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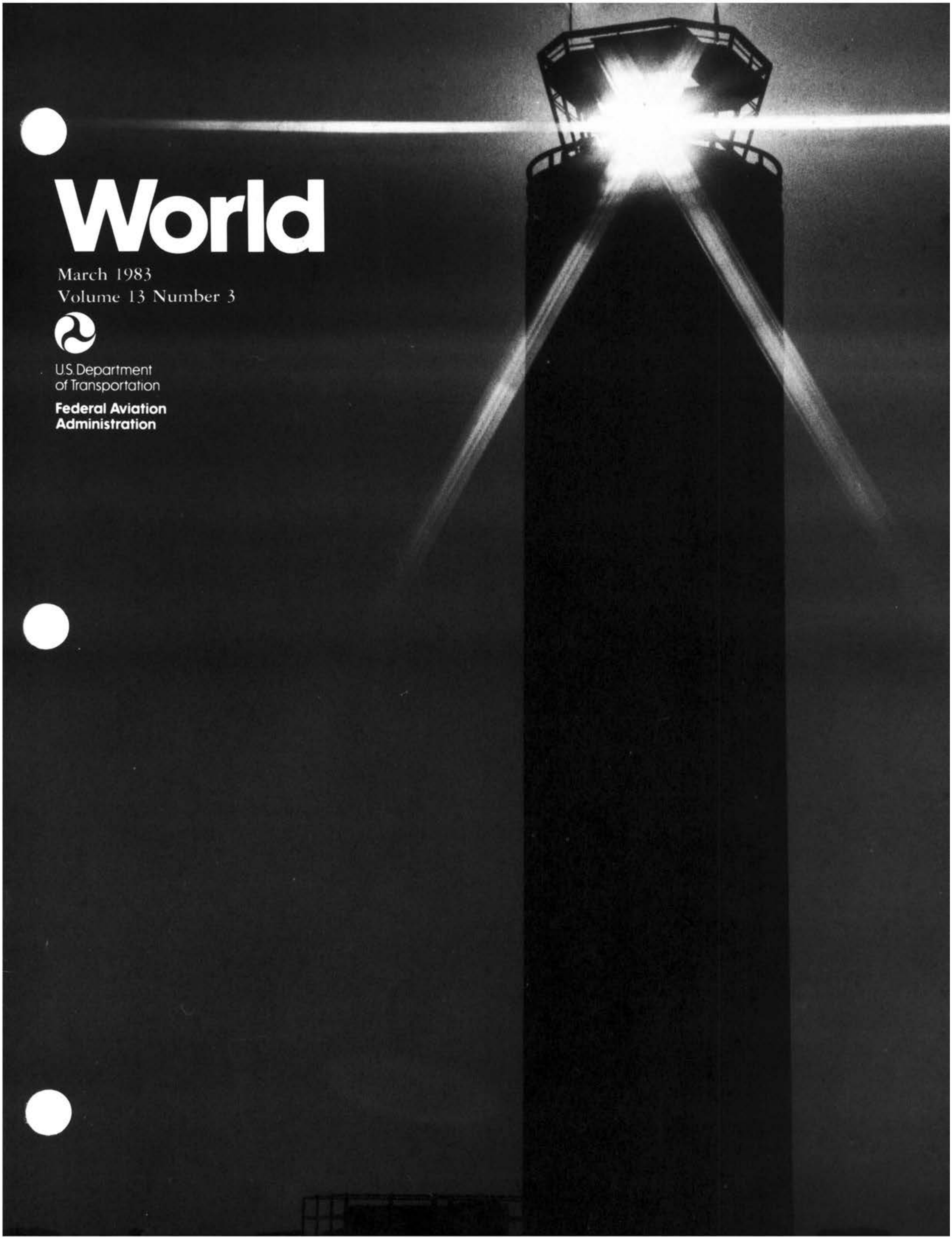
**Federal Aviation
Administration**



New DOT Secretary Sworn In

Elizabeth Hanford Dole was sworn in as the eighth Secretary of Transportation by Supreme Court Justice Sandra Day O'Connor at the White House on Feb. 7, 1983. Attending the ceremonies were President Reagan, Mrs. Dole's husband, Kansas Senator Robert J. Dole, and her mother, Mrs. John V. Hanford.

The new Secretary came to her post from the White House staff, where she was the President's Assistant for Public Liaison. In the Nixon Administration, she served as an aide to Virginia Knauer, the President's Assistant for Consumer Affairs. Then, in 1973, she was named to a seven-year term on the Federal Trade Commission.

She is a graduate of Duke University and Harvard Law School.

"FAA'S mission is to promote the safe and efficient use of the nation's airspace, facilities and the vehicles that travel the airways. To achieve this objective, we should control but not constrain aviation; we should regulate but not interfere with free enterprise of competitive purpose; and we should recognize that most air travelers do so by means of scheduled air carriers. We have a responsibility to consider their priority but not to the extent that it excludes the single individual from enjoying man's greatest achievement—solo flight. Above all, we must remember that the airspace belongs to the users and not the FAA."

—J. Lynn Helms

Front cover: **A star in the West—the New Las Vegas, Nev., Tower.**

Photo by John Katsigenis
Las Vegas AF Sector

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Secretary of Transportation
Elizabeth H. Dole

FAA Administrator
J. Lynn Helms

Assistant Administrator—Public Affairs
Edmund Pinto

Manager—Public & Employee Communications Div.
'ohn G. Leyden

itor
_eonard Samuels

Art Director
Eleanor M. Maginnis

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Mark Weaver—Aeronautical Center
Clifford Cernick—Alaskan Region
Joseph Frets—Central Region
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Tomorrow Starts With Today

Three-Phase Automation System Acquisition Begins This Year

This is an interview with Valerio R. Hunt, director of the FAA's Advanced Automation Program Office, which is charged with overseeing the design and acquisition of the air traffic control system's replacement computers, sophisticated programming and controller displays.

Q. Let's start with a bottom line question. When are controllers in the enroute centers going to see the new computers and when will all the centers have them?

A. The current schedule calls for installing the new computers during 1986 and 1987. At the end of 1987, we would expect them to be in service at all centers.

Q. These computers are called "host" computers. Would you explain that term for the uninitiated?

A. In a sense, you could say that any computer serves as a host to its own applications programs. For example, the IBM 9020 computer systems in the enroute centers "host" the current air traffic control applications programs. Essentially, then, we will be replacing those host computers with new host computers that will use the same basic software. We hope to select new-technology computers that have considerably more capability and capacity than the current 9020 computers.

Q. What will these computers actually do for the controllers and technicians in terms of increased capacity and higher reliability and other benefits? Do you have any comparisons, like 10 times more powerful?

A. Our initial objectives for the increased capacity for the new host computers is that they will be at least triple the 9020 computer capacity. However, during the development program for the new host computers, we will be measuring various factors that will to some extent determine what the capacity needs are for the new system.

