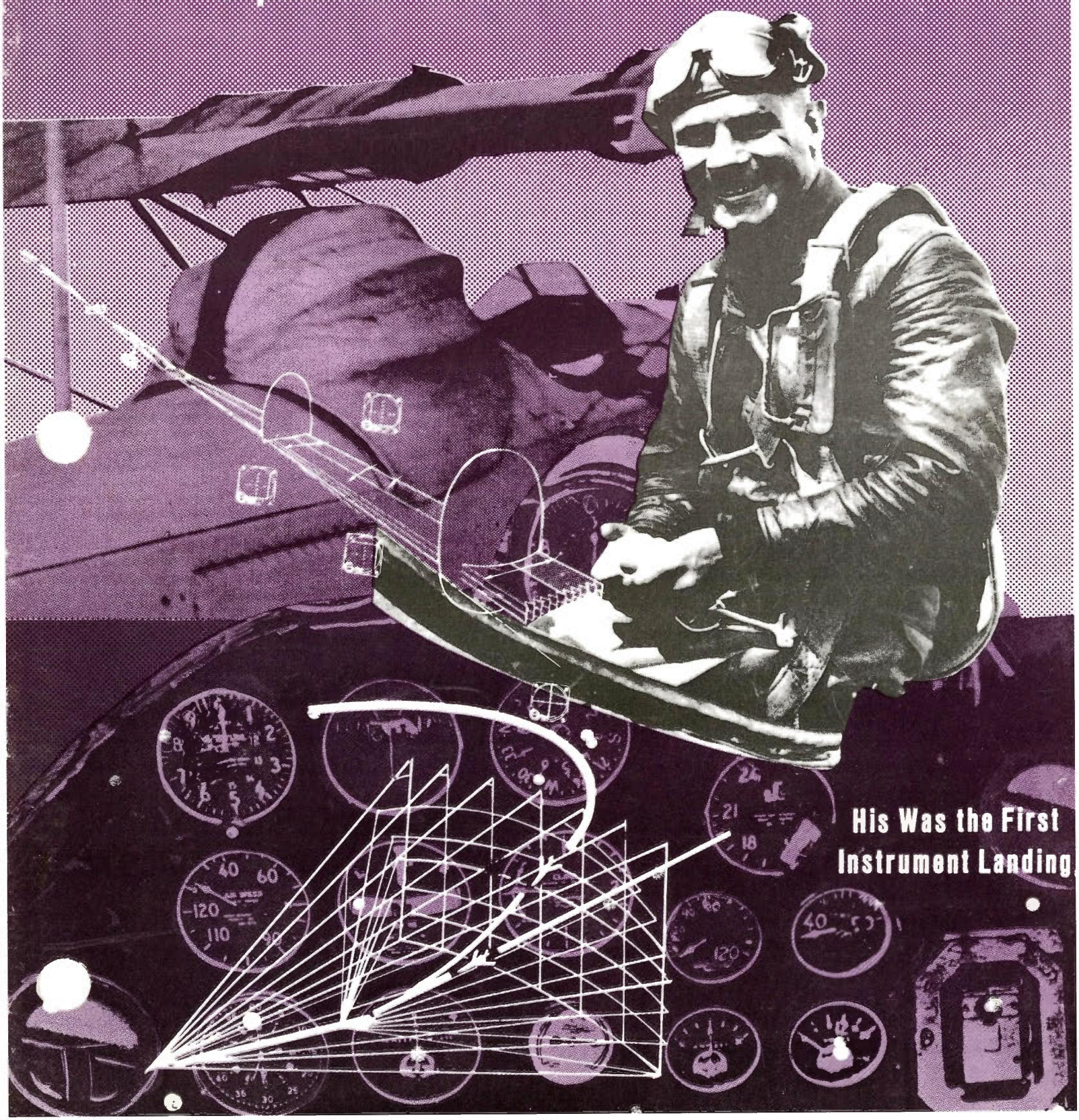
FAA WORLD

September 1979



His Was the First Instrument Landing

FAA WORLD

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Although Florida prides itself on being "the Sunshine State," FAA's Research and Development Service has built a huge umbrella there.

Called appropriately "The Tampa Umbrella," it is woven of air traffic control systems. At the center of the umbrella is a Sperry UNIVAC improved Automated Radar Terminal System (ARTS IIIA) installed at the Tampa International Airport Tower.

Sarasota/Bradenton Airport

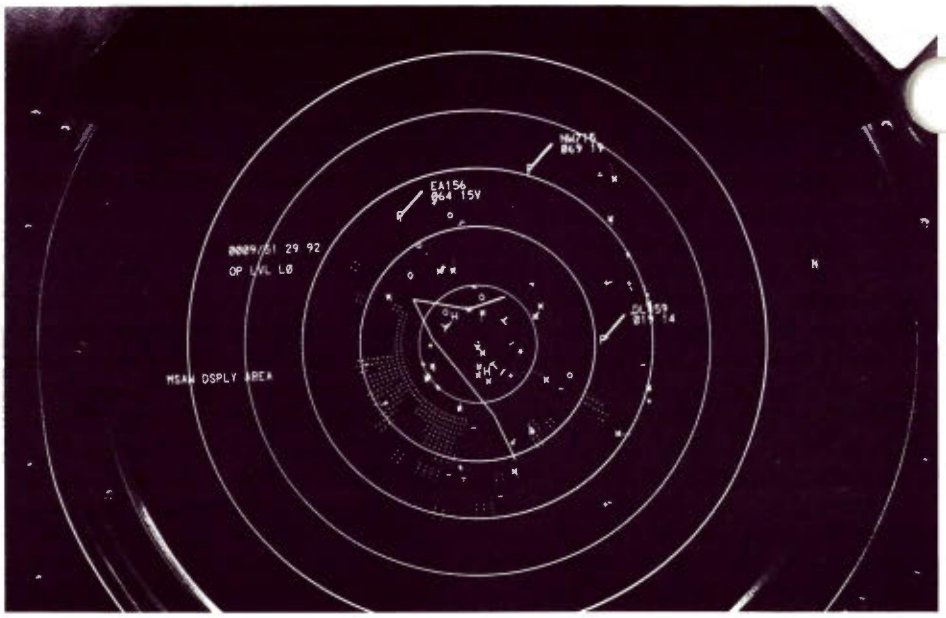
Under a Radar Umbrella

Tampa International —the hub of the radar umbrella.

MacDill Air Force Base

Controller Sarah Hodge at the TCDD at St. Petersburg/Clearwater.

The Tower Cab Digital Display used with the ARTS IIIA carries data tags which can be added by the cab controllers and which will follow the target across the scope.



Also in the Tampa Tower and in the corners of the umbrella at MacDill Air Force Base, St. Petersburg/Clearwater Airport and Sarasota Airport are Tower Cab Digital Displays (TCDDs) recently developed by Magnavox. Flight information from the ARTS IIIA is being remoted to the air traffic control towers at these airports, along with information from a new radar installed at Sarasota. This isn't the first time that radar data has been remoted from a hub to satellite airports, but what makes the Tampa experiment unique is the format in which this information is being sent.

In the past, raw radar data has been transmitted from one facility to another via microwave relay towers. But in west Florida, ordinary, but highly reliable, telephone lines are being used because the format of the data has been altered: The electronic impulses from the radar are converted to digital form at the radar site by a Sensor Receiver and Processor (SRAP) before it is transmitted.

