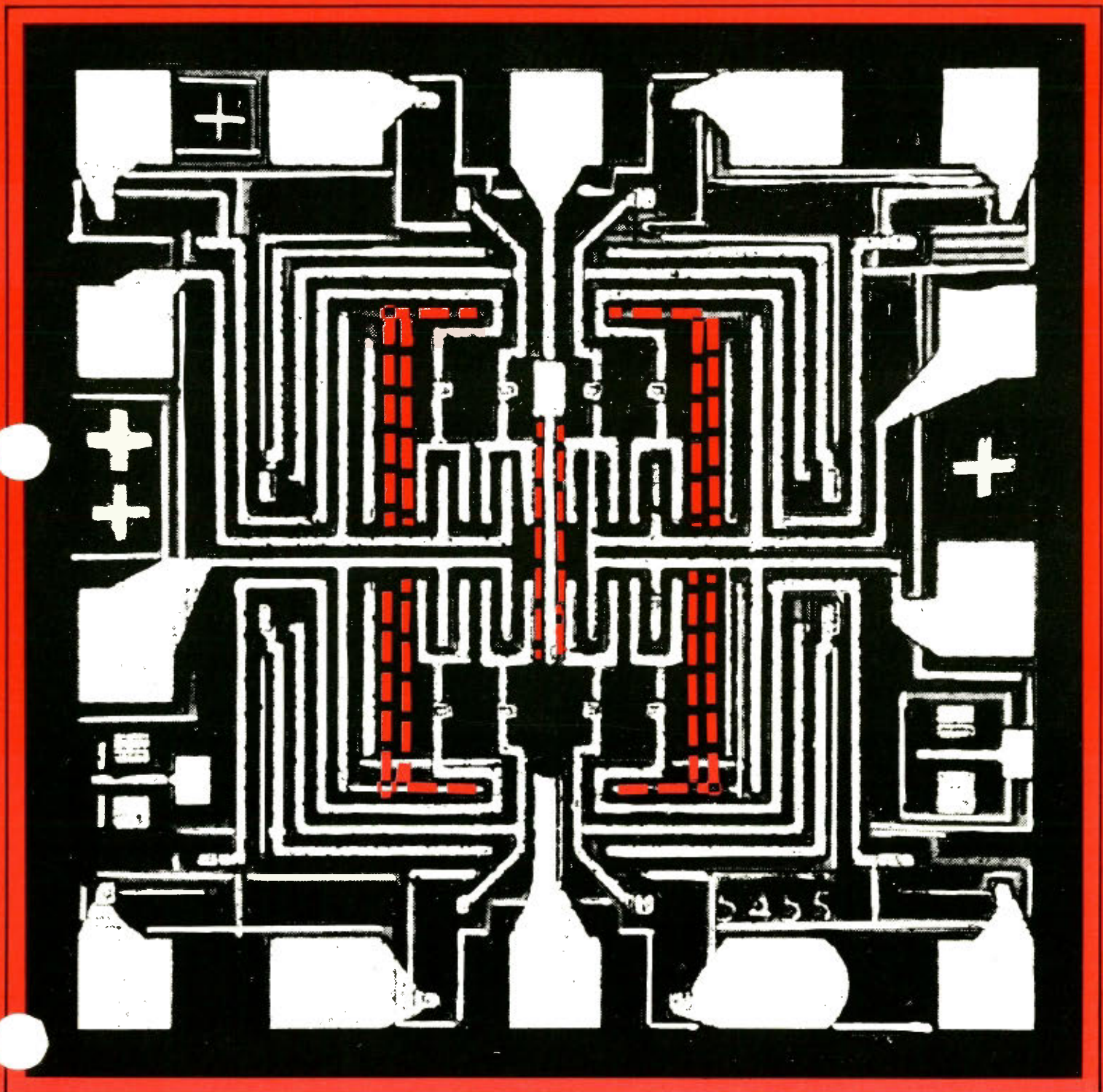
FAA WORLD

December 1979

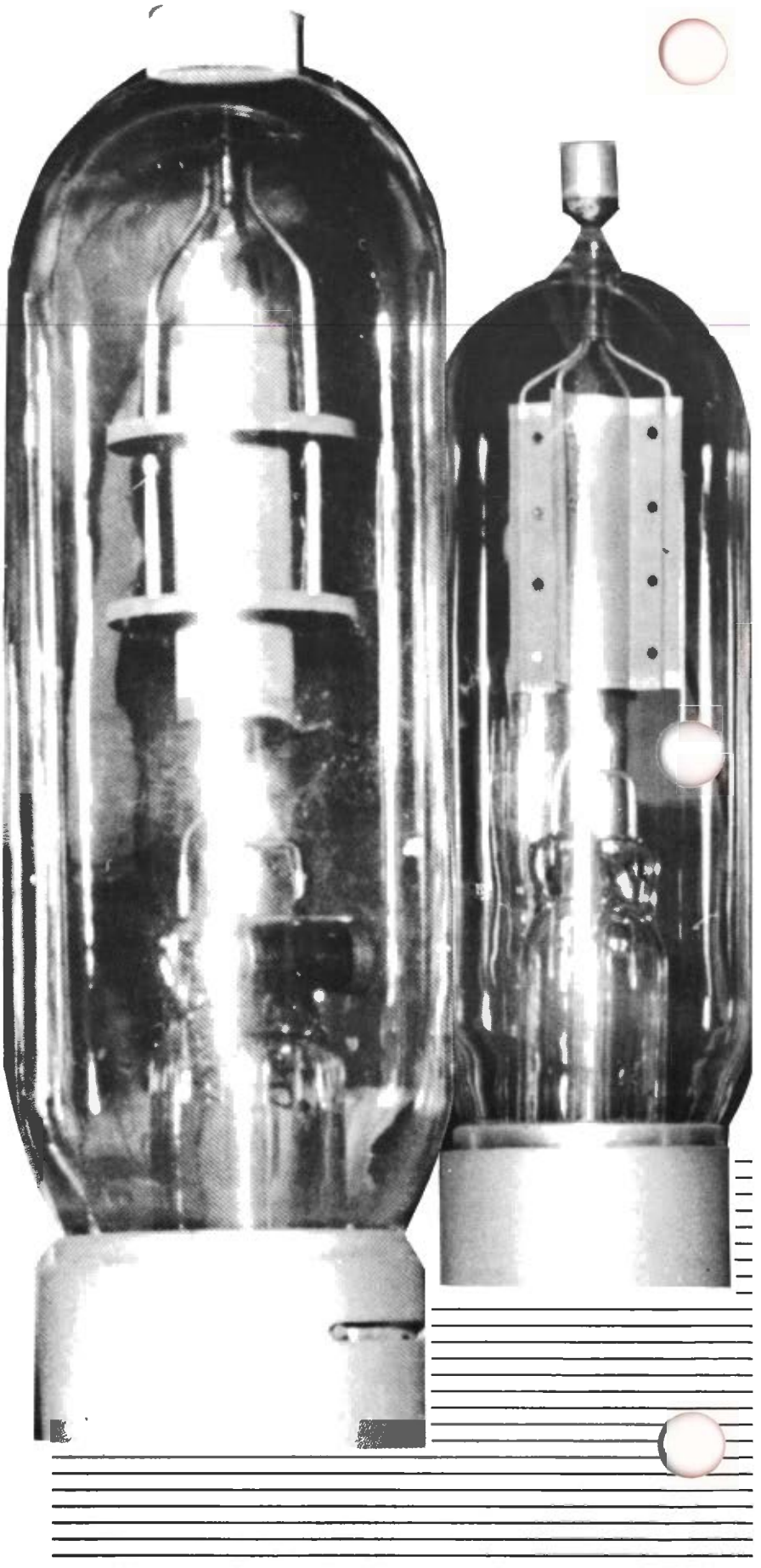


Better Service at Less Cost

FAA WORLD

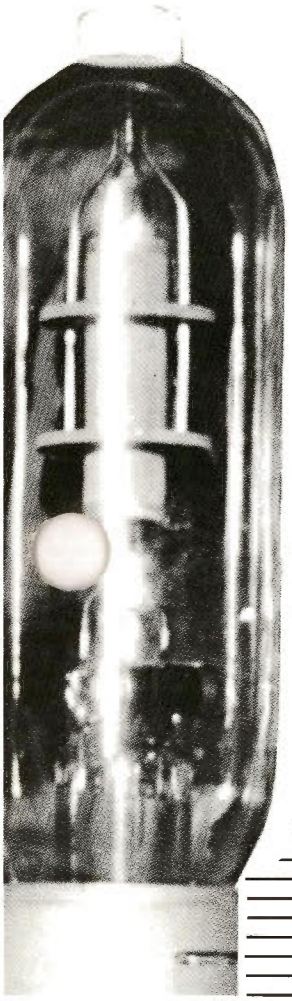
DECEMBER 1979
Volume 9 Number 12

FAA WORLD is published monthly for the employees of the Department of Transportation/Federal Aviation Administration and is the official FAA employee publication. It is prepared by the Public & Employee Communications Division, Office of Public Affairs, FAA, 800 Independence Ave. SW, Washington, D.C. 20591. Articles and photos for FAA World should be submitted directly to regional FAA public affairs officers: Mark Weaver—Aeronautical Center; Clifford Cernick—Alaskan Region; Joseph Frets—Central Region; Robert Fulton—Eastern Region; Neal Callahan—Great Lakes Region; Michael Benson—NAFEC; Mike Ciccarelli—New England Region; Ken Shake—Northwest Region; George Miyachi—Pacific-Asia Region; David Myers—Rocky Mountain Region; Jack Barker—Southern Region; K. K. Jones—Southwest Region; Alexander Garvis—Western Region.