As far as reliability is concerned,

we would expect a significant increase in the hardware reliability. However, since the system will be using essentially the current NAS software, we would not expect any difference in the reliability of the software system.

Q. Where are we right now in the procurement cycle? How do we plan to go about selecting a contractor to actually supply this equipment?

A. The RFP [request for proposals] for the first phase of the host computer acquisition program was issued at the end of December. Under this procurement, two contractors will be selected in mid-1983 to create two competitive designs. Testing will be done first at the manufacturer's factory and then at the FAA Technical Center, with both competing contractors participating. At the conclusion of the tests, each contractor will submit a full proposal for the so-called "production phase" of the program. One of these two contractors then will be selected for full system development and acquisition.

Q. Is there any way to compress this schedule and get the equipment to the facilities faster? For example, why can't we just buy off-the-shelf computers?

A. The schedule is designed to minimize the risk in replacing the current 9020 computers with new and modern hosts. Included are a number of tests that must be performed to assure that the new computers are properly using the existing NAS software. The intention is to buy off-the-shelf computers, but there is a great deal more to this program than just buying computers. There is the installation that must be done on each of the currently operational sites; there is considerable testing, first, for demonstrating that the design objectives have been properly met and, second

for demonstrating that the equipment is ready for actual productive air traffic control operations. So, this amounts to a great deal more than the agency just buying off-the-shelf computers.

Q. Taking the opposite tack, is the schedule realistic? Are we really going to see this equipment in the field by '86?

A. The FAA has exerted a great deal of effort to select the most realistic schedule. In doing this, we have used several so called "software estimating models" to determine the optimum time that would be required for the modifications and redesign that are required as a part of this program. So we feel that the schedule is indeed realistic.

Q. What about the present IBM 9020? Will they hold up until the new computers come on line?

A. Of course, we're plowing new ground in the life of the 9020 computer system. The computers are mid-1960s vintage, and have been in continuous service for almost 20 years. We don't believe that there is any previous experience to demonstrate what the expected lifetime of such a computer system really might be.

But we're experiencing extremely high reliability, considering the capabilities of computers of this vintage, and there is every reason to expect that they will provide reliable service until the host computers are installed and operational.

Q. There has been some criticism of FAA's three-step approach to replacing the present ATC computer system—that is, first buying the host computer and then developing a new software package and sector suites. What is your reaction to that?

A. In the replacement of large computer systems, experience has shown that the best approach is to replace a small piece of the system at a time. Then after the system has stabilized a bit, and the users have become accustomed to it, you proceed with the replacement of the next system element.

That was the basis for the development of the current plan in which the system will be replaced in three major steps. The first step is the installation of the new-technology host computer which will use the existing NAS applications programs.

The second step will be replacing the controllers' work stations with what are called "sector suites," which will include a number of improvements that will allow us to achieve higher productivity with the existing air traffic controller staff.

The third major step will be the introduction of new software and other parts of the total system. We feel that this is probably the safest approach to follow, rather than attempting to replace the existing 9020 system with a new advanced automation system in a single step.

Q. Turning to those second and third steps, what is the time schedule for bringing this new advanced automation system on line?

A. The advanced automation system will follow a clean-sheet approach for totally replacing the NAS system. We expect to start in mid-1983. Our plan is to perform steps two and three—acquire the new sector suites and new software—under the umbrella of a single prime contract. The contractor will be selected in two procurement phases: first, a competitive design phase; second, an acquisition phase.

We expect that the RFP for the competitive design phase will be released in mid-spring and that two of the bidders will be selected in early 1984. There would be considerable testing and demonstrating included as a verification of this design. At the end of about three years, FAA would receive proposals from these two contractors for the execution of a full acquisition development program. The agency then will evaluate the proposals and select one of the contractors for full system development, installation and deployment of the advanced automation system.

A portion of this program—what we called "step two"—will be the installation of what are called "early sector suites." We expect to install the first of these and have them operational approximately in the year 1990. A full advanced automation system—step three—will be installed at the first site and become operational about two years later. This period of two years between the introduction of the new sector suite and the full system will allow the system to stabilize in its new configuration and permit users to become accustomed to it.

Q. It seems to me that all of this is going to involve some installation problems. For example, can we accommodate all of this new equipment in the present physical confines of the centers?

A. The physical arrangement of the new host computer systems and the new advanced automation system is currently undergoing intensive planning here at headquarters. Although we do not yet have the final results, it seems quite clear that additional space will be required at the existing ARTCCs to accommodate the new equipment. We are considering a modest building expansion program to provide that additional space. However, as I say, planning is still underway, and we do not have firm answers in this area.

Q. What's the schedule for implementing the advanced automation system in the terminal facilities?

A. Planning for the consolidation of the terminal functions into what are called the "new area control facilities" is currently underway. It's too early to tell what the schedule will be for facility consolidation, except that it will extend into the early 1990s. One of the prerequisites for including the terminal functions in the en route control centers or the new area control facilities is the full installation and operational cutover of the full new advanced automation system.

Q. What is going to be the impact of all of this automation on the controller? Is he still going to be a controller or just an observer of the traffic scene?

The National Airspace System IBM 9020 computer will soon be replaced with a new high-technology host computer.

A. The advanced automation system is intended to make the job of air traffic control easier to perform. There should be improved console equipment and procedures for the controllers. But the human will have essentially the same role as he or she does today.

The advanced automation system will be structured to allow higher levels of automation to be introduced in the late 1990s, but its first application will be to improve controller productivity and increase aircraft fuel efficiency. This means controllers will be performing essentially the same job they are today. It will just be easier to do because of the new equipment.

Q. One final question: What provisions are being made to get the input of controllers into the design of the new computer system?

A. We are currently structuring a study group to address how best to include the contributions of operating air traffic controllers into the design and the development of the new advanced automation system. The mission of this group will be, first of all, to consider what capabilities should be specified for the new sector suite and, secondly, to provide an ongoing overview of progress being made toward achieving those specifications. So, we feel that this will allow us to incorporate the experience and the needs of field personnel, while at the same time, taking advantage of the new design capability that exists in the industry at large. ■

Q&A

What is the FAA policy concerning administrative time to attend service club lunches, such as the Rotary Club, Exchange Club or the High Twelve Club? I know of a facility manager that takes off every Friday anywhere from 10:30 to 11:15 and returns between 2:00 and 3:30. I am sure that he hasn't taken any annual leave for it. On the other hand, if his people are five minutes late, he docks them. He also complains if electronics technicians are late even when they had worked late into the night on equipment outages. Do we have a double standard—one for the workers and one for the boss?

The FAA's policy reference on excused absence to attend meetings is found in FAA Order 3600.4, Para. 71. This policy applies to *all* employees. Briefly, absence from duty to attend meetings related to the work of the agency would be considered as duty status, including travel time. In situations where the meeting is not directly connected with the work of the agency but relates to the betterment of the employee in relation to his employment, authorized officials may grant excused absence or charge the absence to annual leave. Absences not related to an employee's employment should be charged to annual leave or leave without pay.

