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Front Cover: **B–737 departing Los Angeles International.** Photo by Gary Kious, TRW

Back Cover: **The second stop in the U.S. of the Anglo-French Concordes was at Dulles International Airport in 1976.**

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The 1970s: A Decade of Progress

By Langhorne M. Bond
Administrator of the Federal Aviation Administration.

System Improved Despite Problems

This special issue of FAA WORLD tells our story during the 1970s. That story has been one of extraordinary success on many fronts—and frustration on a few others.

But by and large, we have been doing our jobs superbly—and we can prove it. After all, our product is safety in the air. And by virtually any measurement, flying is far safer today than it was 10 years ago.

Our progress should never tempt us into complacency, of course. There is a long way to go, but we can still be proud of how far we've come together.

In any large organization, progress seems to come only a few inches or feet at a time. We often fail to see that over the years those feet add up to miles. This issue is an attempt to look not at the individual steps we have taken over the past 10 years, but at the miles covered.

The 1970s was a period when the public, fed up with lengthy aircraft delays at major U.S. airports, was demanding new and better facilities, while environmentalists at the same time were voicing stiff opposition to the expansion of aviation facilities, which they considered major contributors to noise and air pollution.

The new decade also found the FAA in the midst of an ambitious program to automate the air traffic control system. At stake was not the mere introduction of new equipment; it involved the most fundamental change in air traffic control since the introduction of radar after World War II.

Later in the decade, FAA had to meet the no less difficult challenges brought about by deregulation of the airline industry. New, stiffer regulations for commuters and air taxis were issued to help meet that challenge. The agency's safety enforcement programs were tightened up. Its safety functions were reorganized to provide more effective responses to safety problems, including the growing threat posed by human complacency and carelessness.

The story of the 1970s, however, is also a story of unfinished business.

We are still seeking, for instance, a new program for financing the airport and airway system and a solution to the problem of increased demand for aviation services at a time when public resources are dwindling. The 1980s also will require a radically new, cost-effective approach to maintaining the nation's airway facilities and modernization of our flight service station network. We can no longer afford to use the same costly, labor-intensive approach we have been using to operate these systems since the 1930s.

These and other problems face us. I am confident that we will meet the challenges of the decade to come as well as we met those of the 1970s. ■

Photo by Neal Callahan

Safety: Always the

It was 9:30 on a winter morning above Cleveland, Ohio, as Flight 187 out of Baltimore prepared to make its descent through snow, heavy winds and tricky traffic conditions. Visibility was patchy.

At 2,700 feet, Captain Bob Brooks ordered the landing gear down, but held the Boeing 727 at 140 knots because of the gusting. Approach control directed him to turn right to 360 degrees, left to 355, then back right to 358 at 1,700 feet.

Captain: *Minimums are one and quarter miles. Minimum descent altitude 1,220 feet.*

Co-pilot: *500 feet above touch-down.*

Captain: *Flaps 30. Final flap setting.*

Co-pilot: *100 feet above minimum. I see ground.*

Captain: *I've got the runway.*

And Captain Brooks touched down safely. Again.

It was only one of about 7,500 safe air carrier landings in the U.S. that day. That year—1979—2.7 million other commercial airliners landed safely. And in the decade of the 1970s as a whole, pilots guided their air carriers down to similarly safe landings more than 26 million times.

During the decade, U.S.-based airlines flew millions more miles than they did in the '60s, with fewer than half as many total accidents. In 1969, for instance, accidents (not necessarily fatal) occurred on the average once every 40 million miles flown. In 1979—despite the worst crash

in U.S. aviation history—that figures was down to once accident for every 10 million miles flown.

One of the great ironies of the tragic crash at Chicago O'Hare Airport in May 1979 and the midair collision over San Diego in September 1978 is that they came at the end of a decade of steady improvements in FAA-mandated air safety. The crashes have brought a new intensity to discussions of air safety. (One of Neil Goldschmidt's first acts as the new Secretary of Transportation was to initiate the appointment of a Blue Ribbon Committee to study FAA certification procedures.)

But the agency is hardly guilty of charges that it shut the barn door after the horse escaped. The committee's efforts are only the latest in a long series of attempts to improve safety.

Some of the improvements go back to the very beginning of the decade. In June of 1970, for instance, FAA established the first Terminal Control Area (TCA) program in Atlanta, Ga. Before the decade was out, 22 other airports could boast TCAs, the result being buffers of controlled airspace around crowded airports

Name of the Game

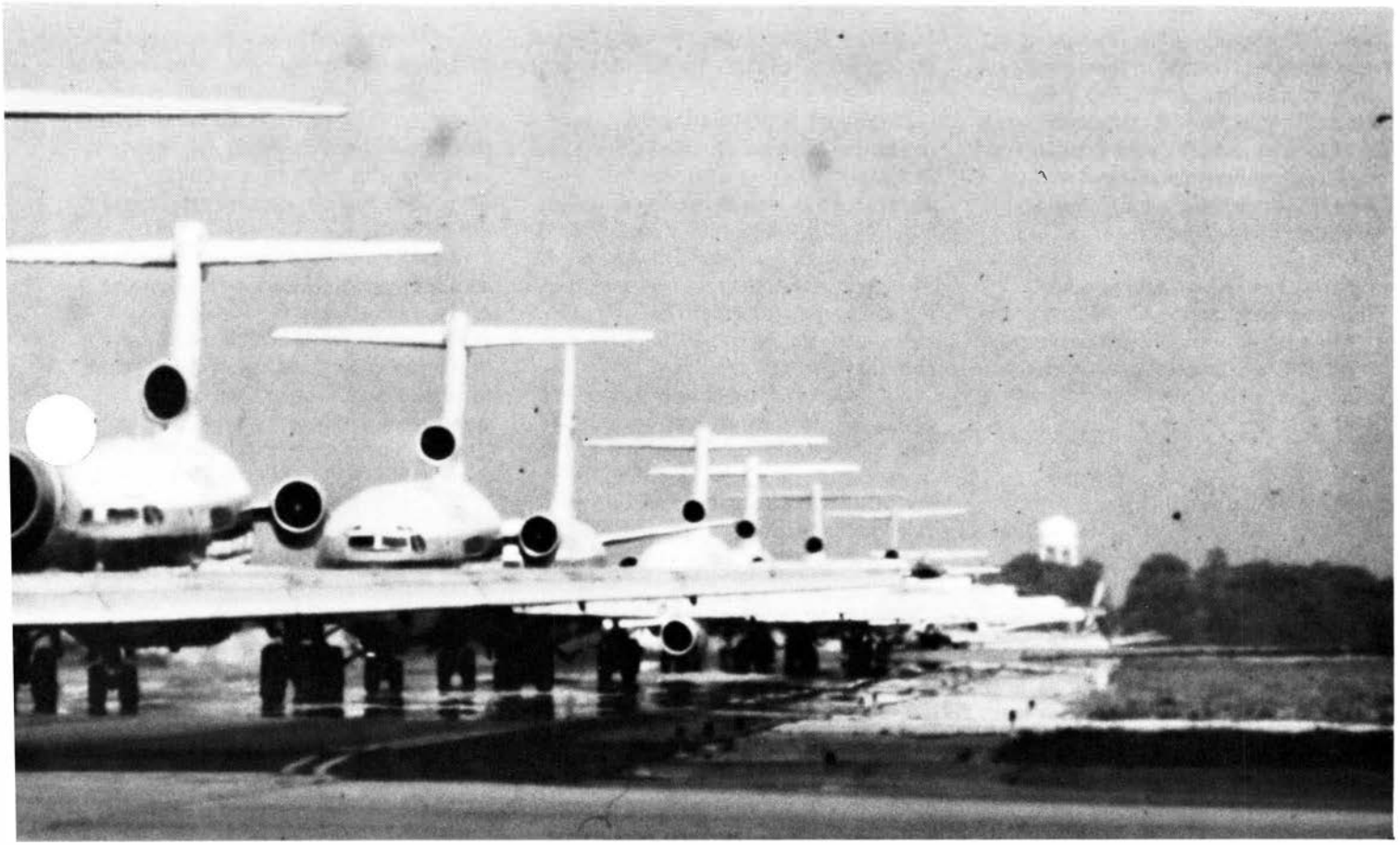


Photo by Neal Callahan

In addition, 127 Terminal Radar Service Areas (TRSAs) were installed during the '70s, with scores more to follow. These are similar to TCAs but are voluntary for the users. Already in 1980, 18 additional airports have begun to benefit from the safety advantages TRSAs provide.

Crowding was the legacy of the '60s, when both the number of air carriers handled by FAA's air route traffic control centers and the total number of aircraft operations handled by control towers more than doubled.

Safe control of those crowds was the challenge of the '70s, when the technology to handle the jam-ups first bore fruit. In 1973, FAA completed final hookup of a new flight data processing system. Since then, flight plans have been sent automatically from center to center.

During the decade, FAA commissioned radar data processing systems for all 20 en route centers; it introduced Automated Radar Terminal Systems (ARTS) II and III, which added alphanumeric radar displays in airport traffic control towers. Today's pilots and controllers also benefit from the Low Level Wind Shear Alert Systems, which let them know about violent wind shifts that could cause accidents during the critical approach and landing phase.

Some of the most important safety improvements of the decade involved certifi-

cation. At the time of the Chicago crash, the agency was already in the middle of a major reorganization designed to streamline and improve the aircraft certification process. The reorganization separated inspections of airworthiness from inspections of operations, allowing for more careful scrutiny of both.

FAA Administrator Langhorne Bond went on to establish "lead regions" charged with responsibility for specialized certification. Under the system, the region in which FAA officials know the most about a particular type of certification will lead the rest of the agency in that area. For example, FAA inspectors in the Southwest know more than anyone else about helicopter certification because that region produces most of the nation's helicopters.

Seattle maintenance inspector Alan Butterworth inspects a control-cable turnbuckle on an amateur-built aircraft, an ongoing job to ensure flying safety.

Photo by Ken Shake

Southwest Region inspectors will now put their expertise to work for the whole country.

During the '70s, commercial aircraft design and certification standards were extended to commuter airlines, which experienced a boom after deregulation. In September 1978, a major revision of Federal Aviation Regulation Part 135 upgraded all aspects of the safety regulations covering commuter airlines and air taxi operators and the design standards for the aircraft they operate.

All told, better design and better certification paid off in superior airworthiness. During the entire decade, not one air carrier accident was caused by in-flight engine failure, a remarkable achievement given the long history of aviation mishaps. Most of today's accidents—particularly in general aviation—result from human error.

But FAA has stepped up its efforts in that area, too. In 1970, the agency initiated the Accident Prevention Program, which aims at improving pilots' skill, proficiency and knowledge. The program takes the educational approach to aviation safety, stressing give-and-take between accident prevention specialists and general aviation pilots. Specialists now participate in more than 30 air safety programs at 84 General Aviation and Flight Standards District Offices across the country. The turnout has been impressive.

Some of these programs, like the safety seminars "Lights On in Traffic," and safety improvement report (SIR) systems, grew out of the original 1970 accident prevention efforts. Others, like the voluntary pilot-proficiency program, were begun after FAA and industry representatives held a general-aviation safety meeting in November 1978. The meeting was called when suddenly—and for no discernible reason—the accident rate for general aviation shot up in 1978. Later, as an apparent result of the meeting and renewed FAA/industry safety education projects, the general aviation accident rate dipped dramatically.

Overall, the '70s were a relatively safe decade for general aviation. The number of active pilots more than doubled in 10 years, but the last year of the decade saw 500 fewer general aviation accidents than the first. Huard Norton, chief of the Accident Prevention Staff, calls his program "one of the most successful ever launched by the FAA."

Throughout most of the decade, the kind of low-key cooperative approach exemplified by the Accident Prevention Program carried over into the agency's long-standing Aviation Safety Reporting Program. That effort aimed at encouraging pilots, controllers and anyone else to report safety problems—including violations of rules—so that FAA could spot weaknesses and correct them. The reports were filed with the National Aeronautics and Space Administration, which guaranteed anonymity and, in most cases, immunity from enforcement action by FAA.

However, the program was strengthened when Langhorne Bond took over as FAA Administrator in 1977. Having promised Congress that he would make "whatever changes are necessary to accommodate our air safety system to the changes brought about by deregulation," he set out to impose a stiffer safety enforcement program. In March 1979, he

Weather and the traffic mix are major concerns in maintaining and improving aviation's safety record.

announced a modification of the immunity provision of the Aviation Safety Program. Those who recklessly compromise safety will no longer escape punishment so easily.

Bond explained the reason for the change: "Somehow, over the years, our attitude has become one of coach. If something goes wrong, we show the people how to fix it, rather than be both coach and regulatory policeman. We have not used our fine and injuctive authorities strongly enough when we find repeated violations of safety rules. We are going to do so now."

The FAA, he said, will continue to be "sympathetic to the airman who violates the rules inadvertenly or out of ignorance." The overall aim is simply a better balance between "cop" and "coach."

A better balance will eventually bring greater air safety. So will improved automation, certification, accident prevention and rule enforcement, all of which should grow still better during the '80s. ■


HOLD
CRD
QUICK LOOK
REPORT
P/D
CODE

A Decade of Airway Automation

Air traffic automation—conceived in the '50s and born in the '60s—finally came of age in the '70s.

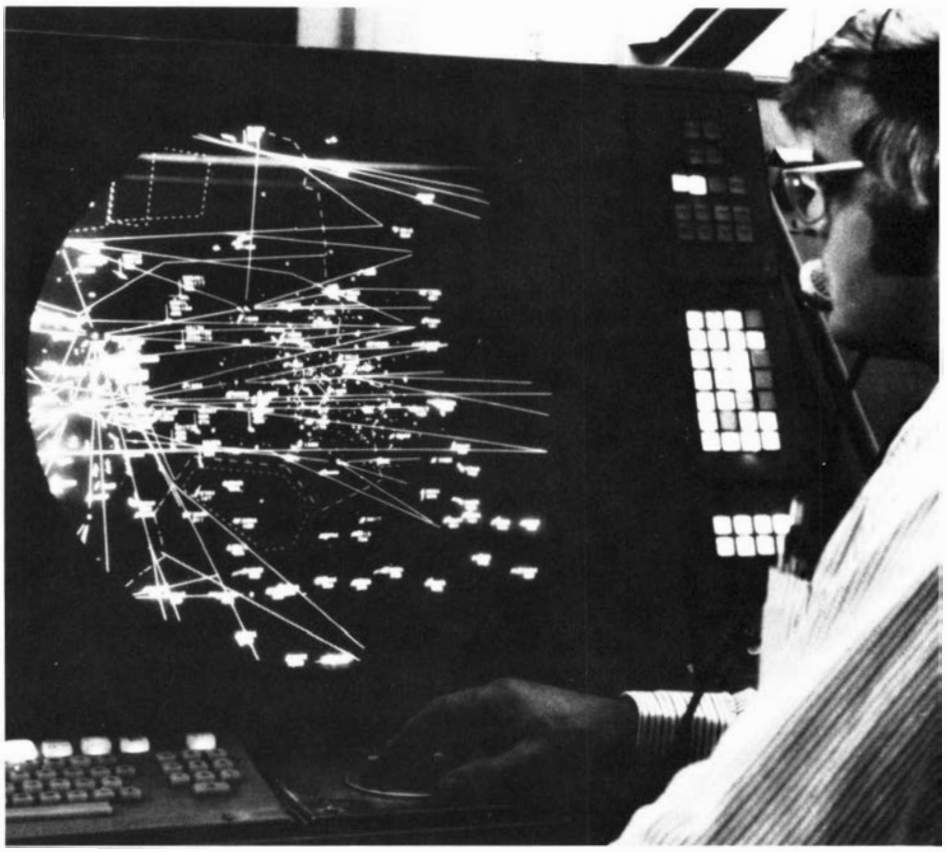
By February 1973, all 20 domestic en route control centers had Flight Data Processing (FDP), which automated clerical tasks that once took too much of an en route center controller's time.