The cover: *This microphotograph shows an integrated-circuit chip—a solid-state device, usually less than one-eighth-inch square, which may contain the equivalent of more than 15,000 vacuum tubes and other circuit components. As our cover story explains, such solid-state components are helping FAA equipment to perform better, more reliably and at less cost.*

Better Service at Less Cost



Every day, five days a week, Mike Blackmond and Billy Douglas, Airway Facilities technicians at FAA's sector office in El Paso, drive to Mt. Franklin, over 10 miles away.

With them is Gil Valenzuela, whose job is to operate FAA's cable car that takes Blackmond and Douglas on a 15-minute ride to the top of the 7,200-foot mountain. There, the two technicians inspect the communications equipment used by FAA air-traffic facilities in the surrounding area.

By the time they check everything out, calibrate the equipment and perhaps replace some parts, take the tramway down the mountainside and drive back to the office, it's usually about time to call it a day.

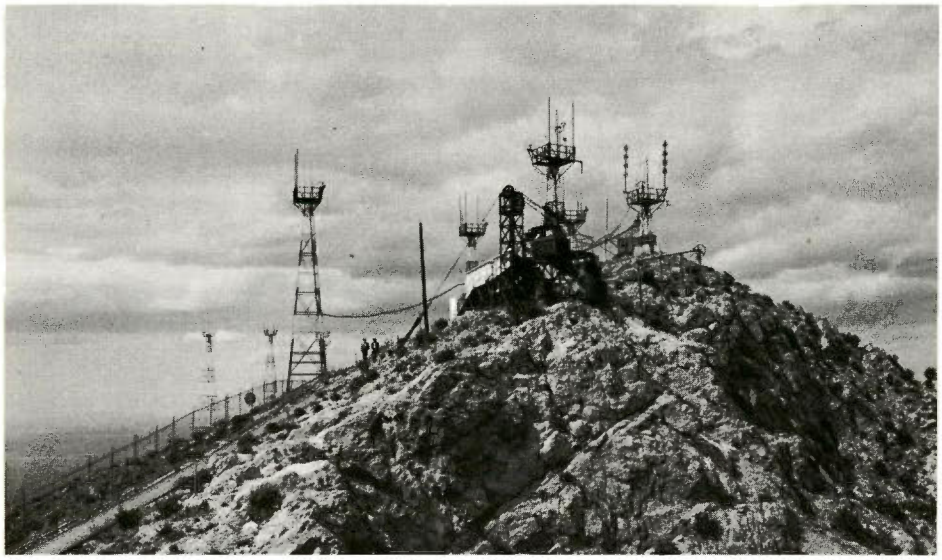
Two technicians are needed "for safety reasons," explains El Paso Sector chief, Chuck Turner; "if something happens to one of them, the other one can go get help."

Over in New Orleans, Bob Payne, Airway Facilities technician at the Lakefront Sector Field Office, climbs aboard a 36-foot boat on an average of three times a week for a six-mile trip to the site of a VORTAC three miles off the south shore of Lake Pontchartrain. At the helm is Tab Walker, a Heavy Mobile Equipment Operator—or skipper, if you prefer—whose job is to operate and maintain the boat.

The El Paso and New Orleans jobs may sound exciting to those who push paper all day, but they can become a drag, too. In fact, most technicians who do routine, preventive maintenance day after day at the same facility are quite ready to move on to another assignment after a couple of years, says Turner.

What can make the work tedious, he says, is that "technicians are usually not out there to fix something that's broken. Probably about 90 percent of the time they're there just to verify that the equipment is working properly."

That approach to maintenance also is very labor intensive and costly, says Jim Bispo, Deputy Director of the Airway Facilities Service in Washington, and plans are underway to radically change



The communications equipment atop Mt. Franklin near El Paso, Tex., now requires a daily inspection by two Airway Facilities technicians who are taken to the top of the mountain by cable car operated by still another FAA employee.

it. "The proposed change is the biggest thing to happen in the history of Airway Facilities," claims Bispo, who has been with the Service since 1958, starting out as a field engineer at Los Angeles, Calif.

He traces the origins of the change back to 1976 when a steering group was formed to assess the current maintenance philosophy in light of the projected changes in the National Airspace System for the 1980s. Bispo said the group was guided by the principle "better service at less cost," because clearly the times call for cutting the cost of government and holding down the number of people involved in providing governmental services. At the same time, adds Bispo, the group was mindful that the increase in air traffic projected for the next decade would require an even higher reliability in air-traffic-control equipment than exists today.

Two years later, the group—made up of regional and headquarters division and assistant division chiefs—submitted its report. Not surprisingly, it concluded that the current way of doing business would not do for the 1980s.

It noted, for instance, that the number of FAA navigation and communication facilities—VORTACs, ILS, radars, remote communications outlets and the like—was expected to increase from fewer than 17,000 today to more than 20,000 by 1990. To maintain those facilities adequately using today's maintenance practices would require an increase of more than 1,300 in total Airway Facilities staffing—from approximately 14,800 today to about 16,100 by 1990.

On the other hand, the steering group recommended, there was a way to actually reduce staffing by more than 2,000 employees over the next decade, save $1.2 billion and provide a higher level of facility reliability at the same time. But, this "maintenance concept for the 80s," as the group called it, would call for a drastic departure from the way the agency had been maintaining its facilities since the 1930s.

To achieve those goals, however, the agency will have to spend about $950 million through fiscal year 1985, says Bispo.

The bulk of that, $785 million, would go towards replacing the old vacuum-tube equipment in the national airspace system with solid-state technology. The old equipment is costly to maintain. Vacuum tubes have a short life, and the equipment needs frequent adjustments. Moreover, Bispo says, the replacement parts are expensive and, increasingly, are no longer available. Besides, vacuum-tube equipment takes a lot of energy to operate.

Another problem with the old equipment, he says, is its general lack of standardization. "Much of it was bought in small purchases over the past 40 years and, as a result, pieces of equipment performing the same functi vary in design," he explains. For instance, there are more than 12 basic types of instrument landing systems, each requiring its own special parts. Lack of standard equipment also makes it difficult for the technicians, says Bispo.

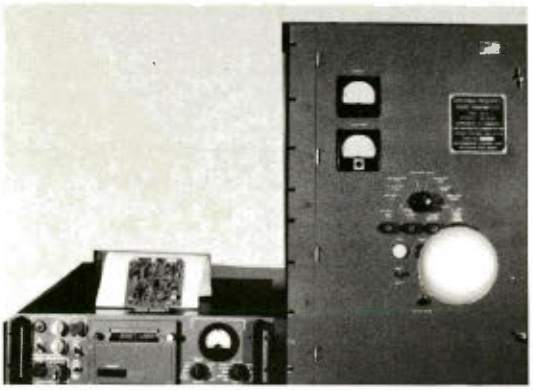
"Currently," says Bispo, "a technician is expected to go to a facility—a VOR, RCAG, en route center, TRACON, or whatever—and fix a machine at any level. That increases the costs of training technicians and stretches them pretty thin," he says.

Solid-state equipment, on the other hand, is much more reliable, not only in terms of transistors versus vacuum tubes. That reliability applies as well to the support components—relays, resistors, capacitors, filters and the like, which have been significantly improved over the past several years. Moreover, standardized modular construction of solid-state equipment and its digital circuitry will allow quick replacement of failed components and reduce the need for adjustments afterward.

Also, solid-state equipment uses l power. For example, says Bispo, an estimated four million barrels of oil can be saved by 1990 by replacing all the tube-type equipment.

Another key element to the new maintenance concept for the 1980s is remote monitoring of facilities. Instead of technicians frequently visiting facilities just to see if the equipment is working properly, all of the facilities would be monitored from as few as 100 sites around the country.

Smaller, more reliable transistorized radio transmitters, like the one on the left with its printed circuit board on top for display, are gradually replacing old tube-type units (right) whose replacement parts are expensive and increasingly hard to find.



"The proposed change is the biggest thing to happen in the history of Airway Facilities."

Here's how it would work. Sensors at remote facilities would feed data over the telephone lines to a minicomputer located at an en route center, major airport or sector office.

The computer would then process and analyze that data and transmit a report to a technician via a portable terminal at a centralized workshop.

Bispo says the agency has not gotten to the design state of a remote monitoring unit, so he doesn't know exactly how it will look. But, for the sake of example, he figures "it will probably consist of a console, keyboard and visual display. A technician can sit at the console and ask for data on a particular VOR by typing a certain code into the computer. In a matter of seconds, he would receive a report on the performance of the facility, whether it needs adjustment and whether any of its components are about to fail."