It is quite possible that the facility manager referred to has completely legitimate reasons for attending numerous functions and meetings in his official capacity and with the approval of his superiors. The FAA encourages facility managers to foster public contacts with user groups and civic organizations to build goodwill toward the agency. Without more specific and complete facts, however, it is impossible to give a more definitive answer.

Paragraph 71 also covers the granting of excused absence for tardiness and brief absences of less than one hour. This is discretionary on the part of the supervisor.

As for your point on the technicians, excused absence is appropriate in situations where employees are required to work overtime beyond their normal workday because of emergency or unusual conditions and are not physically capable of reporting for duty. Management officials should be sure that employees have a true physical incapability and should exercise prudence in granting such excused absence. If the manager feels the privilege is abused, he is well within his rights to charge annual leave for such absences.

General Operating and Flight Rules, Part 91, Para. 91.89, discusses flight operations at airports without control towers. Section a(1) is very clear and states that all turns will be made to the left unless otherwise indicated. However, a(2) is not so clear. It states, "In the case of a helicopter approaching to land, avoid the flow of fixed-wing airplanes."

I believe this means that helicopters on approach should be making left-hand turns but should be aware of fixed-wing aircraft in the pattern. I find it hard to believe that helicopters making numerous touch-and-go landings for a specific runway can legally do so in the opposite direction from the pattern followed by other aircraft, yet this is what my GADO says.

Does this paragraph mean that helicopters making practice approaches to a runway can make either left or right turns when airplanes approaching or making touch-and-go's to the same runway must make left turns?

The requirement of Section 91.89(2) reflects the flight characteristics of the helicopter, particularly its ability to maneuver. In reasonable proportion, the rule broadens responsibility for helicoper operations. One finds, for example, the all-inclusive requirement that when *approaching to land*, a helicopter must avoid the *flow* of fixed-wing aircraft. *Flow* refers to precribed fixed-wing traffic flow and applies not only to landings but to taxiing and takeoff operations as well. So, whatever the helicopter operaton, including left or right turns, the key is that it should not interfere with

You've tried the normal channels—your supervisor, the personnel management specialist, the regional office—and can't resolve a problem or understand the answers you've gotten. Then ask FAA WORLD's Q&A column. We don't want your name unless you want to give it or it's needed for a personal problem, but we do need to know your region. All will be answered here and/or by mail if you provide a name and address.

fixed-wing flow. Thus, though the rule does not prohibit opposite direction turns in the helicopter's approach to landing, pilots must make every reasonable effort to maintain the smooth flow of traffic.

As for helicopter touch-and-go landings or practice approaches at uncontrolled airports, operators must also consider that they become, in effect, departure operations. As such, operators must be prepared to safely integrate their operations with the airport flow. The net effect is that operators must ensure compliance with Section 91.9, which states that no person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.

Order 1100.146, Standard Organization of Air Traffic Flight Service Stations, depicts the type of supervisory and staff positions that will exist in FSSs, and I know that Level I FSSs are staffed with full-performance-level GS-9s. During a time of budget and cost cuts, why are some low-activity, eight-hour, one-person satellite facilities operated by GS-11s?

The cited order addresses the recommended overhead staffing, and Office of Personnel Management classification standards establish the grade level for the facilities. Level I is as you stated.

With those budget and cost cuts, FSSs have had to share in staffing reductions, which has led the agency to reduce hours of operation or close selected stations—the choice based on its impact on the aviation public. Compounding the difficulty is the fact that personnel from Level I facilities commonly bid out to higher-level facilities, often producing a staffing shortage at Level I. To provide staffing for facilities whose hours of operation have been reduced, we have had to obtain qualified employees in some cases from higher activity facilities. This is being done, however, only on a temporary basis until such time as a permanent solution to the staffing problem can be found.

Since our primary function is to provide service to the aviation community, all of our available resources must be used.

I work in a VFR tower at a satellite airport to a major tower. I think we have a deficient control environment during the mixing of IFR and VFR aircraft within the satellite airport's traffic area during VFR weather.

I was told that my tower will only be given a routine inbound estimate on visual approach aircraft and that we would not be advised of the inbound position just prior to their instructing the pilot to contact our facility.

My interpretation of the word *prior* as used in Para. 796C from Handbook 7110.65C is that after receiving the standard inbound estimate per Para. 392a, I would later be advised of the arrival's position momentarily before the aircraft was instructed to contact me. This would facilitate efficient sequencing of arrivals and permit issuing necessary traffic information to both arrivals and departures. Keep in mind that visual approaches are also vectored to base leg and final approach.

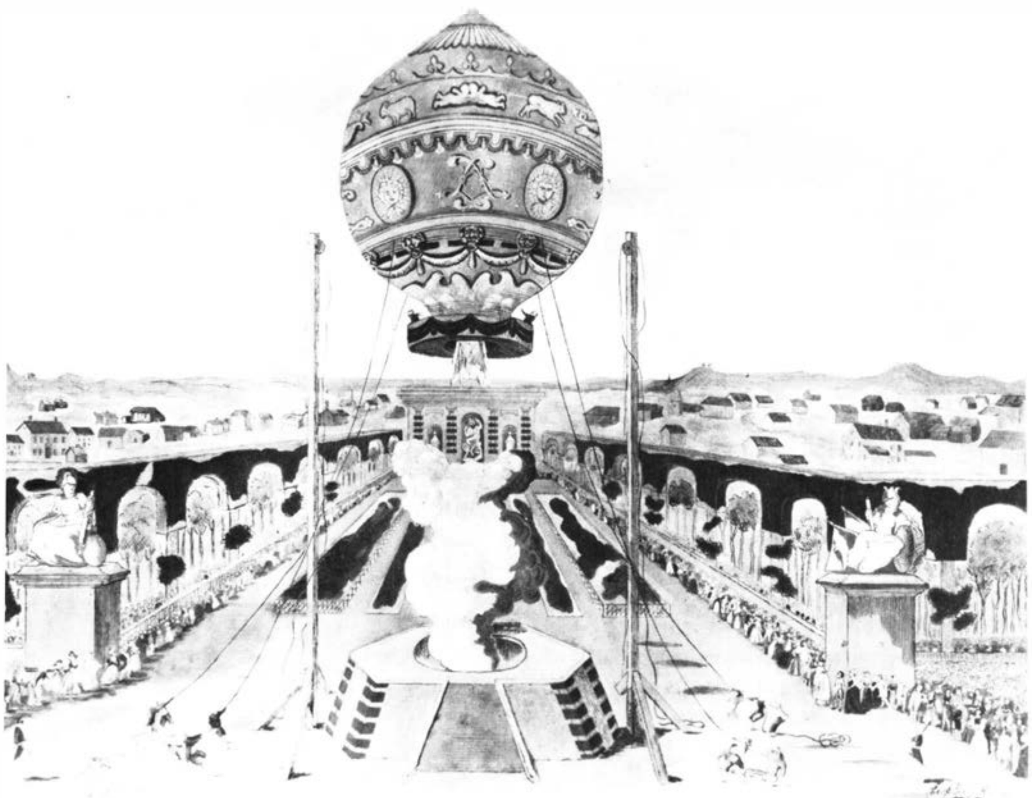
The word *prior* in that citation is not intended to be so rigidly applied as to cause a hardship for either approach control or the tower. A requirement for approach control to always advise the tower of the position of inbound visual approaches "momentarily" before communications transfer would be unrealistic in many cases. Conversely, an inbound estimate issued in accordance with 392a could be given when the aircraft is so far from the airport as to make the estimate of little use to the tower for planning purposes.

