 29 and September 21, respectively, British Airways and Air France formally applied for an amendment to their operations specifications.[10]

The FAA issued the draft EIS on March 3, 1975. That document analyzed the likely environmental consequences of permitting the Concorde to land in the United States. According to the agency, noise would be one of the unavoidable adverse environmental effects of the supersonic jet. The perceived noise generated by a Concorde on its takeoff path was double that of a Boeing 707, four times that of a Boeing 747, and eight times that of a DC-10. In addition, the aircraft produced a low-frequency noise that vibrated structures near airports. The agency did not recommend approving or disapproving granting landing rights but instead offered four alternative courses of action for consideration:

1. amend the Air France and British Airways operations specifications as requested
2. impose additional restrictions on British Airways and Air France Concorde operations
3. refuse to amend the operations specifications of Air France and British Airways
4. take no action—not considered a viable alternative by the FAA[11]

The FAA opened the draft EIS for public comment and held public hearings in Washington, DC, on April 14-15, New York City, April 18-19 and 24, and Sterling Park, Virginia, April 21, 1975. On November 13, 1975, after reviewing comments and conducting additional research, the agency released the final EIS. On the same day, Secretary of Transportation William Coleman announced he would defer action on the airlines' applications to fly into the United States until after another public hearing scheduled for January 5, 1976. Coleman chaired that public hearing.

In his opening remarks, Coleman acknowledged, "This decision will not be an easy one to make. Not only are the issues involved complex, but because of varying interpretations of information made public over the past months, emotional responses have developed which could cloud and distort judgments."[12] The seven-hour public meeting included testimony from seventy individuals from federal and local governments, public interest groups, local school systems, representatives from the British and French governments, and from the national and international aviation community who highlighted the environmental, technical, and global factors that needed to be evaluated in reaching a decision. On January 13, 1976, the DOT closed the docket, and Coleman personally reviewed the submitted materials.

On February 4, Coleman issued a sixty-one-page opinion detailing why he denied the permanent amendment of the operations specifications. He, however, authorized a sixteen-month demonstration period at Dulles and JFK. The secretary believed the technological benefits and the significance to international relations outweighed any adverse environmental effects. He ordered the FAA to permit up to two Concorde flights per day into JFK by each carrier and one flight per day by each airline into Dulles. Coleman also required the FAA to set up monitoring systems at the two airports to measure noise and emission levels and to report the results monthly. The two airlines changed their operations specifications per the secretary's order, and on April 2, 1976, the FAA provisionally amended the two airlines' operations specifications.

Concorde at a Crossroads

Mounting public concern about aviation's effect on the environment became one of the early critical issues facing the Carter administration. In particular, Carter came to office amid the growing dispute of whether or not to permit the Anglo-French SST, the Concorde, to have landing rights in the United States. Issues surrounding the Concorde included airport and vicinity noise, sonic boom, possible detrimental effects on the upper atmosphere, economic viability of the aircraft, and high fuel-consumption rates. Such concerns led to high-visibility court cases and congressional investigations and threatened U.S. diplomatic relationships with Great Britain and France.

Before his election, Carter campaigned on denying the Concorde access to U.S. airports. His opponent, Republican Gerald Ford, wanted to ensure landing rights for the plane. At a New York campaign stop, for example, candidate Carter boldly stated:

> The Ford Administration's decision regarding the supersonic Concorde is wrong and may well jeopardize the health and safety of the people of Long Island and metropolitan New York, as well as other parts of the nation. The environmental dangers caused by the Concorde are out of proportion to the possible benefits.

Although Carter later softened his view in an interview given to a British journal where he approved "experimental flights to gather necessary data," many in the United States did not see the comments. They firmly believed the new president opposed Concorde operations in the United States.[13]

Upon taking office, Secretary of Transportation Brock Adams identified Concorde landing rights as a high visibility issue left over from the Ford administration. Six days after Carter's inauguration, Adams sent the president a memo saying he intended to maintain the Ford administration's Concorde policy of permitting a sixteen-month trial at Dulles and JFK. He informed the president that the Port Authority of New York and New Jersey planned to discuss the Concorde's landing rights at its March 10, 1977, meeting—the same day the British prime minister would arrive in the United States for a state visit.[14] With pressure from the British and French governments, members of the White House staff also recommended Carter maintain the Ford administration's policy. Furthermore, they urged the president not to get involved in the ongoing dispute over landing rights at JFK.[15]

Dulles Experiment

British Airways Concorde at Dulles International Airport
Courtesy: FAA

With landing rights at JFK not immediately approved, the British and French prepared for trial flights at Dulles. Before beginning the sixteen-month Concorde demonstration at the FAA-owned and -operated Dulles, the Secretary of Transportation mandated the FAA monitor and assess the noise and air quality effects of Concorde operations at the airport. That data would provide the technical, operational, and community response information necessary to determine whether the Concorde should be permanently allowed to operate in the United States. The Office of the Secretary of Transportation, the Environmental Protection Agency (EPA), and NASA worked with the FAA to develop a monitoring test plan, which comprised:

- gathering community response through a series of telephone interviews with residents in the area surrounding Dulles
- issuing a final report to compare measured effects to those published in the environmental impact statement
- monitoring citizen complaints received about Concorde operations
- monitoring noise and emissions at Dulles and surrounding communities
- placing sonic boom recorders along the East Coast to determine the occurrence of any sonic booms from the Concorde
- recording structural vibration at Sully Plantation (a local historic site) to determine the effects, if any, of the low-frequency noise from the Concorde
- reporting the monitoring data to the public every month

The FAA allocated approximately $1.3 million for the Concorde noise monitoring system, which consisted of mobile and fixed monitors. The mobile portion had five contained systems, four used routinely plus a spare. The fixed noise-monitoring system used eight self-contained all-weather enclosures, each equipped with instruments to describe environmental noise for selected periods statistically, a continuous decibel time history of environmental noise, and a magnetic tape recording of selected aircraft noise events through the use of a remote radio switching system. The FAA stored all collected data in a computer at Dulles, which could collate and reproduce the data in many formats.

FAA-trained college students, primarily from Northern Virginia Community College, to operate and monitor the mobile and fixed systems for twelve months. According to supervisor Steven Newman, data collection proved to be an arduous job. He explained the students had to "fight snakes, muddy dogs, ticks," and even an angry farmer. They dealt with subfreezing weather in the winter and hot, humid temperatures in the summer.[16]

On May 24, 1976, transatlantic service to Dulles International Airport from London and Paris began with two Concordes, one in British Airways livery and the other in Air France livery. Before landing, they simultaneously flew over the U.S. capital and then made parallel approaches to Dulles. The airplanes touched down together, the British Concorde landing on Runway 01L and the French Concorde on Runway 01R. The FAA required the planes to observe a 10 p.m. to 7 a.m. curfew and abide by noise abatement procedures, including a sharp left turn upon takeoff. The trial period at Dulles would end in September 1977.

As mandated, the FAA issued monthly Concorde monitoring reports and a comprehensive report after the first year of operations at Dulles. The summary report, published on September 2, 1977, but not publicly distributed until September 23 (the same day the FAA issued a notice of proposed rulemaking to regulate supersonic transport aircraft noise), showed results akin to what the agency predicted in its September 1975 final environmental impact statement. Of the 618 Concorde operations from May 24, 1976, through May 24, 1977, the effective perceived noise level in decibels (EPNdB) upon takeoff averaged 119.4 compared to the environmental impact statement estimate of 119.5 EPNdB. On landing, the Concorde's actual EPNdB averaged 116.5, the same as the 1975 estimate. While the noise levels closely approximated environmental impact statement estimates, compared to the loudest subsonic jet transports, they proved to be about twice as noisy upon takeoff and landing.[17]

The FAA found the noise-induced vibrations caused by the Concorde lower than predicted. Although the Concorde created a higher level of vibration in structures, its vibrations appeared less than those from routine household events, such as closing doors and windows. The agency encountered no air traffic control problems at Dulles. The Concorde flights represented 0.3 percent of 187,192 tower operations and did not require any unique air traffic procedures during the departure, cruise, or approach phases of flight or in-ground maneuvering.[18]

In addition to monitoring noise levels, the FAA also measured community reaction. The community survey consisted of three telephone interviews with residents living near the airport. The agency conducted the surveys immediately before the start of Concorde operations, after six months of operations, and after one year of operations. To develop the study, FAA officials worked with representatives from the DOT, NASA, EPA, Fairfax County Planning Office, Metropolitan Council of Governments, Virginia Council on the Environment, Virginia Division of Aeronautics, Virginia State Air Pollution Control Board, as well as social survey and psychoacoustic experts. The agency discovered that public opinion opposing the Concorde lessened during the trial period. The FAA received 1,387 complaints during the trial period but found in its community opinion surveys that, over time, residents became more accepting of the flights.

The National Research Council established its Committee on Community Reactions to the Concorde in September 1976 to review the FAA's monitoring efforts. It issued a report after the Dulles trial ended. Acknowledging the monitoring program began in haste "and, therefore, suffered from lack of a well-specified, well-conceived plan to integrate its components," committee members found the agency's survey data "consistent with other surveys of the impact of the noise from aircraft operations and are sufficiently valid for supporting the findings." They, however, recommended that any future monitoring program "should be clearly defined, the parts well related, and the procedures (including quality control methods) well documented."[19]

The General Accounting Office (GAO), however, which also reviewed the program, found the monitoring data unreliable and concluded, "The public opinion surveys conducted at Dulles will not provide reliable information on the public response to the Concorde." The GAO investigators found inherent problems with the survey's sampling plan, the questionnaire design and application, and the response coding and processing. They concluded, "Because of these problems (and the resultant difficulty of interpreting the results), we question the validity of the community surveys and would not recommend using them in formulating policy on Concorde operations."[20]

Breaking the NY Deadlock

The 1944 multilateral Convention on International Civil Aviation, or Chicago Convention, governed the safety aspects of air transportation. It required, for example, the United States to recognize the British and French airworthiness certificates and allowed British Airways and Air France to operate their aircraft without U.S. aircraft type certificates. It also guaranteed foreign aircraft operators the right to make non-revenue flights anywhere in the United States.

