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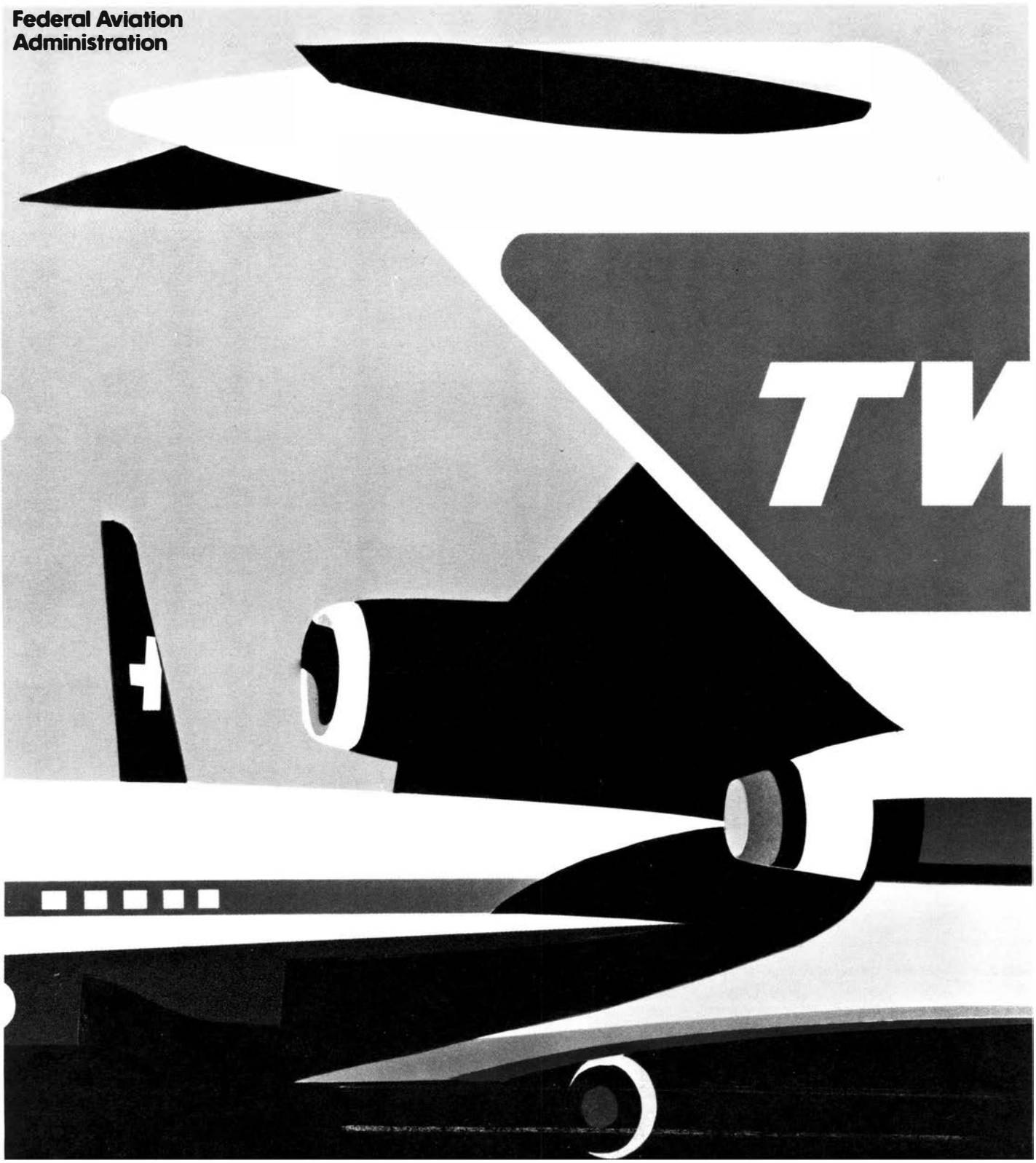