You imply that approach control is vectoring aircraft to the traffic pattern without coordination. This is contrary to the requirements of 7110.65C–32, which requires the approach controller to coordinate with the tower prior to aircraft entering the airport's traffic area.

The respective aircraft managers of the facilities are responsible for ensuring that mutually acceptable procedures are used that will result in a safe and orderly operation.

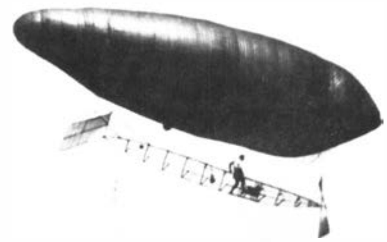
The Roots of Aviation

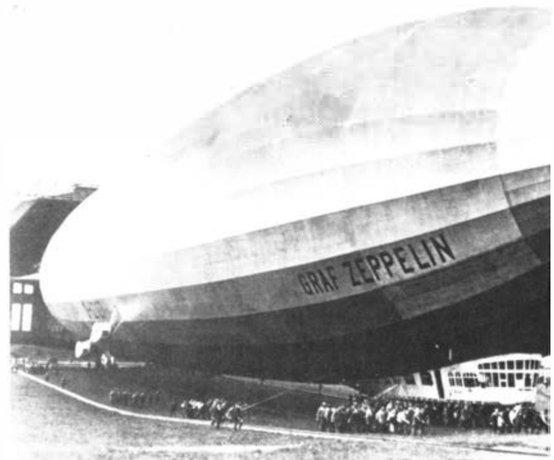
After 200 Years, Many Return to Basic Flight

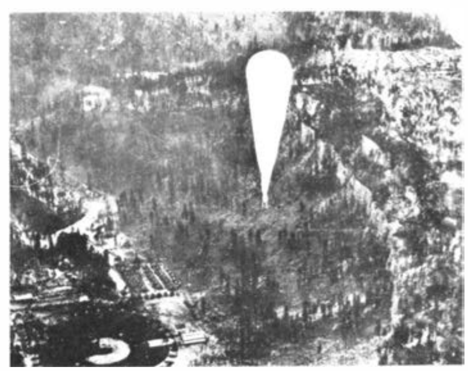


An artist's rendering of the ascent of de Rozier and d'Arlandes in the Montgolfier balloon on Nov. 21, 1783.

Plus ça change, plus c'est la même chose—the more things change, the more they remain the same. This oft-repeated saying has validity even in high-technology aviation, for as we celebrate the two-hundredth anniversary of manned flight this year, today's daring aeronauts are launching







Roy Knabenshue flies the ***Toledo-1***, a nonrigid, almost indistinguishable from Baldwin's ***Califorrnia Arrow***, which Knabenshue flew at the 1904 International Exhibition in St. Louis, Mo. ***(top)***

Ohio Historical Society photo

The ground crew hauls the ***Graf Zeppelin*** out of its hangar at Friedrichshafen, Germany, for its maiden flight. ***(middle)***

In a project sponsored by the National Geographic Society and the Army Air Corps, the balloon ***Explorer II*** set an altitude record of 72,395 feet on Nov. 11, 1935, from the Stratobowl near Rapid City, S.D. ***(above)***

Goodyear Aerospace Corp. phot

By Marjorie Kriz
A Great Lakes information specialist and former reporter, she has been published in the *Chicago Tribune* and *Chicago History* magazine.

.melia Earhart (in white flying suit) prepares to christen the Goodyear airship *Defender* on Aug. 30, 1929. The airship was later acquired by the Navy.
Goodyear Aerospace Corp. photo

An artist's rendition of the hybrid Piasecki Heli-stat being developed under a Navy-Forest Service contract.
Smithsonian Institution photo

themselves in increasing numbers in balloons, gliders and ultralights that bear a striking resemblance to some of the first air craft.

Discounting Daedalus, Da Vinci's unrealized 15th Century designs and the theory of ancient astronauts, the first documented humans to leave the ground in a vehicle and return safely were Jean François Pilatre de Rozier and the Marquis d'Arlandes. They made a five-mile trip across Paris on Nov. 21, 1783, in a splendidly decorated paper and fabric aerostat—a hot-air balloon—constructed by Etienne and Joseph Montgolfier. Benjamin Franklin, the U.S. ambassador to France, was one of the awed witnesses.

It was a hot-bed of aviation activity: Less than two weeks later, J.A.C. Charles with another man made a wo-hour flight from Paris in a nydrogen-filled balloon of rubberized silk—this, only 17 years after hydrogen was first isolated by a Briton, Henry Cavendish. A little more than a year later, Jean Pierre Blanchard and Dr. John Jeffries, an American, flew the English Channel in a hydrogen balloon. Ever since, the Channel has been a primitive-aviation hurdle.

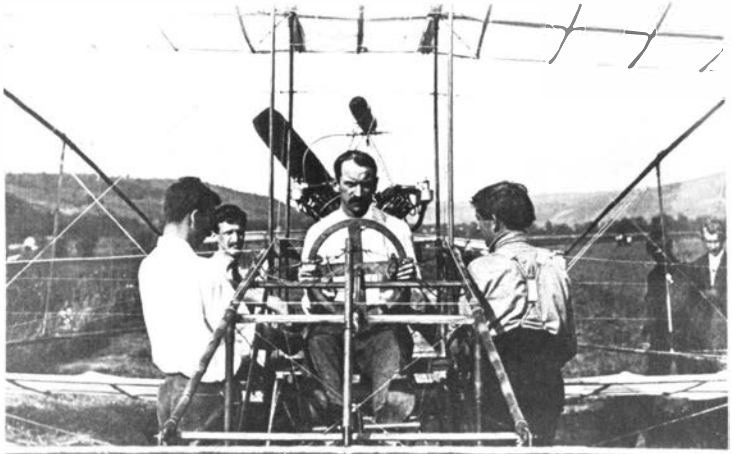
The first for America was Blanchard's ascent at Philadelphia on Jan. 8, 1793, in his hydrogen balloon, with George Washington, John Adams, James Madison and James Monroe in attendance.