The commercial aspects of international air transportation were also the subject of bilateral air service agreements between countries. U.S. agreements with the British and French gave the carriers of those nations the right to operate commercial flights to specified U.S. cities. In the DOT's view, however, those agreements did not limit the authority of either country to impose non-discriminatory operating constraints on foreign aircraft under appropriate circumstances or of local airport proprietors to control noise at their airports. The British and French disagreed with the U.S. interpretation but did not take the matter to binding arbitration. The United States conceded, however, that in the absence of a total ban or detailed environmental restrictions, the bilateral agreements obliged the United States to permit the Concorde to operate at Dulles because the federal government owned and operated the airport.[21]

Even with negotiated treaties in place, Concorde flights into JFK proved problematic. Intense opposition from environmental and citizen groups, such as the Citizens for a Better New York and the Emergency Coalition to Stop the SST, concerned the airport's operator, the Port Authority of New York and New Jersey (Port Authority). On March 11, 1976, in a joint communication, British Airways and Air France officials notified the Port Authority of their intention to schedule commercial Concorde flights at JFK beginning on or about April 10, 1976. The same day, the Port Authority adopted a resolution to ban Concorde operations at the airport pending a six-month study of Concorde operations at Dulles.

British Airways and Air France officials protested the decision. On March 17, they petitioned the U.S. District Court for the Southern District of New York, asking the court to rule the Port Authority's decision invalid.[22] The airlines argued the Port Authority's action violated

U.S. treaty commitments and interfered with the foreign affairs power of the federal government. More importantly, Secretary Coleman's authorization of Concorde landings at JFK preempted the Port Authority’s decision. They also claimed the Port Authority’s ban was an undue burden on commerce. The U.S. government, not a party to the litigation, did not take an official position.

To help bolster its case, on April 23, 1976, the Port Authority retained the consulting services of the Stanford Research Institute and its director, Dr. Karl Kryter, as its noise consultant. The Port Authority directed the institute to analyze the noise and vibrations produced by the Concorde compared to subsonic aircraft at Dulles, Heathrow, and Charles de Gaulle airports. When the Port Authority learned in August 1976 the British did not plan to survey the attitudes of the Heathrow Airport community, it retained Dr. A.C. McKennell, a British social psychologist, to conduct an attitude survey around the airport.[23]

McKennell completed his study in March 1977. He reached two conclusions. First, the "Concorde differed from subsonic aircraft in that vibration effects are almost as important as speech interference as a source of disturbance." Secondly, "Heathrow residents perceive Concorde along with the VC10 [Vickers] and the Trident [Hawker Siddeley HS 121] as the three most annoying and disturbing among the types of aircraft that they hear. . . . Concorde is seen as more annoying and disturbing than the VC10 and the Trident."[24]

The British and French expressed continued concern and surprise about the Port Authority’s unwillingness to allow the Concorde demonstration at JFK. In a speech to a U.S. audience during the controversy, Brian Cookson, the director and general counsel of British Aircraft, Ltd., remarked:

> The environmental challenge to Concorde has been severe—I assume (on the part of some, at least) that it has been well-intentioned. Well, unless we are quite mad, we all believe in the environment in the same way that we subscribe wholeheartedly to democracy and world peace. . . . What annoys me are the

> absurd lengths to which a number of the critics are going and the attitude—almost as a matter of divine entitlement—that they must be right and the rest of the world wrong. Does anyone seriously believe that I or my colleagues are bent on destroying the world, a world which we *all* share, in which we *all* live? Your environment is no different from ours. Would we dare to release an aeroplane into service which we even suspected might be a hazard?[25]

When they learned the U.S. District Court for the Southern District of New York planned to hear their case on February 18, 1977, British Prime Minister Leonard James "Jim" Callaghan and French President Valéry Giscard d'Estaing predicted the court would rule the Port Authority's Concorde ban legal. They contacted President Carter asking him to intervene. The British and French officials expressed concern a ban would mean the "economic death of the Concorde." They hoped the president could use the authority of his office to prevent the need for court action by convincing the Port Authority of the need to maintain reasonable diplomatic relations with its U.S. foreign allies.

The request created a dilemma for President Carter, who asked the National Security Council (NSC) to develop potential responses. Head of the Domestic Policy Staff, Stuart Eizenstat, took charge of obtaining and coordinating the responses from the NSC, State and Transportation departments, the democratic New York governor, Hugh Carey, and Donald Aggar, who represented Concorde interests in the United States. According to Eizenstat, Aggar wanted the president to issue a statement calling for the Port Authority to reverse its decision.

Eizenstat informed the president that the State Department understood the importance of foreign policy over the landing rights. He reported, however, that the governments of Great Britain and France had little understanding of the president's "inability to direct that the Concorde be permitted to land New York." Eizenstat reminded the president the British Government had abrogated the Bermuda Agreement with the

United States, effective June 22, 1977, and the State Department believed a favorable decision in favor of landing rights for the Concorde would facilitate new negotiations. "The Secretary of State, therefore, believes it would be desirable from the foreign policy standpoint to allow Concorde the opportunity to prove itself" in a sixteen-month trial in New York.[26]

Eizenstat told the president that Brock Adams held that unless foreign policy matters dictated to the contrary, the administration should stay out of the issue and leave it to the courts. National Security Advisor Zbigniew Brzezinski believed even more strongly than the State Department that maintaining good relations with France and Great Britain dictated White House intervention. Governor Carey, however, indicated problems would occur if the federal government intervened. In the governor's view, according to Eizenstat, "the emotional state in New York on this issue is such that there may be demonstrations if the Concorde landed, with people attempting to occupy runways and to smash the plane." With a gubernatorial election in the offing, permitting the Concorde to land in New York could be disastrous for the governor's reelection campaign. Department of State Counselor Matt Nimetz advised the Port Authority might be convinced to allow the Concorde trial if the administration informed it of the importance of the landings to U.S. foreign policy.[27]

After reviewing all viewpoints, Eizenstat advised the president to inform the British and French governments that he could not intervene since it was not a proper subject for presidential intervention. He reasoned:

1. An attempt by the federal government to overturn a local decision would appear to be federal intervention in New York's local affairs.
2. Any action would be perceived as pro-Concorde.

3. It would reflect poorly on the administration since the president's first environmental decision would be an anti-environmental position.
4. Presidential intervention to short-circuit a court proceeding would be a bad precedent for the administration.
5. To urge the Port Authority to reverse its position would be going a step further than the previous administration.[28]

If, according to Eizenstat, the president believed foreign policy matters outweighed local issues, he needed to minimize "the political damage from what will be seen as a pro-Concorde decision." To do that, Eizenstat recommended the following:

1. President Carter should write personally to Prime Minister Callaghan and President Giscard requesting they seek a postponement of court action. The president should also ask one of his cabinet members to appeal to the Port Authority for a decision favorable to the Concorde's sixteen-month trial.
2. Before March 10, the president should direct Secretary Adams or Secretary of State Cyrus Vance to issue either a public statement or a letter to the Port Authority and indicate, in light of foreign policy considerations, the administration believed a sixteen-month trial appropriate.[29]

For Eizenstat, the appropriate timing of the actions would:

- leave the final decision to the Port Authority and Governor Carey and take a chance that those decisions would not be favorable to the Concorde trial
- make it clear the president would not prejudice the outcome of the Concorde trial
- postpone immediate court actions
- provide time in which to take some pro-environmental action—such as issuing the environmental message then being drafted—as a backdrop to a pro-Concorde statement or letter
- show good faith to our allies[30]

Jimmy Carter with French President Valerie Giscard d'Estaing
Courtesy: NARA

On February 15, 1977, President Carter wrote Prime Minister Callaghan and French President Giscard, stating, "As you know, I cannot direct the Port of New York Authority or the Governor of New York to reach a particular decision that is theirs to decide." He reaffirmed the U.S. commitment to a sixteenth-month trial period and said he shared the desire of the two European leaders "to approach this matter in a way that reflects the close friendship between our two countries." He concluded, "I hope this action will be a basis for reaffirming the close ties between our two countries as we work together to meet problems that we face in common."[31]

Frustrated by the long delays in obtaining a response from the Port Authority and Carter's message stating he would not interfere in the Port Authority's decision, the British House of Lords debated potential options at their March 2, 1977, meeting. The Earl of Kimberley opened the discussion by pointing out, "When President Carter was only President-elect Carter . . . he did not like the Concorde . . . and he does not seem to have changed his mind very much, alas!" He said, "My Lords, if President Carter wished to, he could exert potent pressure on New York City, whose financial straits, I believe, make it very dependent on Washington. The Port Authority's excuse for more time to evaluate data is purely a time-wasting thing; in my humble opinion they are playing a waiting game." He also inquired about a rumored "backstairs deal" in which the DOT agreed to fund an "expensive highway on New York's West Side if Governor Carey instructed the Port Authority to go ahead and admit Concorde."[32]

According to *Aviation Week*, the "debate in the British Parliament . . . turned into a damn America session, with speaker after speaker arising to condemn both the federal government and New York State authorities." According to the magazine, "In both Britain and France, there were frequent accusations of American 'protectionism' and 'imperialism' and the sentiment prevailed, particularly in France, that the American concept of fair play and free competition was a one-way street that European industry would not be permitted to enter."[33] In an interview with a *Newsweek* senior editor, French President Valery Giscard d'Estaing remarked:

> The United States has always been concerned about its image abroad, and in a certain sense President Carter's human rights campaign reflects this concern. The Concorde affair has seriously tarnished that image for two reasons. First, this fierce resistance against a limited European technological breakthrough appears to be quite out of proportion with the event. Secondly, the flight of governmental responsibility—with the Federal authority saying yes, then a local authority saying no, and so forth-which may strike some as the expression of democratic institutions, hits others as a structural weakness. It is utterly incomprehensible that the Concorde can land every day at Dulles Airport outside Washington without anyone talking about it while it is prevented from landing at Kennedy on the edge of the Atlantic Ocean because it will allegedly upset the ecology.[34]

Before the Port Authority's March 10, 1977, meeting, during which it promised to decide on Concorde landing rights, British Ambassador to the United States, Sir Peter Ramsbotham, contacted Secretary Adams and strongly encouraged him to tell the Port Authority the Carter administration supported Concorde landings in New York. Adams responded the decision rested with the Port Authority, not the administration. He offered, however, "Information obtained from the monitoring of the Dulles operations does not suggest any danger to health and safety necessitating a termination of the demonstration period." As it turned out, the Port Authority canceled the meeting, postponing its decision. Cancellation this time, however, seemed to be in deference to President Carter, who would be welcoming British Prime Minister Callaghan to the United States on that day for an official state visit.