With solid-state equipment and a remote monitoring capability, El Paso's ...k Turner estimates that the visits to ...op of Mt. Franklin could be reduced from once a day to "once every couple of weeks." And Chuck Beasley, sector chief in New Orleans, figures the boat rides across Lake Pontchartrain could be cut from three times a week to "once a month."

In addition, facility shutdowns for routine maintenance can be virtually eliminated, as opposed to now when the equipment has to be shut down for certain tests during routine maintenance checks.

Bispo estimates that the number of work sites where Airway Facilities personnel are stationed can be reduced from about 1,000 sites today to approximately 300 by 1990. As today, the Airways Facilities sector will remain the principal element in the maintenance program, but the sector headquarters will no longer be just an administrative office; it will be a work center, too, where some maintenance and repair is done. (See box, "Organization")

Bispo says Airway Facilities personnel have nothing to fear about the new maintenance concept. The expected staff reductions will be accomplished through attrition, and he expects the future work "of the FAA technician to be more diversified, interesting and challenging than ever before. The routine work will be dramatically reduced, and paperwork will be streamlined. Moreover, says Bispo, "the new equipment will demand a higher level of skill from technicians and require more problem analysis on their part, in contrast to today's routine that consists mostly of preventive maintenance."

Bispo said he expects employee reaction to the new maintenance concept to be mixed. It will probably fall into three categories, he says. "About 10-20 percent who are nearing retirement will say, 'So what?' Another 10-20 percent will be vehemently opposed for personal reasons. Others simply will be opposed to the idea of doing things differently than they've always done.

"On the other hand, I believe about 60 percent or more will react favorably to the new program, and their reaction probably will be on the order of: 'It's about time you guys got around to something like this'."

Nonetheless, Bispo doesn't underestimate the problems ahead in implementing the new maintenance concept. And he stresses that it is nothing more than a concept at this point.

For example, he expects some opposition from members of Congress whose constituents are Airway Facilities technicians vehemently opposed. "The way to handle that," says Bispo, "is for us to put together a package that will convince Congress and others that this is good for aviation, the FAA and the country. Up to this point," he added, "we have been doing all right in that regard."

To illustrate that point, he noted that the new maintenance concept was the principal justification for the proposed increases in the Facilities and Equipment budget over the next five years. "We've already begun to replace the VORs and VORTACs in the system. We've got about $90 million targeted for the solid-state replacement program in 1981 and $100 million in 1982. In addition, we have the support of the Administrator, the Office of the Secretary and the Office of Management and Budget. So, I'm confident that eventually we'll get the necessary funds," he adds.

Bispo believes that "changing our way of thinking" will be the biggest obstacle to overcome in trying to implement the new maintenance concept.

"I've always said that 50 percent of what we do is because of procedures and the other 50 percent is because of tradition. It's the 50 percent tradition that scares me to death." By Gerald E. Lavey

TENTATIVE ORGANIZATION UNDER NEW CONCEPT

Washington headquarters will remain virtually the same. However, it probably will be the site of a new National Support Group which will analyze and correct system-wide problems and assist sector technical staffs. Also, Washington office will be responsible for national planning and procurement.

Regional office will continue to be responsible for overall administration and implementation of national programs within region.

Sector headquarters will no longer be ...st an administrative office. It also will be responsible for logistical and technical support, training, and overall control of maintenance throughout sector. In addition, it will become a central repair facility where modifications to modules and tests on subsystems components are performed. In many cases, it also will be the site of the remote monitoring equipment.

Sector field offices, probably located at en route centers, major airports and at or near sector headquarters, will be the bases of operation for the majority of technicians. And it's there where most maintenance and repair will take place. In certain cases, remote monitoring equipment will be located there.

Looking Out for Xmas Eve Flyers

It was the night before Christmas one year ago and a blizzard was raging all along New York's Southern Tier. The City of Elmira, just a few miles north of the Pennsylvania border, and the surrounding Chemung County were buried under an additional 15-inch blanket of pristine snow.

Not a creature was stirring in the control tower of the Chemung County Airport. The runways were drifted over and traffic had ceased.

Controllers Kenneth Binion and John Gilbert remained on the job, however, watching the bright line of the radar sweep and wondering who would be fool-hardy enough to fly on a night like this. There was even a suggestion that the most famous of all Christmas Eve flyers might be grounded by the weather.

Suddenly, a small blip appeared on the radar screen, off to the west near Corning. Then it disappeared only to show up again some miles from its original position.

For several minutes, the Elmira radar would paint the target and then lose it again. Binion and Gilbert began to wonder just what they had up there.

Maybe it really was St. Nick starting his rounds, one suggested. No, the other responded, glancing at his watch. It's too early, only 7:15. He doesn't fly until midnight.

This judgment was confirmed a minute later when a faint voice was heard over the radio loudspeaker, and it didn't say "Ho-Ho-Ho." Rather it was the voice of a pilot in trouble—a cryptic "Elmira Tower, this is Piper Colt . . . " That was the end of the transmission.

Both Binion and Gilbert immediately tried to establish radio contact with the pilot. They switched from channel to channel but with no success.

Elmira, N.Y., controllers Kenneth Binion (seated) and John Gilbert worked as a team to save a lost Christmas Eve flyer.

"There's a possibility," one of them suggested, "that he still can hear us. Let's try to vector him in."

They started transmitting radar headings to the plane and were relieved to see the blip on the screen turn and head in a direct line for the airport. Although the two controllers still didn't know the dimensions of the pilot's problem, at least they had him headed in the right direction.

Aboard the Piper Colt were pilot James Montgomery of Arian, Mich., and a passenger. They had been enroute to a small airport at Sidney, N.Y., when they encountered the heavy snow over Binghamton. They decided to turn back to Elmira but missed it.

Fuel also was getting dangerously low. In good weather, there was enough for 85-90 more miles. But how long would it last in a plane wandering aimlessly in a blinding, buffeting snowstorm?

Then the plane ran into electrical problems. When the pilot tried to transmit over his radio, a circuit-breaker would trip, plunging the cockpit into darkness. Luckily, he could still receive communications.

In the tower, the two controllers did not know at what altitude the plane was flying nor how much fuel it had. They had received no radio acknowledgment of their directions from the pilot, but from the way he was following them, they felt certain he could hear them.

They began giving him instructions for a blind landing. They turned the runway lights on. Then it occurred to them that, in the blinding snow, the pilot might confuse these lights with others in the area, so they flashed them on and off, instructing the pilot what to watch for.

Then, out of the solid white wall of snow, the small plane appeared. It hovered briefly over the snow-covered runway and then touched down smoothly for a safe landing.

Binion and Gilbert looked at each other, smiling happily. Then they looked at the clock. They were sure the tension-filled activity had taken hours. Actually, from the time they first spotted the radar blip until they brought the plane in for its smooth touchdown, a scant 14 minutes had elapsed.

It was only 7:30, but for the two controllers, the pilot and his passenger, Christmas already had begun.

By Irv Ma

FEDERAL NOTEBOOK

TO-EACH-HIS-OWN HIRING

To speed and improve the quality of Federal hiring, primarily of professional and managerial applicants GS-9 to 15, the Office of Personnel Management (OPM) plans to begin delegating personnel examining responsibilities to individual agencies next month. ■ Agencies now have full authority to extend some details beyond 120 days, direct hire certain disabled veterans and those severely physically handicapped, hire uniquely qualified persons at GS-11 and above at rates above step one of the grade and grant extensions beyond 12 months for certain temporary blue-collar jobs. ■ Through written agreements with OPM, agencies may accept and rate job applicants when the agency is the sole or predominant user of the positions, make payment of travel expenses for interviews for jobs at GS-13 and below and establish training programs for moving employees into new occupations.

THE MANY VIEWS OF PAY REFORM

The Office of Personnel Management reports support for the President's pay reform legislation from 13 important government, public interest, business and professional organizations. ■ The President's Advisory Committee on Federal Pay disputes the talk that Federal white-collar employees are overpaid, saying that private wages have increased faster than Federal salaries in the past decade, and last year these Federal employees earned between 0.6 and 46 percent less than comparable private-sector employees. While supporting the splitting of the general schedule to establish locality pay, the group rejected combining pay and benefits for total comparability and the use of alternative pay caps for other than economic emergencies. ■ In House hearings, members of Congress have taken strong exception to surrendering legislative control over Federal pay to the President.

HOW TO SAVE TALENT

To prevent losing the services of competent, experienced workers during economy layoffs, reorganizations and transfers of functions, the General Accounting Office has recommended the improvement of agency placement programs: providing assistance and counseling for displaced employees and job referral and training, plus placing restrictions on filling vacancies when qualified displaced employees are available.

SMOKING NOT LITIGABLE

The Supreme Court refused to hear a suit that would have required restricting smokers to designated work areas in Federal buildings. This left intact lower-court rulings that Federal employees are not covered by the 1970 Occupational Safety and Health Act (OSHA) and that the OSHA law does not authorize lawsuits against the government.

AND NOW, THE SILVER LINING

Despite all this, a government-wide survey released by OPM says that the majority of Federal employees are very well satisfied with their jobs, like their agencies and are not looking for other jobs. It also showed they think doing good work doesn't necessarily lead to promotions and that doing poor work is unlikely to lead to adverse action against them. The present performance rating system was not seen as useful.