The military quickly seized upon the value of "aviation," with France using a tethered balloon for reconnaissance in 1794. Thaddeus S.C. Lowe was given command of the newly formed U.S. Army Balloon Corps in October 1861, and the Confederacy also had reconnaissance balloons. A young German army officer named Ferdinand von Zeppelin made his first balloon flight in Minneapolis and later ascended in one of Lowe's tethered balloons. During the siege of Paris by the Prussians in 1870, more than 60 balloons took off carrying refugees, mail and carrier pigeons—the latter for bringing mail back into the city.

Balloon fever raged well into the airplane era, with aerostats used for advertising, racing and record-setting flights of distance and altitude. While Auguste Piccard's high-altitude ascensions in the 1930s brought more publicity, the first to penetrate the stratosphere was that of U.S. Army Capt. Hawthorne C. Gray, who made it to 42,470 feet on May 4, 1927, but had to parachute out when his balloon plummeted uncontrollably.

Maxie Anderson in his *Double Eagle II* balloon was the first to cross the Atlantic Ocean in August 1978. Only last November, Anderson failed in his third attempt to circumnavigate the globe in his *Jules Verne* balloon.

Because of the high cost of hydrogen and then helium, ballooning



Orville Wright (right) with Igor Sikorsky and the first successful military helicopter, designed by Sikorsky, in 1942.

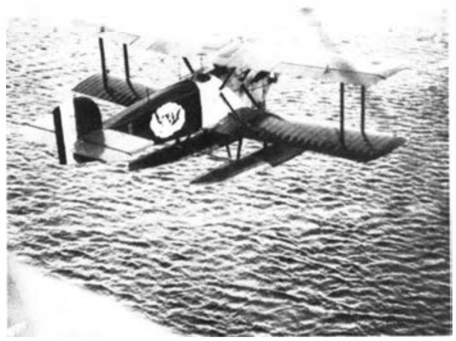
Ohio Historical Society photo

Frank "Bud" Kelley, Jr., who became an FAA aerospace engineer, was the test pilot for the first jet to fly in the U.S.—the Bell XP-59—on Nov. 16, 1942.

didn't catch on as a sport until the development of the propane burner that made hot-air ballooning practical about a quarter-century ago. Now, ballooning has had a renaissance all across the country.

A hybrid of the will-of-the-wind balloon and the airplane were the blimp and the dirigible. It was Henri Giffard who, on Sept. 24, 1852, flew the first successful airship—a steam-engine-driven hydrogen-filled envelope. With Giffard aboard, it traveled 17 miles at 6 mph. Alberto Santos-Dumont, a Brazilian living in Paris, with the first of his 19 models in 1898, flew the first airship successfully powered by an internal combustion engine.

In 1904, Thomas S. Baldwin had built the first successful powered dirigible in the U.S. and sold it to the Army, but by then, the Zeppelin design in Germany was already dominating the airship field.



Glenn H. Curtiss sits in his kite-like *June Bug* of 1908. Some ultralights of today don't look much different. *(top)*

Glenn H. Curtiss Museum of Local History photo

A U.S. Army Douglas World Cruiser takes off on its 1924 round-the-world flight. *(above)*

The airship proliferated after the turn of the century, and some of the dirigibles—rigid airships—became the most luxurious airliners ever seen, then or since. Names of dirigibles that stick in the memory include the Hindenburg, the Graf Zeppelin and the American Akron, Macon and Shenandoah.

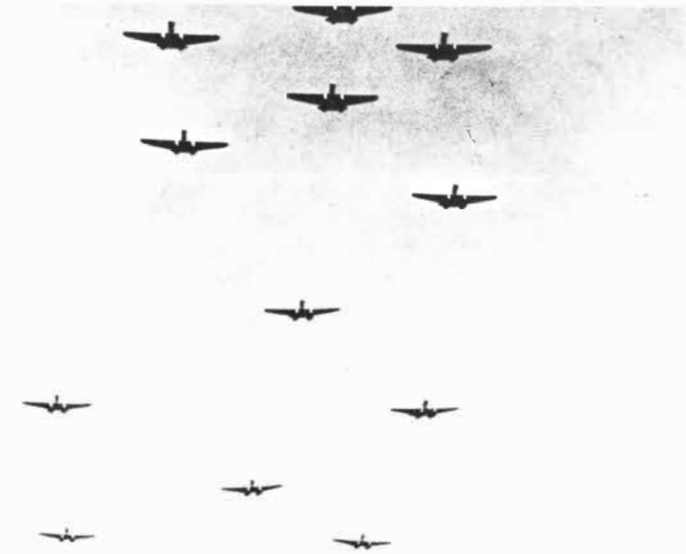
Non-rigid blimps were used by the U.S. Navy through the 1950s. Still surviving from the genre is the succession of Goodyear blimps, primarily used for soft-sell advertising and aerial photography at sporting events. However, the Navy and the Forest Service are now engaged in the development of the Piasecki Heli-stat, which combines the lifting power of a blimp with four helicopters mounted on transverse girders. Its purpose is as a lifting body for hauling loads up to 25 tons.

The direct precursor to airplanes was the glider. Indeed, the first airplanes were not far removed from gliders with engines. While gliding of one sort or another had long been practiced, two of the more famous and more successful experimenters prior to the turn of the century were Otto Lilienthal of Germany, who perished in the experiments, and the American engineer Octave Chanute, who counseled and encouraged another pair of glider experimenters—the Wright Brothers.

While gliders also matured into enclosed designs capable of carrying heavy equipment or troops or into sleek sailplanes of high efficiency, they have gone full circle. Simple gliders returned. New materials, prefabrication and kits made hang gliding a modern sport of great popularity. As was true between 1902 and 1903, the glider gained a motor, but now it's called a powered hang glider. And just as the first planes grew larger and more powerful, so the powered hang glider, or ultralight, has advanced toward planedom, and FAA has had to draw some lines.

While fanciful airship designs had proliferated in the 19th Century with many predicated on muscle power, it was the internal combustion engine that made possible the shifts from balloons to airships and from gliders to airplanes.

After the Wright Brothers had demonstrated powered, sustained and



ats and records were the mainstay of rly aviation development. Here, Italian Gen. Italo Balbo's squadron of 24 Savoia-Marchetti S-55s flew the Atlantic *together* to participate in Chicago's Century of Progress exhibition in 1933.

Chicago Historical Society photo

controlled flight, record-setting, racing and advertising took hold.

Santos-Dumont, who had shifted his aviation interest to heavier-than-air machines, was the first person to fly a plane in Europe on Nov. 12, 1906, and by July 25, 1909, Louis Bleriot had made the first aerial Channel crossing.

On Dec. 10, 1911, Calbraith Perry Rodgers completed his U.S. transcontinental flight under the banner of "Vin Fizz," and Roland Garros flew across the Mediterranean Sea on Sept. 23, 1913, with seven minutes of fuel to spare.