The postponement, however, further complicated the ongoing U.S./U.K. bilateral aviation negotiations. On March 18, Alan Boyd, special U.S. ambassador for the ongoing bilateral talks, informed Carter the British team indicated the denial of Concorde access to New York would have "an extreme adverse impact on aviation negotiations."[35] With a June 22 deadline for an agreement on commercial aviation between the two countries and negotiations slow and controversial, the added pressure of Concorde landing rights seemed to doom the diplomatic discussions on the aviation agreement.

Hoping to break the Concorde deadlock, British and French representatives submitted new noise abatement procedures to Port Authority officials on April 1, 1977. Those procedures would keep the Concorde under the mandated JFK noise limit of 112 EPNdB (effective perceived noise decibels). Several operational maneuvers could reduce the noise levels:

- Concorde would use a decelerating approach for landing in which the aircraft would maintain a higher speed to minimize noise over the communities. Over 98 percent of the predicted Concorde takeoffs would be on runways with departures over the water.
- Takeoff maneuvers for each runway would use specific banking techniques and throttling.
- Takeoffs would be accomplished with approximately 23,000 pounds less fuel than expected, allowing the aircraft to climb faster and with less power, making takeoffs quieter.[36]

In addition, Air France and British Airways offered to cancel one of their regular subsonic flights per day from their New York schedules. In response, on April 5, the Port Authority asked the British and French to obtain a FAA evaluation of the various proposed procedures. The FAA technically assessed the proposals, and in an April 14, 1977, reply, Charles Foster, the FAA's director of environment quality, stated the noise analysis "is technically sound; if the assumptions it is based upon are borne out in practice, the noise reduction would be realized."[37] The agency's response, however, did not affect the two airlines' standoff with the Port Authority, which seemed content to wait for the legal proceedings to conclude.

On May 11, 1977, Judge Milton Pollack of the Southern District of New York ruled the Port Authority could not prohibit the Concorde from landing at JFK. In his thirty-one-page judgment, he argued former Secretary of Transportation William Coleman's decision preempted local control over the matter. Opponents of the Concorde vehemently criticized the decision. New York Governor Hugh Carey protested the decision, saying it conveyed "to the people who are impacted by this decision the clear impression that the Port Authority . . . is left without power and due process to carry out its important functions." Carol Berman, leader of the Emergency Coalition to Stop the SST, proclaimed, "We will fight this all the way to the U.S. Supreme Court. I am horrified by this decision." The head of the Concorde Alert group, Bryan Levinson, added, "The Port Authority has exerted its jurisdiction in New York and New Jersey for 20 years. Now, suddenly, we are told it is powerless."[38]

With the judgment in their favor, British Airways and Air France officials informed the Port Authority they planned to begin passenger service between Paris, London, and New York on June 20. Since the Port Authority planned to appeal the ruling, its officials asked and received from the court a stay of the injunction requiring them to accept the flights. Soon after that, the Port Authority appealed Judge Pollack's decision.[39] Before ruling on the appeal, the U.S. Court of Appeal for the Second Circuit ordered the U.S. government to respond to three questions regarding the litigation in an amicus curiae brief:

1. Does the Port Authority resolution of March 11, 1976, denying appellees permission to operate the Concorde into or out of JFK offend any relevant international treaties or agreements?
2. Did preemption occur because of the Secretary of Transportation's order dated February 4, 1976, amending the operations specifications of Air France and British Airways?
3. Could the secretary's order preempt the power of the Port Authority to refuse landing rights at JFK?

In his June 6 brief to the court, Acting Assistant Attorney General James Moorman concluded, "When Congress enacted Section 611 of the Federal Aviation Act as amended by the Noise Control Act of 1972 . . . it expressed the intent that local airport proprietors not be preempted from enforcing operational rules to reduce aircraft noise provided that such regulations do not discriminate or unduly burden interstate or foreign commerce."[40] He also argued, "The Coleman decision, reaffirmed by Secretary Adams, and the amendment of the operations specifications implementing that decision, were not intended to, and do not, deny to the Port Authority the power to establish its own noise rules."[41] Moorman noted the government declined to take a position on the first question because of the ongoing Bermuda II negotiations with Great Britain. A response "might impede a satisfactory resolution of that extremely important international negotiation."[42]

Moorman concluded, "The Port Authority may have exercised its proprietary powers in such a manner that its ban against the Concorde could not survive judicial scrutiny. We believe its actions have been unfair, dilatory, arbitrary and unreasonable." He urged the court to uphold the district court's decision on the grounds the Port Authority had unfairly withheld a decision on whether the Concorde should be allowed to land on a trial basis since it had initially stated it would decide after reviewing six months of data from the Dulles trials and thirteen months had gone by without a decision.[43]

On June 14, the court of appeals ruled the Port Authority had the right to establish "fair, reasonable, and nondiscriminatory" noise standards. The judge, however, declared the federal government would have authority over the Port Authority if it failed to exercise its power in a fair, reasonable, and non-discriminatory manner. The court remanded the case to the district court to decide if the thirteen-month delay was so excessive as to constitute unfair discrimination and an undue burden on commerce. On August 17, 1977, the district court held the Port Authority ban could not stand because it had resulted in an "excessive and unjustified delay" in setting noise regulations for the SST. On September 29, 1977, the court of appeals affirmed the lower court's decision, finding the ban arbitrary, unreasonable, and discriminatory. On October 7, Justice Thurgood Marshall of the Supreme Court issued a temporary stay to the appeals court's decision on an interlocutory appeal. On October 17, the Supreme Court denied the motion for a stay, leaving the court of appeals decision to stand.[44] As a result, scheduled Concorde service from London and Paris to New York's JFK airport began on November 22, 1977.

Braniff Agreement

While other communities and airports fought to prevent Concorde service, Dallas-Fort Worth (DFW) International Airport openly worked to get approval for such service. Braniff Airways began discussing an interchange agreement with British Airways and Air France in November 1976.[45] Once the three airlines brokered their deals, Braniff Airways, British Airways, and Air France asked the Civil Aeronautics Board (CAB) to approve them on February 10, 1977. The agreements would allow Braniff and British Airways to operate an interchange service between London and Dallas-Fort Worth via Dulles using Concorde aircraft. Braniff and Air France would also run an interchange service between Paris and DFW via Dulles.

This represented an unprecedented request to the CAB. As the agency explained, its decision would be "a matter of first impression since no other equivalent proposal" had ever been considered by the board. The CAB tentatively approved the interchange agreement on June 22, 1978, and directed staff to prepare a formal approval order. On July 13, 1978, the CAB approved the requests but gave any interested parties thirty days to file objections.[46] After reviewing comments, the CAB formally issued Order 78-12-148, approving the interchange agreements on December 21, 1978.[47]

After obtaining CAB approval, the three airlines still had to overcome other hurdles. They needed FAA approval. To help convince the FAA, a delegation of Texas local, state, and national officials that included Texas Governor Dolph Briscoe, U.S. House of Representative's

Majority Leader Jim Wright (D-TX), Dallas Mayor Robert Folson, and Chairman of the DFW Regional Airport Board Henry Sturat, met with DOT and FAA officials, including Brock Adams, Chuck Foster, FAA environment manager, and Bruce Selfron from the FAA's chief counsel office. At the meeting, Adams expressed concern about the interchange agreement and said the proposed arrangement would be very different from that typically approved. He said that ordinarily aircraft would be leased or purchased in such a situation. Foster advised a FAA type certification would require a complete environmental impact statement and a technical assessment. Selfron told the parties that because the Concorde would be in commercial service with a U.S. flag carrier, the FAA had to certify the plane and issue an airworthiness certificate.[48]

Approved by the CAB and waiting for FAA concurrence, Braniff crews began operations and flight training in Great Britain and France in June 1977. The airline trained four three-person crews, a flight check captain, and a flight check engineer. Although legally the Concorde could fly only subsonically over the United States, the crews received training in subsonic and supersonic operations in the aircraft. In November, the first thirteen Braniff flight crew members passed their FAA flight checks on the Concorde.[49] Braniff's Captain Ken Larson became the first American pilot to hold the Concorde type rating on his air transport pilot certificate.

The three airlines also began working with the FAA to obtain a U.S. type certificate for the Concorde. The agency had stopped an earlier certification effort in early 1975 when it became apparent that no U.S. carrier planned to purchase the aircraft.[50] In May 1975, a team of engineers spent a week in London to assess where to begin a certification review.

