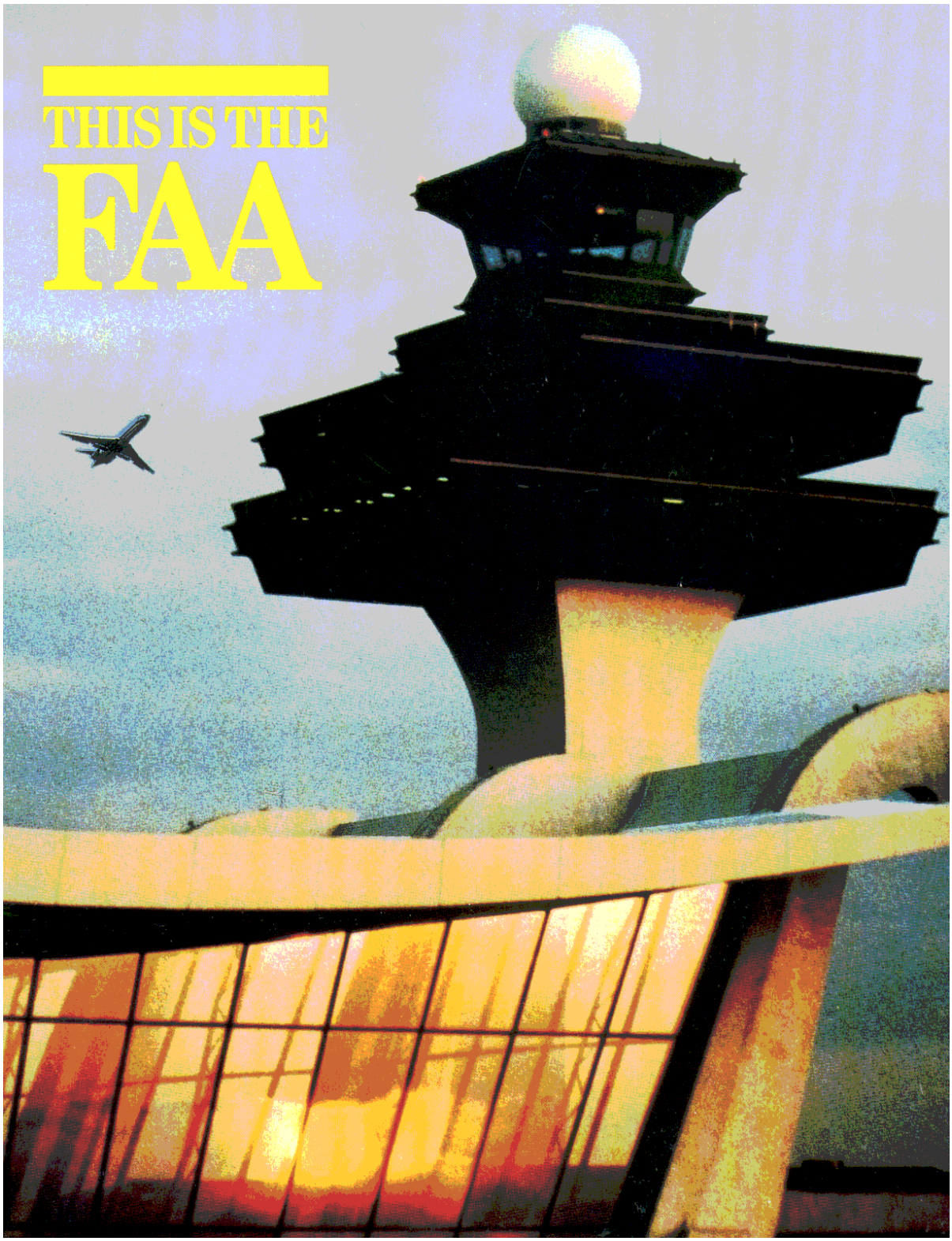

THIS IS THE
FAA

THE FAA STORY

From the Wright brothers to the "right stuff," the magic of flight has sparked the imagination and stirred the spirit. It has inspired a parade of progress that stretches from canvas-winged biplanes to the most advanced jumbo jets carrying travelers in comfort and safety from one distant continent to another. The men and women of the Federal Aviation Administration (FAA) are proud to be part of this aerial pageant. They administer the world's busiest civil aviation system. In a single day, air traffic controllers handle upwards of 200,000 takeoffs and landings at airports across the nation. They are responsible for the safety of half a billion airline passengers a year grandparents, business men and women, children. In the same period, other FAA specialists perform 30,000 security inspections and assessments, host more than 5,000 safety seminars, and conduct 300,000 safety inspections of airlines and aviation activities.

In these pursuits, the agency's mission is clear and direct: to ensure the safe and efficient use of the nation's airspace; to foster civil aeronautics and air commerce in the United States and abroad; and to support the requirements of national defense. This is the story of how we meet these challenges, day after day, with professionalism and pride.

Air navigation and air traffic control

HIGHWAYS OF THE SKY:

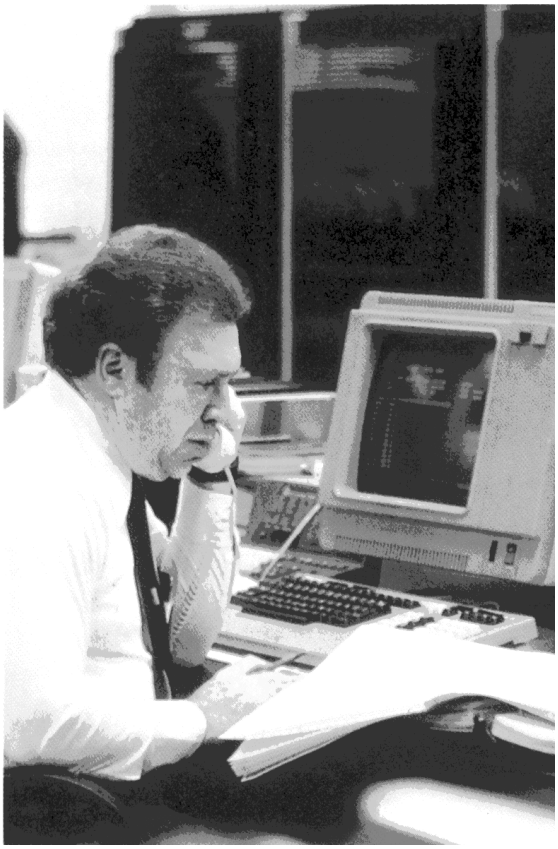
Just as automobiles use roads to travel from city to city and ships use sealanes to cross the ocean, airplanes depend on airways to reach their destinations. Thousands of these invisible paths crisscross the nation's airspace. They are highways of the sky, traveled daily by tens of thousands of airplanes, hundreds of thousands of passengers, and millions of dollars in cargo.

To assure that traffic proceeds safely along these aerial highways is the responsibility of FAA's air traffic and airway facilities services. The men and women of these organizations serve as air traffic controllers, flight service specialists, engineers, electronics technicians, and supporting personnel.

Today's sophisticated air navigation network has its roots in the 1920s, when pilots relied on scattered radio stations and rotating light beacons to hop from one landing field to the next. During periods of poor visibility, however, the usefulness of light beacons was severely limited. By the end of the decade, the Federal Government had introduced the first of many navigational aids that could serve the pilot day or night, fair weather or foul. This was the four-course radio range, a device that transmitted radio signals in four directions. The Government installed a network of these facilities to guide pilots to their destinations.

As aviation grew, more than four paths were needed to handle the navigational needs of air traffic, and the original radio range was replaced by the very-high frequency omnidirectional range (VOR), a device developed during World War II. VORs were deployed on the airways in large numbers after the war, and are still the chief air navigation aids on U.S. airways. Today's VOR uses sophisticated electronics, but operates on the same principle as its predecessors. It emits signals in the pattern of a huge wheel, with the station at the center and 360 spokes radiating from the hub. Each radial represents a radio course that a pilot can use to guide an airplane accurately along a desired track.