After the interruption of World War I and its impetus in developing new aircraft and more pilots, the U.S. Navy's Curtiss NC-4 made the first erial crossing of the Atlantic Ocean tween Newfoundland and Portugal via the Azores during May 1919. Less than a month later, British aviators Capt. John Alcock and Lt. Arthur Whitten Brown made a non-stop flight from Newfoundland to Ireland in a Vickers Vimy.

The summer of 1924 saw two U.S. Army Douglas World Cruisers complete a round-the-world flight.

By the time Charles Lindbergh made his *solo* Atlantic hop between New York and Paris on May 20, 1927, he was, in fact, the 114th person to fly the Atlantic. Charles Kingsford-Smith and Charles Ulm were the first to fly the Pacific, from California to Australia, June 1928, in a Fokker Tri-Motor, and Clyde Pangborn and Hugh Herndon, Jr., made the first nonstop Pacific flight from Japan to Washington in the Bellanca *Miss Veedol* in October 1931.

The *Detroit News* flew this Pitcairn Autogyro in the early 1930s. It was invented by the Spaniard Juan de la Cierva in 1923.

Michigan State Archives photo

Other records for certain routes, for speed, endurance or altitude were to be made and broken, but these were the major firsts.

Aviation development advanced into, first, the autogyro—successfully flown by Juan de la Cierva, a Spaniard, on Jan. 9, 1923—and then the single-rotor helicopter designed by Igor Sikorsky and flown by him on May 13, 1940.

Frank Whittle took out the first jet engine patent in 1930 in Great Britain, but it was Germany that flew the first turbojet—a Heinkel HE-17B—in 1939. The first jet airliner was the British DeHavilland DH-106 Comet, which first flew on July 27, 1949.

The first human rocketed into space was Maj. Yuri Gagarin of the Soviet Union in the Vostok I on April 12, 1961. And the first human to set foot other than on the earth was American astronaut Neil Armstrong in his walk on the moon on July 20, 1969.

When the very firsts were over, it became apparent there was a need for amenities, like places to land, lights to see by, all-weather runways, landing and navigation aids, communications and other sophisticated equipment to match the growing complexity of manned flight. Along with it came civilization's answer to congestion and the dangers of complexity—regulation.

But progress and high-tech civilization palls, and people are showing a longing to return to nature and simpler times. In aviation, it's a feeling for solo flight "through footless halls of air." It's the thrill of flying a simple, slow airplane, an ultralight, a glider or even a balloon. It's another returning to roots that were planted 200 years ago. ■

People

Aeronautical Center

■ **Charles G. Kenner,** chief of the Flight Inspection Section, Tokyo Flight Inspection Field Office, Yokota AFB, from the Atlanta, FIFO.

■ **Daniel A. Lathey,** chief of the Evaluation Section, Air Traffic Branch, FAA Academy, promotion made permanent.

Alaskan Region

■ **Forest Barber,** manager of the International Sector Field Office of the Fairbanks Airway Facilities Sector.

■ **Gary L. Christiansen,** area supervisor at the Anchorage TRACON, from the Honolulu Tower.

■ **Harold Durham,** unit supervisor in the International Sector Field Office, Fairbanks AF Sector.

■ **Cary N. Williamson,** maintenance mechanic foreman in the Juneau AF Sector Central Maintenance Facility.

Central Region

■ **Donald G. Hehr,** programs officer at the Kansas City, Mo., International Airport Tower.

■ **William J. Levisay,** area manager at the Kansas City International Airport Tower.

■ **Gary M. Lewis,** area supervisor at the Springfield, Mo., Tower, from the St. Louis International Airport Tower.

■ **Hersey L. Wright,** area officer at the Kansas City ARTCC.

Eastern Region

■ **Stanley E. Bronczyk,** unit supervisor in the Pittsburgh, Pa., AF Sector.

■ **Andrew H. Ruth,** area supervisor at the Andrews AFB Tower, Camp Springs, Md.

■ **James W. Sherwood, Jr.,** crew supervisor at the New York TRACON.

Great Lakes Region

■ **Ronnie L. Broadnax,** manager of the Detroit, Mich., AF Sector Field Office, promotion made permanent.

■ **James R. Callahan,** area manager at the Mitchell Field Tower, Milwaukee, Wis.

■ **Wayne P. Carns,** manager of the Ypsilanti, Mich., Tower, from the Cleveland (Ohio) Lakefront Tower.

■ **Albert H. Dedauw,** manager of the Lansing, Mich., Tower, from the Decatur, Ill., Tower.

■ **John G. De Jonge,** manager of the Bloomington, Ind., Tower, from the Indianapolis, Ind., Tower.

■ **Lawrence H. Kant,** area manager at the Mitchell Field Tower, Milwaukee.

■ **Phillip M. Reichart,** area manager at the Mitchell Field Tower, Milwaukee.

■ **Ronald E. Riley,** manager of the Milwaukee Flight Service Station, from the Zanesville, Ohio, FSS.

■ **Hubert L. Reynolds,** supply mangement officer, Logistics Services Branch, Logitics Division.

■ **David D. Shattler,** team supervisor in the Air Traffic Operations Branch, Air Traffic Div., promotion made permanent.

■ **Jerald B. Smith,** area supervisor at the Indianapolis, Ind., FSS, from the Traverse City, Mich., FSS.

■ **George W. Van Ells,** area supervisor at the Mitchell Field Tower, Milwaukee.

■ **Robert I. Wagner,** manager of the South Bend, Ind., FSS, from the Air Traffic Div.

■ **James F. White, Jr.,** manager of the Ann Arbor, Mich., Tower, from the Jackson, Mich., Tower.

■ **Curtis Williams,** manager of the Youngstown, Ohio, FSS, from the Air Traffic Div.

■ **Samuel F. Woods,** area supervisor at the Indianapolis Tower.

■ **Stephen J. Zampardo,** area supervisor at the Ann Arbor Tower, from the Ypsilanti, Mich., Tower.

New England Region

■ **Ronald G. Davis,** manager of the Quonset Point, R.I., AF Sector Field Office of the Providence, R.I., AF Sector.

■ **Carl G. Dick,** area supervisor at the Bradley Field Tower, Windsor Locks, Conn., from the Boston, Mass., Tower.

■ **John J. Gaynor,** manager of the Bedford, Mass., AF Sector Field Office of the Boston AF Sector, from the Airway Facilities Division.

■ **Ronald E. Johnston,** area supervisor at the Bradley Field Tower.

■ **James R. Morrissey, Jr.,** area supervisor at the Otis AFB, Mass., Tower, from the Boston Tower.

■ **Patrick F. O'Connors,** unit supervisor in the Warwick, R.I., AF Sector Field Office of the Providence AF Sector.

Northwest Mountain Region

■ **Thomas B. Cadwallader,** assistant manager of the Great Falls, Mont., AF Sector.

■ **Mary J. Carter,** area supervisor at the Walla Walla, Wash., FSS, from the Wenatchee, Wash., FSS.

■ **Patricia A. Cates,** area manager at the Great Falls FSS.