On June 9, 1977, FAA Administrator Langhorne Bond flew to Paris on an Air France Concorde and returned to Washington, DC, on June 16 from London on a British Airways Concorde.[51] He observed the flight crew in the cockpit jump seat on both flights. Four days later, on June 20, 1977, a FAA team departed for Great Britain to begin the certification process. The team compared British and French aircraft regulations with the U.S. federal aviation regulations. According to FAA officials, the agency had already completed approximately 90 percent of the validation process for the Concorde in mid-1975 and expected the remaining 10 percent to be completed by early fall 1977.[52]

The estimate proved overly ambitious. A FAA team returned to Great Britain in September 1977 to complete work on developing airworthiness standards for the Concorde. It informed the British and French of their concerns in a November 10 letter. According to a January 1978 *Aviation Week & Space Technology* report, the certification process hit a snag. Citing a memo sent to Brock Adams by FAA Deputy Administrator Quentin Taylor, the magazine noted a FAA certification team had concluded that 129 out of 149 items complied with FAA airworthiness standards. The FAA team listed concerns with the Concorde's hydraulic systems as a critical issue.[53]

The memo said, "Data received to date raises questions of compliance with our special condition with regard to the possibility of single hydraulic system failure causing loss of all hydraulic systems, including flight control." The reporter talked to a senior engineer on the Concorde program in England, who explained the aircraft's hydraulic system had been designed to the English/French concept of a fail safe system rather than the FAA concept of a dual system. FAA engineers required several changes to the aircraft, such as adding a pneumatic altimeter, a modified flight deck voice recorder system, and developing an FAA-approved flight manual before it would certify the aircraft.[54] The FAA accepted remedies for all technical issues in the fall of 1978 but did not complete noise certification until January 1979. Noise certification became intertwined with a FAA notice of proposed rulemaking that would regulate supersonic aircraft.

The FAA type certificated the Concorde on January 9, 1979.[55] Braniff registered ten in-service Concorde aircraft (five each from British Airways and Air France) for subsonic service the following day. Because U.S.-registered aircraft had to be owned by a U.S. corporation and not registered under the laws of a foreign country, British Airways and Air France organized a subsidiary U.S. corporation, the Delaware Corporation, which leased the aircraft to Braniff to fly the Dulles to Dallas-Fort Worth and Dallas-Fort Worth to Dulles routes at a reported $2,000 per hour.[56] The registration returned to Britain or France for the Dulles to London or Paris flights. In addition, the insurance companies that insured the British Airways' Concordes required British Airways to have a captain and flight engineer as cockpit observers for Braniff's U.S. segments because British Airways still owned the aircraft for insurance purposes.[57]

U.S. law required U.S. airplanes to have registration numbers beginning with a "N." When, for example, a British Airways or Air France crew flew to the airport, the plane's registration had to be changed before the U.S. crew flew the Concorde from Dulles to DFW. Hence, a British Airways or Air France representative had to be at Dulles when the aircraft arrived to certify the British or French registration had been canceled. The rule created an interesting sight at Dulles. Because British law required its planes to have registration numbers that began with a "G," and French law required registration numbers to start with "F," when the Concorde landed at Dulles, the "G" or "F" had to be covered and replaced with "N." The 3M Company developed a unique adhesive so the registration number could be changed quickly without damaging the aircraft's paint. One British Airways representative, speaking anonymously to the *Washington Post*, glibly suggested, "I think we have an opportunity here to inaugurate something really special. . . . We


British and French Concordes at Dulles
Courtesy: www.airwaymag.com

could call it 'the ceremony of the patch.' At least once a week, a brass band could come out and play while the fellow climbs on the side of the plane and places the patch over the G. It could become international tradition."[58]

Braniff inaugurated Concorde service on January 12, 1980. On the first day of service, an Air France and a British Airways Concorde flew in from the east and lined up to land simultaneously on parallel runways at Dallas-Fort Worth. Concorde service lasted only a short time. Braniff flew its last Concorde flight on May 31, 1980. The cost of operating the planes with low load factors and rising fuel costs, coupled with the airline's financial difficulties, led to the termination.

Congressional Concerns

Congress, unwilling to sit idly on the sidelines as the Concorde controversy dragged on, held a series of aircraft and airport noise hearings in 1977. The House Committee on Government Operations, Subcommittee on Environment, Energy, and Natural Resources (an investigative, not a legislative, committee), began a series of public hearings on April 4-5 and continued on May 20, June 21, September 7 and 9, and October 26. Ostensibly called to examine the implementation of the Noise Control Act of 1972 (PL 92-574), the proceedings often centered on the Concorde and the relationship of the FAA and the EPA in fulfilling the aircraft noise restriction mandate.

Enacted on October 27, 1972, among other things, the legislation defined the respective responsibilities of the FAA and the EPA in controlling aircraft noise. The EPA recommended noise standards to the FAA based on public health and welfare considerations. The FAA, in turn, considered the recommendations to determine whether the criteria proposed by the EPA were consistent with safety, technologically practicable, and economically reasonable, and if so, take appropriate action to implement and enforce them.

Before the start of the 1977 hearings, the GAO issued a report criticizing the EPA’s and FAA’s implementation of the act’s provisions. In particular, the report said “Serious problems” of coordination between the FAA and EPA “have hindered development of noise control regulations.” The EPA responded:

> The performance of the Federal Government in the aviation noise area should be one of the major subjects of the oversight hearings conducted by the Congress in 1977. It would be appropriate for the Congress to explore the basic philosophical approaches of the two agencies and to contrast the performance in the aviation area to the performance in other noise control areas set forth by the Act. In EPA's view, the FAA's regulations under Section 7 of the Act require only "current practice," while the EPA's regulations under Section 6 require "best available technology." Since the specific criteria for establishing standards differ in the two Sections of the Act, perhaps the outcomes should also be different, but fundamental policy questions divide the two agencies, and they will continue to delay progress in the aviation noise area until Congress clarifies its intent.[59]

The FAA explained:

> Section 7 of the Act directs the EPA to propose regulations for aircraft noise control based solely on considerations of public health and welfare, while the FAA must (appropriately) proposed its regulations considering not only the goals for public health and welfare, but also maintaining the highest degree of safety in air transportation, economic reasonableness, technological practicability, and appropriateness of the regulatory actions to the particular type of aircraft involved. In addition to these considerations, the task of preparing

> Environmental Impact Statements, Inflationary Impact Statements, safety analyses, and all other support of EPA initiated proposals falls on the FAA.[60]

FAA officials said they felt burdened by the work necessary to process EPA proposals similar to existing agency proposals. The agency understood that the EPA believed using separate proposals spurred the broadest possible public debate. However, it argued that those proposals might work better as amendments to the FAA proposals. Agency officials emphasized the need for the two agencies to recognize areas of agreement rather than highlight their minor differences regarding aircraft and airport noise regulations.[61]

The congressional subcommittee's May 20, 1977, hearing in New York City focused solely on the Concorde. The scheduled hearing proved timely in light of the court's decision declaring the JFK ban unconstitutional nine days earlier. Subcommittee Chair Leo Ryan (D-CA) invited the general manager of Air France, Antoine Girot, and British Airways North American manager, Roddy Wilson, to testify at the hearing, but both declined. In an attempt to get the views of both men, Ryan submitted a list of questions to the State Department in hopes officials there could gain the cooperation of the two airline officials. His request failed.[62]

The representatives on the panel subjected the FAA witnesses at the hearing, Charles Foster, director of the Office of Environmental Quality, and Eastern Region Director William Morgan, to some contentious questioning. Both defended the DOT's policy to permit the Concorde's sixteen-month test at JFK. At one point, after Foster testified the demonstration was necessary to understand public reaction to noise from the Concorde, Representative James Scheuer (D-NY) exclaimed, "Why are you putting a half-million people through the cruel and unusual punishment that should be constitutionally proscribed of having this horrific level of noise imposed upon them approaching the threshold of pain if all you want to know is if they object?"[63] He later told the subcommittee:

> I can't tell you the frustration that I have felt over the years dealing with other Federal officials in the Department of Transportation and in the FAA, and the pusillanimous and the fainthearted testimony of the gentleman who supposedly represents environmental concerns in the FAA couldn't be a more dramatic example of the kind of negative and uncaring attitude that we have all perceived on the part of the federal bureaucracy.[64]

The September 7 hearing in Washington, DC, brought even more fireworks, as DOT and FAA officials refused to provide information and documentation on the development of proposed noise standards for the Concorde based on national security. According to Congressman Ryan, Brock Adams requested the classification, approved by National Security Advisor Brzezinski, because of the international implications of the materials. Ryan explained:

> I have known for months one of the concerns raised by the French has to do with their national pride and hence their elections next year. . . . I am of the opinion that we are asked to give way in the case and sacrifice the peace, the comfort, the quiet, the capacity to lead reasonable lives among the hundreds of thousands of families in this country, in order to satisfy the national pride of the French or the British, who are, I am reminded, our closest allies . . . we are being asked to accept an airplane, not on its merits . . . this is the price the American people are being asked to pay for national security. [65]

Ryan revealed the existence of a Concorde options paper, also classified as secret, circulating in the executive branch. "The Congress has not been made aware of what are those options."[66]

Neither Charles Foster nor David Jewell, the DOT's public affairs director, appeared at the hearing as requested. According to subcommittee staff, the FAA initially told them Foster had left for vacation and later said he was in Montreal at an ICAO (International Civil Aviation Organization) meeting. Foster's supervisor, Dwayne Freer, told the congressional staff that Foster's attendance at the hearing had to be approved by Brzezinski. The committee received a similar answer as to why Jewell had not appeared. Ryan speculated the administration purposely kept them from appearing "until such time as the administration can agree on what their story will be to the subcommittee," or perhaps until the FAA released its promised draft SST noise notice of proposed rulemaking on September 24. An angry Ryan threatened to subpoena Brzezinski, Foster, and Jewell. Representative John Wylder (R-NY) threatened to file a Freedom of Information Act request for the classified document. “We are taking a step backwards if we permit a decision of this importance to be made behind closed doors,” he said. He contended, “Such actions are in direct conflict with the Carter administration’s pre-election promises of open decision-making.”[67]