Navigational facilities also help a pilot descend from cruising altitude to land on an airport runway--a relatively small spot of the earth's surface--even under poor weather conditions. The Instrument Landing System (ILS) is the most widely used equipment in the world for making safe runway approaches in difficult weather. The FAA has deployed nearly 1,000 of these systems at airports across the United States.



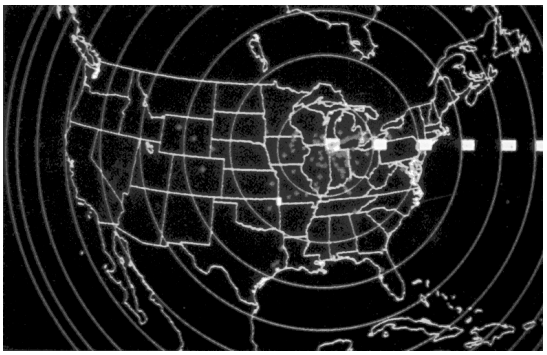
An ILS sends out two radio beams to approaching aircraft. One beam, the localizer, gives the pilot left-right guidance; the other, the glide slope, gives the pilot the correct angle of descent to the runway. Even when visibility from the approach end of the runway is only a few hundred feet, properly instrumented aircraft can now land with pinpoint accuracy.

In addition to accurate navigational aids, pilots need assistance in avoiding midair collisions. The air traffic control system is crucial to civil aviation, keeping airplanes safely separated from each other and regulating their flow into and out of airport terminal areas.

Under instrument flight rules, standard separation between two airplanes depends on a number of factors, including the size of the airplanes being separated and the kind of airspace they occupy. Generally, airplanes close to an airport are kept apart by at least three miles horizontally and 1,000 feet vertically. When airplanes are flying between major terminal areas, standard separation is never less than five horizontal miles and 1,000 vertical feet.

Making this system work are the personnel who staff FAA control towers, terminal area radar facilities, air route traffic control centers, and automated flight service stations. Each type of facility performs a different task. Tower and terminal-area controllers handle airplanes that are landing and taking off, taxiing on the ground, and flying in the vicinity of the airport. Center controllers handle airplanes en route from one terminal area to another, while flight service station specialists provide pilot briefings, in-flight communications, and other services.

A sophisticated array of radar, computer, communications, and electronic equipment helps air traffic personnel perform these missions. Among the most intriguing is the Aircraft Situation Display (see front cover), a color radar system that provides a bird's-eye view of selected air traffic anywhere in the country--on a national or local scale. For example, this device can show all airplanes currently in the air, anywhere in the country, that list Chicago's O'Hare International Airport as their destination--whether it's a passenger jet that just took off from Orlando or a corporate jet an hour out of Hartford. With this information, FAA air traffic specialists can predict if and where congestion and delays might occur, and take action to prevent them. Installed at en route centers across the country, Aircraft Situation Display gives added control over a system in which giant jets soar across the sky at speeds up to 550 miles an hour.



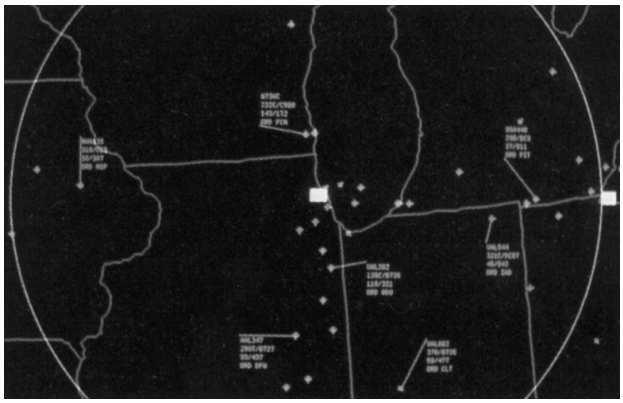
Such advanced equipment reflects the enormous technical progress made since en route air traffic control began in 1935. The system then involved teletype machines, wall-sized blackboards, large table maps, and movable markers representing airplanes. While they nudged the little markers across the flat surface of a map, controllers estimated the positions of real-life airplanes moving through three-dimensional space.