By August 1975, all centers had Radar Data Processing (RDP), which displayed digital alphanumeric data directly on the controller's radar scope.

And by August 1976, all 63 major airport terminals had an advanced Automated Radar Terminal System (ARTS I), which gave tower controllers essentially the same capabilities as their colleagues in en route centers.

As the decade ended, U.S. control centers outside of the conterminous United States—in Anchorage, Honolulu and San Juan—also possessed computer-based air traffic control systems. Moreover, the agency was more than halfway through a program to extend the ARTS system to another 80 airport towers.

It hadn't always been that way. Before automation, there was the "shrimp-boat," a small plastic marker each controller had to prepare by hand for every flight under his care. The shrimp-boat contained the aircraft's registration number or airline flight number, its altitude and other essential information needed to monitor the flight. It required keeping track of the information and updating it by scribbling flight progress slips, which would end up in racks next to the radar screen. That meant endless paperwork and—if no better way had been found—a proliferation of controllers to handle the growing traffic.



Radar data processing scopes with tracking alphanumeric tags became operational at the Chicago ARTCC in 1974.

Photo by William Pitchford

The existing broadband radar system had its shortcomings. Radar antennas simply transmitted a pulse of energy that bounced off the plane and back to the antenna. The result was a "blip," or target, on the radar screen that told where the aircraft was in relation to the antenna (bearing), how far away it was (range), and its direction of flight. Thus controllers had only a two-dimensional picture of air traffic. The critical third dimension—altitude—was missing. Moreover, controllers had no easy was of telling which "blip" was which. That had to be established by calling the pilot on the radio.

Back in 1961, a Presidential task force had recommended a system in which the identity and altitude of a flight would be

provided automatically by a coded beacon transponder aboard the aircraft. The transponder would reply to requests from a ground-based interrogator mounted atop conventional radar antennas. The replies would be digitized at the antenna site—that is, converted into computer language—and sent by telephone line to the en route control center. There, the information would be processed by computer and fed to radar video displays. The information would appear on the displays in the form of easy-to-read alphanumeric data tags which would flash on next to the radar "blips" and follow them across the screen.

Today, the Air Traffic Control Radar Beacon System (ATCRBS) works basically as envisioned in 1961, although its application in the centers and towers has been tailored to the specific operating environment and traffic control requirements of these facilities. The essentials, however, remain the same at both centers and terminals. Controllers at both places have an instant readout of what they need. The calls for information to pilots and neighboring facilities have been substantially reduced. So have the paperwork and other administrative headaches associated with the old manual approach.

"Air traffic control automation relieves the [people] in the system—controllers and pilots—of many of the time-consuming, burdensome and boring chores, and provides time for the controller and pilot to do the task that man does best—exercise his judgment," says Joseph D. Blatt, who served as Associate Administrator for Research and Development during the late 1960s, when the system went through rigorous testing.

Before RDP, these Los Angeles Center controllers regularly used horizontal scopes with plastic "shrimp boats" carrying the flight data. They tracked the planes by being pushed after the blip.

ARTCC Automation

The field testing for the en route system—called the National Air Space (NAS) En Route Stage A System—took place in the Jacksonville, Fla., Center and was built on work done previously at the Indianapolis Center. The prototype installation at Jacksonville validated the basic automation concept and remained in service until December 1973, when it was replaced by more sophisticated equipment. As deliveries of the system's components began in late 1970, traffic controllers suddenly found themselves working with computer update equipment (CUE), common digitizers (CDs), and computer display channels (CDCs)—all parts of the new computerized environment.

The agency had opened a whole new can of alphabet soup and it took a little swimming around to get used to, but the advantages made the effort very much worth while. The NAS En Route computer, an IBM 9020A, could make 200,000 calculations a minute, three times the speed of FAA's old vacuum-tube models. Moreover, the busiest centers in the system received IBM 9020Ds, which were three times faster than even the 9020As.

By the time the '70s began, development of the new system was complete. FDP allowed storage, update and transfer of flight data; RDP, digital readouts of positional data, automatic handoffs and precise tracking of aircraft.

By 1973, FDP was complete: All 20 domestic control centers had it, and the entire system spoke the same language. For the first time, the flight plan of an aircraft could be automatically transferred from a terminal computer at the point of departure to the computer at the nearest control center, then to other center computers along the line of the flight and finally to the terminal computer at the plane's destination. In February of 1973, FAA celebrated the completion of the network with a "Golden Spike" ceremony at the Memphis Center, the last to acquire an FDP capability.

Miles of cables were the *sine qua non* of automating the en route centers in the early years of the decade. Electronics technicians from all over the country descended on the Oakland ARTCC's future computer complex.

Meanwhile, RDP was spreading across the country from center to center. In May 1974, the Kansas City and Los Angeles Centers became the first to process radar data. In less than a year and a half, all 20 of the nation's control centers added RDP.

On Aug. 26, 1975, Miami became the last center to join the RDP network. A milestone had been passed, Acting FAA Administrator James E. Dow told a crowd gathered in Miami to celebrate the addition. "[This] marks the end of the manual approach to air traffic control and gives us a semi-automatic system that we can augment, refine and more fully automate to handle following generations of en route air traffic."

FAA didn't wait long before beginning to augment the system. The centers outside of the conterminous United States—in Anchorage, Honolulu and San Juan—had no need for the full NAS En Route Stage A equipment package, so the agency designed a special En Route Automated Tracking System (EARTS) for them. EARTS is essentially an expanded ARTS III system modified for en route operations. The units were installed last year and will be commissioned for operational use in the next few months.

The Birth of ARTS

Like en route centers, airport terminals used the '70s to install what had been developed in the '60s. After several years of testing in Atlanta and New York City, FAA signed a contract in February 1969 for large-scale production of ARTS units. The first ARTS III was delivered to Chicago O'Hare Airport in late 1970, and by 1976, all 63 major airports had the system. Fittingly, the final ARTS III was installed in Atlanta, where it replaced the pioneer ARTS I—the prototype for the whole ARTS system—which had been operational there since it began as a pilot project in 1965.

Meanwhile, smaller commercial airports began receiving the less expensive ARTS IIs, which are driven by a minicomputer that can provide alphanumeric readouts of identity and altitude but no ground speed or sophisticated tracking information.

The first ARTS II was commissioned at Toledo, Ohio, in November of 1978 and more than 50 are in place. Altogether, 79 airports classified as medium and small air-carrier hubs, are scheduled to get the system. If all goes as planned, the last of those 79 will receive their ARTS II by the middle of 1981.

The new system had not come cheap; by 1980, the price tag on automation had already reached at least $1 billion. But the benefits were substantial. Air operations were safer, controllers more productive, and the system as a whole more economical to run.

A 1976 survey of the Indianapolis, Los Angeles and Miami Centers showed that alphanumeric readouts increased controller productivity by as much as 15 percent over what it had been with broadband radar. The survey also revealed that the three centers, though needing more electronics technicians than before, were still able to reduce their overall staffing by an average of 11 percent.

Those figures are especially noteworthy in view of FAA's more modest goal when it first planned automation: The agency hoped simply to hold staffing levels steady, not reduce them. ■

A Chronology of the Times

1970

March 21. The Airport and Airways Development Act is signed into law, authorizing more money for airport aid projects and creating a new planning-grant program.

March 25. Over 100 controllers fail to report for duty, the first of some 3,000 to be absent over the next three weeks. Absentees are disciplined on a case-by-case basis.

June 25. A Terminal Control Area (TCA) concept is established to cut the the risk of midairs at 21 busy airports.

June 26. The first field evaluation of the ARTS II (automated radar terminal system) for low- and medium-density terminals is completed.

December 31. U.S. airlines record the safest year in their history: a passenger fatality rate of just 0.001 per 100 million passenger miles flown.

1971

March 24. The U.S. Senate votes down a $289 million appropriation to continue the development of SSTs.

June 9. A Quality Assurance Systems Review (QASAR) Program is established by FAA to improve its surveillance of the quality control systems used by aircraft manufacturers and their parts suppliers.

October 4. The first operational ARTS III (automated radar terminal system) is commissioned at Chicago O'Hare International Airport.

October 14. The lowering of the base of area positive control from 24,000 to 18,000 feet over the contiguous 48 states is completed.

November 24. "D. B. Cooper" hijacks a Boeing 727 bound from Portland to Seattle, beginning a series of similar hijack extortion attempts.

1972

February 22. A solid-state telephone communications system linking the air traffic control system command center at FAA headquarters with all 20 ARTCCs and 19 of the country's busiest terminals goes into operation.

June 1. The National Association of Air Traffic Specialists (NAATS) is certified as the exclusive national representative of some 3,000 flight service station specialists. It is the first national agreement between FAA and a labor organization.

September 1. Boston's Logan is the first airport to be certificated under a 1971 amendment to the Airport and Airway Development Act of 1970, which requires all U.S. airports serving CAB-certificated air carriers to have FAA operating certificates showing that they meet prescribed safety levels.

September 25. The Professional Air Traffic Controllers Organization (PATCO) gets exclusive national rights to represent some 13,200 nonsupervisory air traffic controllers.

December 5. President Nixon reacts to hijacking wave by ordering luggage inspection, passenger screening and gate guards.

1973

February 15. An anti-hijacking treaty is signed with Cuba.

April 30. FAA and PATCO sign a nationwide labor agreement.

July 8. The Flight Inspection National Field Office (FINFO) is set up at Oklahoma City to oversee most of the agency's flight inspection program.

August 1. An OST/FAA task force recommends a centralized, automated flight processing facility, with 3,500 self-briefing terminals at 2,500 airports, to ease the workload on flight service stations.

September 22. The Dallas-Fort Regional Airport, the world's largest, is dedicated.

1974

February. The Biennial review of FAA's airworthiness regulations begins.

March 24. A Turkish DC-10 crashes near Paris because of a faulty latch on its rear cargo door. FAA was criticized for failing to issue an Airworthiness Directiv on the latch.

August 15. The Anti-Hijacking Act of 1974, giving the Federal government increased means to deal with hijacking and other acts of piracy and sabotage, is signed into law by President Nixon. Its provisions were incorporated as amendments to the Federal Aviation Act of 1958.

November 1. A biennial flight review is required for all certificated pilots.

December 2. A TWA 727 en route to Washington from Columbus, Ohio, lets down too soon on a landing approach to Dulles International Airport and crashes into a peak in the Blue Ridge Mountains, killing all 92 people aboard. The crash results from a misunderstanding by the TWA captain of the Dulles controller's clearance instructions. This led to the issuance of a Pilot/Controller Glossary to prevent future misunderstandings.

1975

January 1. The Anchorage ARTCC takes over the functions of the decommissioned Fairbanks ARTCC.

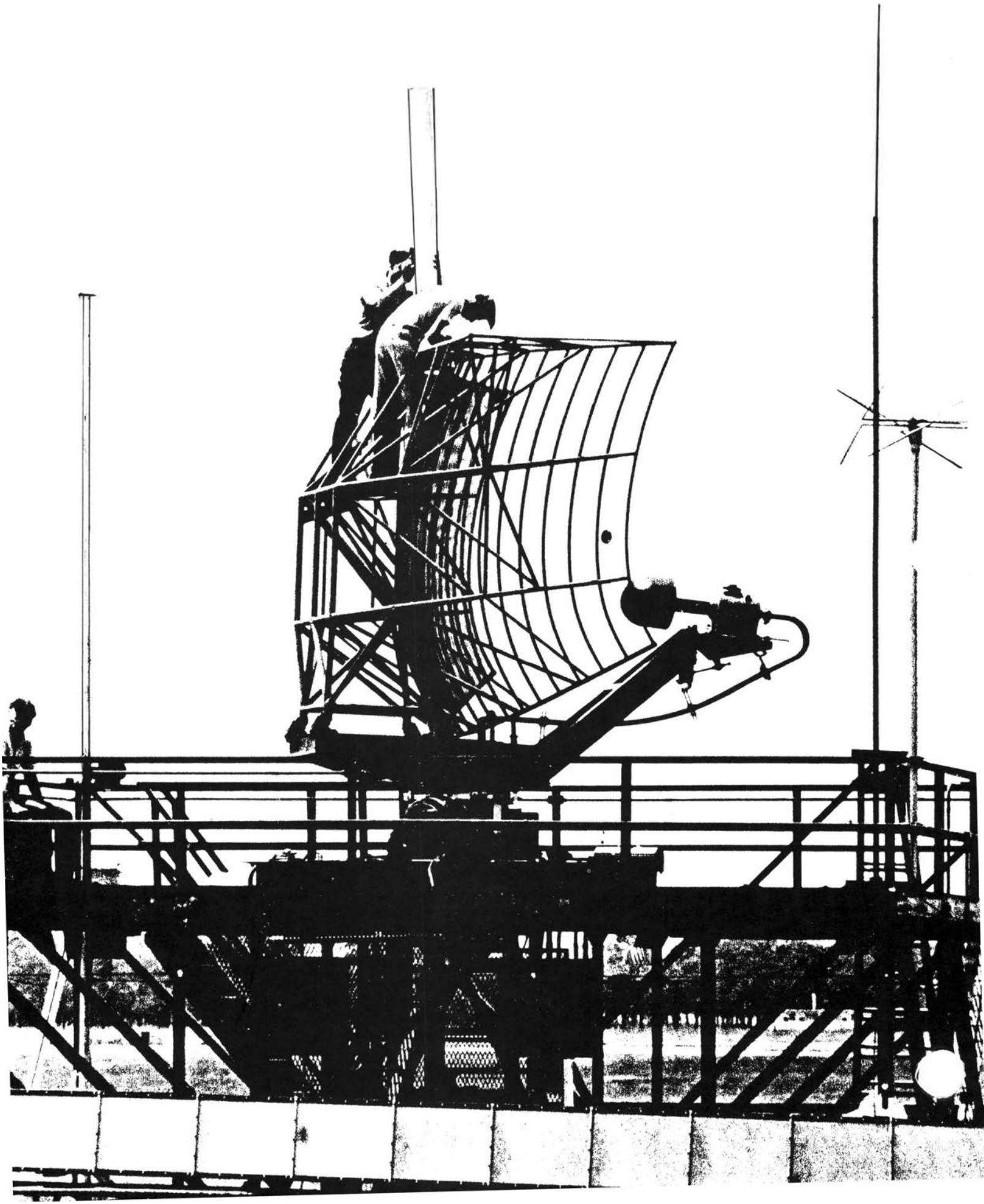
May 3. Under a new rule issued by FAA, only radioactive materials intended for research or medical use are to be shipped on passenger aircraft.
July 7. In the wake of the Paris DC-10 crash, an Airworthiness Directive (AD) is issued requiring floor strengthening on all DC-10s, B-747s and L-1011s.
August 26. A Radar Data Processing system is commissioned at the Miami ARTCC, the last of the 20 en route centers in the contiguous 48 states.
December 29. Following the explosion of a bomb on this date at New York's LaGuardia Airport, which killed 11, injured 54 and extensively damaged the terminal, FAA intensifies its bomb security program, augmenting dog-handler teams, developing automatic bomb-detection devices and regulating the placement of lockers.