In discussing the classified Concorde document, Congressmen Thomas Kindness (R-OH) surmised, in an apparent reference to the recently negotiated but yet-to-be-signed Bermuda II Agreement with Great Britain:

> Everyone can recall, I suppose, the suspension of flights was an immediate threat at that time and it was overcome and we have not heard anything that indicates that there was an agreement reached that had some bearing on the continued flights of the Concorde into the U.S. airports. But maybe there was such an agreement. Maybe that is what we are talking about in terms of national security interests with regard to the documentation involved in this controversy. If so, I think the public has a right to know.[68]

As requested, the EPA’s deputy assistant administrator for noise abatement control, Charles Elkins, did testify at the hearing. Before giving his statement, he declared “that no one in the executive branch has asked me not to come to the committee hearing this morning.”[69] The *Washington Post* published an article on the proceedings:

> The day started with what appeared to be another in an endless series of congressional hearings on whether the noisy Concorde supersonic jet plane should get permanent landing rights in the United States. The plot thickened when two Department of Transportation officers who were scheduled to testify did not appear, apparently on the instructions of National Security Advisor Zbigniew Brzezinski . . . the day ended when Secretary of Transportation Brock Adams hastily called a 6 p.m. press conference to say he was “somewhat confused as to what the chairman Ryan had in mind.” Adams thought Ryan had been satisfied without the testimony.[70]

On December 8, in response to eighty-two questions regarding the Concorde he received from Representative Scheuer, Brock Adams replied that Executive Order 11652 allowed the classification of documents if their release could damage national security. He said the order defined national security to include foreign relations. Adams further acknowledged he could not release the Concorde options paper to Congress because of its classified nature. However, he could share the unclassified background portions of the document.[71]

Supersonic Policy

In a highly politicized atmosphere in which experts did not agree, the DOT and the FAA found themselves in the uncomfortable position of determining whether or not supersonic transport aircraft should have long-term landing rights in the United States. Despite some criticism, the agency deemed the Dulles experiment a success. It granted Air France and British Airways the right to continue operations into the airport until it developed a permanent policy.

The arduous process of regulating SST noise began long before the Dulles experiment ended. On October 8, 1976, an attorney for the Environmental Defense Fund obtained a court order from the U.S. District Court for the District of Columbia requiring the FAA to submit a draft EIS in preparation of noise rules for civil supersonic aircraft by April 15, 1977. In early April, with the controversy over landing rights in New York unsettled and British and French pressure increasing, the White House debated whether or not to request an extension from the court. As the FAA worked to finalize the EIS, Brock Adams sent President Carter a memorandum questioning whether the DOT had to file the EIS per the court order. Because of the issues involved, Adams wanted the president to be part of the decision-making process. Adams, not confident the court would grant an extension, wanted to ensure the administration took the “proper steps . . . to explain the statement and why it was filed, both with the public media in the U.S. and with appropriate foreign ministers.” Adams requested a meeting with the president, White House staff, and the State Department so he would have “the benefit of your guidance in whether to file the statement and, if it is filed, the manner in which you wished it released.”[72]

Adams explained to the president that the EIS could create difficulties since it had to address two situations, what he called the worst-case alternative allowing unlimited access of the Concorde into the United States or a total ban on supersonic transport aircraft. In the draft EIS, the FAA identified twelve airports that could support the relatively high cost of Concorde operations. Assuming a worldwide fleet of thirty to forty Concordes, the FAA projected the effect of noise at those airports in 1987 with and without Concorde operations. Adams warned, “Although the draft EIS does not propose any specific action, the discussion of potential operation at various gateway cities is likely to draw an adverse reaction in those cities.”[73]

In addition, Adams expressed concern over the possibility the Port Authority would use the draft EIS to delay further its decision on permitting the sixteen-month Concorde trial at JFK. If the Port Authority, scheduled to meet on April 14 to discuss Concorde landing rights, once again canceled the meeting, it could use the draft EIS as an excuse not to reschedule it. He also pointed out that “publication could have an adverse effect on the Bermuda air negotiations if, as anticipated, there is a hostile response” to the EIS. Adams lamented, “On the other hand, at some point, we will probably have to face those public reactions, as it might be best to do so in response to this court order.”[74]

The secretary proposed two options for handling the situation:

1. Comply with the court order but announce a public hearing on the EIS in mid-August. The public hearing announcement might dissipate some of the controversy generated by the worst-case scenarios in the EIS.
2. Seek to modify the court order, allowing the draft EIS to incorporate data from the Dulles trial. This would be risky since it might distress the court and the plaintiffs because it would look like the government was again dragging its feet on mandating a SST noise rule.

Adams recommended the first option, explaining the DOT could not avoid publishing an EIS indefinitely, so he suggested, "We might as well get it over with."[75]

Richard Cooper, State Department undersecretary for economic affairs, disagreed with Adam's view. He opposed releasing a draft EIS for various reasons. Aware the FAA planned to respond on April 11 to the Air France and British Airways proposal to reduce noise at JFK, Cooper recommended the administration try to delay the court order. He worried "the issuance of the EIS within two or three days of DOT/FAA's letter to the British and French will give the impression that the [U.S. government] has gone out of its way to contradict or nullify the favorable impact of its judgment on the new noise data." He cautioned, "The EIS, which includes a 'worst-case' situation, will be susceptible to quotation out of context, putting the Concorde in a highly negative light."[76]

In preparing the draft EIS, the FAA considered the probable environmental effects of unlimited operations of first-generation supersonic transport aircraft at twelve major airports they determined could support the Concorde: Anchorage, Boston, Chicago O'Hare, Dallas/Fort Worth, Honolulu, Houston Intercontinental, Los Angeles, Miami, New York JFK, San Francisco, Seattle, Washington Dulles. The agency cautioned, however, that the airports used in the assessment did not imply their operators contemplated Concorde flights. "These airports are presented solely to represent the potential 'worst-case' impacts from potential Concorde flights."[77]

President Carter concurred with Brock Adams' recommendation, and the FAA finalized the draft EIS for public release. In determining the best- and worst-case scenarios of unlimited SST operations, the FAA considered the following actions but offered no specific course of action:

- granting or denying operations specifications amendment requests for SSTs
- issuing airport noise regulations
- issuing a noise certification rule applicable to current and future SSTs
- issuing or not issuing a U.S. certificate for the Concorde
- issuing operational regulations for SST
- taking no federal action[78]

Much of the noise information in the EIS duplicated that contained in the September 1975 EIS impact statement on the Concorde.

To help explain the purpose of the EIS, the DOT issued a press release: "It is customary practice under the National Environmental Policy Act to report best-case and worst-case projections. . . . It is unlikely that a fleet as large as 30-40 aircraft will ever be built. It is also highly unlikely that the Concorde will serve all the airports covered by the draft EIS, especially as some of those airports have already made known that they would not admit Concordes."[79]

With the issuance of the release, Secretary Adams held a short news conference at which he explained he "was concerned with the filing of the statement today that it might be misunderstood as to what its purpose was, why we were filing it, and what actions the Department was prepared to take and was taking." Adams declared the EIS would not necessarily be the basis for an SST noise rule. He emphasized the DOT and the FAA prepared the draft EIS before the completion of the Dulles trial and without data from Dulles in response to a court order. Once the Dulles tests ended, the DOT would use the test data and comments on the draft EIS to develop a notice of proposed rulemaking and a "more sophisticated draft

Environmental Impact Statement." The FAA planned to hold public hearings once it issued its noise proposal to get industry and public input.[80]

The EPA, often at odds with the FAA over aircraft noise regulation, commented on the draft EIS. In a July 14, 1977, letter to FAA Administrator Langhorne Bond, Rebecca Hanmer, EPA director of federal activities, wrote, "It is EPA's opinion that the EIS is inadequate and should be revised to present actual alternative sets of proposals, including data and analysis describing the environmental impacts, costs, and benefits for each, and a discussion of the policy issues which are fundamental to the choosing" of those alternatives. Hanmer complained the EIS, as drafted, contained no:

- analysis of the fundamental policy issues that support the EIS
- evaluation of the bulk of the generic alternatives presented
- rulemaking proposals to accompany the EIS[81]

The EPA recommended the FAA issue the two SST noise rules previously proposed by the agency. Those rules would:

- ban all but a few of the initial-version Concordes (those with flight time before December 31, 1974)
- require later production or derived versions to comply with the 1969 FAR 36 requirements
- require new type designs of supersonic transports to meet the FAR 36 requirements, which were in effect for subsonic aircraft when the application for the new type certificate was submitted[82]

In response to the EPA's concerns, on July 25, the FAA's Charles Foster sent the EPA a working draft of the notice of proposed rulemaking on SST noise. On August 8, Hanmer thanked Foster for allowing the EPA to review the draft. She responded, "The FAA has apparently tentatively decided to reject EPA's proposed regulations for SST noise. Until we receive a full explanation for this rejection of EPA's proposals, it is not possible for us to comment very meaningful on the present draft rule." She provided the following comments:

1. The most disturbing of all the FAA draft proposals is the treatment of future design SSTs. These aircraft may determine the noise environment around our nation's airports in the late 1990s and early 21st Century, but the FAA proposed that they meet only 1969 FAR 36. This high noise level is unacceptable for a new design aircraft, no matter what its unique characteristics.
2. Concerning existing type SSTs, the FAA proposed to rely on airport-by-airport determinations of their acceptability, with significant weight placed on the decision of the airport proprietor to accept the aircraft. At a minimum, this approach should be modified by:
    a. Formulating in exact terms in the preamble a legally acceptable approach that a local proprietor may use to exclude existing SSTs without being discriminatory or violating any U.S. Treaty obligations. Although the proprietor may try any method he wishes, there should be at least one legally acceptable method for excluding the SST, endorsed by the FAA explicitly. Without this policy spelled out by the FAA in detail, the promise that a local proprietor may ban a SST is hollow.
    b. Indicating what the FAA will do to change the rule if the proprietors find they cannot exclude the SST in actual practice. Given even a clear statement of the FAA's opinion of a non-discriminatory method for excluding the SST, the courts will be the ultimate judge. If the FAA is to justify "grandfathering" all the existing type SSTs based on local choice, then it must be prepared to say what it will do if that local choice turns out to be illusory.
    c. Requiring a public hearing by the proprietor before the U.S. admits SST flights. This should apply to the twelve airports now covered by the April 1977 Draft Environmental Impact Statement and future airports. This EIS process also is insufficient to ensure that the proprietor's decision is correct for the community.