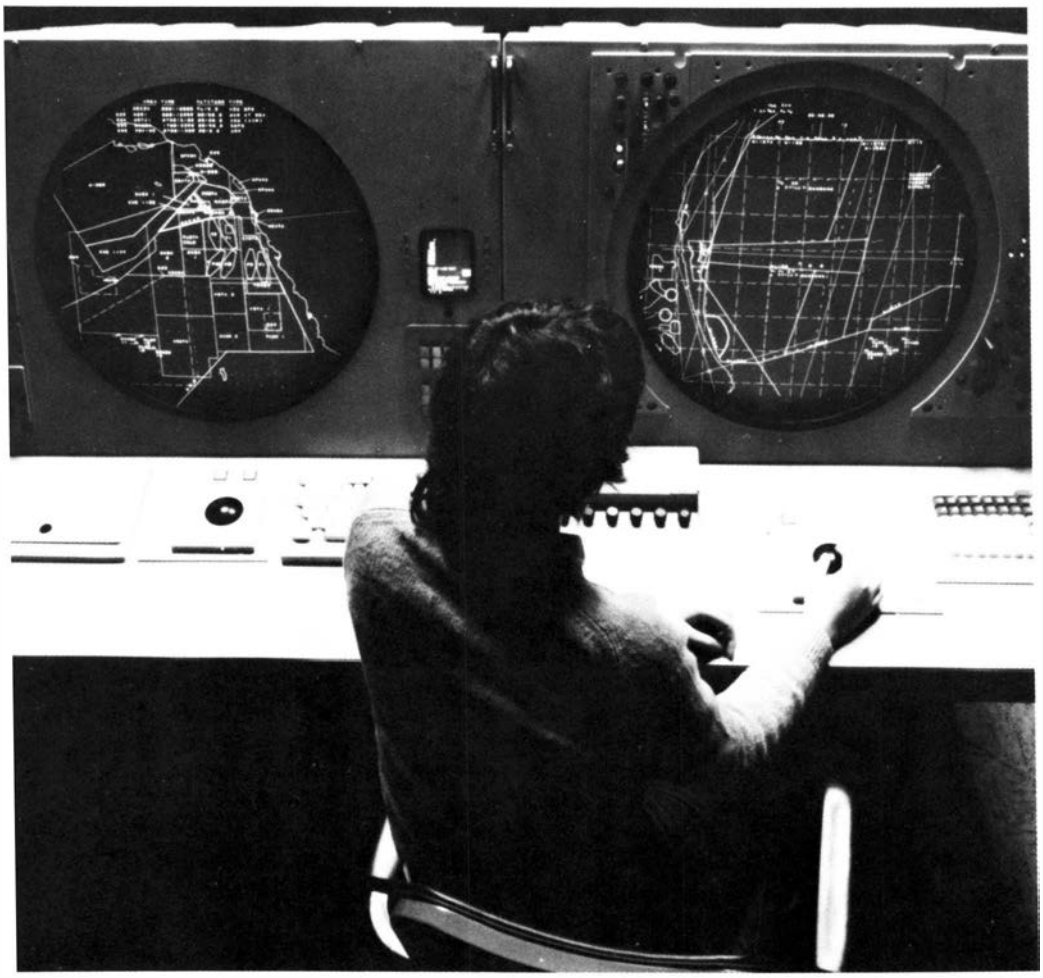

Research Highlights

As part of a five-year program to upgrade its Air Traffic Control Simulation Facility, the FAA Technical Center has purchased eight new controller radar consoles that simulate the equipment currently in use in en route centers and towers.

The consoles will be used to develop, test and evaluate proposed changes and concepts in the nation's air traffic control system and, possibly, to train new controllers.

The units have special interchangeable front panels that give each console the capability of being configured as an en route console, as on the left, or an ARTS III console, as on the right. The displays can also simulate in monochrome, as is currently being used in the field, or in color, to test the use of color in future systems.

Front cover: **Less than capacity at a major airport is still a busy airport. To give all users their due in recent months, FAA has turned to helping the airlines and charters schedule their flights. See story on page 4.**

Back cover: **Morning and a pair of steeds at Charleston, S.C., Airport.**

Photo by George E. Johnson, Jr.
FAA engineer, Aurora, Colo.