Radar, developed during World War II, transformed the control of aircraft from an art to a science. It made possible the surveillance of traffic in the air, and was eventually adapted to the control of aircraft taxiing on the surface of large airports during low visibility. Radar brought with it new techniques and procedures. Among the most useful was the requirement that aircraft above a certain altitude fly by instrument rather than visual flight rules, even if the pilot had unlimited visibility. This helped to segregate aircraft flying by different procedures, and thus to reduce the risk of midair collision.

Advances such as these increased the capacity of the airspace system by allowing controllers to handle aircraft spaced more closely together. The procedures themselves remained labor intensive, however, requiring controllers to spend 75 percent of their time in voice communications and in such activities as preparing paper strips recording flight progress. By the early 1960s, it became clear that most of these functions could be automated.

Combined with radar, the computer became a bridge carrying air traffic control into the future. Signals transmitted by airplanes were received at control centers, digitized by computers, and displayed on radarscopes in the form of a "tag" accompanying the blip that marked a plane’s location. The tag told the controller the aircraft’s identifying call sign, its altitude, and its speed. This reduced paperwork and allowed controllers to concentrate on essential tasks. The result was another great increase in both safety and system capacity.

Radar systems at terminals and en route centers are upgraded periodically. Controllers operating the more sophisticated types of equipment now receive computer-generated warnings if an aircraft descends below its minimum safe altitude, or if two aircraft are on a potential collision course. They can also take a "quick look" at weather conditions by calling up weather advisory information on their radarscopes. A backup radar system serves as a safety net if the main system fails.



The FAA monitors the airspace system with its own fleet of airplanes equipped with precision receivers, recorders, signal analyzers, and other devices. These flying laboratories assure the integrity of radar, communications, and navigational aids across the nation. They are part of an unending inspection program that helps to keep air traffic flowing smoothly along the highways of the sky.

Certification, regulation, and compliance

ASSURING AVIATION SAFETY:

The pursuit of safety takes FAA employees into every corner of the aviation world. In addition to operating the national airspace system, the agency sets standards for aircraft and people working in the aviation field, and also monitors the performance of air carriers and other operators. Other efforts to combat aviation hazards include participation in accident investigation and an internal oversight program to ensure a unified and comprehensive approach to the safety mission.

Any person involved in operating or maintaining aircraft must hold an FAA certificate. In addition to pilots, this requirement includes aircraft dispatchers and mechanics. Pilot and maintenance schools, and their instructors, must also meet FAA certification standards.

To earn a pilot's certificate, an applicant must demonstrate the aeronautical knowledge, skills, and experience prescribed for the type of certificate and rating desired. Applicants must also meet certain physical standards, and pilots must continue to pass periodic medical examinations in order to maintain a valid certificate. The examinations are performed by private physicians designated by FAA as aviation medical examiners.

There are five main types of pilot certificates. Student pilots may not carry passengers or use certain designated high density airports. Recreational pilots cannot carry more than one passenger and must remain within 50 nautical miles of the home airport. Private pilots may use any airport in the national airspace system and carry more than one passenger, but not for hire. Commercial pilots may carry passengers or cargo for hire, but only airline transport pilots can serve as pilot or copilot on air carrier flights.

Pilots are rated for the category and class of aircraft they fly. For example, a pilot rated to fly a single-engine land plane cannot fly a multi-engine seaplane unless the pilot also acquires that class rating. Moreover, pilots must be rated for each type of airplane flown. Pilots rated to fly the twin-engine McDonnell Douglas DC-9 jet transport are not automatically qualified to fly a twin-engine Boeing 737 jet transport.