Many in the Carter administration, especially in the NSC and the State Department, expressed apprehensions about the content and timing of the public release of any proposed SST noise rules. On August 26, 1977, Robert Hunter, National Security Council Director of Western European Affairs, sent a memo to Brzezinski notifying him the British and French governments had transmitted démarches asking that a permanent noise rule for Dulles be issued that would allow Concorde operations to continue at the airport. With a rulemaking effort in progress, Hunter indicated the "only real problem seems to be semantic: whether the Dulles rule is called 'provisional' (DOT's preference) or 'permanent but subject to the final rule.'" Hunter fretted, however, if the DOT unexpectedly argued against permanent landing rights at Dulles, "then there will (rightly) be hell to pay with the British and French." [83]

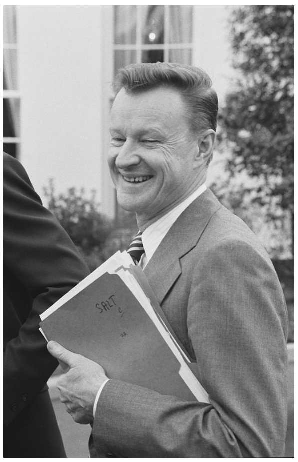
On August 30, Adams sent an options paper to Brzezinski and Stuart Eizenstat outlining the background and issues surrounding SST rulemaking efforts. Per Brzezinski's instructions, Adams classified the document "'Secret' because of the national security implications of its release." Adams indicated he preferred publishing the NPRM on September 24 after the Dulles demonstration ended but said he understood "that foreign policy considerations may dictate otherwise." Adams asked for comments on the options paper from the EPA and the Justice, State, and Commerce departments by September 7.[84]

The twelve-page options paper posed several issues and possible solutions. The primary question centered on whether the FAA should ban the Concorde from flying in the United States or authorize operations subject to noise restrictions. Approval of a Concorde ban would have a favorable domestic response and political significance for the administration. For example, a ban would prove the president's commitment to protecting the environment and would be consistent with the administration's fuel conservation program since the Concorde was not fuel-efficient. Such a decision would also fulfill a U.S. desire to retain control of and direct new technology rather than accept foreign technology.[85]

Supporting the prohibition would result in serious international ramifications. The British and French indicated a ban on Concorde operations could result in the prohibition of specific U.S. aircraft in their countries. Since the Concorde predated any subsonic noise regulation, a ban might be considered a retroactive disapproval of the design. Perhaps more importantly, it could be viewed by the French and British as the United States exercising its "economic clout to control the development of foreign technology."[86]

In a memo to Carter on September 21, Eizenstat and Brzezinski insisted a decision regarding Concorde operations be made. "The trial period at Dulles Airport ends September 24,

1977. At that time, the British and French expect DOT to publish the test results and issue a tentative decision on future operations of SSTs in the form of a notice of proposed rulemaking." The DOT planned to hold a series of public meetings after the release of the NPRM, and the FAA expected to issue a final rule in the spring of 1978. They further stated, "NSC and State have asked that [the final rule] come after the March elections in France."[87]



Zbigniew Brzezinski
Courtesy: Library of Congress

Eizenstat and Brzezinski gave the president two options for a SST rule. The first option, favored by the EPA and the Council on Environmental Quality, would ban Concorde operations. They pointed out that such a ban "would have severe international ramifications. The French have linked progress in the trade negotiations to the Concorde and hinted at a link with some nuclear non-proliferation steps. The French, and perhaps even the British, will feel obliged to take retaliatory action against U.S. airlines should a total ban be imposed."[88]

The DOT, departments of State and Commerce, and the U.S. Special Trade Representative preferred the second option, which would permit only the sixteen Concordes then in service to fly into the United States. SSTs manufactured after January 1, 1980, would have to meet the 1969 standards for subsonic aircraft. Airport proprietors would maintain the right to limit or ban Concorde operations. Carter's policy advisors, however, warned the option would "have sizeable and negative symbolic significance, being viewed by some as a retreat from domestic environmental concerns in favor of new technology and foreign policy considerations." The president approved option two, although he questioned why the FAA had not included his home state's airport in Atlanta on the list of airports proposed for Concorde operations.[89]

With White House approval, on September 23, 1977, Brock Adams announced the administration's decision on a SST noise policy and noted the FAA would issue an NPRM within a month. In announcing the decision, Adams said the DOT developed the forthcoming NPRM "to protect the health and safety of the American people, set a fair and reasonable noise standard for SST operations, and strike a balance between legitimate domestic and international interests of the United States." The proposal would exempt the Concordes manufactured before January 1, 1980, from retrofit requirements while requiring future SSTs to meet all noise standards for newer subsonic aircraft. The rule would ban Concorde operations between 10 p.m. and 7 a.m. and retain the absolute prohibition on supersonic flight over land. In addition, airport proprietors would have local option rights. Until the promulgation of the final SST noise rule, Concorde operations at Dulles could continue.[90]

The FAA issued the SST noise NPRM and a supplemental EIS on October 11, 1977. The agency requested public comments by December 31.[91] The FAA subsequently held public hearings in Washington, DC, on December 15, 1977; Honolulu, on January 11, 1978; and Los Angeles, on February 27, 1978. The FAA justified its grandfather clause for the first sixteen Concordes at these hearings by noting they constituted the entire aircraft production run. (Because of its high fuel costs and limited payload, the Concorde had been purchased only by the state airlines of France and Britain.) Agency officials believed modifications to bring the aircraft into compliance with subsonic noise standards were neither technologically practicable nor economically reasonable.

In addition to noise concerns, the FAA heard other complaints during the public meetings. One of the more serious environmental concerns centered on the fear that emissions from SST engines might damage the ozone layer of the Earth's atmosphere. Citing several recent research studies, including one submitted by the National Academy of Sciences, the agency concluded the possibility of such damage from the Concorde too minor to be an immediate concern. Public comments submitted to the agency also questioned if aircraft emissions would negatively affect air quality. The agency determined the SST would have an insignificant effect on air quality. Other commenters questioned if vibrations from the aircraft could damage property. After research and tests done by the FAA and NASA during the Dulles trial, the FAA determined: “The difference in vibration impact between Concorde and subsonic aircraft is not considered to be significant.”

The SST noise final rule became effective on July 31, 1978. It required all newly manufactured civil supersonic aircraft to meet federal noise standards applicable to subsonic aircraft. It exempted the sixteen Concorde aircraft manufactured before January 1, 1980, from retrofit requirements for older jet transports, banned Concorde operations between 10 p.m. and 7 a.m., and prohibited supersonic flight over land.[92]

Setting Standards

In 1969, the FAA passed Federal Aviation Regulation 36 (FAR 36) to limit the noise emitted by newly designed aircraft.[93] The agency expanded the rule in 1973 to include newly produced aircraft of older designs.[94] The FAA issued a new regulation in 1975 setting maximum noise levels for newly built or newly type-certificated small propeller-driven planes. The rule applied to all propeller-driven airplanes under 12,500 pounds, except for those used in agricultural and firefighting operations.[95] The agency again amended the regulation in 1976 to cover all planes in the existing fleet and continued to amend it as necessary.[96]

On November 18, 1976, Secretary of Transportation William Coleman and FAA Administrator John McLucas jointly issued the "Aviation Noise Abatement Policy," in which they claimed aircraft noise reduction was a shared responsibility:

> Those who anticipate a complete federal solution to the aircraft noise problem misunderstand the need for federal, local and private interaction. The primary obligation to address the airport noise problem always has been and remains a local responsibility. Consequently, we have also set forth what we believe to be the legal and proper responsibilities of the airport proprietors, air carriers and other aircraft operators, aeronautical manufacturers, state and local governments, and private citizens. The full benefit of a federal plan of action will be realized only if complementary action is taken by all these participants.[97]

Under the new policy, the FAA committed to issuing a new rule, effective January 1, 1977, which would require subsonic jet airplanes with maximum gross takeoff weights over 75,000 pounds that did not meet Federal Aviation Regulation (FAR) 36 noise levels to be retired from the fleet or retrofitted to meet new noise levels according to the following schedule:

- 747s within six years, with one-half completed within four years
- 727s, 737s, DC-9s, and BAC 1-11s within six years, with one-half completed within four years
- 720s, 707s, DC-8s, and CV-990s within eight years, with one-quarter completed within four years and one-half completed within six years[98]

On March 3, 1977, the agency published the long-awaited rule establishing three stages of aircraft noise for subsonic large transport aircraft and subsonic turbojets. Stage 1 aircraft included those that did not meet current noise standards and had to be modified or replaced according to a previously established schedule. Stage 2 aircraft met the current standards, while Stage 3 aircraft met the more rigorous noise standards for the next generation of jet transports prescribed by the rule. The agency judged improved noise-reduction technologies made applying new standards economically feasible. The new standards became effective on October 1, 1977, and covered all large (over 75,000 pounds) aircraft for which manufacturers had applied for new type certificates after May 5, 1975. The rule reduced noise limits on landing approaches from the old standard of 102-108 effective perceived noise decibels (EPNdB) to 98-105 EPNdB, depending on aircraft weight.[99]