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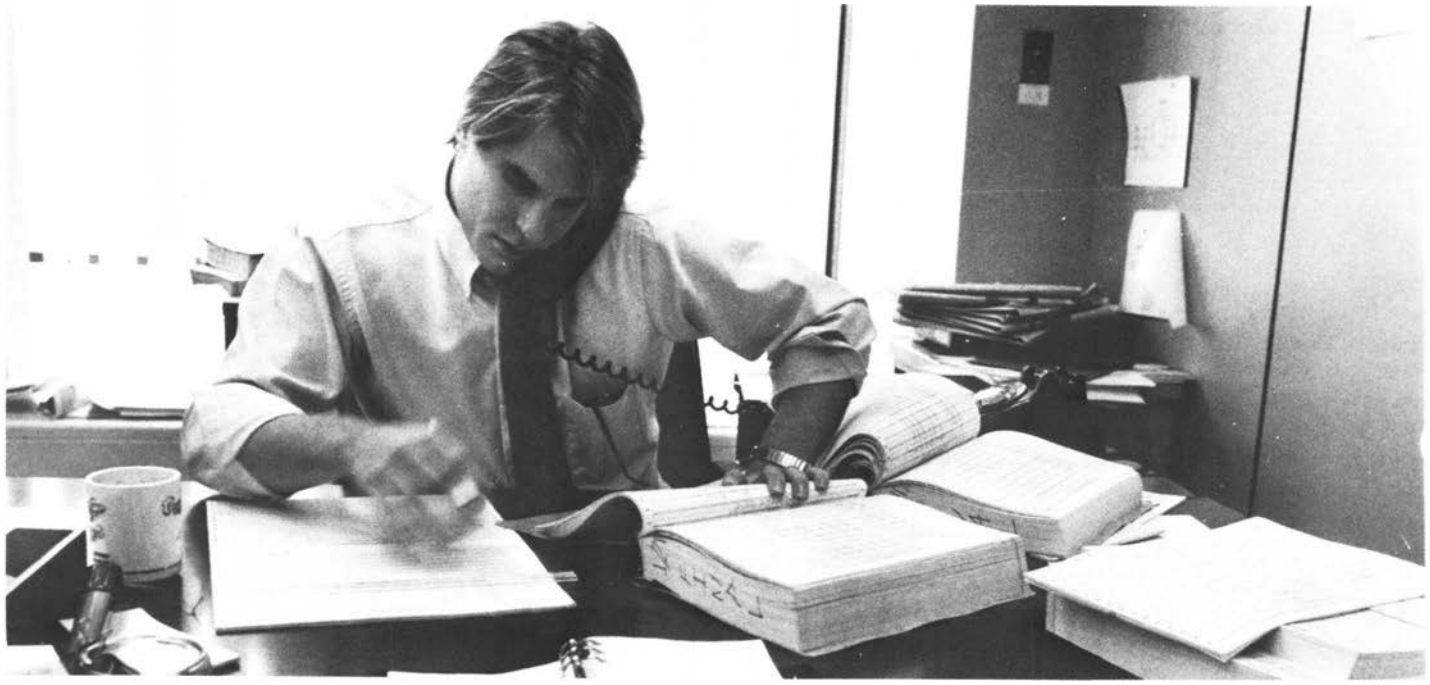
Mark Weaver—Aeronautical Center
Clifford Cernick—Alaskan Region
Joseph Frets—Central Region
Robert Fulton—Eastern Region
Neal Callahan—Great Lakes Region
David Hess—Metro Washington Airports
Mike Ciccarelli—New England Region
Judy Nauman, acting—Northwest Mountain Region
Jack Barker—Southern Region
George Burlage—Southwest Region
Michael Benson—Technical Center
Alexander Garvis—Western-Pacific Region

A New Game in Town

FAA Juggles Airline Schedules To Match Cutbacks



Analyst Mark Pheiffer in the Office of Aviation Policy and Plans talks with an airline representive to verify the data base for a requested schedule change.

"Consternation, I guess, would be the best way to characterize the air carriers' first reaction," says Harvey Safeer, director of FAA's Office of Aviation Policy and Plans. He was referring to the move by Administrator Helms last September that placed FAA policymakers in Washington smack dab in the middle of the airline scheduling cycle.

Some of them must have wondered, says Safeer: "What do these guys know about airline scheduling, much less about airline business or airline economics?"

Actually, what the Administrator did was designate Safeer's boss, Donald Segner, Associate Administrator for Policy and International Aviation, as the coordinator for all scheduling requests by the airlines. It was hardly a power grab or an attempt to meddle in the airlines' business. Segner's role as coordinator is simply to make sure the airlines adhere to the scheduling cutbacks ordered by FAA to accommodate the reduced staffing levels after the controllers' strike.

Under that program, called the Interim Operations Plan, the airlines have had to reduce their operations at 22 major airports, first to 50 percent and later to 75 percent of pre-strike levels during peak hours.

By mid-September, however, airline operations had crept upwards to as high as 84 percent at these 22 sites. Although safety was never a problem, the upward creep ate into the cushion that the agency wanted to have with winter weather coming on, bringing with it increased delays.

The Administrator also wanted to give controllers more time off and wanted to get their workweek back to normal as soon as possible. That would have been impossible with the higher traffic levels. So, he ordered a five percent cutback in airline flights at the 22 pacing airports, beginning with the December schedule, and put Segner in charge as coordinator.