Here's how it works: data from the Sarasota radar is digitized at the radar site by the SRAP, then the digitized data is sent to Tampa over a telephone line. There the Sarasota radar information is processed by the ARTS IIIA and displayed in the Tampa radar room. This display, complete with the flight information stored in the ARTS IIIA, is transmitted back to the Sarasota, St. Petersburg/Clearwater and MacDill cabs, where it is also displayed after being routed through the UNIVAC Remote Display Buffer Memory (RDBM), which translates the message into letters and numbers that are written electronically on the controllers scopes.

At the satellite airports, the scopes are not located in dimly lit radar rooms but in the glass-enclosed tower cabs. Nevertheless, controllers will have no trouble seeing the picture clearly on the new TCDD—it will be just as readable as the displays in the radar room.

Although, in the past, controllers in a tower cab had to get along with a BRITE scope display solely remoted from the radar room, this is no longer the case. While radar room controllers can add flight information to an ARTS IIIA display by using a keyboard and track ball, now cab controllers can, too. When a controller "punches in" a plane's identification on the TCDD, that identification will continue to follow the blip as long as the target is on the screen.

Another feature that makes the ARTS IIIA-based system unique is the fact that it tracks both beacon and primary radar targets and sends data on all targets to satellite airports. This means that the picture generated by the ARTS IIIA computer can be used as the basis of a total air traffic control system, since it shows all aircraft in the area.

Built into the system is both a fail-safe and fail-soft back-up, which will assure air-traffic service even in the event of an equipment failure.

If, for an example, there is a failure in any of the computer processes or memory, the system will automatically compensate for this and recover. When such a failure occurs and the system switches to a fail-safe mode, none of the services will be reduced. On the other hand, if back-up components are not available and the system switches to a fail-soft mode, some of the less-critical services may be eliminated, but essential services would still be on line. In the fail-soft mode, controllers would still see data blocks associated with beacon targets, but primary radar targets would no longer be accompanied by data blocks.

From a controller's point of view, the primary benefits of the new ARTS IIIA-based system is the fact that it will eliminate or greatly reduce the amount of time spent handling routine details.

In essence, the agency is setting up minimum cost radar rooms in tower cabs at satellite airports.

The experiment at Tampa will be watched carefully by air traffic control planners, since the Tampa umbrella is envisioned as a model for future systems in complex metropolitan areas.

Tampa is deemed an ideal proving ground because it contains all the ingredients of a large metropolitan hub area. In the Tampa-St. Petersburg-Sarasota area, there is a mix of general aviation, military and airline air traffic. There are a number of satellite airports and enough traffic to adequately test the new system and new concepts.

What works in the Tampa area is believed will also work in the New York/Newark, San Francisco/Oakland or Chicago areas.

By Theodore Maher

Neil Edward Goldschmidt accepts congratulations from Oregon Supreme Court Justice Hans Linde after having been sworn in as Secretary of Trnasportation. His wife and children look on.

The Secretary Is a Doer

Neil Edward Goldschmidt, the sixth Secretary of Transportation, has a reputation as a doer.

Appointed by President Carter last month, Mr. Goldschmidt has been described as a "sharp, serious urban planner" and as "one of the best of a new breed [who] emphasizes issues rather than the cultivation and manipulation of political loyalties."

Now 39, he earned his credentials as the mayor of Portland, Ore., one of the youngest to accede to such a job in 1972. There he built what former Transportation Secretary Brock Adams and B. R. Stokes of the American Public Transit Association termed one of the best mass transit systems in the country. Mr. Stokes adds, "Neil galvanized the business and [civic] leaders of his city into placing a high value on mass transit."

Mr. Goldschmidt was born in Eugene, Ore., attending school there and at the University of Oregon where he was the student body president. Upon graduation, he was selected to serve as an intern for Sen. Maurine Neuberger in Washington.

In 1964, he left the capital to join Charles Evers in Mississippi to help in a voter registration drive. Shortly thereafter, he entered the Boalt Law School of the University of California, receiving his LL.B. in 1967.

After his admission to the Oregon Bar that year, he settled in Portland and worked with the Legal Aid Service.

In 1970, Goldschmidt ran for the Portland City Council and won handily, repeating for the mayoral post in 1972. He was reelected in 1976.

The new Secretary has served as Chairman of the U.S. Conference of Mayors Standing Committee on Housing and Community Development and the *Ad Hoc* Housing Task Force. He iscco-chairman of the National League of Cities Energy Task Force. He represented the U.S. as an alternate to the United Nations Economic Commission for Europe and the U.S. Young Political Leaders as a delegate to the People's Republic of China. Last year, he was elected to the Board of Trustees of the U.S. Conference of Mayors.

His family consists of his wife, Margie, and two children, Joshua and Rebecca.

Those who know him say he is very intelligent, a team player and a good administrator who possesses a warm personality, even turning to pranks to make a point.

In that he thinks in terms of transportation problems—not freeway problems or mass-transit problems, according to Portland's director of planning, it was only natural than Neil Goldschmidt would innaugurate Bike Day in Portland by riding a bicycle to city hall on his last day as mayor.

WORD SEARCH

By William Carey
ATCS, Harrisburg FSS
New Cumberland, Pa.

Among other things, place names are a major part of the vocabulary of a specialist in a flight service station. This month's puzzle deals with the familiar and not-so-familiar geographical terms used in relation to weather.

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

Use the word list if you must, and you must for some of the abbreviations, but try covering it first. All 61 can be found. Circle those you do find and cross them off the list. The term "coastal waters" has been circled to get you started. When you give up, the answers may be found on page 15.

ALABAMA
APPALACHIAN
BAJA
BASIN
BAY
BEACH
BOOT HEEL
CANADA
CANYON
CAPE
CASCADE
CATSKILLS
CITY
COASTAL PLAIN
COASTAL WATERS
COASTS
CONTINENTAL DIVIDE
DEATH VALLEY
DELTA
ERIE
FALLS
FLATLAND
GAP
GULF
HURON
IDAHO
IFR
IOWA LAKES
ISLANDS
KANAB
KEYS
LAKE
LAND
MEXICO
MISSISSIPPI
MTNS OF SC
NEVADA
OCEAN
OHIO
OKLAHOMA
OLYMPIC
OZARKS
PIEDMONT
PLAINS
PLATEAU
PLATTE
PUGET SOUND
RIVER
ROADS
ROCKIES
SACRAMENTO VALLEY
SAND HILLS
SEAS
SHASTA
SMOKY
STRAIT OF JUAN DE FUCA
TETON
LAKES
VFR
WEST OF PECOS
WHITE MTNS

SMALL WORLD

BITING THE HAND THAT FEEDS YOU . . . You all probably think that writing this column is a snap—something the editor dashes off with his left hand while he's stuffing tacos with his right. Well, you're dead wrong. After five years of trying to scrape up homourous copy for this column every month, we've just about come to the conclusion that there's nothing funny about working for FAA. Now, at long last, someone has taken pity on us and actually submitted an unsolicited "Small World" item—the first one we've ever received. Not surprisingly, then, we're running it verbatim with a tip of the hat to Gary Krupczak of the Ann Arbor, Mich., tower: "Are all the stories heard about controllers being chronic nervous types really true? A certain dentist from the Detroit area will certainly attest to the validity of that statement. On a recent routine visit by an air traffic control specialist, the dentist was amazed to find a large piece of fingernail lodged between the teeth of the controller. Maybe a nationwide survey of all controllers' dentists would add even more credence to the rumor about controllers having bad nerves."