1976
January. A conflict-alert system is implemented at 18,000 feet and above at all 20 ARTCCs in the contiguous 48 states. By December 1978, all of the ARTCCs are provided the same service from the ground up.
March 4. A contract is awarded to begin the development of the Discrete Address Beacon System (DABS).
July 6. The Great Falls, Mont., ARTCC closes; the slack is taken up by the Salt Lake City and Minneapolis Centers.
August 18. ARTS III is commissioned in Atlanta, the last of 63 busy terminals in Honolulu, San Juan and the 48 contiguous states.
November 2. A contract is awarded for a Direct Access Radar Channel (DARC) subsystem for the 20 ARTCCs to provide backup for radar-data-processing (RDP) computers.

1977
February 13. Full-performance air traffic controllers are promoted to GS-14 at the eight busiest ATC facilities, to grades below GS-14 at 30 other facilities. Twenty-five hundred controllers and others upgraded.
March 22. Two 747s collide on the Canary Islands' runway, killing 577—history's worst aviation accident.
June 1. A contract is awarded to develop an improved, all-weather airport surface detection radar, ASDE-3.
October 1. A Minimum Safe Altitude Warning (MSAW) system went into operation at Washington National Airport, the last of the 63 ARTS IIIs to get MSAW.
October 20. A conflict-alert program starts going in at all 63 ARTS III-equipped towers.

1978
February. FAA gets the first of 27 new long range air route surveillance radars (ARSR-3s), which give clearer pictures of weather and aircraft than older radars.
April 19. An arm of the International Civil Aviation Organization selects the U.S.-backed Time Reference Scanning Beam system over the British Doppler as the microwave landing system best suited for international standardization.
July 25. A court fines the Professional Air Traffic Controllers Organization (PATCO) $100,000 for an illegal "slow down" during the spring. On appeal, the decision was upheld.
August 4. Congress finds the controllers' second-career program ineffective and cuts funds.
December 1. A revised FAR Part 135 stiffens pilot qualification, training programs and other operating requirements for air taxis and commuters.

1979
January 8. FAA agrees to transfer its air traffic control facilities in Panama to the Republic of Panama over a five-year period beginning Oct. 1, 1979.
May 25. An American Airlines DC-10 crashes at O'Hare, killing 273 people, the worst air disaster in U.S. history.
July 13. The DC-10 fleet is returned to service after 37 days on the ground on FAA orders.
July 30. The first operational Direct Access Radar Channel (DARC) unit designed to provide computerized back-up for ARTCC radar data processing is delivered to the Salt Lake Center.
October 1. A contract is concluded to replace the agency's entire 927-unit vacuum-tube-type VOR/VORTAC radio navigation system with new, solid-state units. The first deliveries are to begin in 1981. ■



The System Is the Solution

The Need for MSAW

Unlike most airplane accidents, the crash of the Lockheed L-1011 in the Florida Everglades did not remain a mystery for very long.

On New Year's Eve of 1972, only two days after the big three-engine jet went down, National Transportation Safety Board investigators correctly surmised that the crew might have become so absorbed with a faulty nose-gear indicator light that no one remembered to monitor the altimeters as the plane made a gradual, undetected descent into the swamp from its assigned holding altitude of 2,000 feet.

The only person to notice the death glide of Eastern Air Lines Flight 401 was an FAA controller at the Miami approach control facility.

Less than a minute before the crash, he noted that the radar readout of Flight 401's altitude showed it at 900 feet. Aware of the flight's problems, he radioed the pilot to ask: "How are things coming up there?"

The flight deck responded with a cryptic, "Okay, we'd like to turn around and come back in." Thus reassured, the controller assumed the altitude information on the radar was in error and turned his attention to the five other flights under his care.

Still, the controller's message may have had some belated effect on the flight deck. Twenty seconds after receiving the query, the co-pilot glanced at the altimeter and told the Captain: "We did something to the altitude . . . We're still at two thousand, right?"

The Captain made a quick check of the instruments and replied: "Hey, what's happening here?" There was no more conversation. The tape from the cockpit voice recorder carried a quick series of radio altimeter warning "beeps," followed by the initial sound of impact. Ninety-nine people perished in the accident out of a total of 176 on board the aircraft.

But as tragic as the Everglades accident was, it did lead to improvements in the air safety system and focused new attention on the opportunities to build on the automated base being installed in the centers and towers. The development of the Minimum Safety Altitude Warning System (MSAW) was a direct result of the L-1011 crash, but other programs already were underway or in the conceptual stage at that time. They include "conflict alert" to warn pilots of potential midair collisions, metering and spacing to move traffic more efficiently in the terminal area and, eventually, a data-link capability for the automatic transfer of information between controllers and pilots.

The NTSB report on the Everglades accident, released in June 1973, recommended that FAA review the Automated Radar Terminal System (ARTS III) program with an eye towards developing a way to monitor abrupt deviations in altitude. FAA concurred and began a development effort that led to the award of a Minimum Safe Altitude Warning System for the ARTS III. This prototype system was successfully demonstrated at Denver's Stapleton Airport early in 1975, and FAA later gave Sperry Univac a production contract to add MSAW to all 63 ARTS III installations.

MSAW uses information obtained from identity- and altitude-reporting transponders carried in all airliners and many private and business aircraft.

Essentially, the system monitors the flight path of aircraft equipped with these transponders for adequate clearance of terrain and obstructions like tall buildings or TV towers. This is accomplished by comparing the flight path with a three-dimentional grid map of the terminal area stored in the ARTS III computer. When a potentially unsafe condition is detected, the controller is alerted by the sound of a "beeper" and a flashing "LOW ALT" message on his radar scope. He or she can then analyze the situation and alert the pilot if necessary.

The first MSAW was commissioned at Los Angeles International Airport in December 1976 after a long struggle with topographical problems in programming the grid maps. From that point, implementation proceeded rapidly, and all 63 ARTS III sites were on line with MSAW by November 1977.

Meanwhile, FAA had begun working to build MSAW into the automated system in the 20 air route traffic control centers in the continental United States. The job began in the mid1970s at NAFEC (now the Technical Center) near Atlantic City; then came a feasibility test at the Albuquerque Center.

Development of a workable En Route

Workmen at the Technical Center install an antenna for testing the Discrete Address Beacon System in 1978.

MSAW presented a much greater challenge to FAA and industry engineers because of the size and complexity of the areas under center control. However, these problems were largely resolved by the end of the decade. The way was paved for operational testing to begin first at the Albuquerque Center and then the Cleveland Center. This was followed by the commissioning of the En Route MSAW at Albuquerque in the summer of 1980 and the beginning of testing at most of the remaining centers. All facilities are scheduled to be on line with the system by the end of the year or early next year.

Conflict Alert Under Way

As 1975 was drawing to a close, the newspapers and television news programs were leading with stories about near midair collisions. The most serious of these occurred over Lake Michigan on November 26 when two jumbo jets, loaded with more than 300 people, missed each other by no more than 50 feet.

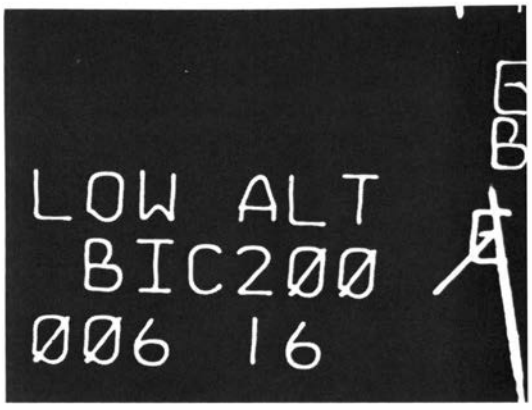
The cause of the near tragedy was improper coordination between controllers at the Cleveland Center. The controller on Wayne sector had been improperly briefed when he took over the position and did not spot the problem until the two jets were less than a mile apart. His urgent "descend immediately" command to one of the aircraft probably saved the day.

The publicity over this and a couple of lesser incidents sparked the inevitable Congressional inquiry. On December 16, Administrator John McLucas trooped to Capitol Hill with his aides to reassure a nervous House subcommittee that the ATC system was not coming apart at the seams.

Moreover, the FAA chief had some good news to report: FAA's program to add conflict alert to the automated system in the 20 domestic air route traffic control centers was moving quickly ahead. Seven centers already had gone operational with the computer-generated collision warning system and the remainder were expected to be on line by the end of the year.

The concept of conflict alert is deceptively simple. The computer already knows the position, heading, altitude and speed of each aircraft in the zone of coverage. So why couldn't the computer also project the flight path of each aircraft ahead in time and check for conflicts? If a problem were detected, it could trigger some kind of alarm to alert controllers to the problem.

Essentially, that's what the conflict alert's software package does. However, to guard against near midair collisions, as well as the actual thing, the conflict-alert software provides for a buffer zone around



Top: To give terminal controllers a better picture of the traffic around them, broadband radar BRITE scopes began to be installed in tower cabs.
Above: Below in the TRACON, ARTS III was enhanced with the Minimum Safe Altitude Warning System (MSAW), which flashed "Low Alt" next to an aircraft's data tag when too close to terrain.

The U.S. won approval from the International Civil Aviation Organization for standardizing the microwave landing system on its time reference scanning beam version. Here, a small-community MLS is tested at Cape May, N.J.

each aircraft that resembles a huge, invisible hockey puck five miles wide and 1,000 feet deep. The computer continually checks two minutes ahead in time to see where these ''hockey pucks'' will be.

If the aircrafts' projected flight paths would bring them closer together than five miles horizontally and 1,000 feet vertically, the data blocks of the affected planes begin blinking and the words ''Conflict Alert'' flash on the scope.

Initially, conflict alert was implemented in controlled airspace above 18,000 feet where all aircraft are required to have an altitude-reporting transponder and ''see and avoid'' flying is prohibited. It subsequently was lowered to 12,500 feet and then down to ground level over almost the entire country.

With conflict alert fully operational in the centers, FAA turned its attention to the 63 towers equipped with ARTS III. Here the problem was somewhat different than in the centers because of the large volume of traffic concentrated in a relatively small area and the fact that most aircraft in the terminal area are climbing or descending rather than in level flight.

But the necessary program changes were made and tested, and, in January 1978, the Houston Tower became the first ARTS III installation to go operational with conflict alert. Implementation at the other single-beacon, or single radar, sites proceeded rapidly after that, and all 54 were on line before the end of the year. The nine dual-beacon sites were added during 1979, with the last one at Los Angeles International Airport commissioned in Apirl 1980.

The Plan for DABS

It was the summer of 1968, and the automated air traffic control system was still more concept than reality. But DOT/FAA already had begun to look down the road in an effort to define future system needs. It pulled together a group of

industry/government/academic experts, backed them with a technical staff of 150 people, and told them to recommend an ATC system for the 1980s and beyond.

In March 1970, this Air Traffic Control Advisory Committee submitted its report to Transportation Secretary John A. Volpe. In general, the committee supported the automation effort then underway, but said more needed to be done to keep pace with the growing traffic volumes.

The committee recommended a basic nine-point program that came to be known as the Upgraded Third Generation System and was quickly abbreviated to UG3D. Included were the development of a microwave landing system, automation of the flight service station network, work on new airport-surface detection equipment, production of a wake-vortex-avoidance system and exploration of satellite use for ATC communications and surveillance.

But perhaps the committee's most pervasive recommendation dealt with the development of an improved system for tracking aircraft in flight, the Discrete Address Beacon System, or DABS.

The committee stated that primary radar and the current radar beacon system simply could not handle the projected traffic loads of the 1980s and beyond.

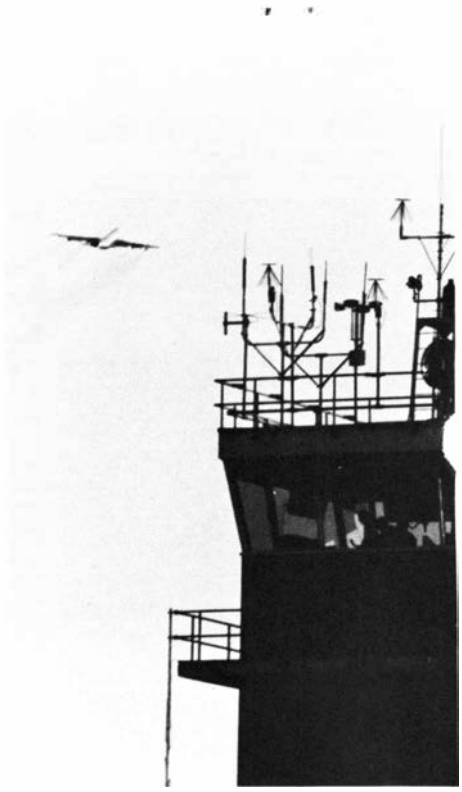
Primary radar, of course, pinpoints the position of aircraft by bouncing signals off the fuselage, whereas the beacon system is based on the use of transponders in aircraft. When triggered by "interrogators" mounted on ground radar antennas, this device sends back a high-energy pulse that gives controllers a clear target or "blip" on their radar scopes. Moreover, advanced transponder models transmit a coded signal containing the aircraft's identity and altitude. This information is processed by computers and displayed directly on the controller's radar.

But current transponders also have limitations that suggest the need for an evolution to more sophisticated, accurate and higher capacity equipment. For example, the sweep of the radar antenna triggers every transponder within range, and the replies can interfere with one another.

This was one of the considerations that led the committee to advocate addition of another mode or channel to the present three-mode transponders to accommodate "discrete address." In other words, the committee was recommending a transponder that would speak only when spoken to.

The discrete-address feature results from the fact that the DABS transponder has more than 16 million available codes or call numbers compared with only 4,096 for present equipment. This means the unit in each plane will have a permanently assigned number just as most Americans have a Social Security number. And the transponder will respond only when it hears the DABS ground interrogator transmit its particular call sign.

DABS can also provide automatic air-ground data-link communications. This is possible because aircraft are addressed and respond on an individual basis.



The heart of air traffic control: communications antennas sprout from the roof of a tower like weeds after a spring rain.

Data link would relieve pilots and controllers of many routine communications by transmitting automatically such information as wind and weather conditions, airport advisories and verification of ATC clearances. Messages would be displayed to the pilot on a small screen in the cockpit. He or she would use a simple keyboard to call up data or confirm it.

Tests of systems for automating the flight service stations got under way. The first major one was AWANS (Aviation Weather and Notices System) at the Atlanta FSS in 1975.

In addition, the DABS data link would be the foundation of a pilot-oriented, ground-based, collision-avoidance system called the Automatic Traffic Advisory and Resolution Service—ATARS, for short.

ATARS will be entirely automatic and operate independently of the ATC system. Information on aircraft position will be obtained from the DABS ground stations and then run through the ATARS computer to check for possible conflicts. Advisory messages also will be generated by the computer and transmitted to the aircraft over the DABS data link.