For the first six weeks following the strike, that job had been handled by the Air Traffic Control Command Center Automation Facility in Jacksonville, Fla. But, gradually, decisions more and more began to involve broader policy questions and economic matters.

By Gerald E. Lavey
Asst. chief of the Public & Employee Communications Div., he previously worked for the Federal Railroad Administration and DOT's Denver SecRep.

Besides, the Facility had more than enough to do to help keep the air traffic control system working properly without having to worry about scheduling, says Safeer.

Segner insists that "FAA is not in the scheduling business, we are in the safety business" —a distinction, he admitted to a meeting of commuter airlines in November, that may be "hard for some of the carriers to understand." It was, at least in the beginning.

The beginning was no piece of cake for FAA either. "Fortunately," says Safeer, "we have a team of analysts and economists, some of whom had airline backgrounds. Others on my staff had been exposed to scheduling, slots and quotas in connection with Washington National Airport. So, we weren't total strangers to the problem.

"Nonetheless," he adds, "it was frustrating at the beginning because, even though we knew for the most part what to do and where we were heading, we didn't always know how to get there."

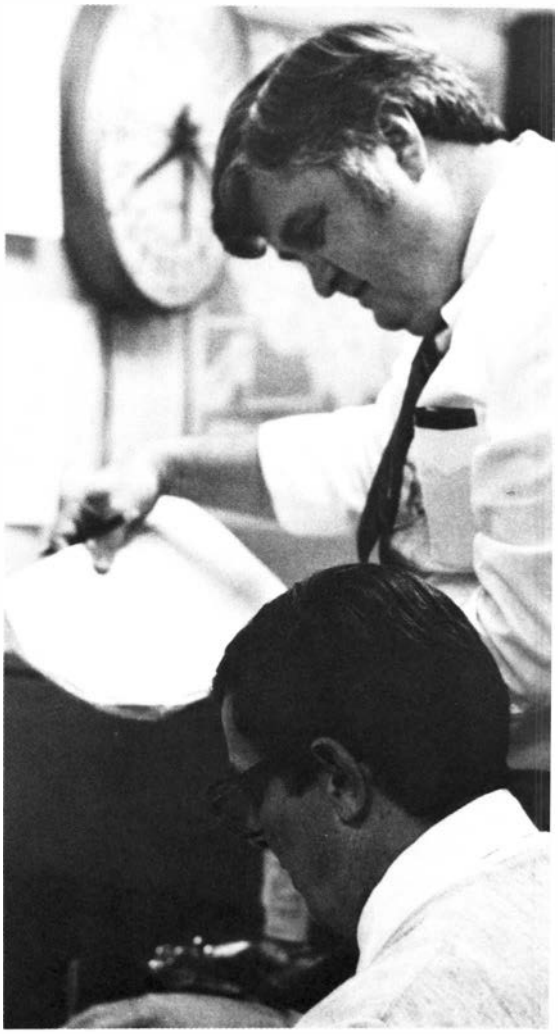
A major part of the early frustration, says Safeer, was trying to "establish procedures and processes for handling the hundreds of scheduling requests from the airlines literally at the same time we were handling them. And, remember, we had to work on three schedules—October, November and December—at the same time."

For December, for example, the cycle started on Sept. 26 when the airlines submitted a proposed December schedule to the Official Airline Guide (OAG). The OAG office at Oak Brook, Ill., then prepared a computer tape with the airlines' proposals and shipped it to the FAA scheduling team at the Jacksonville ARTCC. (Initially, only the Jacksonville computer was programmed to deliver the scheduling information the team needed to check against the OAG tape, so the team had to fly down there. Now, however, that data is available in Washington headquarters.)

The team's job was to review the proposed schedules and figure out where the cuts had to be taken. Intially, the baseline for the reductions was the hourly and daily average of operations over the first six months of 1981. However, following a public meeting with the carriers on Sept. 24, the Sept. 1 OAG schedule was substituted as the baseline because it was agreed that would be fairer to the majority of airlines.

The team was supposed to have this initial review completed and a "first cut" ready for the airlines to look at within four days. Murphy's Law, however, intervened in the form of "inconsistencies" found in the computer tapes provided by OAG. Some of these problems were nothing more than discrepancies between the FAA data and the OAG tape in arrival and depature times, caused, in some cases, when the carriers miscalculated the conversion from Zulu (Greenwich Mean Time) to Standard Time and vice versa.

Nonetheless, OAG had to begin an around-the-clock effort to find the problems and prepare a corrected tape. That, in effect, delayed the final approval of the December schedule until Oct.26, and, by that time, the cycle for the January schedule had already begun. In the meantime, requests for changes to the October and November schedules were still coming in daily to FAA headquarters.