■ **William H. Dickson, Jr.,** section supervisor in the Plans and Programs Branch, Air Traffic Division.

■ **James W. Freeman,** unit supervisor in the Colorado Springs, Colo., AF Sector, from the Denver, Colo., AF Sector.

■ **Raeo L. Passey,** unit supervisor in the Salt Lake City, Utah, ARTCC AF Sector.

■ **Morris G. Warren,** assistant manager for training in the Salt Lake City ARTCC AF Sector.

Southern Region

■ **Curtis E. Brown,** assistant manager for systems performance in the Miami, Fla., ARTCC AF Sector.

Lamoyne J. Delille, area supervisor at the Opa Locka, Fla., Tower, from the Miami Tower.

■ **Richard L. Ellenburg,** area supervisor at the Greenville, S.C., Downtown Tower, from the Greer, S.C., Tower.

■ **Raymond J. Hofmann,** unit supervisor in the Miami ARTCC AF Sector.

■ **Noah M. Johnson,** area supervisor at the Fayetteville, N.C., Tower, promotion made permanent.

■ **Thomas E. Passmore,** unit supervisor in the Atlanta, Ga., ARTCC AF Sector.

■ **Robert K. Seagle,** assistant manager of the Atlanta, Ga., FSS, from the Knoxville, Tenn., FSS.

■ **Ronald E. Sturtz,** area supervisor at the Fort Lauderdale, Fla., Executive Airport Tower, promotion made permanent.

■ **Billy J. Watson,** area supervisor at the Jackson, Miss., FSS, from the Nashville Tenn., FSS.

Southwest Region

Henry J. Boudreaux, area supervisor at the Baton Rouge, La., Tower, from the Moisant Tower, New Orleans.

■ **Lawrence Hall,** central computer complex supervisor in the Albuquerque, N.M., ARTCC AF Sector.

■ **Robert J. Kelly,** area supervisor at the Houston, Tex., ARTCC.

■ **Thomas R. Lon,** area supervisor at the Houston ARTCC.

■ **Michael J. Perry,** area supervisor at the Abilene, Tex., FSS, from the Houston FSS.

■ **Roger M. Trevino,** area supervisor at the Dallas, Tex., FSS, from the McAllen, Tex., FSS.

■ **Paul J. Zimmerman,** assistant manager of the Houston Intercontinental Tower, from the Air Traffic Division.

Technical Center

■ **Patrick J. Heidenthal,** mnager of the Accounting & Budget Branch, Administrative Systems Division.

■ **John H. Lee,** manager of the Acquisition & Materiel Services Branch, Administrative Systems Division, from the Materiel Branch.

■ **William G. Morris,** manager of the National Automation Support Branch, Automation Division, promotion made permanent.

Washington Headquarters

■ **John J. Callahan,** manager of the Airspace Obstruction and Airports Branch, Air Traffic Service, from the office of the Deputy Director, Technical Center.

Western-Pacific Region

■ **Bruno A. Clunich,** area supervisor at the Los Angeles ARTCC.

■ **Gerald M. Dallas,** manager of the Planning and Programming Branch, Airports Division, from the Program Support Branch.

■ **John J. Faletti,** manager of the Establishment Engineering Branch, Airway Facilities Division, from the San Diego AF Sector.

■ **Russel S. Hathaway, Jr.,** manager of the Safety and Standards Branch, Airports Division, from the Los Angeles Airport District Office.

■ **James M. Knolton,** area manager at the Coast TRACON, El Toro MCAS, Santa Ana, Calif., from the Santa Monica, Calif., Tower.

■ **J. Henry Maag IV,** assistant manager for automation in the Office of the Human Relations Expert, from the Oakland, Calif., ARTCC.

■ **Richard J. Mathews,** manager of the Lihue, Kauai (Hawaii) Tower, from the Molokai Tower.

■ **John J. Medina,** area supervisor at the Phoenix, Ariz., TRACON.

■ **Glenn J. Miller,** assistant manager for technical support in the Guam AF Sector.

■ **Janet L. Morris,** area supervisor at the Honolulu, Hawaii, FSS. from the Macon, Ga., FSS.

■ **Jon R. Musser,** area supervisor at the Los Angeles Tower.

■ **Lawrence L. Parrent,** area manager at the Coast TRACON, El Toro MCAS.

■ **James R. Partridge,** assistant manager of the Los Angeles Tower, from the Air Traffic Division.

■ **Maurice D. Thompson,** area supervisor at the Phoenix TRACON.

■ **Darrell L. Young,** area manager at the Phoenix TRACON.

By Theodore Maher
The editor of *Intercom* and a frequent contributor to FAA WORLD, he is a former editor of *Our Navy* and associate editor of the *Navy Times*.

The Dawn of Electronic Aircraft

Fly-By-Wire Systems Start To Appear in Airliners

Astronaut John Glenn introduced much of the world to the expression "fly-by-wire" while he was flying a Mercury capsule on this country's first orbital flight. When Glenn radioed back to earth, "This is Friendship-7 going to fly by wire," the expression took its place in aviation parlance.

Since those early days of space exploration, fly-by-wire has come a long way, but it still has not come far enough to be in exclusive use in commerical airliners.

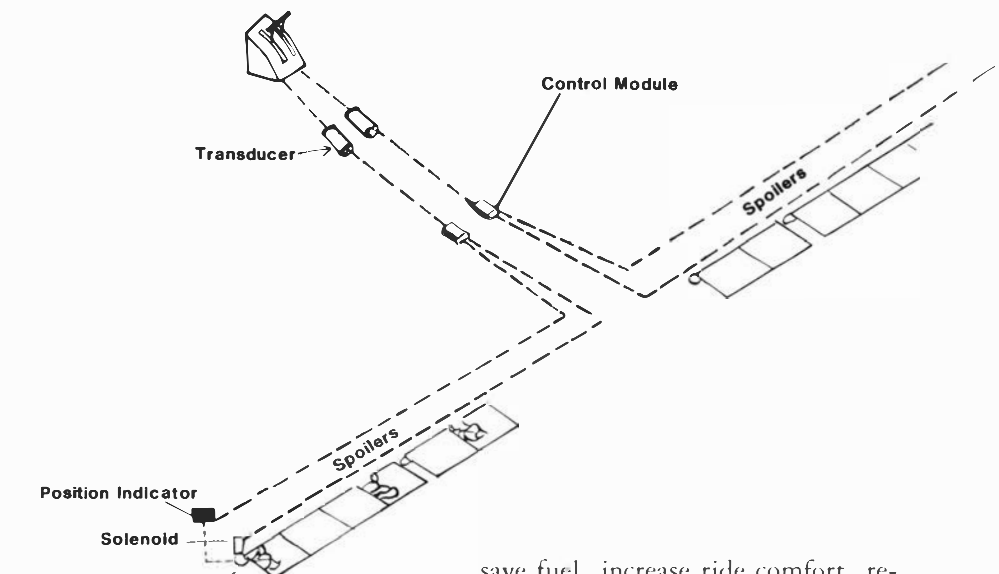
Boeing's new 757 and 767 airliners both use fly-by-wire systems on secondary flight controls, such as flaps and spoilers. Also, the 757 is slated to use fly-by-wire on the propulsion system in the version that will be powered by Pratt and Whitney 2037 engines.