THE NOSE KNOWS . . . Last month, we told "Small World" readers how the Coast Guard was training pigeons to spot survivors of marine and air accidents. This month, our animal feature focuses on an FAA project to train gerbils to detect explosives that hijackers or terrorists might try to smuggle aboard an airliner. Approximately 30 gerbils are being used in the project, which is being conducted by the V.A. Medical Center in Philadelphia under an FAA contract. The research team is trying to determine if gerbils' have the ability to detect particular odors and signal their findings to law enforcement officers. No one really knows at this point whether gerbils can do the job effectively over an extended period of time in a noisy airport environment, but everyone agrees that the possibilities for improving airport security are intriguing. Besides, gerbils have certain advantages over dogs, which now are used to sniff out bombs at airports, according to the project manager. They don't require walking or petting or grooming and they'll never take off to chase a cat. Well, maybe so, b "Small World" doubts that you could tra one to fetch your paper or your slippers. And would you really want one to lick your face?

DIRECT LINE

Q **Major airlines with Service B capability formerly transmitted their flight plans directly to the ARTCC. Now they are encouraged to transmit them to the FSS/IFSS for retransmission to the center and other addressees, reportedly so that the facility may take a flight-plan count. Since I don't see a reason for this change, I'd like to know if it's a local or a new national policy.**

A There is no local or new national policy on transmitting flight plans to the center and other addressees. It does not represent a change; this procedure has been in effect for many years. You say that airlines were sending their flight plans directly to the ARTCC. This is not entirely correct, for most airlines were filing them—in your region—with the Anchorage IFSS, which in turn transmitted them to the ARTCC. This procedure is not designed for an extra flight-plan count—in fact, the count is being eliminated in determining the total number of flight service activities. The FSS and the IFSS were combined in September 1978, and the specialists are now sending ICAO flight plans, which they had not done prior to the merger. The reason we're doing this now is because the International Civil Aviation Organization rules of the Air Traffic Services state that "filed flight-plan messages shall be originated and addressed by the air traffic service unit serving the aerodrome of departure or, when applicable, by the air traffic services unit receiving a flight plan from an aircraft in flight." (ICAO Document 4444, Para. 3.3.3.4.1.) The FSS/IFSS is that unit for Anchorage International Airport. In addition, agency Handbook 7210.3, Para. 2086, makes provision for prefiled flight plans between the concerned flight service station and any scheduled operator, preferably certificated under FAR Part 121 or 135, or military desiring to prefile flight plans.

Q **Why do there appear to be two basic procedures that apply to the same aircraft. In Order 7110.22B, dated Mar. 19, 1973, Arrival and Departure Handling of High Performance Aircraft, there is one procedure outlined; in Order 7110.72, dated November 15, 1976, Local-Flow Traffic Management, and Order 7110.73 dated Feb. 28, 1977, Profile Descent Procedures, there is a similar procedure outlined. I have been unable to determine if Order 7110.22B is still effective or not, although that is the procedure that our chief wants used. We do not have in our facility the procedures in 7110.72 or 7110.73, nor can we apply the ones in Handbook 7110.65A, Para. 233.**

A Each facility maintains a directives checklist, and this list will readily identify which orders are current. We agree there are similarities in the two orders you mentioned. You have to understand the basic intent and scope of the individual orders, however, if you are to make proper use of each. The basic intent of Order 7110.22B is noise abatement and is necessarily broad because its principles can and must be applied to every controlled airport in our system. The basic intent of Order 7110.72 is fuel conservation, along with aircraft performance. Although Order 7110.72 is very similar to Order 7110.22B, when referring to procedures below 10,000 feet, Order 7110.72 cannot be applied to every terminal or airport. This order addresses metering, profile descents, etc., which are very difficult to apply at most non-radar facilities. It supersedes Order 7110.22B where the provisions of 7110.72 can be applied. Where they cannot, then 7110.22B will be followed. The same type of situation exists with Order 7110.73 and Handbook 7110.65A, Para. 233. They should and will be applied where possible and practical.

Q **Our office is remotely located on an airport and is off the beaten track for public transportation and places to eat. There is a small coffee shop at our office that all employees must use if they do not go out for lunch. The nearest suitable cafe takes about 20 minutes round trip to reach, leaving about 10 minutes for lunch. The minimum time needed for lunch this way is about 35 to 40 minutes. Is travel time allowed in a situation like ours or should annual leave or comp time be used if we can't make it back within 30 minutes?**

A What can be done is to increase the lunch period not to exceed one hour, in accordance with Handbook PT P 3600.3, Workweeks and Hours of Duty. Naturally, work time must still be at least eight hours, so the total day would be longer. However, if eating out were done infrequently, charge to annual leave or compensatory time would be the proper action. There are no circumstances in which travel time could be allowed. If you wish to pursue changing your lunch period, have your supervisor contact the Personnel Management Division experts through channels.

Q **Under the new Civil Service Reform Act where the pay increases of managers and supervisors GS-13 to 15 will be linked to performance, just what constitutes a supervisor? Is it that outlined in the position description of the Supervisory Grade-Evaluation Guide by the old Civil Service Commission or the definition of supervisor outlined in the Civil Service Reform Act? The latter would not seem to cover the many supervisors on the firing line that cannot "hire, direct, assign, promote, reward, transfer, furlough, layoff, recall, suspend, remove or adjust the grievances of employees." These supervisors can direct or assign and can recommend these other actions to their own supervisors. If the definition under the new law prevails, wouldn't all these supervisors remain in the step-increase category?**

A To determine coverage under the merit pay provisions of the Civil Service Reform Act, the definitions of supervisor and management official outlined in the Act will be the criteria used. Whether or not an employee's position is titled, "supervisory" based on the Supervisory Grade-Evaluation Guide is not a consideration in making the coverage determination.

FEDERAL NOTEBOOK

PLAYING CATCHUP

This summer, the General Services Administration boosted the mileage rate paid for the use of privately owned cars from 17 cents to 18.5 cents in response to increasing gasoline and other costs.

PARKING UNCAPPED

For those Federal employees who park free or at cut-rates at the job, the day of reckoning has been postponed 30 days. Where GSA appraises the fair rental value of the property used for parking at $10 a month or more, based on commercial rates in the surrounding area, Federal employees will be required to pay one-half the going rate as of November 1. A year or so later, the fees will be increased to full price. Where the value of the space is under $10, parking will remain free. The purpose of the fees is to encourage carpooling, vanpooling and the use of mass transit.