WORD SEARCH

By Max J. Kassler, ATCS
Cape Girardeau, Mo., FSS

About the only thing one can do about the weather is talk about it, predict it or do a "Word Search" on it. All of the words in this month's puzzle can be found in the Aviation Weather Manual.

The words read forward, backward, up, down and diagonally, are always in a straight line and never skip letters. The words may overlap, and letters may be used more than once.

Use the word list if you must, but try covering it first. All 63 can be found. Circle those you do find and cross them off the list. The term "Anvil" has been circled to get you started. When you give up, the answers may be found on page 19.

S E A B R E E Z E V A P O R A T I O N W
E U I S A Y H I N H N H G Y O O R Z I U
A A L L I E C H O G L A C W M F R O M N
L E O U N M E R L I R Y E A I E C N B O
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L V F R A P P O I Y Y I R O N T T I R Y
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N C O F E T N O E G S H O W E R A T I L
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R A D E N C E L S I U S S I L O I R O C
H D A I M R O T S U R E D N U H T F S S
A A A R E H T A E W E N I L L L A U Q S
F R O N T O G E N E S I S O B A R A I R

ADVECTION
AIR
ALBEDO
ALTIMETER
ALTOCUMULUS
ANEMOMETER
ANTICYCLONE
ANVIL
ATMOSPHERE
CALM
CELSIUS
CHART
COLD FRONT
CORIOLIS
CYCLONE
ECHO
EVAPORATION
EYE
FAHRENHEIT
FOG
FRONTOGENESIS
FROST
GLAZE
HAIL
HAZE
HIGH
ICE
IFR
INVERSION
ISOBAR
ISOTACH
LAYER
LEE
LOW
MAMMATO
MILLIBAR
MOIST
MOISTURE
NIMBOSTRATUS
OZONE
RADAR
RAIN
RAINING
SEA BREEZE
SEA LEVEL
SHOWER
SLEET
SMOKE
STORM
STRATIFORM
SQUALL LINE
SYNOPTIC
THERMOMETER
THUNDER
TOP
TORNADO
TOWER
TROUGH
TWISTER
TYPHOON
VFR
WARM FRONT
WEATHER

Heads Up

CENTRAL REGION

Dale E. Lehmann, assistant chief at St. Louis Tower in Berkeley, Mo., from the Cedar Rapids, Iowa, Tower.

GREAT LAKES REGION

Kenneth A. Burger, chief of the Labor Relations Branch in the Personnel Management Division.

NORTHWEST REGION

Louis W. Rosgen, chief of the Pasco, Wash., Tower, from the Lewiston, Idaho, Tower.

PACIFIC-ASIA REGION

Donald W. Kent, assistant chief at the Guam CERAP.

SOUTHERN REGION

George [illegible] Bergmark, Jr., chief of the General Aviation Branch in the Flight Standards Division, from the Atlanta, Ga., General Aviation District Office . . . **Henry J. Lawson,** chief of the Mobile, Ala., Tower, from the Huntsville, Ala., Tower . . . **Douglas B. Moore,** chief of the Atlanta General Aviation Branch of the Flight Standards Division.

SOUTHWEST REGION

Glendon E. Brammer, assistant chief at the Fort Worth ARTCC.

WESTERN REGION

Herschel Gillins, assistant chief at the Red Bluff, Calif., Flight Service Station, from the San Juan International Flight Service Station . . . **John R. Hull,** chief of the San Diego General Aviation District Office . . . **Robert J. Krass,** chief of the Sacramento, Calif., General Aviation District Office . . . **James A. Loomis,** chief of the Oakland, Calif., Flight Standards District Office . . . **Jack L. Skelton,** chief of the Flagstaff, Ariz., Tower, from the Palomar Tower in Carlsbad, Calif. . . . **Kenneth G. Yocom,** chief of the Torrance, Calif., Tower, fro[illegible] the Air Traffic Operations Branch in the A[illegible] Traffic Division.

A Heroic Quartet

Secretary of Transportation Neil Goldschmidt (right, in each photo) presents the Award for Valor to Donald R. Gottman of the Great Lakes Region (left), Ronald I. Fedchenko of the Eastern Region (center) and Paul A. Palmer of the New England Region for acts of heroism. A fourth recipient, Dale R. Colt of the Eastern Region, was not present for the ceremony.

The four FAA employees already had received their rewards. Perhaps as many as 34 people were alive because of their heroic acts. That's a very heady feeling.

But some formal recognition also was due, and Transportation Secretary Neil Goldschmidt wanted to meet each hero and shake his hand personally. So, on Oct. 9, 1979, Donald R. Gottman of the Great Lakes Region, Ronald I. Fedchenko of the Eastern Region and Paul A. Palmer of the New England Region stood in the courtyard of the DOT Washington headquarters and received the Department's Award for Valor. The fourth hero, Dale R. Colt of the Eastern Region, had to miss the ceremony.

Here are their stories, as recounted by Secretary Goldschmidt:

On the morning of Aug. 3, 1979, Gottman with his wife and two of their children were driving on a weekend holiday when his auto was passed by another which swerved in front of him, crossed the road, leaped a ditch, crashed through a fence and plunged into a large, 15-foot deep farm pond.

Don, a controller at the Indianapolis Center, stopped his car, ran to the pond, stripped off his outer garments and swam out to the rapidly sinking auto. Inside he found a woman lying on the car seat, unconcious, with all the windows rolled up and the doors locked.

He pounded on the windows and windshield, attempting to gain entry to no avail. Then, with the car now mostly under water, he noticed a small cobweb-like pattern of lines the size of a half-dollar on the windshield. Realizing this was the windshield's only weakness, he concentrated his efforts there, hitting the glass repeatedly with his hands and feet. Although he sustained severe cuts and bruises, he continued until he had an opening large enough to reach inside and pull out the windshield.

With his head, shoulders and arms inside the car under the muddy water, he felt along a door frame until he located and freed the door latch. He then moved to the outside of the car, opened the door, and pulled the woman to safety.

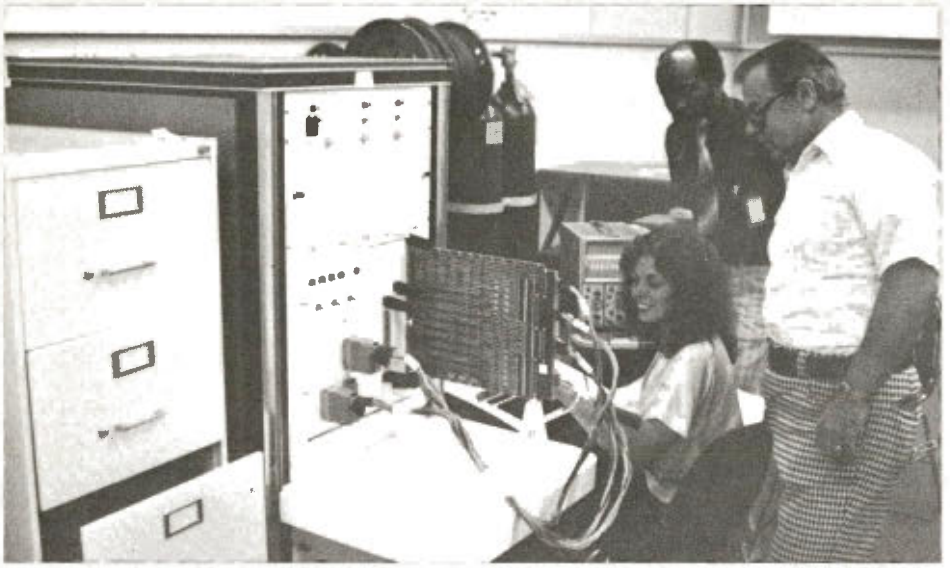
The woman, who was unconcious from medication she was taking, certainly would have died had it not been for Gottman's quick and selfless action.

On Dec. 28, 1979, electronics technicians Dale R. Colt and Ronald I. Fedchenko were busy repairing a localizer at the Lebanon Regional Airport in New Hampshire.

Just before lunchtime, a Cessna 172 taking off from Runway 25 crashed near where the two men were working. The two dropped their tools and ran to the smashed light plane. They found the unconscious pilot, his wife and mother all badly injured and bleeding profusely.