Aircraft equipped for ATARS service—and that means they must have both the DABS transponder with altitude encoder and an appropriate warning display—will receive advisories on all aircraft in the immediate vicinity. Moreover, any aircraft that is a potential threat will be identified. If separation continues to narrow, one or both pilots will be given collision-avoidance instructions. Threat advisory and resolution messages also will be transmitted to the controlling ATC facility to assure proper coordination.

The DABS program was launched officially in late 1971 with the award of a system design contract. This was followed by a $12 million contract to Texas Instruments in 1976 for three DABS ground stations and 30 airborne transponders.

Delivery of the DABS equipment to the FAA Technical Center was begun in June 1978 and completed 11 months later. Two of the DABS stations were designed for terminal operations and were installed in conjunction with airport surveillance radars at the Technical Center and at Clementon, N.J., near Philadelphia International Airport. The third was an en route system that went to the long-range radar site at Elwood, N.J. The three were linked together into a DABS network and tied in with Technical Center simulation facilities.

Joint testing of DABS and ATARS is scheduled to continue at the Technical Center until the spring of 1982. Researchers are still trying to answer such key questions as what types of information are best suited for use with the DABS data link, the best ways to display different types of material and the proper sequence for message priorities and overrides.

Meanwhile, the agency has requested funds in the Fiscal Year 1981 budget for procurement of 120 DABS ground stations. Of this number, 90 will go to busy air terminals with the remaining 30 installed in the en route system where traffic densities are highest.

Assuming Congress approves the request, the operational DABS ground stations could go on line by the end of 1983, with all operational by the end of 1987. And that will be the beginning of the transition to the fourth-generation air traffic control system of the future. ■

The Changing Face of FAA

Her career born in the '70s, journeyman Gail Grover works ground traffic at Baltimore-Washington International Airport.

In the 1956 movie *Julie,* an airborne gun battle ends with stewardess Doris Day landing the plane herself—talked down by a square-looking white controller with a skinny necktie.

Today, Doris's life might have been saved by a woman (goodbye, romantic plot), a black, an Asian-American, or a Native American. And the word that first sprang to mind to describe him or her would not have been "square."

The total number of FAA air traffic controllers at the end of the 1970s—27,479—wasn't very much greater than the number employed at the beginning of the decade—23,199. But the faces behind those numbers have changed. In 1970, women accounted for a mere 1.2 percent of all controllers. Today, that figure has reached 5.9 percent. Minority controllers, who numbered under one thousand in the early '70s—about four precent—have now doubled to 2,314, or 8.4 percent of the controller work force.

FAA controllers of the '80s are bright, well-qualified and relatively young. Their average grade level is 11.0 (salary average of $29,019); their average age is 36.6 years, and their average experience in government is 15 years.

Gail Grover and Dave Wagner began working the boards at busy Baltimore-Washington International Airport (BWI) only a few years ago. Gene Joiner, a 20-year veteran controller who works out of Atlanta's Hartsfield International Airport, represents a more established breed. As the '70s unfolded, he watched the agency and its controllers change dramatically from what he knew before.

Grover, a 27-year-old black woman, first came to work for FAA in the early '70s, while still attending a Washington, D.C., high school. With the encouragement of her co-workers in the FAA Office of Civil Rights, she took the test for air traffic control and did well. After four months of training in Oklahoma, she went to work at BWI. Today she is a GS-13 journeyman controller.

Dave Wagner, also a GS-13, at first thought he'd end up as a commercial pilot. He flew for the Air Force, for Cumberland Air Lines (a commuter service) and for various Washington area air-freight outfits. But piloting meant a lot of strange hours and distant places. And it didn't provide much security. "It was feast or famine," Wagner recalls. By 1974, he was working air traffic control in Morgantown, W.Va. Later he moved to BWI.

Gene Joiner has been a controller almost as long as Gail Grover has been alive. Unlike some of his younger colleagues, he has always viewed himself as a

The first woman electronics technician assigned to the Chicago O'Hare Airway Facilities Sector was Susan Beatty.

controller. After working traffic in the Air Force from 1955 to 1961, he moved to FAA. Since 1967, he has worked in Atlanta, where he helped try out the first Automated Radar Terminal System (ARTS) ever installed.

Joiner recalls that at the beginning of the '70s, one Atlanta controller would handle 10 to 15 aircraft at once. Now the number is down to 6 to 8. Before the decade began, Joiner and his co-workers had to contact approach control every time they wanted to find out how far away an aircraft was. Now they simply look at a BRITE display that tells them all they need to know.

"Initially there was some resentment towards automation," Joiner says. "Pilots saw it as Big Brother looking into their cockpits . . . [and] controllers complained about it a lot. Now, they complain if it goes out for 30 seconds."

As part of the new breed of controllers, Grover and Wagner feel very strongly about their union, PATCO, which now represents more than two-thirds of the total controller work force.

Wagner, a local PATCO officer who also hopes to enter FAA management some day, believes his "only recourse for many of the changes being talked about is through PATCO." He is especially concerned about pay, which he believes is grossly inadequate.

"We do equally as responsible a job as pilots or surgeons," he asserts, adding that the number of hours controllers are required to work is also unfair. "There's

Would-be commercial pilot Dave Wagner chose ATC in the '70s. He's satisfied and proud of his career in the tower cab and TRACON of Baltimore-Washington Airport.

no doctor who has been in the field for five or six years who doesn't have Wednesday off to play golf," he says. Not that he wants to play golf, but he would like time off during the week to attend law school. FAA, with its system of staggered schedules, cannot provide that time, he adds.

Grover's support of PATCO is more simple. She just believes that in order to achieve what they believe they deserve, controllers must stick together.

Sticking together is exactly what Joiner says controllers don't do nowadays. "There's a decrease in morale," he notes wistfully. "Most people feel 'heck, I'm my own boss.' The idea got around that if you pushed yourself too hard, you weren't going along with the union." Joiner longs for the old days—pre-1970s—when there was "more of a feeling of pride, a brotherhood, an *esprit de corps* . . . We used to work strictly for the pleasure of it, and that same feeling is just not there."

Joiner is right as far as a certain extreme element in the controller work force is concerned. One vitriolic West Coast controller wrote in a union publication recently: "We are the ones in the gutters of the airways, we are the ones squinting through the smog, we are the ones to be spit upon for trying to do our job . . ."

But Grover and Wagner, both supportive of PATCO, are proof that the old spirit isn't dead. Both say they are proud to work as FAA air traffic controllers.

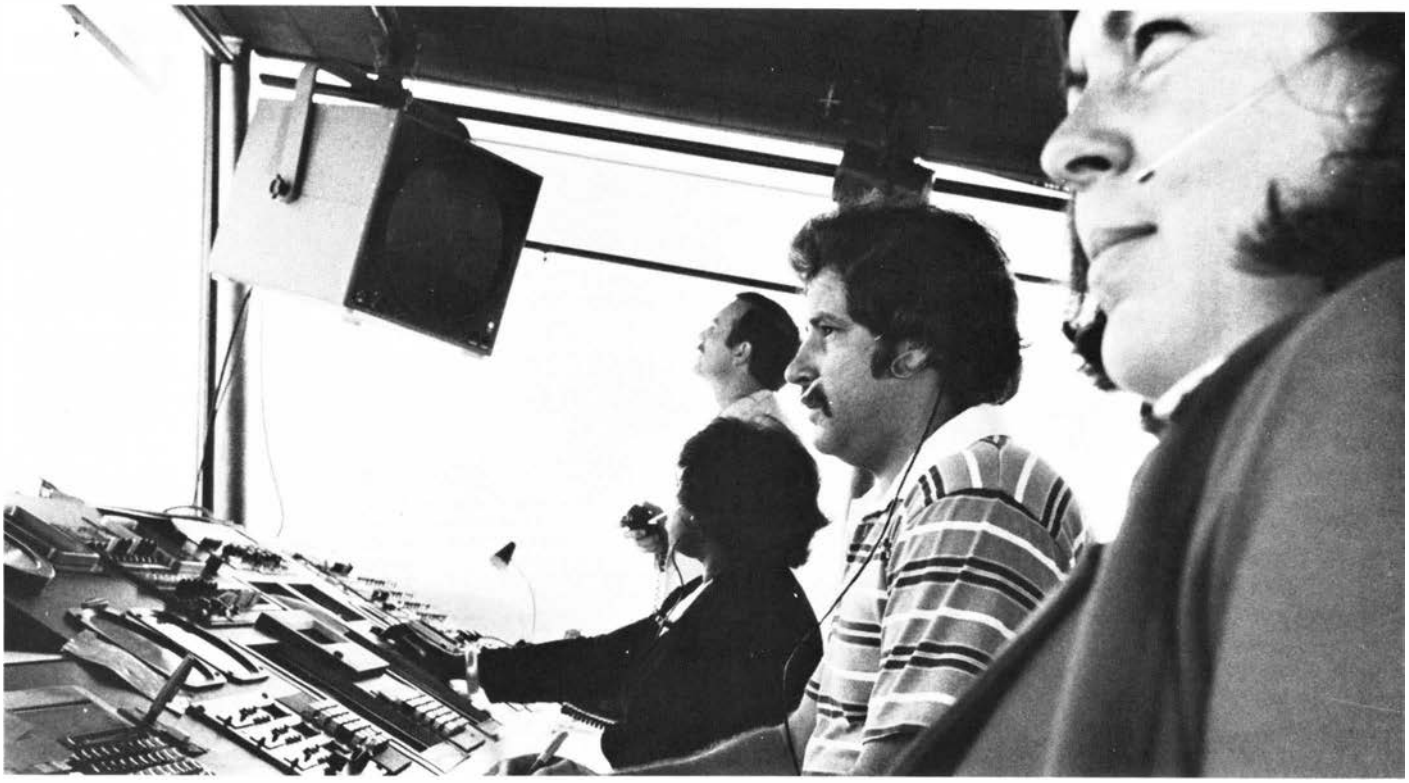
Grover says that after an especially busy and challenging day, she gets a certain feeling out in the parking lot on the way home: "I feel like I've accomplished something."

Wagner says that of his many pursuits (he still flies), none proves as gratifying as his occupation: "I just don't get the same feeling of satisfaction from any other activities."

So, if Doris Day has a new flight emergency in the 1980s, she is likely to get the same professional, cool-headed help she got the last time, although possibly without the romantic entanglement. ■

By Quentin S. Taylor
Deputy Administrator of the Federal Aviation Administration.

EEO Commitment of '60s Became Action in '70s



A contemporary scene that's no longer rare as a result of the agency's equal employment opportunity efforts of the '70s.

In 1968, the Department of Transportation ranked next to last among government agencies in employing women and minorities. Only NASA had a worse record.

Because the FAA employed 80 percent of the Department's civilian personnel, Transportation Secretary John Volpe had no trouble fixing the blame.

So, in April 1969, when Volpe directed each of his administrators to establish an Office of Civil Rights, most of the work fell to the FAA.

Most earlier equal employment matters—usually involving investigations of discrimination complaints—had been handled by the FAA's Office of Compliance and Security, then headed by Richard Lally, later to become the Director of Civil Rights for the whole Department of Transportation. With the FAA reorganization, these functions were absorbed by the new FAA Office of Civil Rights.

Shortly after Volpe created the office in 1969, FAA Administrator John Shaffer named me to head it. I'd like to say that the new Office of Civil Rights galloped after its new task like a racehorse, but looking back, a turtle seems more accurate. The early slowness did not result from any lack of enthusiasm; we simply lacked resources. My meager staff of six people had been asked to help change the attitudes of FAA employees, as well as those of numerous aviation-related private

sector employers. This was, and remains, a task of monumental proportions, as Leon Watkins, now director of the FAA's Office of Civil Rights, will surely attest.

Our mission in those early years was clear. First we had to establish an effective organization able to parlay limited resources into significant civil rights programs for FAA headquarters and regional offices. That took about seven months. At the same time, we needed to assess the current minority and female employment situation. That didn't take long at all. In fact, not much more time than it is taking you to read this.

The equal employment record that confronted us was decidely bleak. In 1969, only 6.5 percent of all agency employees were members of minority groups. The FAA employed no minority regional directors, deputies or executive officers. In fact, there were no division chiefs from minority groups—male or female—and very few other supervisory positions were held by minorities anywhere in the agency. In FAA's Washington headquarters, only two minorities occupied "supergrade" positions. I was one. The other was Ben Darden, the first black GS-17 ever appointed in the FAA. The circumstances of women in the agency were similarly depressing.

So we had our work cut out for us. The good news was: we had no way to go but up. The bad news: up looked like a very long way.

Deputy Administrator Taylor, a former director of the Office of Civil Rights, flew an airline's B-747 simulator while attending a national conference of civil rights chiefs.

From the beginning we had trouble overcoming the belief of some people that we were bringing unqualified men and women into the agency. The refrain at the time went: "The agency is determined to lower its professional employment standards." That was not true then and it is not true now. All potential FAA employees—recruited or not—have always been required to pass appropriate Civil Service examinations and other tests designed to show professional aptitude.

Today, a few diehard minsconceptions remain, but the outstanding performance of most of the minorities and women recruited by the FAA since 1969 persuasively refutes any charges of lowered standards.

Perhaps the agency's biggest problem throughout most of the '70s was the Civil Service Commission itself. Until 1978, the commission could not find a way to modify its rules so as to boost affirmative action in employment. Yet at the same

time, the commission ordered (and properly so) the FAA and other agencies to accelerate efforts to employ minorities and women. Only when the Civil Service Reform Act became law in 1978 did the commission begin to assist us in our affirmative action program.

Before 1978, we carried out a very energetic recruitment program. On our own, we advertised heavily in the various minority media. We arranged numerous seminars with minority organizations to enlist their support in recruiting. Occasionally, we requested such organizations as the National Urban League to counsel minorities on the general background and nature of Federal testing—not the contents of any examination that would have been improper—but on the *nature* of Federal examinations. And finally, of course, we hired recruiters, 20 of them based at regional offices, whose sole responsibility was to recruit minorities and females for the FAA.

During the '70s, we also began to take advantage of the Cooperative Education Program. This is a program (also used by private industry) in which a work/study agreement is signed with a university or other learning center allowing FAA recruits to go to school and work for the FAA simultaneously—partly at FAA expense.

Yet another recruitment and applicant-placement tool we have used effectively is the Veteran's Readjustment Act. Because the law has for many years given veterans priority in getting government jobs, the Office of Civil Rights has successfully placed many minority veterans in FAA positions via VRA.

During the decade, we also began to contact other government agencies in the hope of reaching minorities who felt stymied in dead-end jobs elsewhere in the government. When one of these agencies discovered minorities interested in a transfer, we promptly screened them for aptitude and potential. If they measured up to FAA standards, our recruiters took over and told them how to apply for an FAA assignment.

Not long after our recruitment efforts began, we established the "150 Program," now called the "Pre-development Program." It allows would-be air traffic controllers and electronics technicians to be brought into the FAA at a grade lower than the customary entrance grade. Once on board, the trainees are sent to Oklahoma City for 12 to 18 weeks of training and instruction in their chosen specialty. If they prove qualified at the end of the training, the recruits are given FAA jobs at the regular entry grade. The career performance of those who have completed the program has been almost uniformly excellent. (Pre-development training for air traffic control was recently transferred from the Aeronautical Center in Oklahoma City to the campus of the University of Oklahoma in Norman.)