Flow controller Bill Craft (standing) and flight information specialist John Smith of Washington Headquarters' Central Flow Control compare data in their job of approving charter flight schedules.

Photos by Jay Carroll

Evaluating the scheduling change requests is the monthly scheduling team made up of (left to right) Joan Fisher, consultants Diane Wood and John Laur, team leader Mary Jo Oliver and Bill Beaven.

To handle requests for scheduling changes, Safeer pulled in employees from all his divisions, plus personnel from the Office of Environment and Energy and the Office of International Aviation Affairs. Now, there are about 20 people working full time on scheduling. At one point, however, he says, "there may have been 30 people or more involved. We used them like cannon fodder, just to handle the daily crises that cropped up." During that time, he says, he "essentially denuded two of his divisions."

Sue Switts, an economics assistant in the Loan Guarantee Branch, was brought on board the team to set up a system of logging in and filing the hundreds of requests for scheduling changes. "It was chaotic at the beginning," she says. "We were getting as many as 200 requests a day." That number has dropped off considerably—to about 30 per day now, she says.

Each request is reviewed by one of eight analysts, whose job is to prepare a background paper with a recommendation to help Segner decide whether to grant or deny the request. A typical issue paper describes the current situation at the airports involved in the request, what their peak hours are, staffing, what particular problems the enroute centers serving the airport might be encountering, and the like.

Before the request is sent upstairs to Segner, it is routed through Jack Ryan, chief of the Operations Division in the Air Traffic Service, who checks it against his list of capacity limits by the hour at each airport to see if Air Traffic can handle the additional flight or the switch of a flight from one hour to another.

Most of the carriers have been very cooperative—99 percent, in fact—says Switts, but "some of them forgot that we had over 400 carriers to deal with and not just their particular request." Some carriers would telex a request to FAA and then call five minutes later to find out what had been done about it.

"A very small number also tried to beat the system," says Safeer. "The most common ploy was to file something with the Official Airline Guide and not bother to tell us about it. It took us a while to spot those incidents, but we now have the capability to compare quickly the OAG schedule with what we have approved."

Inspectors from the Office of Aviation Standards also spot check various airports to find out whether carriers are flying the approved schedule or something else.

Some airlines also are "policing" each other, says Segner, recalling the time he received a call from Airline A complaining that Airline B was operating outside its approved schedule. "I had just hung up when I got a call from Airline B making the same claim against Airline A. It was the classic case of the pot calling the kettle black."

Not surprisingly, too, some airlines have resorted to political pressure to get extra slots. "When members of Congress call to express interest in the approval of extra slots for airlines in their districts," says Segner, "I explain that we have a limited number of slots and, if we were to accommodate them, we'd just have to reduce the slots of another airline. Once they understand the system and what we were trying to accomplish, most of them are very cooperative."

Sometimes it's the FAA's unfamiliarity with the airline scheduling system that causes the misunderstanding, says Safeer, "like not knowing that airlines sometimes give airplanes two different flight numbers." He cited the example of two flights coming into the U.S. from Europe, one from Spain, the other from England. When passengers from those two flights pass through Customs in New York and then board a single plane for Los Angeles, that single plane may have two different flight numbers. "It took us a while to catch on to that," says Safeer.

Ralph Mikell, computer programmer/analyst, Tina Johnson (foreground), programmer, and Jo Windtberg, programmer, operate computer terminals that make possible comparisons of requests with the Official Airline Guide.

Sue Switts, economics assistant from the Aircraft Loan Guarantee Program, passes schedule change to Steve Albershein, normally in the Office of Environment and Energy, now elbow-deep in schedules.

Charters were a major problem at the beginning. Safeer's office was inundated with requests by charters for slots. Many of them were from sports teams, which account for a large share of the charter business.

Says Segner: "One afternoon, I found myself in the position where we could have guaranteed our home football team, the Redskins, their first win of the season—by forfeit. The opposing team was on a charter plane awaiting clearance to take off for the Washington area, and they still didn't have our okay. Ultimately, we were able to accommodate it, but some of the staff were upset about that one because it extended the Redskins' losing streak."

Later, part of the responsibility for approving charter flights was transferred to the Central Flow Control Facility on the 6th floor of FAA headquarters. Jack Ryan explains: "The scheduled charters who know far in advance what they're going to do are still handled upstairs with the long-range scheduling plans. Some operators, however, don't know that far ahead of time what airplane they will be flying or exactly what time they'll be leaving. The same is true with last-minute ferry flights and extra sections of some charters. All of those who don't fit into the long-range scheme—and there are an average of 200 per day—are now handled by Central Flow."