Knowing full well that the damaged aircraft might burst into flames at any moment because a ruptured fuel tank had saturated the crash area, Colt and

continued on page 14

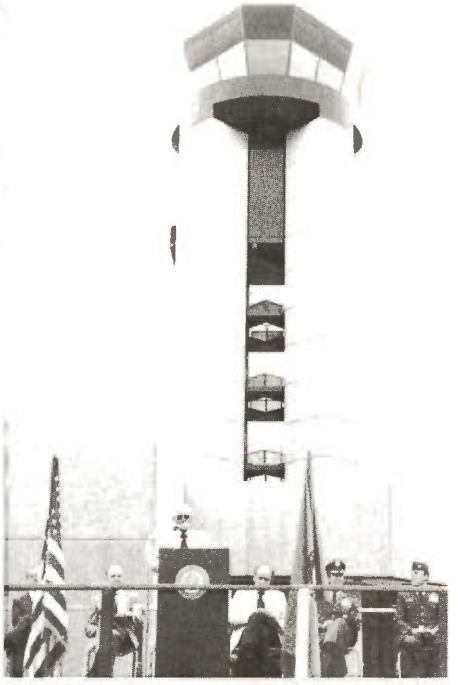


RADAR BACK-UP IN PLACE—*Electronics technician Bob Hayes (right) shows technician trainee Sue Leech the operation of the Direct Access Radar Channel (DARC) printed-circuit-board tester recently installed at the Minneapolis ARTCC, while John Smith of Raytheon observes. A replacement for broadband radar, DARC will be undergoing shakedown tests at the Salt Lake City, Minneapolis and Chicago en route centers.*

Faces and Places

HISTORIC MARKER—*Technician-in-depth Larry Cheskaty, San Diego Airway Facilities Environmental Support Unit, presented Western Regional Director Leon C. Daugherty with a U.S. Coast Guard & Geodetic Survey marker that designated Beacon Number One at the Western Terminal of the Los Angeles-Amarillo/Los Angeles-San Francisco Airways in Glendale, Calif.*

WORD FROM THE BOSS—*NAFEC computer systems analyst Ralph N. Caprio (second from left) displays a letter from President Carter recognizing his work in the National Airspace System that resulted in savings. Presenting the letter to Caprio are (left to right) NAFEC Director Joseph M. Del Balzo, Data Engineering and Development chief John K. Lacy, and Software Engineering Branch chief Bernard F. Garbowski.*



NEW TOWER—*With civilian and military digi ticipating, Rocky Mountain Regional Director Martin recently dedicated a new control tower Springs (Colo.) Municipal Airport, which Peterson Air Force Base.*

OUTSTANDING SERVICE—*Mrs. Char jo, administrative secretary to FAA's Civ Assistance Group in Caracas, Venez presented an award by Ambassador Wil for her assistance to CAAG in its mis*

IMMORTALS—*Teterboro, N.J George Hicha (second from le ducted into the Teterboro Hall of troller there since 1946. The i Bendix test pilot and Instructo American Airlines Pres ·m and American Airline Bil pilot John Thompson.*

UNDERSTANDING EMPLOYER—*Mike Monroney Aeronautical Center Director Benjamin Demps, Jr.)left) receives a national Employer o the Year award from George W. Dutton, field coordinator for the National Association of Retarded Citizens, for the Aeronautical Center's hiring of handicappeds.*

DISTINGUISHED GRADUATE—*Rod Minklein (right), chief of the Employment Branch, receives the Distinguished Graduate Award for having the highest grade in the Basic Supervisory Course at the Management Training School from New England Regional Director Bob Whittington.*

MEETING THE BOSS—*Mel Leskinen, planning officer in the Alaskan Region Airway Facilities Division and president of the Alaska Jaycees, was one of more than 80 Jaycee officers to meet President Carter during a governmental affairs seminar.*

BEST OF THE BUNCH—*Great Lakes Regional Director Wayne J. Barlow (right) presented the Air Traffic Facility of the Year Award for 1978 to Roger Brubaker (center), chief of the Chicago ARTCC, as assistant Air Traffic Division chief William H. Pollard looks on approvingly.*

The Tell-Tale Hum

It is an almost inaudible hum on the tape. It really shouldn't be there at all, and it could easily be squelched. But Paul Turner, who is responsible for "reading" the tapes, doesn't want it suppressed. He's even asked that the harmless technical problem that generates the sound not be corrected. The hum has helped him before in his work and could help him again.

The hum, and the way it dipped and then jumped on a cathoderay tube that portrays sound waves visually, was the clue that enabled Turner not only to identify a lightning strike and a resulting fuel-tank explosion as the most likely cause of the crash of an Iranian 747 in Spain in 1976 but also to pinpoint where the lightning hit the aircraft.

The hum was preserved on magnetic tape by the aircraft's cockpit voice recorder. It, along with the companion flight-data recorder, is equipment that the FAA and its many foreign counterparts require on most large passenger-carrying aircraft as accident-investigation tools.

The cockpit voice recorder records the voices of the crew members and the other sounds heard on the flight deck so that investigators from the National Transportation Safety Board, the FAA and other interested parties can play the tapes back for clues as to what caused an accident. The flight-data recorder plays a similar role by recording vital information on the aircraft's altitude, air speed, heading and, in the case of the more sophisticated models, attitude, power settings and many other measurements.

The National Transportation Safety Board is the government agency that has the official responsibility for the custody of the two devices following an accident and for interpretation of the information recorded on them. Turner, is its expert on the cockpit voice recorder. Dr. Carol A. Roberts and Billy M. Hopper are its experts on the flight-data recorder.

In the case of the Iranian Air Force 747, which crashed near Madrid during a severe thunderstorm, the Board assisted the Iranian government in its investigation of the accident.

As part of this assistance, the cockpit voice recorder tape—which had survived the accident inside a crash-proof box where it is surrounded by containers of water which boil off to dissipate the heat from a fire—was flown to Washington where Turner took it into his cramped electronics lab to begin the search for clues.

One of his first moves was to play the tape through the cathode-ray tube, paying close attention to the extra and very regular line of light above the

egular one representing the sounds in .e cockpit. The line is caused by a hum resulting from a tiny leak from the aircraft's electrical generating system, which is found on most air-carrier aircraft.

He noticed that the line dipped and then jumped shortly after a crew member was heard to say "we're in the soup."

Six thousandths of a second later, a noise that sounded like lightning hitting the aircraft was heard in the cockpit.

With this in mind, he studied cockpit voice recorder tapes from other aircraft that had been struck by lightning and found that each had the same dip and then jump in the extra line.

Having thus established that lightning had indeed struck the aircraft, Turner, making use of the fact that sound travels at a speed of one foot every one-thousandth of a second, calculated that the lightning had hit the plane six feet from the cockpit.

Using this and other evidence, the Board then came up with the hypothesis that the aircraft crashed because the lightning, after hitting the fuselage, coursed through the left wing where it ignited fuel fumes in a wing-tip tank. The explosion led to a series of events that eventually tore the wing off.

As a result of the finding, changes were made in the 747 to improve the shielding on the wires in the wing to reduce the possibility of a similar accident in the future.

Turner used the hum in a similar way in another accident to establish that the cause of the crash was the explosion of a bomb in a forward cargo compartment.

But much of his work is not as dramatic.

A lot of it involves listening to the tape and making a transcript of what is said and the other sounds in the cockpit. For this he uses a small room off his laboratory where he and other experts listen over and over until they are sure that they have identified all the voices and sounds involved correctly.

The other experts include pilots who are familiar with sounds peculiar to the type of aircraft involved—such as the sounds of the landing gear going down, the flaps going down, an altitude alert going off. Others will be friends of the crew members involved in the accident who can identify their voices and help determine who said what.

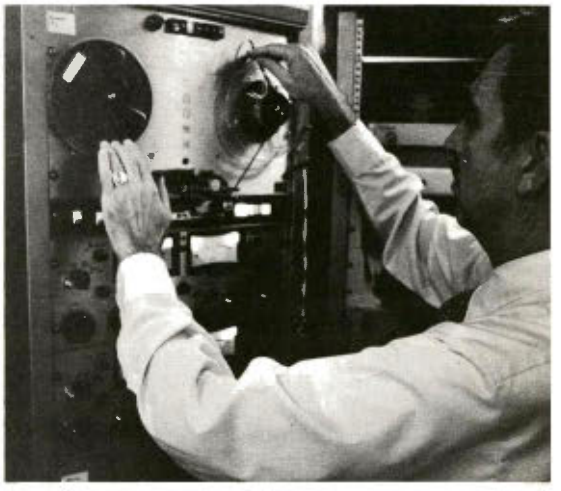
When an American Airlines DC-10 crashed at Chicago last May 25, its flight-data recorder was recovered from the wreckage and flown immediately to Washington where it was opened in Dr. Roberts' lab across a hall from Turner's.

Her first job was to splice the metal tape—which had been broken in several places by the force of the impact. Then she fed the tape into the computer—an electronic presence that tends to dominate the lab—so that the computer could translate the information on the

The digital flight-data recorder that was recovered from the DC-10 that crashed in Chicago on May 25, 1979 produced the metallic tape that lies on the table alongside it.

Dr. Carol Roberts of the National Transportation Safety Board switches on a computer that provides readouts from a crashed aircraft's digital flight-data recorder.

A cockpit voice recorder and its microphone (lower left) that picks up voices and other sounds audible in an airliner's cockpit.



NTSB's Paul Turner, whose expertise is with the cockpit voice recorder, loads a tape machine in his electronics laboratory.

tape into numbers on a computer printout.

This printout—to those trained to read it—tells the story of what the aircraft was doing in the final moments before the accident. And it showed clearly, by indicating a sudden loss of a power reading from the left engine, exactly when it broke away from the wing at takeoff and started the sequence of events that culminated in the crash.