The Aviation Safety and Noise Abatement Act of 1979 gave airlines more time to comply with Stage 2 aircraft noise standards as they applied to two-engine jets over 75,000 pounds. The legislation required these two-engine aircraft to comply by January 1, 1983. However, the law extended, with exceptions: until January 1, 1985, for those with over one hundred seats, and until January 1, 1988, for those with one hundred or fewer seats. It also gave the FAA authority to issue regulations on "air noise compatibility planning" and to make funds available for airport projects contained in an approved noise compatibility program, and in certain circumstances, barred lawsuits for damages because of airport noise.[100]

Under the new law, the FAA, for the first time, based the standards for takeoff and sideline noise levels on the number of engines and weight. Takeoff limits from the old measure of 93-108 effective EPNdB were reduced to 90-106 for four-engine jets, 90-104 for three engines, and 89-101 for one and two engines. Sideline noise limits decreased from 102-108 EPNdB to 96-103 for three and four engines and 94-103 for one and two engines. The new noise limits did not apply to aircraft types already certificated. On November 28, 1980, the FAA published a rule requiring foreign operators of aircraft over 75,000 pounds serving the United States to comply with the same noise standards as U.S. operators. The regulation generally required final compliance by 1985.[101]

With community noise complaints increasing, on January 19, 1979, the FAA recommended a two-segment departure profile for jet aircraft of 75,000 pounds or more. Aircraft using the new procedure would climb under full power to 1,000 feet to get up quickly over airport communities, thus minimizing the noise reaching the ground. At that altitude, they reduced their climb angle to pick up speed and permit retraction of flaps and other high-lift devices before climbing to 3,000 feet under reduced power. Officials intended the new procedure to replace practices at many airports, where power cutback points varied from 450 feet to 1,500 feet. The FAA did not mandate the approach because safety considerations sometimes dictated pilots employ other departure procedures.[102]

The agency next issued an advisory circular on ozone irritation in aircraft cabins on July 21, 1977. Beginning in the winter of 1976, persons on high-altitude flights reported symptoms such as shortness of breath, coughing, and eye irritation. By March 1977, the FAA concluded ozone was the probable cause. Although the main atmospheric ozone layer lies above altitudes commonly used by airliners, gas concentrations occasionally descend lower, particularly at high latitudes and during certain seasons. The FAA recommended pilots descend to lower altitudes if crew and passengers noted ill effects of ozone contamination. If pilots experienced significant exposure to the gas, the agency advised them to breathe pure oxygen before landing to counteract ozone's known impact on night vision. The agency also began research to find more permanent ways of dealing with the problem.[103]

On January 21, 1980, the FAA published a rule limiting the amount of ozone gas in airliners flying above 18,000 feet. The agency restricted ozone concentration in the cabin to a maximum of 0.25 parts per million at any time. The average exposure on flights of more than four hours could be no more than 0.1 parts per million. The FAA gave the airlines the choice of achieving these standards through air filters, using engine heat to break down ozone, or selecting routes that avoided ozone concentrations. However, the agency expected that about five hundred large transport aircraft used at high altitudes in northern latitudes would require modification.

The deadline for compliance was February 20, 1981. The same rule amended airworthiness standards for new transport aircraft to protect against ozone irritation.[104]

In addition to new federal aviation regulations, Congress passed, and the president signed a law enhancing the FAA's environmental program. The 1978 Quiet Communities Act provided for the coordination of federal research and activities in noise control. Congress expected the act to increase FAA response to noise regulations proposed by the EPA. The law also required the agency to provide the public with a detailed analysis of EPA proposals and authorized FAA funding to develop noise abatement plans around airports. Eligible projects included the construction of barriers and acoustical shielding, soundproofing of buildings, and acquiring land and air easements to achieve compatibility with noise standards.[105]

Expansion Noise

Despite new rules designed to reduce airport noise, decisions on capacity and noise limitations plagued many cities. While some city and county governments often approved airport expansion plans because of their economic benefit, others tried to restrict airport growth because of noise. For example, after years of dealing with citizen complaints, legal battles, and even purchasing homes near the airport, in June 1979, the Los Angeles City Council passed an airport noise ordinance. That regulation required Los Angeles International Airport (LAX) operators to retrofit all early-generation two-, three-, and four-engine jets with quieter engines by 1985. The rule also prohibited noisy foreign jets like the Concorde from using the airport. Saying he was optimistic about the new regulation, FAA Chief Counsel Clark Onstad commented it would be "inaccurate and misleading" to believe the ordinance would solve LAX's noise problems. He did say, however, “While the noise will not disappear, there will be, as a result of these regulations, a reduction in the noise impact on the communities around LAX.”[106]

More court cases and airport operational curfews ensued as other communities in California and cities across the United States tried to stop airport growth to ease aircraft noise and emissions. In 1980, for example, the Orange County (California) Board of Supervisors imposed a limitation of approximately forty-one daily departures for air carriers at its John Wayne Airport because of a growing number of citizen noise complaints. The rule, which provided grandfather rights to the two existing airlines, Air California and Hughes Airwest, resulted in the denial of applications by other air carriers asking for entry into the airport. On April 4, 1980, the FAA warned the supervisors the grandfather clause violated the airport's non-exclusive use and non-discrimination obligations. The agency gave them thirty days to allow other carriers into the airport. The FAA warned the supervisors to “start negotiations to accommodate . . . other applicants without further delay. Failure to do so will warrant our pursuance of contractual, injunctive and civil penalties.” The agency remarked that this was the first time it had threatened to take an airport to court for refusing to allow airlines to use an airport.[107]

Public and congressional concerns continued unabated once the Carter team left office. For example, on July 30, 1981, in San Diego Unified Port District v. Gianturco, the U.S. Court of Appeals for the Ninth Circuit struck down an attempt by the State of California to impose more stringent noise rules at Lindbergh Field than those set by Lindbergh's proprietor. The court's decision included a rationale for the "Burbank exception."[108] Noting that the U.S. Supreme Court held in Griggs v. Allegheny[109] that airport proprietors could be liable for the noise produced by aircraft using their facilities. The court observed, "Fairness dictates that they must also have power to insulate themselves from that liability." At the same time, the court set forth criteria that defined airport proprietorship, including "ownership, operation, promotion, and the ability to acquire necessary approach easements." If a local or state entity possessed these characteristics, it also included the power to regulate noise. In the case of Lindbergh Field, however, the State of California did not meet the criteria, having entrusted them to the San Diego Unified Port District.[110]

Anti-noise sign at entrance to Santa Monica Airport
Courtesy: FAA

On September 23, 1981, in Santa Monica Airport Association v. City of Santa Monica, the same court reaffirmed the "Burbank exception." It upheld aircraft noise-abatement ordinances and a night curfew on takeoffs and landings imposed by the City of Santa Monica, which owned and operated the local airport. In reaching this decision, the court again emphasized that "municipal airport owners needed some means of limiting their liability under Griggs." However, the court did strike down a categorical ban on all jet aircraft as violating the Constitution's commerce and equal protection clauses.[111]

Bibliographical Comment and Notes

I conducted archival research for this history in a number of public archives, such as the Federal Aviation Administration History Archives in Washington, DC, the Jimmy Carter Presidential Library in Atlanta, Georgia, and the National Archives and Records Administration in College Park, Maryland. University archival collections, such as those at Georgia State University Labor Archives in Atlanta, Georgia, and the University of Texas at Arlington, Texas Labor Archives in Arlington, Texas, contained large collections of PATCO documents, most of which have now been digitized and published online. Most congressional hearings, congressional investigative reports, comptroller general reports, public laws, court cases, and other federal documents cited in the endnotes are available online at www.hathitrust.org and www.heinonline.org. FAA research and development reports are also online at https://www.faa.gov/data_research/research/med_humanfacs and https://www.faa.gov/data_research/library. Federal agency websites also contain pertinent historical information, such as the NTSB's aviation accident report repository.

Contemporary newspaper reports provide a valuable source of information and opinion. Most of the newspapers cited in the endnotes came from www.newspapers.com. Magazines and journals were important sources of information, especially *Aviation Week & Space Technology*, which presented a wide range of articles on FAA activities. More partisan publications, such as the *PATCO Journal* and *PATCO Newsletter,* contained helpful information, as did FAA publications, such as *FAA Horizon*, *FAA World*, and *FAA Headquarters Intercom*.

Very few published books include information on the FAA during the Carter years. I found Edmund Preston's *Troubled Passage: The Federal Aviation Administration During the*

Nixon-Ford Term, 1973-1977, and his edited *FAA Historical Chronology, 1926-1996*, online at https://www.faa.gov/about/history/chronolog_history, provided excellent background information, as did Nick Komon's *The Third Man: A History of the Airline Crew Complement Controversy*. A variety of books are available discussing the background of the 1981 controller strike. Jimmy Carter's *White House Diary* and other works on his tenure as president also gave insight into his administration.

I have included more specific references to the sources used in the endnotes. These notes should enable readers to pursue their interests in greater detail.

Endnotes

[1] Howard Zinn quote. Zinn (1922-2010), an American historian, playwright, philosopher, social activist, and World War II veteran, served as chair of the history and social sciences department at Spelman College and as political science professor at Boston University.

Prologue

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John L. McLucas served from November 24, 1975 to April 1, 1977

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[11] Langhorne Bond, interview by Nick Komons on January 13 and 19, 1981, in Washington, DC (Washington, DC: FAA Oral History Collection, FAA History Archives): 14-15.