All of these improvements at the FAA are related, of course, to a larger social transformation. As a result of the civil rights movement, the character of the country changed during the '60s and '70s and today continues to change for the better. The nation as a whole is more attuned to the enormous consequences posed by inequality of opportunity.

So the timing was right for the establishment of the agency's Office of Civil Rights. And even in the early years of the decade when the going got rough, we always received strong support of our efforts in the one place it really counted—at the top. The Secretary of Transportation said "Do it!" And the FAA Administrator said "Right now!" That kind of backing made most office and service heads of the agency listen closely. That kind of top-level commmitment—from Mr. Volpe to Mr. Goldschmidt and from Mr. Shaffer to Mr. Bond—continues to provide the power base for real action on equal employment.

Today, a new sensitivity permeates the agency. FAA managers are increasingly aware of the plight of minorities and women who seek professional career assignments. Many of our managers are now very vocal and active in their support of equal employment opportunity. Since 1970, we have doubled our sensitivity level, as well as our minority and woman employment performance.

We've always employed the best, and we still do at all levels. That's the way it should be. With your continued support, the '80s should yield still more gains in this vitally important area. ■

Air Wars: The FAA and PATCO

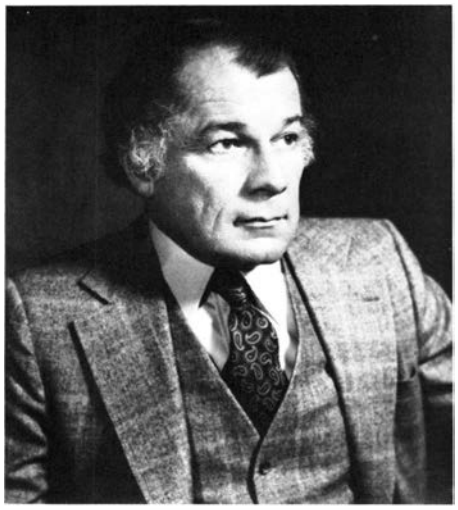
Scene I: Turning Over a New Leaf
Apr. 16, 1970. A crowded press conference. After 17 bitter days and untold headaches, the Professional Air Traffic Controllers Organization (PATCO) strike is finally over. "I don't claim a victory in this thing," FAA Administrator John Shaffer tells reporters. But FAA has clearly dealt PATCO a serious blow. The strike has been crushed and PATCO badly bloodied.

The controllers' union is under a Federal court injunction. F. Lee Bailey, trial attorney extraordinaire and PATCO official, faces contempt charges. So do several other union officers. Controllers who participated in the strike can look forward to long suspensions or dismissals. The union has lost its dues-withholding privilege and is $5 million in debt. Rank and file confidence in PATCO and its leadership is shaken. And controllers appear to have dissipated a good deal of the public sympathy they generated in earlier struggles.

The old PATCO leadership—Bailey, Michael J. Rock and the rest—resigns, and a new team, headed by John F. Leyden, promises to turn over a new leaf. "It is my intention," Leyden says, "to introduce a sense of realism into the organization . . . to eliminate a 'showboat-gunboat' approach, and to replace it with a firm and reasonable persuasion."

Leyden's words are a far cry from the PATCO militancy that had so recently sent tremors through FAA. Still, the labor-management confrontations of the early years of the decade set a tone for the rest of the 1970s. PATCO, for better or worse, was here to stay.

Scene II: Flashback to Chaos
July 1968. Cut to a jammed runway. The air traffic control system is coming apart at the seams. In a single day, nearly 2,000 aircraft in the vicinity of New York City are delayed in taking off or landing, some for as long as three hours. One transcontinental flight is actually delayed on the ground in Los Angeles because of traffic congestion in New York.



F. Lee Bailey, noted trial attorney and PATCO leader at the turn of the decade.

Controllers make the jam worse by deliberately slowing down traffic. PATCO admits to a work-to-rule slowdown. It even has a name for it: Operation Air Safety, a campaign to maintain FAA-prescribed separation standards between aircraft. PATCO claims lesser standards have been used to accommodate the booming trafffic. Those standards are unsafe and must be thrown out, the union asserts. But there is more to this campaign than a concern for safety. It is a way to dramatize controller grievances.

Controllers have plenty to complain about in the year 1968: Outmoded equipment, low pay, long hours. "I have been working a six-day week for over two years, just about all the holidays and a majority of Sundays and nights, [yet] I still make less than my neighbor who is a plumber," complains a Chicago-based controller. Says another midwestern controller: "Sometimes, after all those planes come at you, you just sit there and shake. These days, the first thing I do when I get home is to drink two beers so fast they don't know they've been in a glass."

Vietnam-bred austerity is at the root of the problem. An airways modernization program is languishing in Congress for lack of funds. Federal aid to airports for additional takeoff and landing space is inadequate. Staffing levels aren't keeping up with traffic growth. In the five years preceding the 1968 traffic jam, the controller work force has increased by only

8.5 percent, while air traffic has jumped by more than 50 percent. FAA works controllers harder to handle the traffic.

These conditions gave birth to PATCO in January 1968. Not that other organizations representing controller interests do not exist. The Air Traffic Control Association has been around a long time, but it isn't aggressive enough to suit the militants. Moreover, it's a professional organization rather than a labor union. The National Association of Government Employees, a union, is more aggressive, but its doors are open to all Federal workers. What problems do controllers have in common with clerk typists? Only an organization made up exclusively of center and tower controllers will do.

Acting FAA Administrator David D. Thomas is worried. He knows he is working controllers too hard. But he can't provide immediate relief. New controllers can't be trained overnight. And Thomas sees Operation Air Safety as a shocking precedent. Left unchallenged, this defiance of authority could lead to graver acts of defiance. But with controllers' nerves already frayed, a heavy-handed approach might make matters worse. And Thomas realizes controllers have attracted public sympathy. FAA does not admit a slowdown has taken place. Controllers now know they possess leverage.

Scene III: The Plot Thickens

Jan. 20, 1969. Close-up of Richard M. Nixon taking the oath of office. Congestion has eased, the overtime pay rate has been increased, and staffing is up slightly, but Nixon makes little headway in securing permanent reforms. PATCO discontent festers.

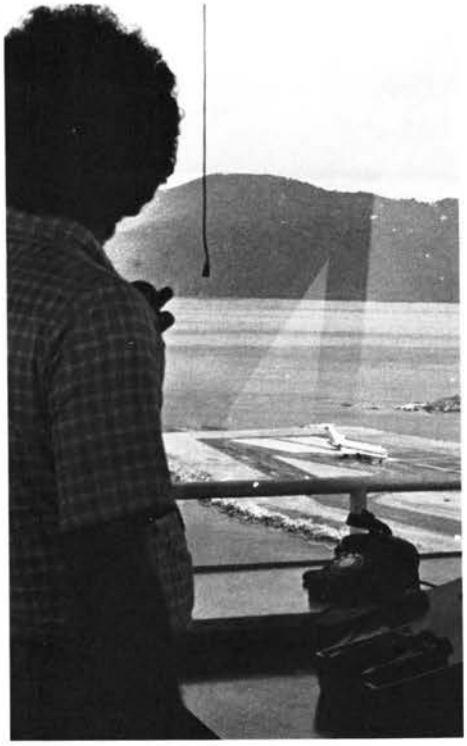
June 17,1969. A slip of the tongue. John Shaffer, the new FAA Administrator, testifies before Congress on an airport-airway bill. He is asked a question about a controller career bill that the FAA opposes, and he replies that the controllers are "well-paid" considering their educational level. The controllers are not amused. The die is cast.

(Cut to T.V. cameo. Evening of the same day. On the "Tonight Show," F. Lee Bailey tells Johnny Carson, "I'd start walking if I were you.")

June 18, 1969. PATCO first tries to flex its muscles: a three-day "sickout." To call it a strike, of course, would violate federal law prohibiting strikes against the government.

Flashed on the screen: Definition: Sickout *(sik' aut) n:* Euphemism for strike.

Shaffer plays along with the word game, declaring that the sickout is not a strike, which means it is not in violation of the anti-strike statute. At Bailey's urging,



Among the labor-management-relations specialists who had to deal with the early PATCO problems were these attending a conference in 1971: from the foreground, Jack Embrey, Marty Hogan, Bob Garner, Keith Christenson and Bob Hunter.

controllers return to work. They are charged only with abuse of sick leave and face little punishment. Shaffer directs FAA staffers to devise "an action program" that includes optional early retirement for controllers. The effort does nothing to appease controllers. They continue to lash out.

Shaffer shifts from carrot to stick, calling PATCO a "carcinogen" and terminating its dues-withholding privilege. PATCO accuses FAA of acting "maliciously, in bad faith, and for the sole purpose of destroying PATCO." It threatens mass resignations that never materialize.

Scene IV: Air Strike

April 1970. Cut to darkened control towers. PATCO applied for exclusive recognition as the national representative for all tower and center controllers and was rebuffed by FAA. Now it needs a powder keg. The union seizes on the involuntary transfer of three Baton Rouge, La., controllers. With that, PATCO stages its fateful strike, which finally forces FAA to call

The Union Boom

FAA employees flocked to the ranks of organized labor during the 1970s. In the process, they turned FAA into one of the most heavily unionized agencies in the Federal Government, and they helped make the spread of unionism in government one of the big stories of the decade.

When the decade opened, 12,612 FAA employees—26 percent of the FAA work force—were represented by employee organizations; when it closed, union membership had shot up to 37,563, or 67 percent of the work force.

The tripling of union or employee organization membership is one part of the story. The other part is the rise of the national bargaining unit. In 1970, no employee organization had exclusive recognition on the national level. By the end of 1979, four unions had won recognition: the Professional Air Traffic Controllers Organization (PATCO), representing 18,333 tower and center controllers; the Federal Aviation Science and Technological Association (FASTA), representing 8,560 Airway Facilities employees; the National Association of Air Traffic Specialists (NAATS), representing 3,890 flight service specialists; the National Association of Flight Standards Employees (NAFSE), representing 252 Flight Standards employees. These four unions alone represented nearly 83 percent of the agency's union members.

The remaining 6,628 union members were represented by regional and local units, the largest of which was the American Federation of Government Employees (AFGE), with 2,616 FAA members.

The rise of the large national and regional union has taken a heavy toll on the number of existing bargaining units. In 1970, no fewer than 233 units engaged in collective bargaining on the local level; at decade's end, only 61 bargaining units existed on the national, regional and local levels. The trend toward fewer but larger bargaining units has slowed in recent years but has by no means stopped.

With the national union has come the national labor agreement. NAATS, PATCO, and FASTA have national contracts with FAA. These three contracts alone cover 30,773 employees. ■

a spade a spade and resort to legal sanctions.

(Brief flashback to Scene I: The strike takes its toll. Tempers flare; epithets fly. Many lose their jobs. PATCO lies vanquished.)

Scene V: The Olive Branch

Cut to PATCO members, FAA officials shaking hands. *Nov. 3, 1970.* Shaffer: "Those employees who have completed their suspensions have 'paid their debt' and they should be treated like any other employee." *Feb. 7, 1972.* FAA news release: "Air traffic controllers fired for their activist roles in the 1970 strike may apply for re-employment."

Oct. 6, 1972. Shaffer: "The need to bargain, consult, and otherwise deal with [unions] has represented a drastic change in [our] concepts of management. [Our] decisions . . . must not only be well reasoned and correct, they must also . . . stand the test of . . . challenge. . . ." FAA learned that it could no longer take its employees for granted, that it must earn their loyalty with fair and reasonable policies.

Operation Air Safety transformed controllers into sympathetic public figures by drawing attention to their plight. The Nixon Administration took notice. It proposed and Congress approved new controller positions at a record rate.

Dramatizing the controllers' plight also helped bring passage of the Airport-Airway Development Act of 1970. And it prompted FAA to do battle with the Civil Service Commission and get 11,000 controllers' jobs classified higher.

The 1969 sickout induced the administration to appoint the Corson Committee to study controllers' problems and to get cracking on controller career reform, something it had been dragging its feet on. The result was the Air Traffic Controller Career Program of 1972, which gave controllers optional early retirement.

PATCO, then, profited from its illegal acts. But it did so only because controllers' grievances were generally recognized as legitimate.

Scene VI: From the Ashes

As the decade wears on, PATCO is no longer battered and bloodied. It is a financially healthy union with a secure mem-

bership and a contract that gives it a voice in FAA labor councils. Its comeback is made possible by Executive Order 11491, which give the Department of Labor the authority to grant exclusive recognition to government unions. In October 1972, PATCO gets that recognition, and its fortunes soar thereafter. There would have been no recognition and no soaring fortunes, however, if the union had not abandoned the sickout.

But controllers do not abandon the slowdown. By one count, they used the technique on nine occasions during the 1970s.

Scene VII: New Issues

May 1978. Cut to a sunny beach. PATCO stages a slowdown over the issue of overseas familiarization flights.

This isn't 1968. Equipment is modern. Pay is good. Staffing is adequate. Tying up traffic for a free trip overseas? The public is outraged. So is Washington. A Federal court fines PATCO $100,000. Close-up of *Washington Post* editorial: "Someone has finally gotten stern with PATCO, one of the most arrogant Federal unions around."

Scene VIII: The Outlook

PATCO goals for the 1980s. A reduction in the controllers' workweek. The right to bargain collectively for wages. That's the speculation about what PATCO will seek in future contract negotiations. These are concessions FAA has no power to make. Congress has established a 40-hour Federal workweek. And the law says Federal employees cannot bargain collectively for wages.

And how to achieve them. FAA Administrator Langhorne Bond: "People forget that most of the benefits that have come to the union membership in recent years have been achieved through a sympathetic Congress. [The] same holds true for what PATCO wants [now]. Those goals would have to be achieved through Congressional action if they are achieved at all." Congress has been known to respond to "firm and reasonable persuation." Judging from its reaction to the 1978 slowdown, the days when it will yield in the face of an illegal job action appear over.

Epilogue

May 1978. PATCO establishes National Controller Subsistence Fund. FAA charges the fund is illegal, but the Federal Labor Relations Authority rules against the agency. FAA appeals . . . and there the matter stands. Meanwhile, FAA becomes increasingly apprehensive. Is this a fund for the needy, or a war chest for future job actions? Question mark for the 1980s. ■

Nobody Wants an Airport

In 1970, environmentalists finally won their long battle to block construction of a giant jetport in the heart of the Florida Everglades.

Also in 1970, Congress passed the Airport and Airway Development Act, thereby authorizing what grew to be billions of dollars for U. S. airports and airway development.

These two events represented the often contradictory—and often colliding—forces that shaped airport development over the past decade. On the one hand, almost nobody wanted an airport in the backyard. On the other hand, almost everybody knew that something had to be done to safely accommodate the rapid growth of American aviation.

Airport construction was blocked or delayed by a wide variety of environmental concerns, from noise pollution to the possible effect of jet landings on the Everglades kite, a rare bird. Eventually, tests would show that nearby jet landings left the birds basically bored, or at least nonplussed.

It has been more than a decade since ground was broken for the country's only new major airport in recent history—Dallas/Fort Worth. And the next decade may not see any more built, although new airports for Denver and Los Angeles are under serious study. Land near downtown is often too expensive, and noise is both a legal and a political problem. Sites farther

out lay most of an airport's burdens on a host community that receives few of its benefits.