But the job was far from over. This was because each of the places where the tape had broken, pieces of information were missing. So Dr. Roberts had to go back over the printout and determine from the sequence of key bits of information that came before and after what the missing information probably was. This took about two weeks. When it was done, the board had a full record of what the airplane did during the approximately 30 seconds between the time the aircraft left the ground and the recorder stopped working because of the crash.

The DC-10 flight-data recorder was one of the new, digital types that are now required on all new aircraft. Under the FAA rules, they must record at least 17 types of information, but some record as many as 100. It was the introduction of these new recorders that prompted the Board to hire Dr. Roberts, an electronics engineer, to set up the lab they needed to read the tapes.

However, many older aircraft still are equipped with "first generation" flight-data recorders that monitor only altitude, airspeed, heading, vertical acceleration and microphone keying. The information is traced on a piece of metal foil and read with a precision microscope that notes each turn and dip and curve in the lines and plots the information on a chart.

While they are not as sophisticated as the digital recorders, they nevertheless provide much useful information.

A case in point was Trans World Airlines Flight 841, which was cruising at an altitude of 39,000 feet over Michigan on the night of April 4 when it went out of control into a high-speed dive.

The trace on the metal foil showed that the Boeing 727 went from 39,000 feet to between 5,000 and 6,000 feet in just 65 seconds before the pilot pulled out of the dive by extending the landing gear. The tape also showed that the big jet hit a top speed of 529 miles an hour during the dive.

Later, by feeding this information into a simulator belonging to the Boeing Company, the Board's investigators also were able to determine that the aircraft made two complete spirals during the dive. They also determined that the angle of the dive was at least 60 degrees relative to the horizon.

Fortunately, the flight did not end in tragedy, and the passengers and the flight crew were able to tell the investigators what they remembered of what happened. But it was a harrowing experience, and they probably missed or forgot a lot of the details.

But the flight-data recorder didn't.

By Fred Farrar

HEROIC QUARTET

Continued from page 9

Fedchenko, without regard for their own safety, forced open the aircraft door and began rescue operations.

While Colt supported the plane, teetering nose down, with his shoulders to avert further impact and possible ignition of the fuel, Fedchenko attempted to get the passengers out of the plane.

The pilot and his wife were lodged in such a way that neither could be removed. And the pilot's mother had her foot wedged under the front seat and she too was locked in place. Colt continued to support the plane on his shoulders, while Fedchenko comforted the passengers until the fire department arrived and the rescue was completed.

Shortly after noon on Dec. 20, 1978, Paul A. Palmer, a data systems specialist from the control tower at Hancock International Airport in Syracuse, N.Y., was in the building basement getting supplies when he noticed steam pouring out from beneath the fire-door of the facility's boiler room. The steam was so intense that condensation covered the walls and floor eight feet beyond the doorway.

Without regard for his personal safety, and without a moment's hesitation, Palmer yanked open the door and entered the fiercely hot, steam-filled room. Somehow, the gas-fed fire in the furnace had run amok. All of the automatic pressure mechanisms had failed. And since the boiler had automatically shut off, it was in imminent danger of blowing up.

The temperature gauge was beyond the 260-degree mark, the highest figure on the dial, and obviously had been for sometime. The pressure gauge, too, was far past its highest limits.

Palmer acted quickly and instinctively. First he extinguished the fire by turning off the gas supply valve. Then, he forced open one of the pressure release devices to reduce any further pressure on the boiler.

His actions proved to be the right ones. Had the fire gone unchecked and the pressure within the boiler not been reduced, the boiler would have exploded, rupturing the gas line and causing an even greater explosion. The control tower undoubtedly would have crumbled into the shattered basement and the more than 25 people working there would have been lost.

By Hilda R. Ryberg

DIRECT LINE

Q **I started work at the FAA in 1974 as a Wage Grade-11, Step 1, moved to Step 2 a year later, to Step 3 a year after that and to GS-9, Step-4, in 1976. Prior to this promotion, my rate of pay as a WG-11, Step 3, was $7.44 an hour, or $15,475 a year. I received night differential, which—according to definition—increased my basic rate of pay to $15,-990.98. My rate of pay as a GS-9, Step 4, was set at $15,507—a decrease in pay. Para. 14a(2) of FAA Order PTP 3550.1A states that when an employee moves from a Wage Board position to a classification act position, he will be placed in the lowest step of the classified position that will not result in a loss in the employee's basic rate of compensation on an annual basis. A ruling in the U.S. Court of Claims states that such promotions entitle the employees to a pay raise equivalent to at least two steps of their WG grade. I'd like to get the back pay. How do I go about it?**

A Pay-setting procedures for promotions from prevailing-rate to general-schedule positions will change as a result of the recent Terry Ray Ashbaugh and Ralph Nail decisions. Present procedures cannot be changed, however, until additional interpretive guidelines are issued by the General Accounting Office and the Office of Personnel Management (OPM). We have requested further guidance from OPM, but have not yet had a response. Once necessary guidance is received, instructions will be provided through headquarters and region/center publications advising affected employees of the procedures to be used to file claims.

Q **The technicians at MacArthur Airport, Islip, N.Y., are GS-11s. Islip radar data will soon be remoted to the New York TRACON, which, in turn, will send alphanumerics to the equipment at Islip. Upon selecting radar positions at Islip, we were told that upon commissioning of the TRACON, we would be upgraded to GS-12. Two technicians had a statement on their bid sheets stating there was a potential promotion, and I was told of this potential by my sector manager, the PDEO and the management of the facility I left. Last year, we were told that we will not receive this upgrading because the MacArthur Tower is a Level II tower, and an IFR traffic count of 100,000 or more is required for upgrading. The region is applying this count from the DOT Position Classification Guide of 1972. I came across DOT Order 3410.12, April 1976, which states that certification of two or more complex systems warrants a GS-12 grade. We hold certifications on ASR-9, ATCBI-5, BRITE-IV and others, including communications. Therefore, according to the order, we should be GS-12s. Which supersedes?**

A The governing documents in the determination of sector electronics technician grade levels are the original Civil Service Commission Standards issued in 1962 and the 1972 DOT Position Classification Guide for Electronics Technician positions, GS-856, at specific locations. These standards and guide, recognized as consistent with the Office of Personnel Management's position classification standards, are the only criteria for official classification determination. Agency Order 3410.12 is not a grade-determining document, as pointed out in Para. 7 of the foreward. It is a document that consolidates career guidelines in a single directive. The DOT guide is applicable to the classification of positions at an air traffic approach control facility with 100,000 or more instrument operations annually. At such a location, the certification of two or more complex radar systems warrants classification to the GS-level. Since the systems you certify are not at such a location or any other covered by the guide, it cannot be used for determining your grade level. The original 1962 standards are applicable, and these recognize the GS-11 level certification of many complex systems. It is unfortunate that the bid sheets stated that there was a promotion potential to the GS-level for those positions. This was in error. Position classification specialists make the determination of what the proper title, series and grade of a position should be, based on the assignment of duties and responsibilities by management. Managemeft was erroneously under the impression that, in the future, the duties at your location would warrant classification to GS-12. However, when this assignment was referred to position classification specialists for official determination, it became apparent that the proper grade level of the position would be GS-11.

Q **I am a GS-856-12 journeyman technician in an en route center. In the absence of my immediate supervisor, can I be forced to assume temporarily the responsibilities of a GS-13 supervisor? My job description says nothing about performing supervisory duties.**

A The answer is "yes." However, decisions involving such details must include consideration of overall job requirements, employee qualifications and expected duration of the assignment. Decisions could vary depending on whether the assignment is being made under normal or emergency operating conditions. As a rule, short details—less than 30 days—to the full range of duties of a supervisory position would be unusual. The full range of duties would include making decisions or recommendations on such areas as employee conduct; discipline; identifying and justifying training requirements; completing performance ratings; and making recommendations for appointments, promotions or reassignments. It is normal practice, however, for a GS-856-12 electronics technician to assume watch or shift responsibility for assigned systems in 24-hour work situations.