Pilots also receive an FAA rating in order to fly under instrument flight rules

(rather than visual rules). Optional for private pilots, this instrument rating is an integral part of the airline transport pilot certificate and is also mandatory for commercial pilots flying passengers or cargo farther than a specified distance.

All air traffic controllers and flight service specialists currently receive intensive initial instruction at the FAA Academy in Oklahoma City. Training continues after graduates of the program are assigned to centers, towers, or flight service stations. When they learn all the different air traffic procedures unique to their facility, controllers are certified as having attained the "full performance level."

In addition to requiring pilots and other airmen to meet well-defined standards and be properly certificated, the FAA requires aircraft to meet high standards of airworthiness. The aircraft certification process starts at the manufacturing plant, where FAA engineers and specialists work with factory engineers to assure quality workmanship and design conformity. When an aircraft prototype is finished, it must pass an extensive series of ground and flight tests conducted by engineers, inspectors, and test pilots. If all goes well, the aircraft receives a type certificate showing that it meets FAA standards of construction and performance.

When the manufacturer demonstrates the ability to maintain a high-level quality control system, the FAA issues a production certificate authorizing the building of aircraft that meet the provisions of the type certificate. Individual airplanes conforming to that standard then receive an airworthiness certificate. The FAA also issues type certificates for engines, propellers, and other aircraft components.

An aircraft type may be in operation only a short time before a manufacturer decides to make changes. For example, the fuselage may need to be lengthened to increase the plane’s capacity, or special purpose modifications may be added at the request of a customer. These modifications go through a process that leads to an amended type certificate.

Manufacturers and airmen are not alone in meeting standards set by the FAA. Air carriers and airports also are subject to agency standards and must have an FAA operating certificate. An airline seeking such a certificate, for example, must produce manuals that give the FAA certain pertinent information. The manuals must make clear how the company intends to operate and maintain its aircraft, train its crew members and maintenance people, and comply with the Federal Aviation Regulations. In evaluating a company’s ability to function as an air carrier, FAA certification teams observe the performance of cockpit and cabin crews as they fly over routes that the airline intends to serve. These flights include simulated emergencies selected by FAA inspectors.

Certification is the first step the FAA takes to ensure that competent pilots fly airworthy aircraft into and out of safe airports. Pilots must remain current in order to exercise the privileges of their certificates and ratings. By the same token, once an aircraft leaves the

factory it is the responsibility of its owner to keep it in airworthy condition. In the case of air carrier aircraft, FAA-approved maintenance programs are designed to assure that airliners are checked and repaired in accordance with a prescribed schedule.

Scheduled maintenance is not always enough to ensure safety, so the FAA issues airworthiness directives to correct problems that may appear during the service life of an airplane. These directives order mechanical, procedural, or inspection changes covering virtually any condition that could affect the ability of a plane to operate safely. FAA personnel conduct periodic inspections to monitor how well airlines comply with airworthiness directives and other regulations.

The very first set of Federal air safety rules, issued in 1926, prohibited pilots from "being under the influence or using or having personal possession of intoxicating liquor, cocaine, or other habit-forming drugs while on duty." The same prohibition still holds, with more specifics and stiffer penalties attached. For example, no person may act as a crew member of a civil aircraft within 8 hours after consuming an alcoholic beverage, or while having a blood alcohol level of 0.04 percent or higher. Moreover, air carriers are required to conduct periodic and random drug testing of employees who perform flight or other critical duties. At the same time, FAA requires all of its own employees holding safety-related jobs to be randomly tested for illicit drug use.

Combating air piracy and sabotage

AVIATION SECURITY:

The FAA regulates aviation security as part of its mission to maintain a safe aviation environment. The agency makes rules to protect users of the nation's air transportation system from sabotage or hijacking, and its specialists coordinate the security work of airlines, airport operators, and other members of the aviation community. In response to the emergence of air piracy as a significant national problem, the FAA required the inspection of carry-on baggage and screening of all boarding passengers by airline security personnel. Airport operators also are required to establish systems to keep unauthorized persons from gaining access to air operations areas. The FAA sets standards for these programs, approves security plans, and conducts inspections to ensure that the prescribed procedures are followed. The agency's force of Federal Air Marshals also performs special protective missions and works with other law enforcement authorities to prevent criminal activities. The FAA also cooperates with foreign governments and international organizations to raise security standards worldwide.