Stymied by these problems, planners have sometimes found themselves literally at sea. A few months ago, southern California officials proposed a new $2 billion airport to take some of the strain off Los Angeles International Airport. The new airport would be on a man-made island adjacent to the Los Angeles-Long Beach harbors. "Everything points in that direction," one local mayor said. "Wherever a new major regional airport is built on land, there will be opposition."

Adding runways would be a partial answer to overcrowded airports, but many of the most crowded are in urban or suburban areas where expansion presents almost as many problems as building a new airport.

Since 1970, Federal aid has helped build only 12 new parallel runways at air carrier airports, such as Atlanta, Philadelphia, Honolulu and Denver. These runways, over a 10-year period, will save six times their construction costs by cutting down on fuel-wasting delays. (Delays today are much less severe than in the late 1960s, even though annual passenger enplanements have gone up more than 100 million since then.)

This, then, is the story of airport development in the 1970s—not one of unsolvable problems but of FAA having gone a long way toward accommodating the surging growth of aviation.

In the first half of the decade just ended, FAA spent more money under its grant program on airports than in the previous 23 years—money raised from taxes paid into the aviation trust fund by the users of the airport and airway systems. The total for the fiscal years 1971 through 1980 will come to more than $4 billion.

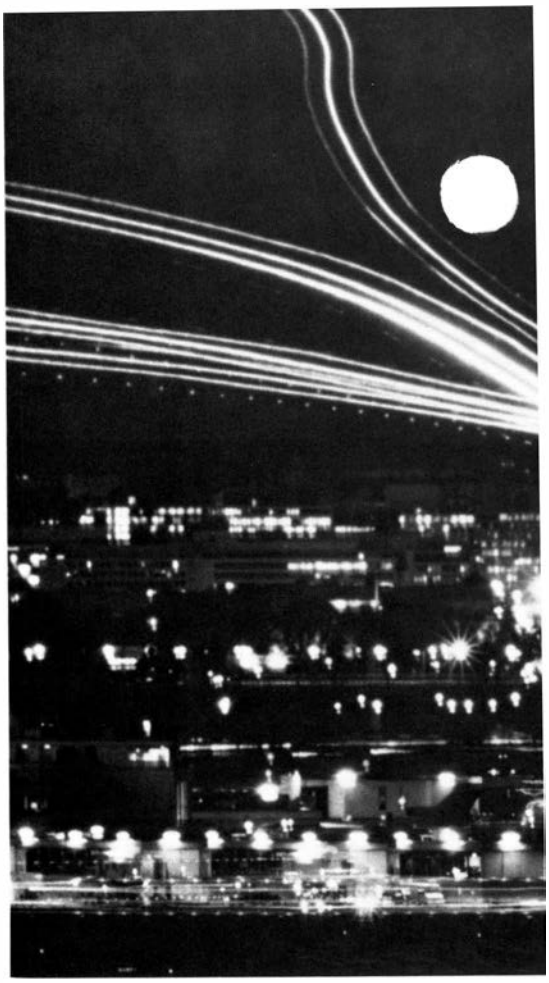
Most of it didn't go for new airports, but for a number of alternative means to build capacity. One is to make more use of secondary airports to relieve the primary airports. (Six of the nation's 10 largest cities have more than one airport served by airlines.)

Another way is to improve satellite airports or to build new ones to attract general aviation away from the major airports. More than $150 million went to pursue this goal in the past decade, and the FAA embarked last year on a $100 million, four-year satellite airport program, which is only the first phase of a broader program that would one day affect as many as 236 airports in 75 metropolitan areas.

Another way to ease airport crowding is to encourage the airlines and their passengers to travel more during off-peak hours. Peak spreading, quotas, surcharges and price differentials are potential ways to bring this about.

Rationing of airspace around airports would be another way, and Transportation Secretary Neil Goldschmidt has said he is ready to do just that, if required.

In a sense, there's nothing new about



Where the Money Went

	1970	1980
TOWERS	281	499
INSTRUMENT LANDING SYSTEMS	288	753
PAVED RUNWAYS	3,806	5,618
LIGHTED RUNWAYS	3,554	4,631
APPROACH LIGHT SYSTEMS	260	916
AIRPORT SURVEILLANCE RADARS	124	192
VASIs	84	2,741
VORs/VORTACs	947	1,028
NON-DIRECTIONAL RADIO BEACONS	589	1,015

—In 1970, there were 4,260 publicly owned and 7,001 privately owned airports in the U.S. Of the privately owned airports, 3,111 were open to the flying public.

—In 1980, there were 4,761 publicly owned and 9,985 privately owned airports in the U.S. Of the privately owned airports, 2,385 were open to the public.

A time exposure of aircraft landing lights mark the paths of successive airliners at Washington National Airport.

Photo by Bruce A. Dale
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Housing developments that marched toward runway ends of airports have caused bitter contentions between airport operators and their new neighbors.

rationing or the effective use of available airspace. ''Now the system rations itself,'' William H. Gregory recently wrote in *Aviation Week and Space Technology,* ''and the method of rationing is delay when weather or peak congestion saturates parts of the existing system.'' To avoid that saturation is one of the major problems ahead as the FAA moves into the 1980s.

''Changes in pricing, scheduling or methods of operations can go only so far toward freeing substantial or inefficiently used resources at major airports,'' Administrator Bond said as the decade came to a close. ''The United States must face the fact that we can hardly hope to handle the additional passengers projected for the 1980s without significant commitments to capital construction.'' ■

Airport Under Siege

When it comes to citizen opposition to airports, the Japanese are way ahead of us. Narita Airport, 40 miles north of Tokyo, was opened two years ago to relieve the pressure on Haneda Airport—after a two-month delay caused by radical guerrillas who damaged the control tower. The leftist guerrillas are still holed up around the airport, in a fortified building ringed with barbed wire. They issue forth from time to time to burn tires, launch balloons and set off fireworks in hopes of disrupting traffic. Things weren't always so quiet, though. In earlier phases of the struggle, four policemen and two leftists died in pitched battles. ■


公光潮
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海外信託銀行

The Quiet Revolution

"Along with the possibility of the extinction of mankind by nuclear war, the central problem of our age has . . . become the contamination of man's total environment . . . "
—"Silent Spring" by Rachel Carson

It took a one-time GS-11 biologist for the Fish and Wildlife Service to arouse the nation's concern for preserving the environment. Although Rachel Carson's best-selling book, "Silent Spring," dealt only with the indiscriminate use of pesticides, it led to a total assault against those who ›ould offend nature.

Aviation was no exception. Aircraft noise was a conspicuous offender; the airport a bad neighbor.

But despite a mounting outcry against noisy aircraft, the FAA was for many years limited in what it could do to control noise. Until 1968, the agency had only air traffic control procedures and flight paths with which to fight the problem. That year, however, Congress gave the agency the clear legislative authority it needed to control noise at its source by regulating the design of the aircraft itself. A year later, the agency adopted a landmark rule requiring quieter jets: Part 36 of the Federal Aviation Regulations.

The rule was long overdue. As early as the 1950s, it was clear that something had to be done to reduce jet engine noise. John Wiley, then director of aviation for the New York Port Authority, said, "The jet has got to adjust to civilized community life. It can't come in raw and screaming--its's got to be housebroken first."

By the early 1960s, only a few years after jets entered commercial service, their noise had developed into a major constraint. Local anti-noise gorups rallied their forces to throttle airport development and airport expansion.

FAA was concerned, too. In 1967, the agency had established the Office of Noise Abatement, transforming it later into the Office of Environmental Quality to reflect a broader concern for the effect of aviation on the community. When Congressional action came in 1968, FAA moved quickly to establish a rule.

For the first time the agency had the power to certificate aircraft not just for safety but also to control noise—although Congress had imposed important restrictions. The rule could only call for what was technologically practicable and economically reasonable. But the effect remained profound. The rule required manufacturers to show that new aircraft did not exceed noise levels ranging from 93 to 108 "effective perceived noise in decibels" on takeoff and 102 and 108 decibels on landing. Exact levels were keyed to aircraft weights.

Because of all this, the decade of the

Part 36 of the FARs came in just ahead of the '70s. An FAAer takes measurements of the decibel level of Washington National takeoff traffic with an audio meter.

A jetliner appears to skim buildings in Hong Kong as it heads for a landing at Kai Tak Airport. The child holding his ›rs confirms the noise problem prevalent ›here cities coexist with jetports.

Photo by Bruce A. Dale
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Los Angeles Times photo

'70s saw a quantum improvement in noise control. New additions to the fleet, all certified under the rule, were significantly quieter. The new model of the Boeing 747 (the first model was not required to meet the noise levels of the rule because it was already in production) and other wide-body jets (DC-10, L-1011, A-300) were just about half as noisy as previous large jets. For example, the 747s being built today run 6 to 10 decibels below the levels of the original models. That's 35-50 percent less noise.

General aviation aircraft joined the quiet revolution. The Cessna Citation, a business jet, was substantially below FAA's noise standards. "It's quieter than many prop aircraft," says Dr. John O. Powers, FAA's chief environmental scientist. Both the redesigned Lear Jet and the Lockheed Jet Star also conform to the "quiet rule."

Modifying existing aircraft also became part of the FAA's noise roll-back program. A program to re-engine the Boeing 707 and the DC-8 is in progress. Models of the 727 and 737 coming off Boeing production lines are quiet versions of noisy ancestors.

Aircraft still undergoing FAA certification will add a quieter note to the fleet when they enter service. The Boeing 757 and 767 are quieter than the toughest provisions of part 36.

Says Powers, "We probably have forced acoustic design to a level where further improvement will be nominal."

Acoustic design was only one area of improvement. Airport operators also jumped on board in the 1970s. At many locations, they worked with FAA, the airlines and community officials to minimize noise by modifying approach and departure flight tracks. FAA came up with a "keep 'em high" ATC program to cut jet noise resulting from premature descent to low altitudes. The agency also recognized that extended wing flaps increase noise levels on the ground and began requiring pilots to use no more flap than was needed for safety on descent.

By late 1976, the FAA turned its attention to the existing fleet, announcing that all aircraft then in use had to meet the noise standards on a phased schedule or be withdrawn from U.S. service. With the new program, the goal became "Retrofit, re-engine or replace." For some aircraft, it was feasible to add sound-absorbing materials in the engine nacelles and the engine itself in order to cut noise. For others, completely new and quieter engines were more practical. Moreover, some were even more fuel efficient. The new CFM 56 and JT-10D engines, for example, which will power some of the future wide-body jets, pay off with as much as a 10 to 20 percent fuel saving over the original engines.

The aerial giants were not the only targets. In 1975, the FAA issued a rule setting maximum noise limits for small propeller aircraft. And two years later, FAA awarded unprecedented grants to four airports for land-use planning designed to curb noise impacts. This was the first time that an attack on noise was not aimed at the source of the noise—the aircraft—but at its effects by intelligent planning.

That same year, FAA required commercial jets to meet noise levels of FAR 36 by Jan. 1, 1985. About 75 percent of the commercial fleet was affected.

The supersonic transport, admittedly in small supply, was not overlooked. Those

A Second Look Before Acting

The 1970s brought two new entries to the FAA lexicon: EIS (environmental impact statement) and FONSI (finding of no significant impact). Both originated in a piece of landmark legislation that went into effect Jan. 1, 1970: the National Environmental Policy Act.

Robert Eisengrein, an FAA attorney specializing in environmental law, calls the act "one of the broadest laws ever written. It probably has had as much effect in the Seventies as the Federal Aviation Act had in the Sixties."

The law required FAA to consider *the environmental effects of proposed actions that might significantly affect the environment.* This cast a wide net: building new ATC facilities such as centers, towers, flight service stations; installing navigation aids (e.g. VORs, ILS) and communication systems; most engineering and development projects; new air traffic procedures; aircraft and engine certification; land acquisition and office building construction. In these areas, FAA determines the environmental impact.

In airport development—major construction programs running nationally more than half a billion dollars in Federal funds a year—FAA also studies the environmental effects of others' projects.

By the close of the decade, hundreds of FAA people were involved in the environmental process. ■

Concordes in operation before January 1, 1980 were limited in their operations. Those still in production at that time would have to conform to Part 36. In all cases, civil supersonic flight over the United States that would cause sonic booms was banned.

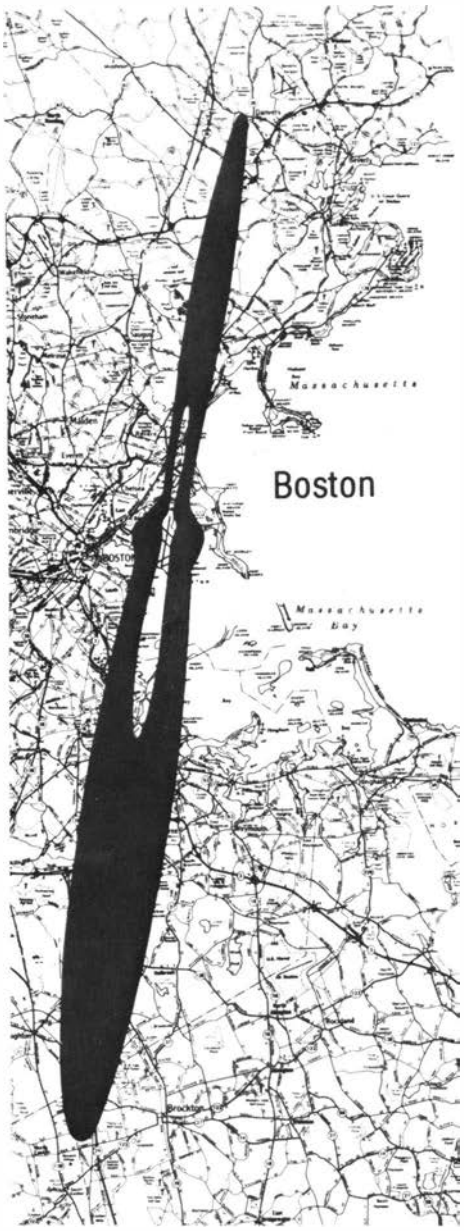
As the decade of '70s came to a close, FAA proposed noise standards for civil helicopters. Every form of aviation was now affected.

It hasn't been cheap. Boeing alone has invested more than $100 million in noise research. One of the major engine manufacturers, the Pratt & Whitney Division of United Technologies, has also passed the $100 million mark. Other U.S. aircraft manufacturers, Lockheed and McDonnell Douglas and the other large engine company, General Electric, have spent similar amounts.

Where do we stand now? John Powers estimates that about 48 percent of the commercial fleet is now in compliance with Part 36. He estimates that the number of airport neighbors adversely affected by aircraft noise has been reduced approximately 20 percent. There are prospects for an additional 30 percent reduction by the end of 1984 when 100 percent compliance is achieved.