To handle that added responsibility, Ryan took eight people out of the National Flight Data Center, which is part of his division, and had a two-way ARINC teletypewriter circuit installed for their use. Since they took over that part of the charter operations on Oct. 23, says Ryan, "we've had very few complaints.

Ryan's office also is in charge of the General Aviation Reservation (GAR) program, which like its airline counterpart in the Interim Operations Plan, is designed to tailor the level of general aviation activity in the system to capability of the reduced air traffic control staff to handle it safely and efficiently.

Under the GAR program, general aviation pilots must obtain a reservation from a flight service station to fly IFR in enroute airspace, and the number of reservations available are based on 1980 operations adjusted to reflect the reduced staffing levels in air traffic control facilities.

Even though the GAR program had reduced general aviation flying to acceptable levels within two weeks of its implementation on Oct. 19, it also had to be modified within that same period to accommodate some of the users who felt they weren't getting a fair shake. Later, GAR was modified again to provide additional slots for on-demand air taxis.

Says Ryan: "There are so many things you can't foresee when you start a program like GAR that you've got to keep listening to the users and be flexible. Ryan said he and his deputy, Dan Creedon, the "GAR czar," still meet with the alphabet groups—AOPA, GAMA, NBAA and NATA—each Friday afternoon to discuss how the system is working.

For Ryan and the others involved, therefore, the months since the strike—despite the occasional frustration and long hours—have presented a unique opportunity to learn more about the system and the people who work in it.

For Safeer, "Perhaps the most interesting part has been noting which of the staff surfaced as people who have the initiative needed to work in this kind of hectic, pressurized atmosphere where we've had to work late, sometimes through the night, and every weekend. I could not have predicted which ones would have been able to handle that," he says.

"I think of the pressure we put on the Telecommunications Center on the first floor," he adds. We just pumped messages to them, not realizing they had only one telex and one ARINC machine to work with. At one point, we had generated something like 37 hours of work for them that had to be done immediately. They really busted their hump down there with overtime crews and came through fantastically.

"The other people on my staff who weren't involved in scheduling also did a great job. They kept the office going. That's what disturbed me most about having to furlough some 40 people from my office for the afternoon on Nov. 23 when the appropriations resolution was vetoed. They were considered 'nonessential' because they weren't working directly on the scheduling exercise. Yet, without those people, I couldn't put the 20 people on the scheduling exercise. People tend to forget it's a team that keeps this agency going. I know it's a team that keeps this scheduling process going." ■

People

Aeronautical Center

■ **Derald R. Lee,** chief of the Line Maintenance Section of the Tokyo Flight Inspection Field Office at Yokota AFB.

Alaskan Region

■ **Trent S. Cummings,** team supervisor at the Fairbanks Flight Service Station, from the Gulkana FSS.

■ **Henry F. Dodd,** chief of the Plans, Programs and Evaluation Branch, Air Traffic Division, from the Operations, Procedures and Airspace Branch.

■ **John A. Wilber,** team supervisor at the Anchorage FSS/IFSS.

Central Region

■ **Gerald E. Dedecker,** team supervisor at the Des Moines, Iowa, Tower, from the Cedar Rapids, Iowa, Tower.

■ **William J. Levisay,** programs officer at the Kansas City International Airport Tower.

Eastern Region

■ **John D. Canoles,** chief of the Erie, Pa., Tower, from the Manpower Systems Branch, Air Traffic Service.

■ **Albert F. Douglas, Jr.,** deputy chief of the JFK Tower, New York, from the Operations Branch, Air Traffic Division.

■ **Robert Eschmann,** team supervisor at the Morristown, N.J., Tower.

■ **Elwood G. Fritz, Jr.,** team supervisor at the Lancaster, Pa., Tower.

■ **Alan L. Gerhon,** proficiency development and evaluation officer in the JFK Tower AF Sector.

■ **Louis G. Moore,** unit chief in the Lynchburg, Va., Airway Facilities Sector Field Office in the Norfolk, Va., Sector.

■ **Stephen A. Popovich,** chief of The Plains, Va., AF Sector Field Office, Baltimore, Md., Sector, from the Maintenance Engineering Branch, AF Division.

■ **Robert P. Rosscoe,** chief of the Operations Branch, Air Traffic Division, from the New York TRACON.

■ **Vincent C. Tesore,** team supervisor at the Erie Tower.

■ **George J. Weaver, Jr.,** chief of the Morgantown, W. Va., AF Sector Field Office, Pittsburgh, Pa., AF Sector.