When Air Speed Was King

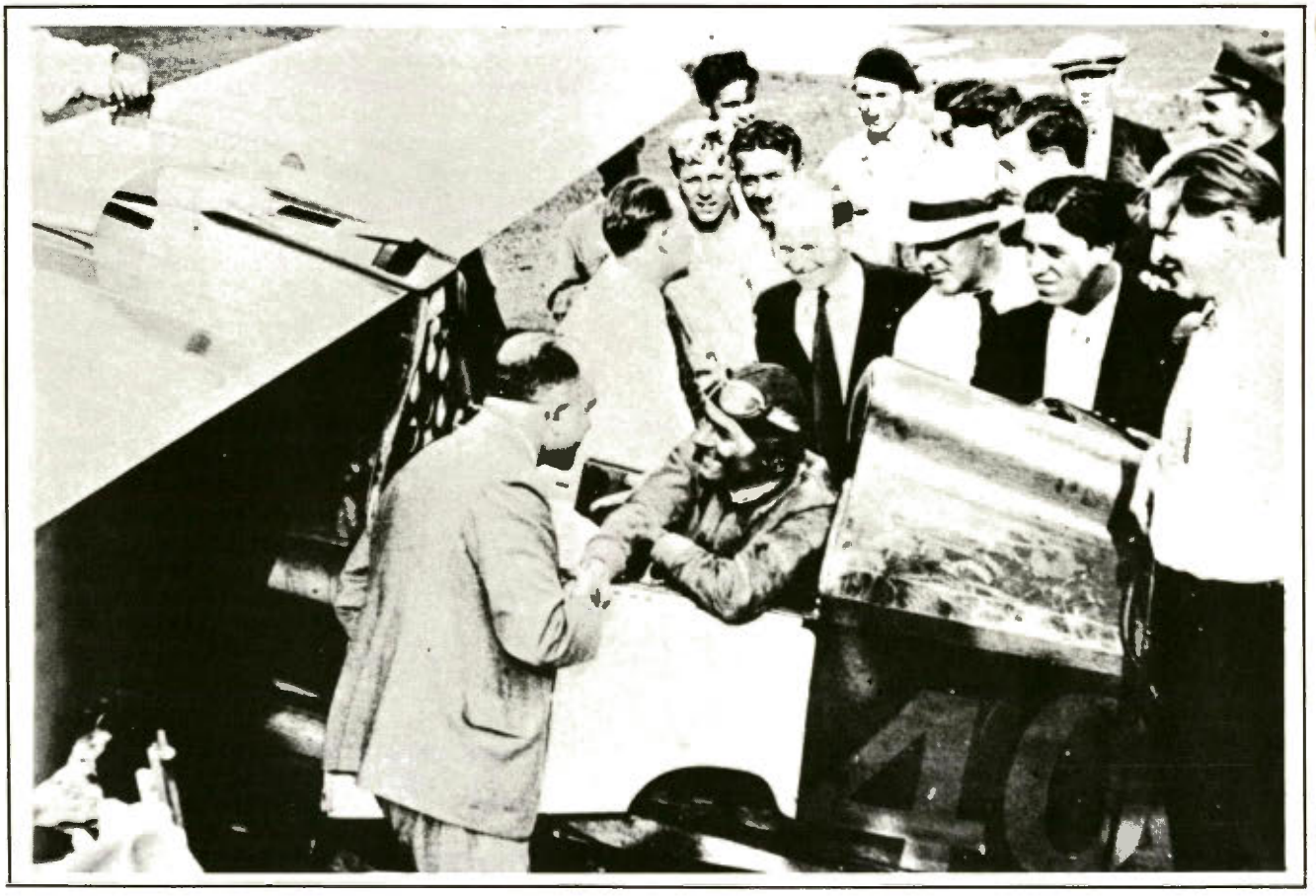
The Bendix Trophy

The superstar of all air shows—the National Air Races—celebrated its Golden Anniversary this fall.

And some of the people who were there when it all began a half century ago returned for this year's edition, now billed as the Cleveland National Air Show.

One of these was 75-year-old Steve Wittman who flew in the 1929 air races and again this year. In fact, he set a national record this year of 166.1 miles per hour over a closed course in a 1600cc, VW-powered Formula V racer.

Also on hand for the event was racing great and World War II hero retired Air Force Lt. Gen. James "Jimmy" Doolittle. He and Wittman exchanged reminiscences of past National Air Races and



The year is 1932 and Jimmy Doolittle receives congratulations from an official after setting a new transcontinental flight record in the "Super Solution," built by Emil "Matty" Laird for the National Air Races. The solution is now being restored at the EAA Museum.

U.S. Air Force "Thunderbirds" frame Cleveland's skyline, which has changed considerably since the first National Air Race was held there a half century ago.

The great racing duo of the late 1920s, Eddie Ballough (left) and Charles "Speed" Holman, both flew Laird "Speedwings," This photo was taken at Ashburn Field in 1929.

Famed designer-builder Matty Laird prepares to test fly his "Super Solution" at Chicago's Ashburn Field in August 1931. Laird also built the "Swallow," which Varney Airlines flew to open America's commercial aviation era.

Benny Howard's famed "Ike" and "Mike" on the south ramp at Chicago's Municipal Airport in the 1930s were among the Thompson Trophy race winners between 1932 and 1935.

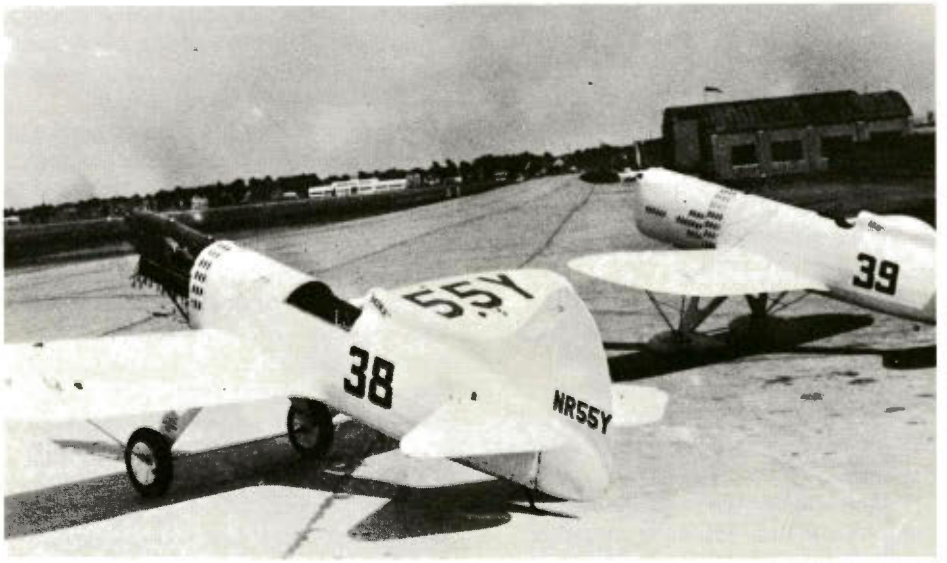


Photo by Neal Callahan

the men and planes that participated in them. Included were Emil "Matty" Laird who dominated the early Thompson and Bendix trophy events with his sleek racers—the "Solution," "Super Solution" and "Speedwing"—as well as such outstanding racing pilots as Roscoe Turner, Charles "Speed" Holman, and Eddie Ballough.

Today the races at Cleveland National Air Show are limited to small, swift and high-maneuverable custom-built aircraft that buzz around a three-mile closed course. The bigger, faster airplanes no longer fly for prizes but may be seen in exhibition flights and on static display by aviation enthusiasts. FAA was represented at this year's show by the Cleveland General Aviation District Office, headed by John Johnson. They began working with the U.S. Air Racing Association on the thousand and one details of the show last February. And, as proof of a job well done, this year's races were free of both accidents and incidents.

Also on hand for the event over the Labor Day weekend, as they always are, was the FAA control tower crew at Cleveland's Burke Lakefront Airport. For them, the races mean a lot of extra work. But, then, they always have the best seat in the house.

By Marjorie Kriz

Training a Generation of Executives

John C. Slover, Employee Development Specialist.

Victor J. Onachilla, Manager, FAA Executive School.

"This is not a school; it is a cafeteria of experience, mostly of your own making," said Vic Onachilla, manager of the FAA Executive School, during the opening session of class 64 last October, which was the school's 20th anniversary class.

Onachilla's presentation is easy going. He doesn't expect the participants to memorize his words. He believes they will learn best by doing.

To carry out their learning tasks, participants are divided into four teams.

In this way, Onachilla feels, the participants will best learn how to function effectively as top managers, and this is what it's all about at the Executive School.

Both in the classroom and outside, it is within the teams—dubbed red, blue, green and tan—that most of the learning takes place. Onachilla explained that participants tend to identify with their teams. During our short visit to the Executive School, we found this to be true. At lunch, for instance, we found several members of one team eating together at the University of Virginia cafeteria. They said they spend a lot of time together outside of the classroom, explaining they had a lot in common and always had plenty to talk about.

Also stressed during the two weeks of training are two interrelated concepts. Half of the training period is devoted to agency management effecitiveness and the other half to personal managerial effectiveness. The agency management-effectiveness portion of the material is discussed by FAA officials from Washington headquarters. The personal managerial-effectiveness half is introduced by guest speakers, Onachilla and his associate John Slover. In this portion of the training, most learning activities are carried on by the teams. Most of the classroom time is spent outlining tasks to be carried out by the teams.

Actually the team concept has been used as a teaching tool ever since the school got started in October 1959. The Exec School has operated continuously since that time, which is longer than any other school of its type in government. Since the first class reported to the school, originally located in Oklahoma City, a total of 1,803 FAA managers have been graduated.

The Oklahoma City location was abandoned after the third class. By then, FAA management was sold on the school, and they wanted it within about a hundred miles of FAA headquarters so that FAA officials could more easily conduct sessions dealing with agency management effectiveness. Charlottesville was selected because it is only 115 miles from Washington and has a good airport.

Until December 1968, classes were held in the Red Cross Training Center, and FAA students were bused in a vehicle affectionately called "The Green Hornet" from the old Monticello Hotel to the classroom building.