PAY, NOW AND TOMORROW

In recognition of the impact of higher-than-expected inflation on Federal salaries and the fact that private industry salaries have exceeded the guidelines, President Carter has recommended to Congress a flat 7 percent pay increase for most Federal employees effective with the pay period that begins after October 1. The lowest paid employees--those earning under $8,900--would receive more than 7 percent under the President's plan. The President's pay agents had proposed a sliding-scale boost averaging 10.41 percent, but that was deemed too costly. ■ Meanwhile, the White House's Council on Wage and Price Stability is reported to be considering adjusting upward the observed-in-the-breach 7 percent national wage guidelines. ■ While the AFL-CIO executive council rejected a call to boycott U.S. Savings Bond purchases as a means of protesting the 5.5 percent pay cap, there have been sharp drops in Federal employee purchases, which have been accounting for more than 13 percent of the $8 billion purchased annually. Although the lower-key boycott may be having some effect, the Treasury Department believes it's more a reflection of economic conditions, as is the general decline in personal savings. ■ Congress appears to be in no mood to rush through the President's pay reform legislation, which proposes to require total compensation--including fringe benefits--to be used as a basis for comparability pay, to establish locality pay and to include state and local government pay in comparability surveys. ■ The National Association of Counties has refused to endorse the pay reform legislation.

FOR A BRIGHTER SMILE

Rep. Gladys Spellman (Md) has introduced a bill to provide prepaid dental care to Federal and postal employees. Hearings will be scheduled after staff work to determine the desirability and costs of four types of plans and industry attitudes, although she believes that dental care should be part of a full health care program.

HOLIDAY PROPOSED

As part of his pay reform legislation, President Carter has proposed that the birthday of Martin Luther King, Jr., January 15, be declared a tenth Federal holiday.

They Needed a Guiding Light

Working in sub-freezing weather last spring, three of the four members of the crew installing REILs at Rock Springs, Wyo., were (left to right) electronics technician Amos Bush and maintenance mechanic Bob Pauley of the Rock Springs Sector Field Office and Harold Bray, Casper, Wyo., Sector engineer. The fourth, Roy Hewitt, was scrounging for parts.

A quick reaction to a public need is the business of government, and Airway Facilities technicians in Rock Springs, Wyo., gave a full measure of speed in solving an aviation-safety problem.

It happened at the Rock Springs Sweetwater County Airport where, despite a published Notice to Airmen (NOTAM) and closed-runway markings, business jet pilots insisted on landing on the wrong runway. A new runway was being constructed that nearly paralleled the old one, and the new blacktop prime coat proved to be much more visible on a VOR radio-navigation approach than the active, weathered runway.

The Rock Springs FSS chief, Joseph Kruljac, called the region's Airports Safety and Certification office to say that he had a pilot in his office who said that he could not see the "X"s on the new runway until on short final, and didn't see the active runway until he started his go-around.

It wasn't the first time they had been aware of some confusion, so Kruljac and Airports engineers discussed marking the active runway for increased visibility. It was decided that runway end identification lights (REILs) should be placed on the end of the active runway. A call was put in to Flight Standards specialists who agreed that the condition was critical. The engineers then contacted the regional Airway Facilities Division, and a search began for the necessary equipment.

In the meantime, Airports engineers coordinated the project with Casper, Wyo., AF Sector technicians and local and county representatives. The equipment was located in various parts of the region. Exactly one week later, the REILs were installed and commissioned.

As if to demonstrate the validity of FAA's speedy action, while the installation crew was testing the lights just prior to commissioning, a military C-131 with one engine out, making an emergency landing, was on approach and lined up on the closed runway. The FSS specialist on duty advised the pilot to make a shallow turn, allowing the pilot to see the REILs, make a correction and land safely on the open runway.

Within an hour of the commissioning, the airport manager received two telephone calls from pilots expressing their relief and appreciation for the REIL installation, which diverted them to the proper runway.

It was a timely solution to a pressing safety problem.

By Al Barnes

Faces a

BIG BIRDS HER BEAT—*Carol Rayburn of the Salt Lake City Flight Standards District Office is the first woman inspector to be assigned as a principal operations inspector to a company operating large carrier-type aircraft—Key Airlines.*

UNDERSTANDING EMPLOYER—*With or handicapped, the Oklahoma Association fo the Mike Monroney Aeronautical Center as the Year." Rachel Denton of the associati Thomas J. Creswell, former director of the*

BIG BUCKS—*Alice Drewdson, programming specialist, and Richard Griffith (left), project engineer, turn over a check for $3,083,298—the largest ever by FAA to an Alaska airport sponsor—to Robert Ward, state commissioner, Department of Transportation, for work on the new Anchorage International north-south runway.*

FIRSTS—*Oakland Center cont ony is believed to be the first ATCS to rue in an U-2 aircraft, which he did at Beale AFB. It's thought he set a record for downing traditional yard of beer after the fligh ounces—in just over 15 min.*

JOB COMPLETED—*Jack Sain (left), New England Flight Standards Division chief, and Lou Musacchio (right), Engineering and Manufacturing Branch chief, present the type certificate for the new JT8D-209 engine to Walter Hemlock of Pratt & Whitney, culminating two years of work.*

ıd Places

in 14 center employees
Retarded Citizens named
Handicapped Employer of
presented the award to
eronautical Center.

A REAL ACHIEVER—*Barbara Hertan of the Teterboro, N.J., FSS has become the Eastern Region's first evaluation and proficiency development specialist. In addition, she has run two businesses, raised a family, is a pilot and is involved in a variety of sports. She's included in the 1979 "Who's Who in American Women."*

RAMP-SIDE SERVICE—*Weather briefings for 32 balloons from all over the U.S. at the annual Balloon Stampede were given by (left to right) team supervisor Dick Allen, chief Larry Hendriques and EFAS specialist Jim Fisher, all of the Walla Walla, Wash., FSS.*

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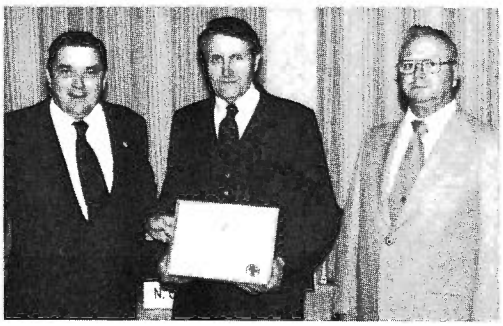
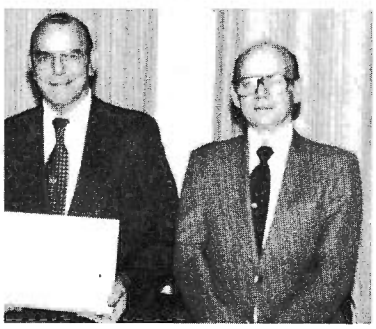
WIDENING HIS CIRCLE—*Electronics technician Raul Parra made it to the White House. The Albuquerque Center computer technician was invited as one of 30 editors and news directors to a briefing by President Carter. He has recently become the news director of KMXN-TV, a Spanish-language station in Albuquerque.*

TURNABOUT—*It's a switch for a state agency to praise FAA facilities, but Norman Crabtree, deputy director of the Ohio Division of Aviation, presented award certificates signed by the governor to three Ohio GADOs for having the lowest accident rates in the region. From the left are Crabtree; John Blohm, Cincinnati chief; William Keiser, his Accident Prevention Specialist; Anthony DeSilvio, Cleveland chief; Jerrold Kuzia, Accident Prevention Specialist; Edward Eisele, Columbus chief; and Terrance Culley, Columbus APS.*





The 37 Days of the DC-10

"I think in retrospect that I picked the course that best protected American aviation and the flying public."