Great Lakes Region

■ **James A. Allan,** chief of the Detroit, Mich., AF Sector Field Office.

■ **Paul J. Dushane,** team supervisor at the Chicago DuPage Tower, promotion made permanent.

■ **Paul C. Kenward,** team supervisor at the Detroit FSS.

■ **Robert L. Miller,** area officer at the Chicago ARTCC.

■ **Thomas E. Stubenhofer,** unit supervisor in the Cleveland, Ohio, AF Sector.

New England Region

■ **Frederick H. Banks,** chief of the Hyannis, Mass., Tower, from the New Bedford, Mass., Tower.

Northwest Mountain Region

■ **Paul C. Andes,** team supervisor at the Arapahoe County, Colo., Airport Tower, from the Denver, Colo., Tower.

■ **Virgil R. Berridge,** chief of the Grand Junction, Colo., Tower, from the Denver Tower.

■ **Thomas W. Cowan,** team supervisor at the Denver Tower.

■ **James R. Franko,** team supervisor at the Medford, Ore., Tower.

■ **Joe Hink, Jr.,** team supervisor at the Broomfield, Colo., Tower.

■ **Kenneth L. Kerr,** area officer at the Salt Lake City, Utah, ARTCC, from the Operations, Procedures and Airspace Branch, Air Traffic Division.

■ **Luther P. Koehler,** chief of the Olympia, Wash., Tower, from the McChord AFB, Wash., RAPCON.

■ **David S. Meyer,** team supervisor at the Broomfield Tower, from the Denver Tower.

■ **Evan F. Payne,** team supervisor at the Spokane, Wash., International Airport Tower, promotion made permanent.

■ **Dennis J. Winebrenner,** team supervisor at the Seattle, Wash., FSS, from the McChord AFB RAPCON.

Southern Region

■ **Lloyd H. Allen,** team supervisor at the Knoxville, Tenn., FSS.

■ **Carl H. Barr III,** chief of the Isla Grande Tower in San Juan, Puerto Rico, from the Mayaguez, P.R., Tower.

■ **Donald J. Bishop,** team supervisor at the St. Croix, Virgin Islands, Tower.

■ **Raymond Calvert,** team supervisor at the Clearwater-St. Petersburg, Fla., Tower, from the Albert Whitted Tower, St. Petersburg.

■ **Dale H. Cannon,** chief of the Kinston, N.C., Tower, from the New Bern, N.C., Tower.

■ **Larry P. Connor,** team supervisor at the San Juan Center/RAPCON, from the Oklahoma City, Okla., RAPCON.

■ **Fred A. Gleason, Jr.,** deputy chief of the Atlanta ARTCC, from the Operations Branch, Air Traffic Division.

■ **Harold L. Goforth,** computer specialist at the Memphis, Tenn., ARTCC AF Sector.

■ **Thomas T. Martin,** deputy chief of the San Juan CERAP.

■ **Ray S. Massey,** assistant systems engineer in the Memphis ARTCC AF Sector.

■ **Lee R. Parker,** chief of the Gainesville, Fla., Tower, from the Hawkins Tower in Jackson, Miss.

■ **William E. Rice,** team supervisor at the Miami International Airport Tower, from the Honolulu, Hawaii, Tower.

■ **Carl A. Rosati,** program support officer at the Tampa, Fla., AF Sector.

■ **Carl E. Rowland,** assistant systems engineer in the Jacksonville, Fla., ARTCC AF Sector.

■ **Robert K Seagle,** chief of the Knoxville, Tenn., FSS, from the Crestview, Fla., FSS.

■ **Joe B. Shirley,** chief of the Greenville, S.C., Downtown Tower, from the Spartanburg, S.C., Tower.

■ **William B. Sly,** team supervisor at the San Juan IFSS.

Southwest Region

■ **George P. Bedford,** team supervisor at the College Station, Tex., Tower, from the Hot Springs, Ark., Tower.

■ **Ray V. Bush,** team supervisor at the Houston, Tex., ARTCC.

■ **Gerald W. Graham,** chief of the West Memphis, Ark., Tower, from the Memphis, Tenn., Tower.

■ **Edward A. Mann,** team supervisor at the Houston ARTCC.

■ **Albert T. Tober, Jr.,** team supervisor at the Ardmore, Okla., Tower, from the Addison, Tex., Tower.

■ **William D. Turner,** team supervisor at the William P. Hobby Airport Tower, Houston, from the Houston Intercontinental Tower.

■ **Jimmie L. Vaughn,** team supervisor at the Houston ARTCC.