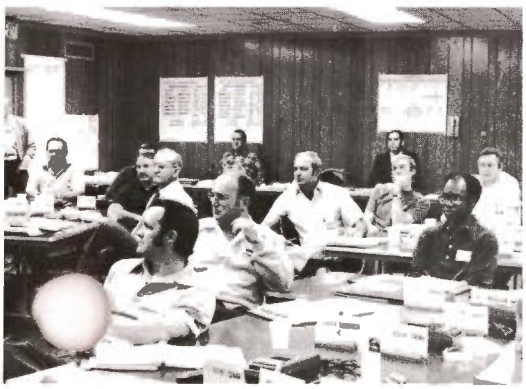
But Onachilla, who has been training executives for 30 of his 38 years with the government, decided that riding "The Green Hornet" wasted too much time. He had the entire operatiion moved to a single building. Currently, students are all housed in a Howard Johnson Motor Lodge and classrooms are provided in the motel.

Onachilla pointed out that no one is required to attend the school. Because of this, most of the participants go to Charlottesville ready to learn and to improve their own effectiveness. "As I said in the first session,"Onachilla went on, "this is not really a school. It is an experience for each participant and not a school that they pass or fail. In most cases, the participants are here because they want to be here.

"But this is not the only way the school is unique," he added. For instance, no two classes have exactly the same curriculum. The subject matter presented is alltuned to the individual class. "Still," he emphasized, "we hope each class will leave with the tools to improve agency operational effectiveness and improve personal managerial skills. We hope to help all participants live a more meaningful work life and a more satisfying personal life."

By Theodore Maher

Executives and potential executives at FAA's Executive School team up to make decisions. Here the FAAers are trying out new ways to work as a team. They are (from left): John Sekman, Office of Airport Planning and Programing, Washington Headquarters; Robert Conrad, New England Region; Raymond Zazzetti (standing) Western Region; and Martin Brazier, Northwest Region.



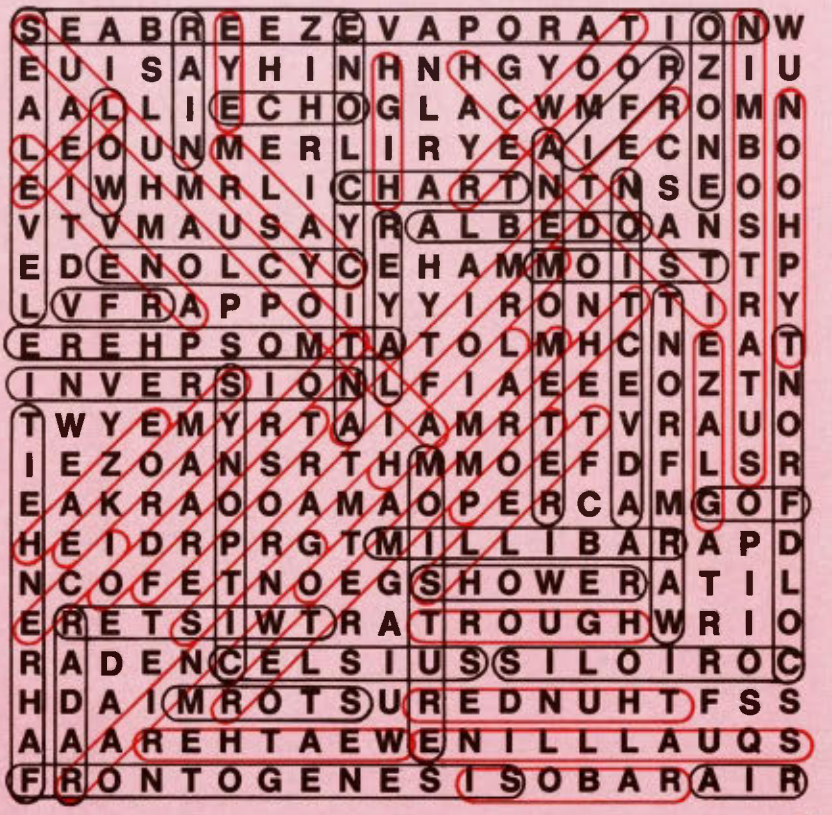
With the "green team" in the foreground, the 64th class listens to "the word" from Neal A. Blake, (Acting) Deputy Associate Administrator for Engineering and Development. Onachilla is standing at the left edge of the picture.

Members of the blue team: San Juan C. Romero of the Cincinnati Tower and Barry Clements, Wichita, Kan., EMDO, eat lunch at the University of Virginia cafeteria.

One of the work teams from Class 48 of the Executive School in May 1974 included (left to right) Frank J. Meehan, chief of NAFEC's Budget Division; Lyndel W. Long, manager of the Austin, Tex., Airway Facilities Sector; Benjamin Demps, Jr., Director of the Mike Monroney Aeronautical Center; Keith D. Anderson, chief of Great Lakes Engineering and Manufacturing Branch, Flight Standards; Terry K. Oliver, chief of the Casper, Wyo., AF Sector; and Robert H. Orr, Executive Officer, headquarters Air Traffic Service.

Word Search Answer

Puzzle on page 8



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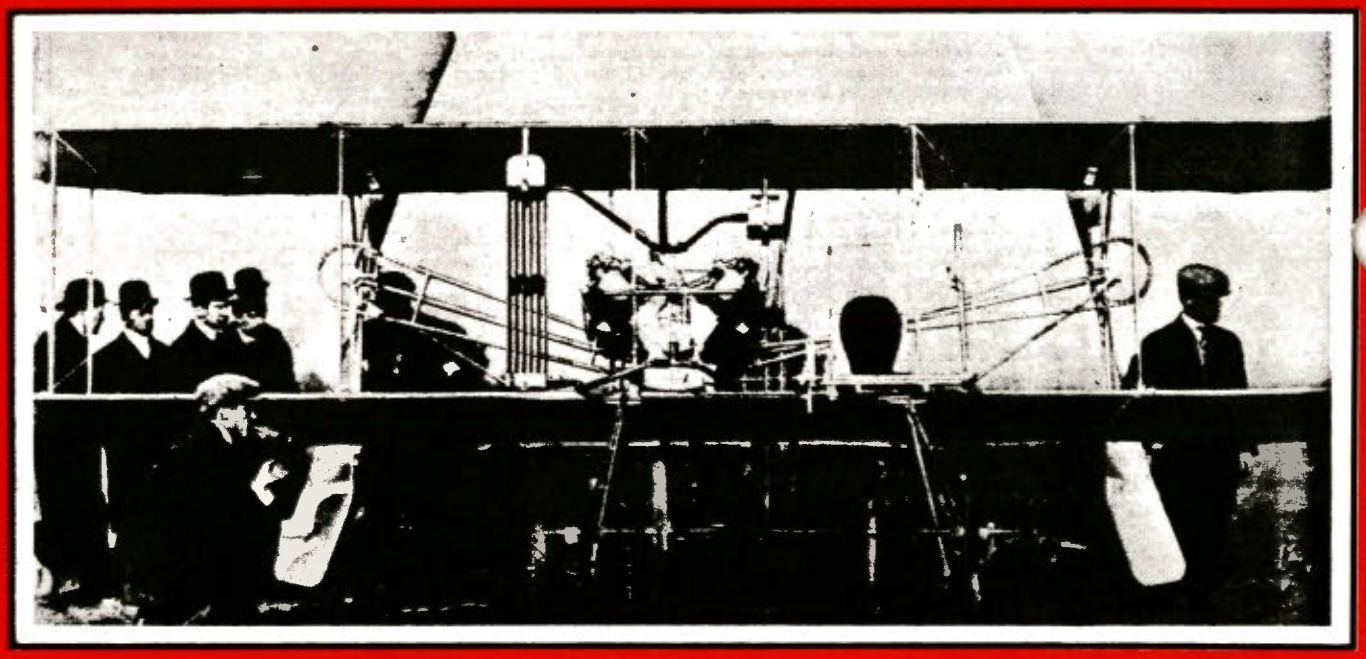

The first president, former president or candidate for the presidency ever to fly was Theodore Roosevelt on Oct. 12, 1910, and none did again for 22 years until his cousin Franklin took to the air on his campaign.

It took place at a St. Louis race-track, courtesy of famed aviator Arch Hoxsey in his Model B Wright Flyer.

The *Washington Evening Star* reported that Roosevelt "made an ascension in an aeroplane lasting 3 minutes and 30 seconds, lapping the field two times, for a distance of four and a half miles."

"I really had no idea of making the trip," TR said, "until I reached the aviation grounds. Just as I arrived, Mr. Hoxsey asked me if I would not sometime make a trip with him. I took off my hat and coat and announced that I was ready to start at once."

On landing, the former president was said to have exclaimed, "Bully! Great! Fine!" to awed spectators. According to Hoxsey, a Wright Brothers employee in St. Louis for an Aero Club meet, he continually had to warn Roosevelt to keep his hands on the "holding rail" because Teddy, his famous teeth flashing, waved his arms so excitedly at the spectators that he came dangerously close to tripping an overhead cord that would have short-circuited the engine.

As a postscript to flying in that era, one month later, Ralph Johnstone, Hoxsey's alter ego in the famed "Stardust Twins," was killed in a crash, and two and a half months later, Hoxsey was killed in the same Wright Flyer when a gust of wind caused a wing strut to give way and the plane crashed.