These policies helped produce a dramatic improvement in security and have been followed by other rules and legislation strengthening the government's hand in dealing with criminal acts. The agency continues to pursue sophisticated anti-terrorist programs and procedures. FAA's vigorous program to develop advanced explosives detection systems and related devices reflects the agency's commitment to new technology for enhancing security standards.

Environment, growth, and support for aviation

BEING A GOOD NEIGHBOR:

Although air safety is FAA's top priority, the agency works hard to safeguard the environment and to help aviation remain a good neighbor to the communities it serves. The FAA considers these responsibilities critical to the continued growth of aviation in the United States.

Significant progress has been made in reducing aircraft-engine noise. The newest generation of commercial jet transports are between 20 and 25 decibels quieter than the first-generation transports they replaced; moreover, they burn fuel more cleanly and with greater efficiency. FAA regulations prohibit the operation of the first generation of large jetliners unless they have been modified for quieter performance. The agency also enforces noise standards for piston-driven airplanes and helicopters. FAA cooperates with the Environmental Protection Agency in a variety of ways, including limiting exhaust gases and smoke from aircraft engines. Complementing these efforts are programs to develop airport noise compatibility plans that combine noise abatement procedures with support for compatible uses of land around airports.

Participation in airport development P through grants-in-aid to state or local sponsors is one of the largest and most universally accepted Federal aviation activities. Airport grant programs have existed since 1946, when the Federal Airport Act became law, and continue today under a system of user fees that go directly into an aviation trust fund. Money from this fund can only be spent with Congressional authorization.

Under the Airport Improvement Program, the FAA allocates funds on a cost-sharing basis for construction of runways and taxiways, purchase of aircraft rescue and firefighting equipment, installation of lighting and navigation aids, land acquisition for airport or noise-compatibility purposes, and specific noise-abatement measures that are identified in noise compatibility programs.

The Airport Improvement Program also helps state and local authorities identify transportation needs--an activity of critical importance as passenger traffic and other demands strain the capacity of the nation's air transport system. Grants are made for preparation of master plans or noise compatibility plans at individual airports, and for development of integrated airport system plans that cover entire states or metropolitan areas.

Because the United States is the recognized world leader in aviation, the FAA plays a vital role on the international aviation scene. The agency's safety and regulatory responsibilities

extend to every part of the world in which U.S. air carriers operate and where U.S. citizens travel by air. FAA works closely with the International Civil Aviation Organization (ICAO) to establish worldwide safety standards, and exchanges information with other nations on air traffic control, air navigation, airports, and airworthiness certification. In addition, FAA has taken the lead in negotiating bilateral airworthiness agreements with other nations that produce aircraft. These agreements encourage standardization and facilitate trade in aircraft and aircraft components; they also play a major role in maintaining the nation's consistent record of trade surpluses in aerospace products. International joint ventures, geopolitical changes, and the prospect of satellite-based navigation and control systems promise to strengthen FAA's global perspective in the future.

FAA also works closely with other agencies in extending technical assistance to other nations. The agency and its predecessors have provided training to more than 7,000 foreign nationals from 143 countries, helping these nations develop technical and operational independence. In this way, the FAA serves as a good neighbor abroad as well as at home.

Research and development programs

PREPARING FOR THE FUTURE:

In an environment presenting daily change and challenge, one element has remained constant: a growing demand for aviation services and resources. By the end of this century, air travel will have more than doubled from its level in 1980. To keep pace with this growth, the FAA devised its National Airspace System Plan, a comprehensive program to help the agency maintain its world leadership. Implementation of this ambitious program had entered the "home stretch" by the beginning of the 1990s.