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Chapter 2: Airlines Deregulated

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- June 12, 1980, Air Wisconsin Swearingen SA-226 Metro, near Valley, Nebraska, 12 fatalities. The NTSB cited probable cause as the flight crew's continued flight into an area of severe thunderstorms, which resulted in precipitation-induced flameout or loss of power of both engines at an unrecoverable altitude. The crew's failure to use all available sources of weather information, the failure of the air traffic control system to disseminate critical weather information to the air traffic controllers and crew, the failure of air traffic control supervisory personnel to accomplish key job functions, and the failure of the center weather service unit meteorologists to disseminate critical weather information to the Omaha Terminal Radar Approach Control facility supervisors contributed to the accident.
- September 12, 1980, Florida Commuter Airlines Douglas DC-3 at Freeport, Bahamas. 34 fatalities. The NTSB could not determine probable cause, but the following factors may have contributed to the accident: flight into known thunderstorm activities and turbulence; preexisting discrepancies in the pitot/static system of the aircraft and their effect on the reliability of the flight instruments; and lack of operational control exercised by the airline's management.

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- H.R. 3326: Experienced Pilot Act of 1979, introduced by Representative Glenn Anderson (D-CA) on March 29, 1979
- H.R. 3731: A bill to amend the Federal Aviation Act of 1958 to eliminate the age limitation presently imposed on certain pilots of aircraft, and for other purposes introduced by Representative John P. Hammerschmidt (R-AR) on April 25, 1979
- H.R. 4506: Experienced Pilot Act of 1979 introduced by Representative Tim Lee Carter (R-KY) on June 18, 1979
- H.R. 4823: A bill to amend Section 602 of the Federal Aviation Act of 1958 to direct the National Institutes of Health to conduct a study on certain age restrictions on individuals seeking to serve as pilots of aircraft and for other purposes, introduced by Representative Barry Goldwater, Jr. (R-CA) on July 17, 1979
- H.R. 4826: A bill to amend Section 602 of the Federal Aviation Act of 1958 with respect to certain age restrictions on individuals seeking to serve as pilots, flight engineers, or flight navigators of aircraft, and for other purposes, introduced by Representative William Harsha (R-OH) on July 17, 1979

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Chapter 5: Modernization

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[57] Douglas Feaver, "Bureaucratic Rules Outstrip the Concorde," *Washington Post*, December 16, 1978; Erwin Bulban, "Braniff Starts Concorde Interchange," *Aviation Week & Space Technology*, January 22, 1979, 33.

[58] Ibid.

[59] US Comptroller General, "Noise Pollution – Federal Program to Control It Has Been Slow and Ineffective," CED-77-42, March 7, 1977, 17, 46.

[60] US Congress, "Aircraft/Airport Noise Control," April 5, 80.

[61] Ibid., 81.

[62] Ibid., May 20, 1977, 204.

[63] Ibid., 237.

[64] Ibid., 254.

[65] Ibid., September 7, 1977, 520-521.

[66] Ibid.,530-531.

[67] Quoted in "Concord Options," *Aviation Week & Space Technology*, September 19, 1977, 13.

[68] US Congress, "Aircraft/Airport Noise Control," September 7, 1977, 568.

[69] Ibid., 532-536.

[70] Douglas Feaver, "Landing Rights for the Concorde: A Diplomatic Dilemma," *Washington Post*, September 8, 1977; "'Security Curtain' Charged During Concorde Hearing," *Aviation Week & Space Technology*, September 12, 1977, 24.

[71] Adams to Scheuer, letter, December 8, 1977, File III 12h(1), FAA History Archives.

[72] Secretary of Transportation to president, memo, April 6, 1977, Box CA-1, White House Central File, Subject File Civil Aviation, Jimmy Carter Library.

[73] Secretary of Transportation to president, memo, "Draft Environmental Impact Statement on SST Noise Rules: Response to New British-French Data on Concorde Noise Levels," n.d., Box CA-1, White House Central File, Subject File Civil Aviation, Jimmy Carter Library.

[74] Ibid.

[75] Ibid.

[76] "Jack Watson, Under Secretary of State for Economic Affairs, to president, memo, "Noise Impact of Supersonic Aircraft in the United States," April 8, 1977, Box CA-1, White House Central File, Subject File Civil Aviation, Jimmy Carter Library.

[77] Federal Aviation Administration, "Draft Environmental Impact Statement and Type Certification Alternatives for Civil Supersonic Aircraft," April 1977, 2, File III 12h(1), FAA History Archives. The DOT timed the release for 3 p.m. Friday, which is typically a day and time not conducive to large media coverage.

[78] Ibid., 1.

[79] DOT press release, DOT-50-77, April 15, 1977, File III 12h(1), FAA History Archives.

[80] Transcript, "News conference with the Honorable Brock Adams, Secretary of Transportation, on the Draft Environmental Impact Statement (EIS) on the SST, Washington, DC, April 15, 1977," File III 12h (1), FAA History Archives.

[81] Rebecca Hanmer to Langhorne Bond, letter, July 14, 1977, reprinted in "Aircraft/Airport Noise Control," September 26, 1977, 711-717.

[82] Ibid.

[83] Hunter to Brzezinski, memo, "Concorde," August 26, 1977, Box FG-140, White House Central File, Subject File, Federal Government Organizations, Jimmy Carter Library.

[84] Adams to Brzezinski and Eizenstat, memo, "SST Noise Regulations – Background Issue Paper," August 30, 1977, reprinted in "Aircraft/Airport Noise Control," September 7, 1977, 573.

[85] Ibid., 579.

[86] Ibid.

[87] Eizenstat and Brzezinski to the president, memo, "Proposed SST National Noise Rule," September 21, 1977, Box CA-2, White House Central File, Subject File, Civil Aviation, Jimmy Carter Library.

[88] Ibid.

[89] Ibid.

[90] "Secretary Adams Announces Proposed Concorde Noise Rule," DOT Press Release, DOT 107-77, September 23, 1977, File III 12h(1), FAA History Archives.

[91] *Federal Register,* 42, no. 198 (October 13, 1977): 55175-55184; "DOT Issues Proposed SST Noise Rule," DOT Press Release, FAA 96-77, October 13, 1977; FAA, "Supplemental Draft Environmental Impact Statement and Noise Regulations and Type Certificate Alternatives for Civil Supersonic Aircraft," October 1977; "Final Noise Rules for Supersonic Transport Aircraft, FAA fact sheet, June 27, 1978; "Public Hearing on SST Noise Rules Set," DOT Press Release, FAA 115-77, November 18, 1977, File III 12h(1), FAA History Archives.

[92] "DOT Issues Final SST Noise Rules," DOT Press Release, DOT 96-78, June 27, 1978, File III 12h(1), FAA History Archives; *Federal Register* 43, no. 126 (June 29, 1978): 28169-28428.

[93] *Federal Register* 34, no. 221 (November 18, 1969): 18355-18379.

[94] *Federal Register* 38, no. 206 (October 26, 1973): 25969-29574.

[95] *Federal Register* 40, no. 3 (January 6, 1975): 1029-1036.

[96] *Federal Register* 41, no. 248 (December 23, 1976): 56046-56056.

[97] Department of Transportation, "Aviation and Noise Abatement Policy," November 18, 1976, 2.

[98] Ibid. 6-7.

[99] *Federal Register* 42, no. 42 (March 3, 1977): 12360-12372.

[100] Public Law 96-193.

[101] Edmund Preston, ed., *FAA Historical Chronology: Civil Aviation and the Federal Government, 1926-1996*, https://www.faa.gov/about/history/chronolog_history/media/b-chron.pdf.

[102] Ibid.

[103] See, for example, J. Robert Dille and Charles F. Booze, FAA Office of Aerospace Medicine, Civil Aerospace Medical Institute, "The 1976 accident experience of civilian pilots with static physical defects," August 1979, Report DOT/FAA/AM-79/19; C. F. Booze and J. K. Pidkowicz, FAA Office of Aerospace Medicine, Civil Aerospace Medical Institute, "Postmortem coronary atherosclerosis findings in general aviation accident pilot fatalities: 1975-1977," February 1980, Report DOT/FAA/AM-80/8; J. O. Boone, L. Van Buskirk, J. Steen, FAA Office of Aerospace Medicine, Civil Aerospace Medical Institute, "The Federal Aviation Administration's radar training facility and employee selection and training," September 1980, Report FAA-AM-80-15.

[104] FAR 121.578; FAA Advisory Circular 120-38, "Transport Category Airplanes Cabin Ozone Concentrations," October 10, 1980.

[105] Public Law 95-609.

[106] Erwin Baker, "L.A. Approves New Airport Noise Law," *Los Angeles Times*, May 30, 1979.

[107] "Orange County Airport Told 'to Open to Airlines,'" *Desert Sun (Palm Springs, CA),* April 7, 1980.

[108] On May 14, 1973, in Burbank v. Lockheed Air Terminal, the U.S. Supreme Court prohibited states and municipalities from using their police powers to impose curfews on jet aircraft operations. The City of Burbank, CA, passed an ordinance banning turbojet takeoffs and landings between 11 p.m. and 7 a.m. at the Hollywood-Burbank Airport, a privately owned and operated facility. Pointing to the Noise Control Act of 1972, the Supreme Court concluded that the noise-regulatory powers granted by Congress to the FAA and the Environmental Protection Agency were so pervasive that the federal government had preempted state and local authority. The court also noted that upholding the ordinance could lead to "fractionalized control" of takeoffs and landings that would severely limit the FAA's flexibility in controlling air traffic. Under the Federal Aviation Act, air traffic control had been preempted by the FAA. Thus, the court concluded it was "not at liberty to diffuse the powers given by Congress to the FAA and EPA. . . . If that change is to be made, Congress alone must do it." In what came to be known as the Burbank exception, however, the court stated the Burbank decision applied to the exercise of police power and did not pertain to what limits, if any, apply to a municipality as a proprietor.

[109] 402 Pa. 411, 168 A.2d 123 (1961).

[110] 651 F.2d 1306 (9th Circuit 1981).

[111] 659 F.2d 100 (9th Circuit 1981).