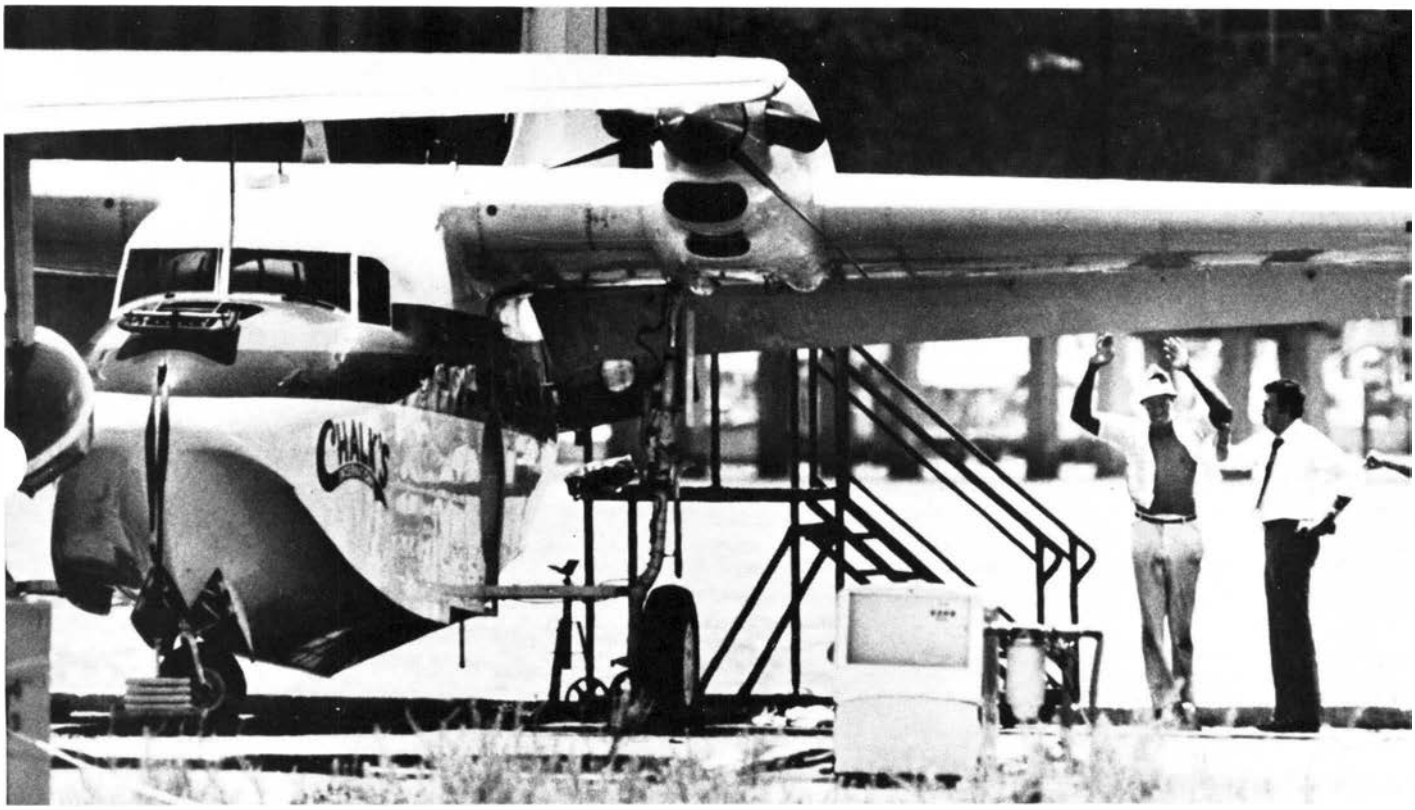
Early in the decade, FAA Administrator John H. Shaffer proclaimed, "We are . . . determined to prove wrong the contention . . . that the airplane is hopelessly at odds with our environment."

Government and industry have proved him right. ■



The noise "footprint" of a DC-8 over Boston. The area exposed to 90EPNdB (effective perceived noise decibels) with its earlier engine (black outline) is contrasted with the area affected by the plane with a new, quieter engine installed in response to the FAR (white outline).

A Headwind for Hijacking



A would-be hijacker raises his arms in surrender to a Miami FBI agent after holding a mechanic hostage for over eight hours in an attempt to have a Chalk's Airline seaplane fly him out of the country.

AP photo

Making history wasn't exactly what Antulio "Tony" Ortiz had in mind on the morning of May 1, 1961, when he boarded a National Airlines flight bound for Key West, Fla., put a knife to the throat of the co-pilot, aimed a revolver at the captain and told them to head for Havana.

Nearly 20 years later, Ortiz looks back with amazement at the menace he unleashed. Air piracy of one kind or another dates back as far as 1931, but Ortiz was the very first to hijack an American airliner. "I didn't even know I was the first," Ortiz says today. "I only knew I wanted to go to Cuba."

Ortiz made his decision, unfortunately, just after this country broke diplomatic relations with Cuba and banned travel there. A departing Cuban consular official in Miami told Ortiz there were only two ways left to get to his country: "You can steal a boat, or you can steal an airplane."

So Ortiz bought himself a gun and booked passage on the flight to Key West under the alias "Elpir Confrisi." He had simply dropped the "ata" from the name

Tony Ortiz, by a fellow prisoner.

of one of his heroes: El Pirata Confrisi, a buccaneer of the Spanish Main.

The hijacking era was born. It lasted, as a major threat to the safety of American aviation, till the winter of 1972, when the tide began to turn.

On November 10 of that year, a group of heavily-armed men hijacked a Southern Airways DC-9 en route from Birmingham to Montgomery, Ala. By the time the ordeal ended three harrowing days later, the aircraft had landed not only in Havana—twice—but in a grand total of eight other North American cities. Even after the FBI shot out the plane's tires in Orlando, Fla., the hijackers forced one more takeoff. They wounded the co-pilot

This sensitive nose of this dog, trained under the co-sponsorship of the FAA and the Law Enforcement Assistance Administration, can sniff out explosives that may have been secreted aboard aircraft.

The rash of hijackings in the early '70s resulted in tightened airport security, as reflected in these photos of baggage x-raying (right) and body scanning with a hand magnetometer (facing page) being used at Philadelphia Airport.

Photo by Marilynn K. Yee, *The New York Times*

He Learned the Hard Way

Unfortunately for Tony Ortiz and a number of other hijackers—including three who came back to the U.S. in this year's refugee sealift—Cuba wasn't what they thought it would be. Ortiz returned voluntarily to the United States in 1975 and is now doing 20 years for his pioneer role.

"I got no right to complain," he says. "This place is a deluxe hotel compared to Cuban jails." He was speaking from the Federal Correctional Institution in Lompoc, Calif.

Cuban authorities greeted the Puerto Rican hijacker warmly when he got off the plane in Havana, and put him to work as an electrician in the Foreign Ministry.

But Ortiz says he got into trouble fast—the first time for "fooling around" with a Russian woman whose husband was in town on missile business. The year was 1962. Ortiz claims the missile crisis caused him to abandon communism for capitalism, an ideological re-orientation he underscored by trying to peddle pictures of Russian MIGs to foreign agents.

He spent the next 10 years in and out of Cuban jails. Once he tried and failed to escape Cuba by raft, but only in 1975 did he finally get official permission to leave.

He traveled to Kingston, Jamaica, where he walked into the U.S. consulate and turned himself in. "I decided to get it over with," he recalls. Someone handed him an airline ticket and the FBI arrested him when he got off in Miami. The only charge against him that held up in court was kidnapping. Anti-hijacking laws couldn't be applied. They hadn't been enacted until Tony Ortiz help create the need for them.

"Hijacking is no good," says Ortiz, now 53 years old and working in the kitchen of the Lompoc prison. "You are risking not only other lives but your own, too . . . It's impossible nowadays. It's suicide to try." ■

and threatened to crash into a nuclear power plant. They demanded to speak with the President.

The Southern Airways flight was the 31st to be hijacked in 1972—the latest in what had become an epidemic of hijackings. The previous five years had seen an average of 27 hijackings of U.S. airliners a year, each further undermining the safety of air travel. The Southern hijacking was the last straw.

On Dec. 5, 1972, FAA ordered the screening of all passengers and their carry-on luggage, effective 30 days later. The agency also worked out an agreement with the FBI under which FAA would handle all law enforcement between the time when the doors of the aircraft closed for departure and when they opened upon arrival.

Mandatory screening lifted the siege. Air carrier hijackings dropped from 27 a year to an average of only five a year. Until this year, no known firearms or high explosives whatsoever slipped through the system. Tightened security meant fewer attempts and less chance of success. Before 1973, a hijacker had about a 60 percent chance of getting away with it. Over the rest of the decade, his or her odds dropped to less than 15 percent.

In the late '60s and early '70s, hijacking in the U.S. accounted for as much as one half of the world's total; by 1977, it accounted for only about one fifth. ■

People

Aeronautical Center

■ **Raymond H. Corley,** chief of the Financial and Personnel Systems Branch, Data Services Division, from the Management Systems Branch.

■ **Ruble G. Garner,** chief of the Logistics and Training Systems Branch, Data Services Division, from the Software Systems Branch.

■ **George E. Williamson,** chief of the Systems Support Branch, Data Services Division, from the Program and Quality Analysis Staff.

Alaskan Region

■ **Edgar W. Anderson,** maintenance mechanic foreman in the King Salmon Airway Facilities Sector, from the Anchorage International Sector Field Office.

■ **Louise C. Long,** chief of the Nome Flight Service Station, from the Fairbanks FSS.

■ **Sevard E. Wagenius, Jr.,** supervisory electronics technician at the Sitka AF Sector Field Office.

Central Region

■ **Melvin R. Culli,** chief of the Joplin, Mo., Airway Facilities Sector Field Office, from the Guam AF Sector.

■ **Hagan E. Gibbs, Jr.,** team supervisor at the Waterloo, Iowa, Tower.

■ **Frank D. Guy,** team supervisor at the Kansas City Downtown Tower, from Kansas City International Tower.

■ **Robert D. Reed,** team supervisor at the Kansas City Flight Service Station, from the Cedar Rapids, Iowa, FSS.

■ **Anthony Joseph Soule,** assistant manager of the Wichita, Kan., AF Sector.

Eastern Region

■ **Lawrence Battle,** unit supervisor in the Avoca, Pa., Airway Facilities Sector Field Office, from the Newark, N.J., AF Sector.

■ **Charles J. Bell,** deputy chief of the JFK International Tower, from the regional Airspace and Procedures Branch.

■ **Henry T. Dean, Jr.,** chief of the Rochester, N.Y., Airway Facilities Sector Field Office, from the Albany AF Sector.

■ **John R. Gilmore,** team supervisor at the Erie, Pa., Tower.

■ **James E. Haight,** chief of the New York Air Carrier District Office.

■ **Rosalind Halpern,** chief of the Evaluation Staff, Airway Facilities Division.

■ **Frank D. Havlin,** assistant chief at the LaGuardia Tower, Queens, New York, from the New York Common IFR Room.

■ **Martin Isaacson,** area officer at the New York ARTCC.

■ **Ralph E. Kearns,** team supervisor at the Westchester County (N.Y.) Airport Tower, from the New York CIFRR.

■ **Theodore M. Kiladitis,** Central Computer Complex supervisor, New York ARTCC.

■ **Arthur Kish,** Display Channel Communications Crew supervisor, Washington ARTCC.

■ **Alfred R. Miller,** chief of the White Plains, N.Y., AF Sector Field Office, from the regional Evaluation Staff.

■ **Edmund Spring,** deputy chief of the Andrews Air Force Base Tower, from the Technical Training Branch, Office of Personnel and Training, Washington headquarters.

■ **Richard W. Wern,** chief of the Roanoke, Va., FSS, from the Utica, N.Y., FSS.

■ **James G. Windish,** team supervisor at the Washington National Tower.

Great Lakes Region

■ **George M. Acri,** chief of the Plans and Programs Branch, Air Traffic Division, from the Indianapolis ARTCC.

■ **William S. Beisiegel,** program manager in the Evaluation Branch, Airway Facilities Division, from the Civil Aviation Assistance Group in Oman.

■ **Ronald G. Breckler,** chief of the East St. Louis, Ill., Tower, from the Air Traffic Branch, FAA Academy.

■ **Willie R. Cadwell,** assistant manager of the Springfield, Ill., AF Sector, from the En Route Radar Branch, Radar/Automation Engineering Division, Airway Facilities Service, Washington headquarters.

■ **Joe Chavez,** chief of the Indianapolis ARTCC, from the New York ARTCC.

■ **David Cherry,** chief of the Cuyahoga County Airport Tower (Ohio), from the Cleveland-Hopkins Tower.

■ **Salvatore R. Dimaggio,** assistant systems engineer at the Aurora, Ill., AF Sector, from the Airway Facilities Branch, FAA Academy.

■ **David F. Erickson,** assistant chief at the Cleveland ARTCC, from the Evaluation Branch, Air Traffic Division.

■ **Henry D. French,** deputy chief at the Chicago ARTCC, from the Washington ARTCC.

■ **Nicholas Guglielmi,** assistant chief at the Chicago ARTCC.

■ **Warren E. Holtsberg,** area officer at the Chicago ARTCC.

■ **Ronald E. Ide,** proficiency development and evaluation officer at the Detroit AF Sector.

■ **Billie Johnson,** area officer at the Chicago ARTCC.

■ **Loren L. Knop,** proficiency development and evaluation officer at the Springfield AF Sector.

■ **Robert R. Mauntel,** assistant chief at the Chicago ARTCC.

■ **William E. Nash,** assistant chief at the Chicago O'Hare Tower, from the Oklahoma City Tower.

■ **Clarence E. Newborn,** deputy chief of the Detroit Metro Tower, from the En Route Terminal Requirements Branch, ATC System Programs Division, Air Traffic Service in Washington headquarters.

■ **Gilbert F. Piker,** assistant chief at the Chicago ARTCC.

■ **Douglas F. Powers,** chief of the Chicago Palwaukee Tower, from the Meigs Field Tower in Chicago.

■ **Gerald D. Probst,** team supervisor at the Chicago ARTCC.

■ **Ronald C. Schlitter,** team supervisor at the Decatur, Ill., Flight Service Station.

■ **Watson I. Searle, Jr.,** assistant chief at the Indianapolis ARTCC.

■ **Roy L. Seyferth,** assistant manager at the Indianapolis ARTCC Airway Facilities Sector, from the Automation Engineering Support Branch, Radar/Automation Engineering Division, Airway Facilities Service in Washington headquarters.

■ **Ransom L. Smith,** program manager for the ET Pre-Developmental Training Center in Cleveland, from the Cleveland AF Sector.

■ **Richard A. White,** assistant chief at the Chicago ARTCC.

■ **George D. Woods,** systems performance officer at the Cleveland ARTCC Airway Facilities Sector.

■ **Danny G. Yarger,** team supervisor at the Fort Wayne, Ind., FSS, from the Detroit FSS.

New England Region

■ **Herbert Anderson,** chief of the Boston Flight Service Station, from the Operations, Procedures and Airspace Branch, Air Traffic Division.

■ **John J. Campbell, Jr.,** assistant chief at the Boston Logan Tower.

■ **Maurice W. Finn,** supervisory technical inspector in the Maintenance Operations Branch, Airway Facilities Division, from the Evaluation Staff.

Northwest Region

■ **William T. Abernathy,** chief of the Seattle ARTCC, from the Balboa, Canal Zone, ARTCC.

■ **Paul Bagley,** assistant manager of the Seattle ARTCC Airway Facilities Sector, from the Pasco, Wash., AF Sector.

■ **Lewis D. Byrd,** team supervisor at the Bellingham, Wash., Flight Service Station.

■ **Patrick G. Claxton,** team supervisor at the Seattle ARTCC.