Created in 1982, the NAS Plan is part of a wide-ranging program of research, development, and system modernization. It includes nearly 100 major projects for revamping en route and terminal control systems, consolidating facilities, improving ground-to-air surveillance and communication, and modernizing flight service stations. Cornerstone programs call for faster, more powerful computers at air route traffic control centers, improved displays and work stations for controllers, and further automation of air traffic control functions.

First deliveries have been made of more than 80 percent of NAS Plan projects. Many improvements have already been put into effect, enhancing the capacity and reliability of en route air traffic control; other aspects of the program are undergoing review and development. Once the advances are fully in place, the FAA plans to integrate en route and terminal radar control services, adding a new element of efficiency to air traffic management. The NAS Plan itself has been incorporated into a more comprehensive document called the Capital Investment Plan, which will permit a more flexible response to the rapid evolution of technology.

One project being pursued includes the use of interactive computer software to free en route controllers from many planning tasks and allow them to concentrate on the overall safe flow of air traffic. Another important safety enhancement is a collision avoidance system that has been tested extensively by FAA, and is being adopted by commercial carriers. The system enables moving aircraft to "talk" to each other electronically and alerts pilots to potential course conflicts. In the area of maintenance, the introduction of solid-state equipment and remote monitoring of facilities has reduced costs while enhancing reliability.

FAA is also implementing a satellite-based navigation technology known as the Global Positioning System, or GPS. Originally developed for the military, this system will provide services to pilots for all phases of flight to include precision approaches, and even airport-surface operations. With 24 GPS satellites in orbit and covering the entire globe, pilots will have accurate, three-dimensional position guidance information 24 hours a day in all weather conditions.

The FAA is taking the lead in helping airports develop an ability to handle higher volumes of traffic, through research into closer-spaced runways, reduced separation of aircraft, and wake vortex detection technology. Computer simulation techniques to analyze and reduce terminal area delays are being developed and new and more flexible landing systems will increase safety and efficiency during poor weather and help to reduce congestion.

Research is being undertaken on helicopters and new technology vertical flight vehicles such as tiltrotor and tiltwing aircraft. By providing vertical flight landing areas and terminal airspace independent of fixed-wing operations, the FAA believes congestion will be reduced at major airports.

Weather has always been a key consideration in upgrading system safety and efficiency. FAA's research includes work with airborne windshear detection systems and new ground-based radar technology that warns pilots and controllers of windshear conditions and other meteorological hazards that may delay or threaten aircraft. The agency continues to explore improvements in the dissemination of weather information to pilots. Advances include automated flight service stations and a new service that allows pilots to receive weather briefings and file flight plans using personal computers.

FAA engineers and research scientists work closely with industry, universities, and other governmental agencies, and make use of the Transportation Systems Center, operated by the Department of Transportation. Many of the agency's research and testing activities, however, take place at two major facilities devoted exclusively to this purpose--the FAA Technical Center near Atlantic City, N.J., and the Civil Aeromedical Institute at Oklahoma City.

The Aviation Safety Research Act of 1988 had a major impact on the agency's research and development programs, mandating more emphasis on long range projects and stimulating increased efforts in certain specific fields. In the area of aging aircraft, for example, FAA researchers address such issues as structural fatigue, corrosion, and flight loads. Full-scale crash tests and other experiments explore the effects of crash forces and fire, including the hazards of smoke and toxic fumes. The resulting data are used to improve structural design, cabin materials, and warning and evacuation systems. The agency also has expanded its human performance research, and is planning even more comprehensive work in cooperation with other agencies. Among the subjects

under scrutiny are aircrew response to fatigue, workload management, and human factors in aircraft maintenance.

Research, engineering, and development have provided a solid foundation for advances in aviation--progress that has continued ever since the first rotating light beacons flared and faded below night-flying pilots decades ago. A strong commitment to research will be even more vital in the years ahead.