The Administrator Explains

The second hardest decision I ever made was the one to ground the DC-10.

The hardest was to lift that grounding.

During the approximately six weeks the DC-10s were on the ground, I was criticized for grounding the DC-10 when the evidence didn't justify action that strong. In other words, I was what you might call too decisive. I shot from the hip.

On the other hand, when I finally let

On July 8, the agency's report on the DC-10 crash was ready at the Western Region printing shop. Some of the members of the FAA team that prepared it include (left to right) Keith May, Southern Region; John Varoli, Eastern Region; Charles Foster, Associate Administrator for Aviation Standards; Jerome Doolittle, Assistant Administrator for Public Affairs; Clark Onstad, Chief Counsel; Tony Broderick, technical advisor to Foster; James Robinson, Engineering and Manufacturing Division; Administrator Langhorne Bond; Arthur Pidgeon, New England Region; Arnold Anderjaska, Structures and Interiors Section of Technical Standards; Carl Schellenberg, Assistant Chief Counsel, Regulations and Codification Division; Robert Weaver, Southwest Region; Barry Clements, Wichita, Kan., EMDO chief; and Bob Allen, chief of the Airframe Branch.

the DC-10s fly again, I was criticized for using the traveling public as guinea pigs before the plane was proven safe. According to this theory, then, I was reckless, irresponsible and in bed with the industry.

In other quarters, I was criticized for not having let the planes back in the air much more quickly, as so many foreign countries had.

According to this theory, I was overcautious, and not responsive enough to the financial problems of the industry. After a while, I began to find something encouraging in this confusing crossfire. If I was under attack from both extremes, I must be doing something right.

To be serious, I did doubt myself at times, but I think in retrospect that I picked the course that best protected American aviation and the flying public.

I'd like to describe for you the problems I faced along the way, the solutions I came up with for those problems and some of the reasoning behind those solutions.

The first clue we had to the crash of Flight 191 was the famous bolt that shocked the public so much—one tiny bolt, or so it seemed in some news accounts, which held tons of engine to the wing of a giant jet. This impression was totally wrong, of course.

But still, the discovery of the thrust-link-assembly bolt gave us a valuable piece of what turned out to be a much larger puzzle. The bolt was found Sunday, two days after the crash. That evening, the National Transportation Safety Board recommended that we issue an airworthiness directive ordering the inspection of thrust-link bolts on all DC-10 aircraft in the U.S. fleet.

The next day, Monday, I ordered inspection of the pylon aft-bulkhead, as well as the thrust-link bolt, because our engineers thought there might be problems in that area, too. By Tuesday, results had started to come in. Discrepancies were showing up throughout the fleet, in many different areas of the pylon.

That same day, I grounded all DC-10s until they could be inspected even more thoroughly. Those inspections had to be repeated every 100 hours of operation or 10 days, whichever came first.

The point I'd like to make here is that I was waiting until I had the facts in hand before I took action. But one big fact I had, right from the beginning

was that the DC-10 had safely flown more than four million hours since it was certificated in 1971. A decision to ground the DC-10 immediately after the Chicago crash would have ignored this important fact.

By the second of June, both the safety board and our own investigators were coming up with evidence pointing to the role of maintenance procedures in causing certain cracks we had found in the aft-pylon attach structure. At first I was hopeful that a major part of the problem was about to be solved. If we could be sure that the suspect cracks were caused by using a type of forklift to dismount and remount engine and pylon as a single unit, then the fix was easy.

But on the night of Tuesday, June 5, our technical staff confirmed the existence of new cracks—so big the mechanics spotted them visually—in two American Airlines DC-10s in San Francisco. The planes had been inspected less than a 100 flight hours before, and no cracks were found.

It was possible, of course, that the mechanics who did those earlier inspections had simply missed seeing the cracks. But I couldn't base a decision on possibility.

I ordered three parallel investigations into the DC-10. One was headed by Prof. Raymond Bisplinghoff, former director of NASA's Office of Advanced Research and Technology. The other members of this independent team were Profs. James Mar of MIT and Lucien Schmit of UCLA and Dr. Charles Tiffany of Boeing-Wichita.

The team's initial assignment was to investigate the engine pylon failure of Flight 191, to draw conclusions from the investigations being conducted by the FAA and by McDonnell Douglas and to recommend measures to ensure structural integrity of the pylon assembly.

"... our procedures for certifying and maintaining the safety of aircraft ... are [not] flawed in any basic way."

The second branch of the overall investigation was headed by John Cyrocki, a former regional director of the FAA and government accident investigator who came out of retirement to help.

His 24-man team of FAA maintenance experts and lawyers reviewed the maintenance records and related documents of the eight U.S. carriers which fly DC-10s. They also made on-the-spot observations of maintenance procedures being carried out. They took 32 sworn statements and examined tens of thousands of airline documents on maintenance and airworthiness procedures. Before they were through, they had put in more than 4,000 man-hours.

The third and longest investigation was headed by James Robinson, Chief of the Engineering and Manufacturing Division of the FAA, and Carl Schellenberg, the FAA's Assistant Chief Counsel for Regulations and Enforcement.

Twenty-two FAA engineers, safety specialists and lawyers from all over the country were assembled in Los Angeles near the McDonnell Douglas plant in Long Beach. Eventually, more than 1,000 people were involved in the study, including hundreds of engineers and specialists from McDonnell Douglas, 40 FAA field inspectors and some 80 airline representatives.

The FAA personnel involved in this on-site investigation were divided into four teams. One reviewed pylon design; one looked into the DC-10's service bulletins; one went over airworthiness directives and service difficulty reports; the fourth investigated quality control.

The pylon-design review team also went into basic loads for the airplane and the correlation of analytically derived loads with loads obtained under test conditions, as well as external-loads derivation and stress analyses for both sound and partially failed pylons.

The records-review team evaluated the quality-control systems records for the DC-10's pylon-assembly manufacturing and installation—all the way from procurement of raw materials through installation of the completed pylon-engine assemblies on the airplanes. The various teams examined more than 1,500 field service reports and 2,365 service-difficulty reports from 1971 to 1979.

In addition, four FAA engineering test pilots and four FAA air-carrier operations inspectors who are also jet-rated pilots were called in. Each flew a dozen take-offs in flight simulators to re-enact the problems faced by the crew of the crashed aircraft.

And two DC-10s, specially instrumented to measure stresses, were flown on three flights by McDonnell Douglas crews accompanied by FAA technicians. This was to revalidate the original data on design and strength of various parts of the engine pylons.

The whole investigation—from the time I grounded the DC-10 fleet until I let it fly again—took 37 days. These studies explain in part why it took so long. But other factors enter in as well.

The problem of the cracked aft bulkhead flange, found in the pylon of Flight 191, would not have taken long to solve by itself. But there was also the problem of whether the pylon design met our fail-safe criteria. That took time to answer.

And there was the problem of the San Francisco flange cracks, which we had to assume were not caused by maintenance until we found differently. That took time, too.

Then there was another difficult

oblem, which I have not yet mentioned. The inspections we ordered had turned up serious cracks in an entirely different area of the pylon on a United DC-10.