■ **Robert E. Coleman,** manager of the Seattle ARTCC Airway Facilities Sector, from the Eugene, Ore., AF Sector.

■ **Charles E. Davis,** team supervisor at the Portland, Ore., Tower, from the Spokane, Wash., International Tower.

■ **Robert E. Doty,** team supervisor at the Spokane FSS.

■ **Lester H. Hamlin,** manager of the Eugene AF Sector, from the Seattle ARTCC Sector.

■ **Robert J. Jones,** chief of the North Bend, Ore., FSS, from the Seattle FSS.

■ **Melvin R. Nieuwsma,** unit chief at the Olympia, Wash., AF Sector Field Office.

Pacific-Asia Region

■ **James L. Gerard,** team supervisor at the Honolulu ARTCC.

■ **Michael J. Musgrove,** technician-in-depth at the Finegayan, Guam, Airway Facilities Sector.

■ **Gary M. Sanada,** team supervisor at the Honolulu ARTCC.

■ **Frank D. Swanson,** unit supervisor in the Samoa AF Sector, Tutuila Island, American Samoa.

Rocky Mountain Region

■ **Charles A. Carlson,** team supervisor at the Miles City, Mont., Flight Service Station, from the Air Traffic Branch at the FAA Academy.

■ **Mary Ellen Ozimkowski,** team supervisor at the Arapahoe County, Colo., Airport Tower.

■ **Edwin J. Siroky,** team supervisor at the Denver, Colo., Tower.

■ **John L. Swartz,** team supervisor at the Denver Tower, from the Charleston, W. Va., Tower.

Southern Region

■ **James C. Berry,** chief of the Standiford Field Tower in Louisville, Ky., from the Memphis, Tenn., Tower.

■ **Robert A. Blackburn,** team supervisor at the Greater Cincinnati Tower in Covington, Ky.

■ **Andra G. Diggs,** team supervisor at the Birmingham, Ala., Tower, from the Miami International Tower.

■ **Kenneth T. Galick,** unit supervisor in the Miami Hub Airway Facilities Sector Field Office in Fort Lauderdale, Fla., from the King Salmon, Alaska, AF Sector.

■ **Eugenio T. Garcia,** chief of the Balboa, Canal Zone, ARTCC.

■ **Willis J. Granger,** chief of the Maintenance Operations Branch, Airway Facilities Division, from the Savannah, Ga., AF Sector.

■ **Robert J. Morgan, Jr.,** unit supervisor in the Tampa, Fla., AF Sector Field Office in Fort Myers, Fla., from the San Juan, Puerto Rico, CERAP Sector Field Office.

■ **Gerald L. Norris,** chief of the Fort Myers Tower, from the Key West, Fla., Naval Air Station.

■ **Ralph D. Rhoten,** team supervisor at the Bowman Field Tower in Louisville, Ky., from the Lexington, Ky., Tower.

■ **Billy M. Riley,** chief of the Jacksonville, Fla., FSS, from the Greenwood, Miss., FSS.

■ **Catherine S. Ruggiero,** team supervisor at the Fort Myers FSS, from the Nashville, Tenn., FSS.

■ **Ralph E. Schetron,** chief of the Accounting Operations Branch, Accounting Division, from the Property and Cost Accounting Branch.

■ **Albert E. Suter, Jr.,** deputy chief of the Miami Tower, from the Plans, Programs and Evaluation Branch, Air Traffic Division.

■ **Arthur L. Wallace, Jr.,** team supervisor at the Gainesville, Fla., Tower.

Southwest Region

■ **William E. Becton,** chief of the Tulsa, Okla., Tower, from the Houston, Tex., Intercontinental Tower.

■ **Milton D. Blume,** team supervisor at the Amarillo, Tex., Tower.

■ **Marvin S. Canter, Jr.,** computer specialist in the Albuquerque, N.M., ARTCC Airway Facilities Sector.

■ **Richard E. Chaney,** program support officer in the Albuquerque ARTCC Sector, from the Houston, Tex., AF Sector.

■ **Carl E. Cowgill,** chief of the Austin, Tex., Tower, from the Detroit Metro Tower.

■ **Gilbert Elizalde,** assistant manager of the Houston ARTCC Airway Facilities Sector.

■ **Daniel C. Gardner,** manager of the New Orleans, La., AF Sector, from the Corpus Christi, Tex., AF Sector.

■ **Manuel R. Hugonnett,** team supervisor at the Houston ARTCC, from the Airspace and Procedures Branch of the Air Traffic Division.

■ **Bobby A. Jones,** team supervisor at the Amarillo Tower.

■ **Donald E. Kneram,** chief of the Dallas-Fort Worth Tower, from the Austin Tower.

■ **William E. Krout,** navaids specialist at the San Angelo, Tex., AF Sector Field Office of the Austin Sector, from the Corpus Christi AF Sector.

■ **Robert D. Sholl,** systems engineer at the Fort Worth ARTCC Airway Facilities Sector.

■ **Juan R. Solis,** maintenance mechanic foreman at the El Paso, Tex., AF Sector.

■ **Daniel C. Williams,** team supervisor at the Amarillo Tower.

Technical Center

■ **Ludwig V. Kunzman,** chief of the Budget Branch, Financial Services Division, from the Accounting Branch.

Washington

■ **Richard C. Beitel,** chief of the Operations Law Branch, Regulations & Enforcement Division, Office of the Chief Counsel.

■ **Robert J. Huhn,** chief of the Systems Branch, Aircraft Engineering Division, Office of Airworthiness.

Western Region

■ **Curtis A. Alms,** deputy chief of the Las Vegas, Nev., Flight Service Station, from the Yuma, Ariz., FSS.

■ **Lewis Z. Clark,** chief of the Fox Field Tower in Lancaster, Calif., from the Fresno, Calif., Tower.

■ **Walter H. Daigle,** chief of the Riverside, Calif., General Aviation District Office.

■ **Levino R. Garcia,** assistant chief at the Oakland, Calif., ARTCC, from the Oakland Tower.

■ **Joe D. Gilkison,** chief of the Tonopah, Nev., Airway Facilities Sector Field Office of the Las Vegas Sector, from the Fresno AF Sector.

■ **Fred L. Howard, Jr.,** deputy chief of the Las Vegas Flight Standards District Office, from the Oakland FSDO.

■ **Philip L. Huff,** team supervisor at the Litchfield Municipal Airport Tower, Goodyear, Ariz., from the Communications Control Center, Air Traffic Division.

■ **John J. Humphries,** assistant manager c the Los Angeles ARTCC Airway Facilities Sector, from the Fort Worth, Tex., Maintenance Engineering Field Office.

■ **Richard L. Jacobson,** chief of the Angel Peak, Nev., ARSR Sector Field Office of the Las Vegas AF Sector, from the Tonopah, Nev., SFO of the Las Vegas Sector.

■ **James M. Lindsey,** team supervisor at the Reno, Nev., Tower, from the Oxnard, Calif., Tower.

■ **Robert M. Neher,** team supervisor at the Los Angeles ARTCC.

■ **Dennis R. Ragle,** team supervisor at the Los Angeles ARTCC.

■ **John Rendon,** team supervisor at the Livermore, Calif., Tower, from the Oakland ARTCC.

■ **Richard T. Stevens,** team supervisor at the Long Beach, Calif., Tower, from the Orange County Airport Tower, Santa Ana, Calif.

■ **Stanley K. Stoll,** assistant chief at the Las Vegas FSS.

■ **Gerald C. Walton,** deputy chief of the Los Angeles ARTCC, from the Oakland ARTCC.

Q&A

I recently tried to file a grievance at the Aeronautical Center using agency procedure 3770.2A, and my branch chief on two attempts refused to accept it. He explained that I was not following the procedure outlined in Article 10 of the PAACE Agreement. The center's labor-management specialist gave me the same answer. My contention is that an employee can use either the agency procedure or the one in the PAACE Agreement. I tried to explain to both that under Article 9, Section 3, I had the choice—but to ɔ avail. If I'm wrong, I'll apologize.

ɪ'he reply given you by management about your grievance was correct. Under law, every negotiated labor agreement must contain a grievance procedure. Employees in the bargaining unit may only use this negotiated procedure to grieve covered matters.

The framework for the labor-management relations program is in Title VII of the Civil Service Reform Act. Under these provisions, employees have the right to form, join or assist a labor organization or to refrain from such activity. However, if a labor organization succeeds in gaining exclusive recognition through appropriate procedures, it represents all employees who are members of the bargaining unit, whether or not they join the union. All members of the unit are covered by any labor agreement that is negotiated and are subject to its provisions.

In your case, you are in the bargaining unit represented by the Professional Association of Aeronautical Center Employees (PAACE). As the PAACE/FAA labor agreement contains a grievance procedure ʰhat covers, among other things, any ɪimed violation or misinterpretation of .ɪy law, rule or regulation affecting conditions of employment, the grievance you described can only be processed under the negotiated procedure. Article 9, Section 3, of the agreement refers to employee rights on matters not covered by the negotiated grievance procedure that may be raised under the agency grievance procedure.

I don't believe that a previous "Direct Line" completely answered the question on control zones (February 1980). If the weather at an airport served by a tower and a radar approach control is below VFR minima, is a pilot on a VFR flight plan in contact with the approach control required to obtain a Special VFR clearance to transit the control zone? Also, within a TRSA (Terminal Radar Service Area), is the intent of Manuals 7110.65B and 7210.3 to require a controller to provide IFR separation (3 miles or 1,000 feet) between Category I and II aircraft—one being on an IFR flight plan, the other on a VFR flight plan—within 15 miles of the radar antenna executing practice approaches in VFR weather? Finally—both the AIM and Manual 7110.65B define an airport traffic area as airspace "at which a control tower is operating"; a VFR sectional chart depicts an airport traffic area as one color and airports without as another color. If an airport is strictly for military use and operates on an intermittent basis, but this information is not on the sectional, how is a pilot or controller to know if approval to overfly must be obtained from the tower? Can I assume that where there is a control tower—not necessarily FAA—there is an airport traffic area?

A pilot on a VFR flight plan being worked by radar approach control for an airport that is below VFR minima is not necessarily required to obtain SVFR clearance to transit the control zone. He may elect to proceed IFR, if qualified, or, if flight conditions at the altitude permit, he may be able to continue VFR. If either of the above is not applicable, he would then be required to obtain an SVFR clearance.

For practice approach separation in TRSAs, Handbook 7110.65B, Para. 435.d., authorizes the use of the standard separation prescribed in Chapters 3, 4, 5 and 6 of the handbook. Stage III separation of 1 ½ miles is prescribed in Chapter 5. Thus, Stage III separation standards can be applied for VFR aircraft practicing instrument approaches in a TRSA—1 ½ miles within 15 miles of the radar antenna or 500 feet vertically. Changes in the handbook are being made to reflect this.

To determine whether an airport traffic area is in effect at part-time military airports, refer to the control tower tab on each sectional aeronautical chart for hours of operation and frequencies. According to FAR 91.87(c), airport traffic areas do exist at those locations with a control tower not operated by the FAA.

May a controller ask, suggest or require a pilot to adjust his speed while on final, once the aircraft has passed the final approach fix or a point five miles from the airport while on instrument approach?

A controller cannot apply the speed adjustment procedures in Chapter 4, Section 10, of Handbook 7110.65B under those conditions described. The procedural philosophy is that all necessary spacing should have been resolved by the time an aircraft reaches the referenced fix/distance on the approach, and the pilot should have unrestricted approach-speed responsibility.

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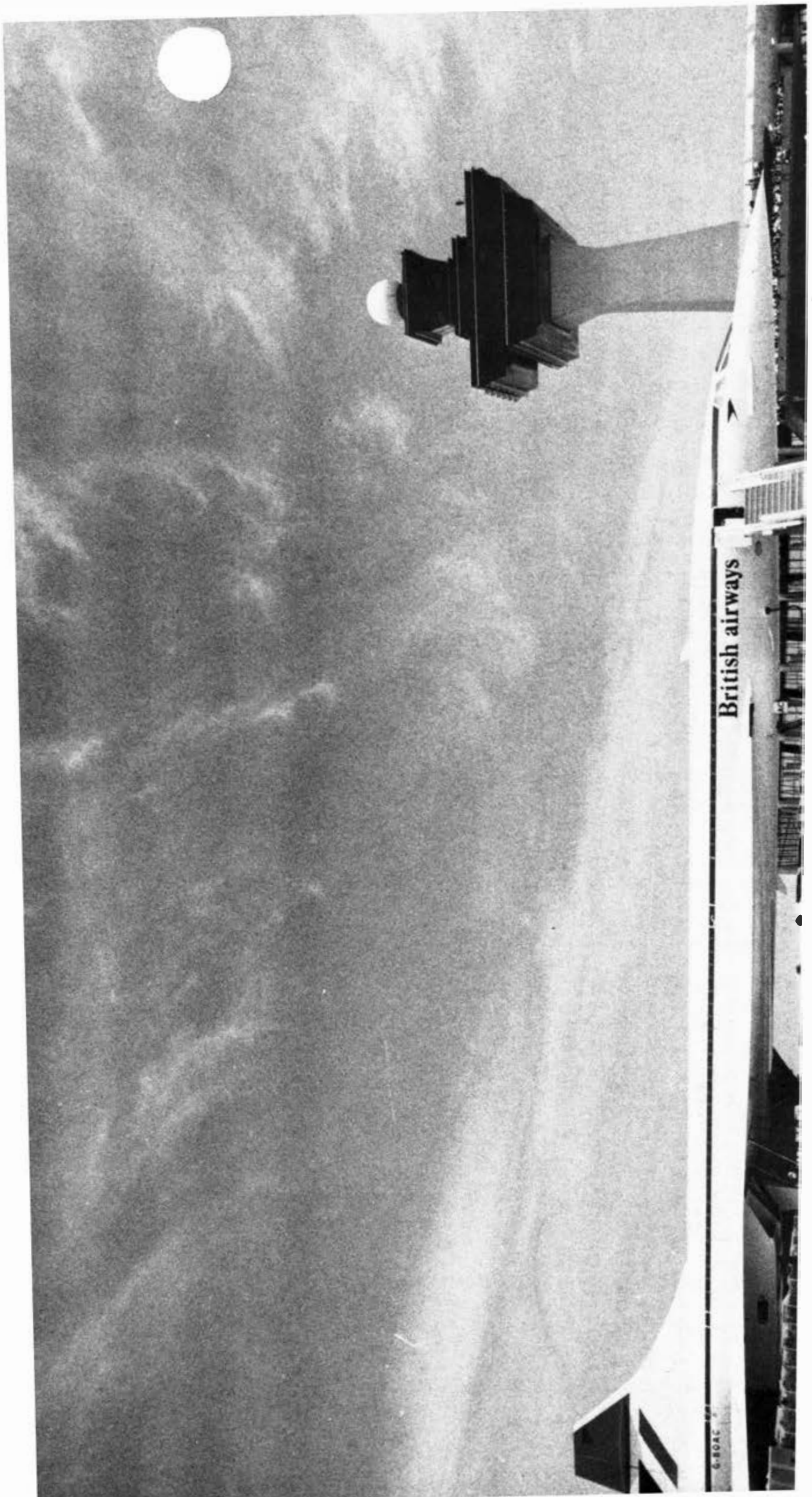

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