FAA LEGISLATIVE HISTORY

1926 Air Commerce Act authorizes Secretary of Commerce to establish airways, encourage air commerce, create and enforce air traffic rules, license pilots, certificate aircraft, and operate navigational aids.

1938 Civil Aeronautics Act transfers aviation functions of Commerce Department to Civil Aeronautics Authority (CAA), which also is authorized to issue air carrier route certificates and regulate airline fares.

1940 CAA is divided into two agencies--the Civil Aeronautics Board (CAB), responsible for rulemaking and accident investigations, and the Civil Aeronautics Administration (CAA), responsible for air traffic control, certification, and enforcement. Both agencies are made part of the Commerce Department but the CAB functions independently.

1946 Administration of Federal aid airport program is added to CAA responsibilities.

1958 Federal Aviation Act creates Federal Aviation Agency (FAA), which assumes CAA functions and takes safety rule-making responsibilities from CAB. FAA has sole responsibility for the nation's civil-military system of air navigation and air traffic control.

1967 FAA is renamed the Federal Aviation Administration and placed in newly created Department of Transportation.

1968 Congress gives FAA Administrator authority to set aircraft noise standards.

1970 Airport and Airway Development Act authorizes Administrator to set minimum safety standards for airports and issue operating certificates to air carrier airports meeting standards.

1978 Airline Deregulation Act phases out the CAB, introduces fare and route competition, and permits unrestricted entry into air passenger marketplace by new domestic carriers.

FAA HEADQUARTERS AND REGIONS

NATIONAL HEADQUARTERS

Federal Aviation Administration 800 Independence Avenue, S.W. Washington, DC 20591.

REGIONS

Alaskan Region Headquarters
222 West 7th Avenue
Anchorage, AK 99513
Area covered: Alaska.

Central Region Headquarters
601 East 12th Street
Kansas City, MO 64106
Area covered: Iowa, Kansas, Missouri, Nebraska.

Eastern Region Headquarters JFK International Airport
Fitzgerald Federal Building
Jamaica, NY 11430
Area covered: District of Columbia, Delaware, Maryland, New Jersey, New York, Pennsylvania, Virginia, West Virginia.

Great Lakes Region Headquarters
O'Hare Lake Office Center
2300 East Devon Avenue
Des Plaines, IL 60018
Area covered: Illinois, Indiana, Michigan, Minnesota, North Dakota, Ohio, South Dakota, Wisconsin.

New England Region Headquarters
12 New England Executive Park
Burlington, MA 01803
Area covered: Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont.

Northwest Mountain Region Headquarters 1601 Lind Avenue, S.W. Renton, WA 98055 Area covered: Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming.

Southern Region Headquarters
3400 Norman Berry Drive
East Point, GA 30344
(Mail address: P.O. Box 20636, Atlanta, GA 30320)
Area covered: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Republic of Panama, Puerto Rico, Virgin Islands.

Southwest Region Headquarters
4400 Blue Mound Road
Fort Worth, TX 76193
Area covered: Arkansas, Louisiana, New Mexico, Oklahoma, Texas.

Western-Pacific Region Headquarters
15000 Aviation Boulevard
Hawthorne, CA
(Mail address: P.O. Box 92007, Worldway Postal Center, Los Angeles, CA 90009)
Area covered: Arizona, California, Hawaii, Nevada, American Samoa, Guam, Marshall Islands.

CENTERS

Mike Monroney Aeronautical Center
6500 South MacArthur
Oklahoma City, OK 73125
(Mail address: P.O. Box 25082)
Major responsibilities: FAA-DOT technical training, logistics, research and service.

FAA Technical Center
Atlantic City International Airport
Atlantic City, NJ 08405
Major responsibilities: Engineering, research, and development.

EUROPEAN HEADQUARTERS

Federal Aviation Administration
European Office Headquarters
15, Rue de la Loi (3rd Floor)
B-1040 Brussels, Belgium
(Mail address: c/o American Embassy
APO, New York 09667)

U.S. Department of Transportation

Federal Aviation Administration