In this case, the upper spar web was so badly cracked that it had literally shattered. Maintenance seemed unlikely to be the culprit—and we had to assume that whatever had caused the damage might cause it on other planes as well. We had a number of suspicions, all of which took time to check out. We eliminated engine shutdown, hard landing, rough operation of the engine, turbulence and finally sonic fatigue as causes of the cracks.

The Bisplinghoff team finally came up with the answer—deficiencies in assembly. Knowing the cause, at last, we could prescribe a cure and be confident that inspection would stop recurrence of such extensive damage.

Then, what turned out to be the final problems came up: Whether the DC-10 needed locks on the leading-edge slats and whether the stall-warning and stick-shaker systems were adequate. These took more time to work through.

And then, at the very end of the process, the rigorous pre-flight inspections I ordered began to turn up cracks in a brand-new location—the center spar web-attach angle inside the pylon. Again, these cracks turned out to stem from assembly. They could be spotted and brought under control by adequate inspection.

I should point out, incidentally, that every one of these problems—including the flange cracks—could just as well have applied to the 30 and 40 series as to the 10s.

All in all, the DC-10 investigation had turned out to be the most exhaustive such investigation ever undertaken. I imagine it was the most exhausting, too.

I'm very grateful to the men and women who took part in the effort to return the DC-10 fleet to the air. Some work for McDonnell Douglas, some work for the FAA, some work for the carriers. All of them gave up vacations, weekends and normal family life till the job was done. All worked long hours, late into the evening and sometimes all night.

The accident in Chicago threatened American aviation leadership. If our certification procedures were unsound, if one of our wide-body jets was unsafe, then the effects would spread far beyond the DC-10.

Most leaders in the American aviation industry were fully aware of this. I was heartened and encouraged by the support I got from industry in my efforts to push through an investigation that would establish once and for all, throughout the world, the reliability of the DC-10.

I was conscious every minute of how much the grounding of the DC-10 fleet was costing in dollars and in passenger inconvenience. I was conscious of the international problems posed by the decision of some foreign countries to let the planes fly again after close inspection.

But I was more conscious of safety and of the long-range integrity of American aviation. That integrity is tied closely to the integrity of the FAA itself. It is important that Congress and the courts have confidence in our responsibility, judgment and competence.

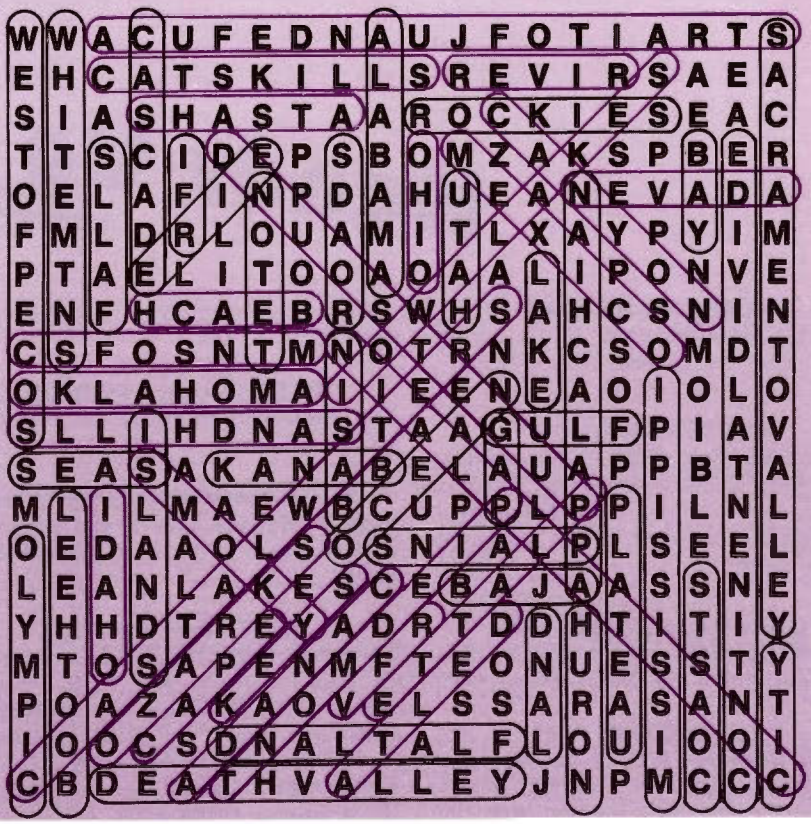
Congress gave us responsibility under the law for air safety; if that responsibility is not to shift back to Congress or the courts, we must demonstrate that we are qualified to bear it.

In ordering such a thorough investigation into the DC-10, I meant to do this. And I think we succeeded in building an unassailably solid foundation of fact. The conclusions we have drawn from that mountain of data, I believe, are equally solid.

The investigation not only uncovered and corrected certain weaknesses in a particular aircraft; it also uncovered certain weaknesses in the maintenance and certification procedures followed by the industry and by the FAA. And the investigation set us on the path to

World Search Answer

Puzzle on page 6



eliminate those weaknesses.

We found that no pattern appeared in our computers that would have alerted us to special problems in the engine pylon area, because the proper information hadn't been fed into the computers. And it wasn't fed into the computers because our regulations didn't require—or didn't require unequivocally enough—that it be reported to us.

I am moving to correct that situation.

The investigation revealed that the fail-safe data supplied to the FAA by McDonnell Douglas at the time of the plane's certification was incomplete for the pylon area. This suggests that we may not have taken, historically, an active-enough role in the certification process.

I am moving to correct that, too.

The investigation showed potential problems with the slats and the stall-warning system.

And I am moving to correct that.

The investigation showed problems with FAA monitoring of maintenance practices and procedures.

This is being changed.

The investigation showed that certain maintenance procedures had caused cracks in the aft pylon bulkhead. Those procedures are no longer in use, and the pylon will be redesigned to be more tolerant of maintenance, if that proves necessary.

The investigation showed problems with quality control in other areas of the pylon as well. These problems have been identified and corrected.

So far, nothing in our investigations has led me to conclude that our procedures for certifying and maintaining the safety of aircraft in this country are flawed in any basic way. On the contrary, the extraordinary safety record of our country's airlines is proof that the system is basically sound.

Industry and government may be at cross purposes in some areas, but not in this one. We all want what is best for American aviation, and that is safety. Because an FAA-licensed mechanic is employed by an airline does not mak[e] his commitment to safety any less than [i]t would be if his paycheck came from the Federal Government.

However, relying on common purposes and licensed people is not enough. I have directed a further investigation of FAA certification and maintenance procedures. Our job is to ensure safety by getting ourselves into the process as far as is necessary—and that may mean farther than at present.

No system functions at its best without monitoring and checks, and yet few things would be more harmful to the system than a looming, constant Federal presence in the cockpit, the factory or the hangar. Determining the appropriate Federal role in the aviation-safety equation is a question constantly before me. I will satisfy myself that the FAA involves itself deeply enough to see that the job is done and done right.

I can equally assure you that we will do this without damaging an industry whose overall record for safety is so superb.

Heads Up

ALASKAN REGION

Robert L. Nelson, chief of the Juneau Tower, from the Yakima, Wash., Tower.

EASTERN REGION

Richard W. Fox, chief of the Saranac Lake, N.Y., Sector Field Office, from the Albany, N.Y., Sector . . . **Harold Hanson III,** assistant manager of the Baltimore, Md., AF Sector.