However, according to James Treacy, airworthiness national resource specialist in the Northwest Mountain Region, so far, FAA has had no proposals for a total, or true, fly-by-wire airliner.

Essentially, "fly-by-wire" refers to an electronically activated control system in an aircraft or spacecraft— that is, the control surfaces of the wings and the tail are connected to the controls in the cockpit by thin, lightweight electrical wires, instead of by cables and connecting rods that push and pull.

In the present fly-by-wire approach, the control surfaces are not being moved by electric motors. Instead, fly-by-wire systems, such as those used in current fighter aircraft, relay electronic signals through regulating computers to electromagnets that open and close hydraulic valves. So, it's the tried-and-true hydraulic cylinder that actually moves the control surfaces.

It all sounds pretty simple, and like most effective, efficient systems, it is. On paper, at least, it looks like the way to go.



One of the principal advantages of the fly-by-wire system is a savings in weight. Getting rid of all those cables and connecting rods would substantially cut an aircraft's weight.

Other savings result from the exact control made possible by introducing a computer into the control system. The pilot will move the controls in a conventional manner, but the computer will activate the control surfaces.

By making instantaneous and often minute adjustments to the control surfaces, the computerized system can save fuel, increase ride comfort, reduce flutter and even save more fuel by cutting weight in permitting a lighter structure. This comes from giving the airliner "relaxed stability."

Boeing's new 757 is equipped with fly-by-wire secondary flight controls. A future version is expected to have an electronically controlled propulsion system.

In general, the electronic control system also would reduce maintenance costs. Wear resulting from moving parts would be virtually eliminated, and efficient plug-in, plug-out components would simplify maintenance.

Right now, it looks as though the European Airbus Industrie A–320 will be the first airliner to incorporate this technology extensively. The 200-plus-passenger airliner is slated to be provided with electronic controls for elevators, ailerons and spoilers. Nevertheless, it still won't be completely fly-by-wire. A mechanical backup will be provided for rudder control and a mechanically trimmable tailplane.

Electronic control probably will be the way of the future, but right now there's a rub. The rub is reliability and it's backup systems—how many and how extensive.

'Fly By Wire' for Tomorrow

"The decision to launch a new airplane design is an economic and business decision. To be successful, each new design must have enough new technology in it to offer economic advantages. . . .

"All commercial aircraft today have positive stability and multiple cable or hydraulic systems for control. [New designs] will seek to go 'fly by wire,' that is, nothing but electrical circuits to the controls and probably neutral or even negative stability to reduce aerodynamic drag. . . .

"[We have] perhaps six to eight years experience with 'fly by wire.' I doubt that sufficient basis exists for certifying a 'fly by wire' airliner—the risk is too great. My judgment is that another five to eight years of development is necessary to yield a [practical] design. . . ."

–By J. Lynn Helms in a speech delivered at the Airline Seminar for Institutional Investors and Analysts, Marco Island, Fla. Feb. 4, 1983

Jet transports today use hydraulic control systems. To achieve reliability, most of these planes have four independent hydraulic systems. This has worked very well, achieving a very high level of reliability.

In order to attain this level in fly-by-wire systems, extensive design improvements, testing and safety assessment will be required.

The technology to do this is available today, and, according to Robert Allen, Aircraft Engineering Division, Office of Airworthiness, the development of a practical design for use in transport aircraft is right around the corner. ■

on
the
job

Tech Center's Mechanical

Larry Ramsey builds telephone dials to be used on TRACON console mockups.

Bob Shinn assembles a device for a horizon simulator that will be used on the center's general aviation trainer (GAT-II).

Norman King (left) and William Mayer work on displays to modify TRACON consoles for the center's simulation lab.

A vocational-technical student employed part-time in the lab, Mike Convey drills a metal part for the GAT-II trainer.

Services Lab

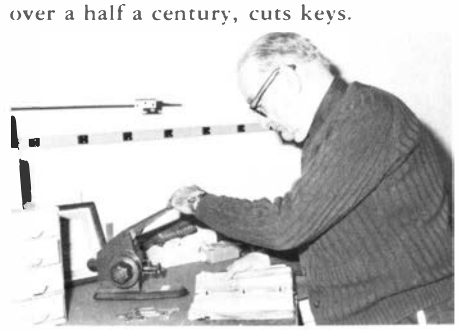
Its work varies from the unusual to the mundane, but whatever the job, the Technical Center's Mechanical Services Lab adapts itself to the task at hand.

The lab's 11-man team, which consists of eight modelmakers, an equipment repair mechanic, a sheet metal mechanic and a locksmith, may be called upon to make modifications to controller consoles in the center's simulation facilities, construct radar towers and antennas, repair air conditioning ductwork or work on the au-omatic gates used throughout the)00-acre center.

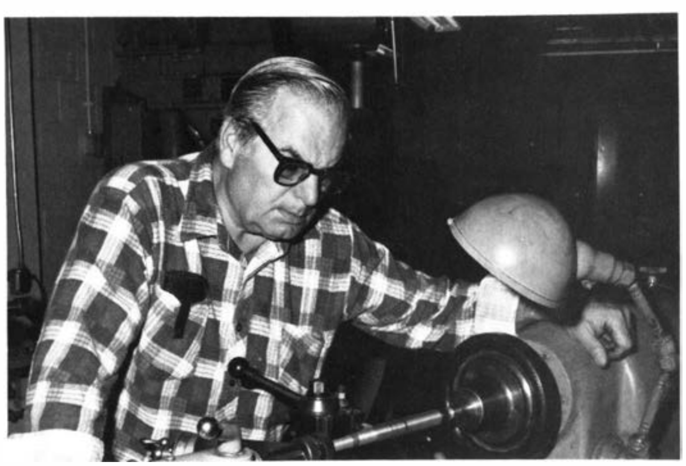
Specifically, the modelmakers have constructed plastic, one-quarter-scale models of air traffic controllers that were used in the design and evaluation of controller work station layouts. Another has been revamping simulation consoles to accommodate the new Electronic Tabular Display Subsystem (ETABS) screens. Then again, they've had to fabricate a bracket to support a shelf.

Ernest Heinz makes combination locks.

Edwin "Wally" Smith, a locksmith for over a half a century, cuts keys.



Foreman Ed Holt (left) and George Fox at a metal brake discuss a project.



Machining a shaft for a gear box that will operate hangar doors at the Flight Operations Building is Albert Colwell.

A controller at the Van Nuys, Calif., tower watches the soul of aviation—a two-place Beechcraft Skipper making an intersection landing.

Photo by Ken Geisinger

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