GREAT LAKES REGION

Cecil N. Sparling, chief of the Houghton, Mich., FSS, from the Detroit, Mich., FSS.

NAFEC

Leo F. Stinson, chief of the Hardware Engineering Branch in the Data Engineering and Development Division, from the Advanced Engineering and Planning Branch.

PACIFIC-ASIA REGION

Roy Anderson, manager of the Maui, Hawaii, AF Sector.

ROCKY MOUNTAIN REGION

Peter R. Hansen, chief of the Cheyenne, Wyo., Tower, from the Santa Monica, Calif., Tower.

SOUTHERN REGION

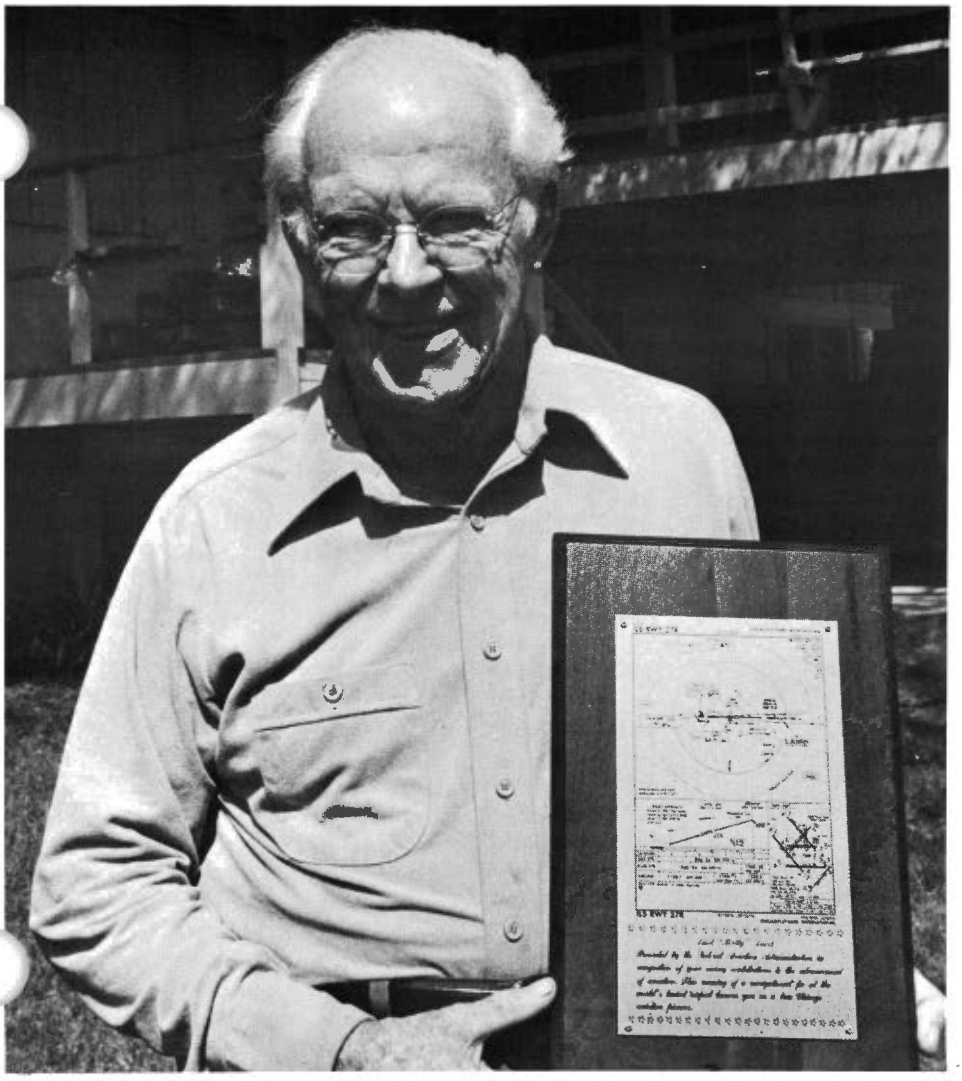
Donald E. Bennett, an assistant chief at the Muscle Shoals, Ala., FSS, from the Jacksonville, Fla., FSS . . . **Chester L. Conn,** an assistant chief at the Melbourne, Fla., FSS, from the Brunswick, Ga., FSS . . . **Charles F. Criswell,** an assistant chief at the Balboa, Canal Zone, ARTCC, from the Vero Beach, Fla., Tower . . . **David K. Dye,** deputy chief of the Savannah, Ga., Tower, from the Balboa ARTCC . . . **Thomas R. Jones,** chief of the Miami International Airport Tower, from the Cleveland Hopkins, Ohio, Tower . . . **Aubrey L. Rhue,** chief of the Raleigh, N.C., FSS, from the Birmingham, Ala., FSS.

SOUTHWEST REGION

Reid A. Butler, Jr., maintenance mechanic foreman at the New Orleans AF Sector.

WESTERN REGION

Kenneth F. Golcher, an assistant chief a[t] the Oakland, Calif., ARTCC . . . **James H. Thomas,** an assistant chief at the Oakland FSS . . . **Jack S. Trott,** chief of the Blythe, Calif., FSS, from the Santa Barbara FSS.



Remembering the Pioneers

An aviation pioneer whose exploits from pre-World War I to post-World War II are nationally recognized in museums and heavy historical tomes has been honored by FAA with an approach "fix" named for him at his home town, Chicago. The new fix name is the first in the country to honor an aviation pioneer.

The new fix, an en route intersection where Victor 7 and Victor 172 airways cross over the Lake Michigan shore, is named for Emil M. "Matty" Laird, pilot and aircraft designer and builder. The fix is a transition point from en route flight to a radar approach for Chicago-area airports—primarily for O'Hare International.

"People in aviation always have looked more to the future than the past," said Neal Callahan, Great Lakes Region public affairs officer, who started the ball rolling for the new fix name. "It just seemed that those of us in aviation could do well to remember where we came from. Fix names remembering our antecedents will certainly bring to mind the deeds of our pioneers."

Callahan said the FAA program to rename many fixes and intersections so that all would be five letters long provides an ideal opportunity to honor more aviation pioneers.

The Laird fix was officially named on Dec. 29, 1978, after which Laird was sent a new approach plate—the chart used by pilots when making approaches to O'Hare, the Naval Air Station at Glenview and Midway Airport. Early this summer, Callahan presented Laird with a copy of the approach plate etched in metal and mounted on a plaque.

Laird was 14 and a bank messenger in 1910 when Walter Brookins put on an exhibition in his Wright biplane over Grant Park, the city's first airfield. Brookins was the first to fly over Chicago, and it was the first time most Chicagoans, including Laird, had seen a plane in flight. Laird recalled many years later that it was Brookins' flight that steered him into aviation.

Laird started making models as a member of the Aero Club of Illinois' model club for boys and then began building a single-seat monoplane of his own design. At 17, he had completed the aircraft and took it to Cicero Field, Chicago's first real airport, where he practiced taxiing. One day, he pulled back on the controls and he was airborne, rising 15 feet in the air.

Later, Laird became one of the country's best-know exhibition fliers. He made his public debut in August 1915 at Grant Park with Katherine Stinson, the first woman to loop-the-loop. His Laird Swallow was the first plane flown by Varney Air Lines, predecessor of United Airlines; his racing planes—such as the Solution and Super Solution—were flown by such National Air Race trophy winners as Charles "Speed" Holman, Jimmy Doolittle and Roscoe Turner. In his 80s and retired, Laird has homes in Boca Raton, Fla., and Lake Toxaway, N.C.

Great Lakes has a second new fix name. It's at Cleveland Hopkins Airport and honors Al J. Engel, who died earlier this year at age 99. Engel was the first to own and fly a plane in Cleveland, the first to land on Lake Erie, the first to fly across Lake Erie and the first to carry unofficial airmail in the area. During the two wars, he was an aircraft builder.

Fifty years ago this month, aviation's long search for a reliable all-weather landing system officially began.

On Sept. 24, 1929, James H. (Jimmy) Doolittle logged history's first "blind landing" in a specially instrumented Consolidated NY-2 military trainer at Mitchel Field on Long Island, N.Y. More specifically, to use Doolittle's own description, the 15-

The First Instrument Landing

Lt. James Doolittle in 1929 following his flying the world's first instrument landing.

Photos courtesy of the Smithsonian Institution

minute flight marked "the first time an airplane had been taken off, flown over a set course and landed by instruments alone."

The next day, newspapers across the country hailed the flight as a victory over the "peril of fog." the *New York Times*, for example, said: "The demonstration was more than an exhibition of blind flying and instrument perfection. It indicated that aviation had perhaps taken its greatest single step in safety."

And Harry Guggenheim, president of the Guggenheim Foundation for the Promotion of Aeronautics, which had sponsored the demonstration, was equally enthusiastic. He issued a statement, noting that the development of instrument flying would make air travel more independent of the weather and remove the "last great hazard to airplane reliability."

Doolittle, who held a doctorate in aeronautical engineering in addition to being one of the country's foremost pilots, was more conservative and realistic. He recognized the value of his achievement in advancing the technological frontiers of aviation but knew much work remained to be done before instrument landings were a practical reality.

The story of Doolittle's flight began more than a year before the event when Harry Guggenheim borrowed him from the Army Air Corps to run his foundation's newly created Full Flight Laboratory at Mitchel Field. This was in August 1928 when Lt. Doolittle was 31.

One of Doolittle's first acts in his new position was to purchase the rugged NY-2 biplane for use in the instrument-landing experiments. He also purchased a sleeker and faster Vought Corsair O2U-1 for cross-country practice flying.

In March 1929, seven months into his experiments, Doolittle received a very practical demonstration of the need for blind-landing capability. Flying the O2U-1 from Buffalo back to Mitchel Field, he was caught in rapidly deteriorating weather and found himself flying lower and lower in order to maintain visual contact with the ground.

When he finally reached the New York area, he found Mitchel Field socked in. Attempts to land at a Governor's Island drill field, a Yonkers golf course, Battery Park and Newark Airport similarly were frustrated by fog. Finally, with his fuel gauge registering zero, Doolittle crash-landed the aircraft near Elizabeth, N.J., taking the impact by wrapping the left wing around a tree. The O2U-1 was a total loss, but Doolittle walked away without a scratch.

"The moral of the story," Doolittle later wrote, "is that had I been flying the NY-2 with blind-landing equipment and with the Full Flight Laboratory radio alerted at Mitchel, this would have been a routine cross-country flight with 'no sweat'."

However, the initial flight tests with the NY-2 showed that even this very stable and sturdy airplane, which had been rebuilt by the manufacturer to Doolittle's specifications, required additional instrumentation to qualify it for the blind-landing experiments. Two

Hardly a full IFR panel, Doolittle's NY-2 was instrumented with an altimeter, magnetic compass, earth-inductor compass direction indicator, air-speed indicator, bank-and-turn indicator, rate-of-climb indicator, tachometer, oil-pressure gauge, oil-temperature indicator, clock, earth-inductor compass flight indicator, Moto Meter ice-warning indicator, ammeter, voltmeter, Kollsman altimeter, Sperry artificial-horizon indicator, radio-beacon reed, stop watch, instrument light switch and an ignition switch.

major problem areas were the magetic compass and the turn-and-bank ndicator. Neither instrument was adaptable to blind flying techniques. What was needed was an accurate and reliable instrument that would show the aircraft's exact heading and precise altitude at all times during approach and landing.

Doolittle enlisted the aid of Elmer Sperry, Sr., founder and president of the Sperry Gyroscope Company, who put his son, Elmer, Jr., to work on the project. The results were the Directional Gyroscope and Artificial Horizon, the descendants of which are still standard equipment on all U.S. airline and military aircraft.

But Doolittle still needed an instrument that would provide exact altitude readings. The crude barometric altimeters then in use would give only approximate readings—to the nearest 50 to 100 feet at the very best—making them totally unsuitable for instrument landings.

Doolittle heard about a young man named Paul Kollsman who had developed a highly sensitive barometric imeter that would accurately measre altitude to within a few feet of the ground. He ran a series of flight tests with Kollsman riding as a passenger and found that the altimeter was perfect for the blind-landing experiments.

Doolittle used the sturdy Consolidated NY-2 for blind flying under a zip-up hood.

It subsequently was installed in the NY-2 along with the instruments developed by the Sperry Company.

On Sept. 24, with many practice blind landings behind him, Doolittle was ready for the official test. The weather conditions were perfect for his purpose since a heavy ground fog had rolled in off Long Island Sound and blanketed the area.

Doolittle sat in the shrouded rear cockpit of the NY-2 with only his instruments to guide him. At Guggenheim's insistence, Lt. Ben Kelsey, another Air Corps officer assigned to the Full Flight Laboratory, occupied the front cockpit to serve as a safety pilot. But he held his hands above the cowling in plain view of everyone to show that he was a spectator on this history-making flight rather than a participant.

Doolittle has written his own description of that famous flight:

". . . I taxied the airplane out and turned into the takeoff direction on the radio beam. We took off and flew west in a gradual climb. At about 1,000 feet,the airplane was leveled off and a 180-degree turn was made to the left. This course was flown several miles and another 180-degree turn to the left was made. The airplane was lined up on the left of the radio range located on the west side of Mitchel Field and a gradual descent started. I leveled off at 200 feet above the ground and flew at this altitude until the fan beacon on the east side of the airfield was passed. From this point, the airplane was flown into the ground, using the instrument-landing procedure previously developed. Actually, despite previous practice, the final approach and landing were sloppy . . . The flight from takeoff to landing lasted 15 minutes. It was the first time an airplane had been taken off, flown over a set course, and landed by instruments alone."

Several months after his blind landing, Doolittle ended his association with the Full Flight Laboratory and resigned his active commission with the Air Corps to go to work in private industry. He continued to make newspaper headlines throughout the 1930s, however, as a result of his numerous air-race victories and record-setting flights.

He returned to active duty with the Air Corps in the summer of 1940, with World War II already underway in both Europe and the Pacific. In April 1942, just four months after Pearl Harbor, he led the first American bombing raid against Tokyo using carrier-based B-25s. The feat won him the Medal of Honor and lasting fame.

He retired from the Air Corps with the rank of Lt. General in the spring of 1946, but his service on behalf of the nation continues to this day.

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Bond discusses the DC-10 grounding—story on page 12