Western-Pacific Region

■ **James A. Bass,** team supervisor at the Coast TRACON, El Toro MCAS, Santa Ana, Calif.

■ **Frank E. Boyer,** area officer at the Honolulu, Hawaii, ARTCC, from the Operations, Procedures and Airspace Branch, Air Traffic Division .

■ **Edward R. Brady,** unit supervisor in the Hilo, Hawaii, AF Sector Field Office, Maui AF Sector.

■ **William A. Brown,** team supervisor at the Reid-Hillview Airport Tower, San Jose, Calif., from the San Jose Municipal Tower.

■ **James A. Caudle,** deputy chief of the Los Angeles ARTCC, from the Honolulu ARTCC.

■ **Albert Crosley, Jr.,** team supervisor at the Tucson, Ariz., TRACON at Davis Monthan AFB.

■ **Terry L. Dobson,** team supervisor at the Scottsdale, Ariz., Tower, from the Phoenix, Ariz., TRACON.

■ **Michael J. Fitzgerald,** team supervisor at the McClellan AFB, Calif., RAPCON, from the Reno, Nev., Tower.

■ **Charles F. Henderson,** team supervisor at the San Francisco Tower, from the Oakland, Calif., TRACON.

■ **Thomas B. Huntington,** team supervisor at the Honolulu Tower, from the San Diego, Calif., TRACON.

■ **Louis E. Iseley,** team supervisor at the Sacramento, Calif., Municipal Tower.

■ **Tokiwo Nagata,** unit supervisor in the Hilo, Hawaii, AF Sector Field Office of the Maui AF Sector.

■ **Orrin L. Shackleford,** team supervisor at the Concord, Calif., Tower.

■ **David A. Smith,** team supervisor at the Napa, Calif., Tower, from the Edwards AFB, Calif., RAPCON.

By Thomas S. Hook
Acting chief of Headquarters' Public Inquiry Center, he is the author of two books on the U.S. Navy's rigid airships, including *Shenandoah Saga.*

ARINC—The Air-Ground Link

The Company That Gave ATC Its Voice Still Speaks for Airlines

You are a pilot for American Airlines, and one of your glide slope receivers goes "on the fritz" just before you land at St. Louis. You have a number of other cities to reach, and you don't want a long delay for your passengers.

Thanks to the communications link that American and all the other airlines have through Aeronautical Radio, Inc. (ARINC), you've called in your need before touching down. With a minimal delay, maintenance has a working glide slope—with an Ozark Airlines sticker on it—ready for installation. Your flight continues, and the instrument will eventually get back to Ozark.

"A good deal of our communications is in support of this logistical swapping," said Richard Covell, air-ground operations manager for the Annapolis, Md.-headquartered company.

Whatever needs replacing to avoid an unwanted RON—remain overnight—is solved by the communications link ARINC provides.

While much of ARINC's communications support this type of equipment swapping, it is only a tip of the iceberg of the many services in which the not-for-profit company is involved.

This equipment-loan "back-scratching" among the airlines and business aviation is appreciated by the FAA but does not involve the agency directly. However, for pilots flying over the oceanic areas surrounding the United States, well beyond radar or very high-frequency (VHF) line-of-sight radio coverage, ARINC is the link between the pilot and his airline's base, as well as the means through which FAA air traffic control messages are exchanged. If controllers want a flight to change altitude or need to reroute the aircraft, they give the ARINC ground radio operator the clearance, and ARINC, in turn, relays it to the pilot. The company is not in the flight-following or air traffic control business, but permits everybody to get in contact with the flights.

Ironing out the problems of international air communications, ARINC people, such as Covell, sit along with FAA staff in periodic meetings of the International Civil Aviation Organization (ICAO). At a recent meeting in London, ICAO members worked on standardizing communications over the heavily traveled North Atlantic. One result was that airlines instructed their pilots to use four digits and not two when they report times—such as the next reporting point—and that the times are given in Greenwich Mean Time (GMT).

Typically, a message flows from an aircraft flying over the New York Flight Information Region (FIR)—which extends half-way across the Atlantic—to ARINC's ground radio operator at the company's station at Islip, N.Y., two blocks from the FAA Air Route Traffic control Center (ARTCC). He acknowedges receipt to the flight crew, and, if it's routine, puts it on the teleprinter or automatic message Electronic Switching System (ESS).

If the message is urgent involving air traffic control, ARINC can phone-patch the FAA controller and the pilot for direct communications over interphones. Since the high-frequency (HF) circuits are noisy, static-filled and something a controller doesn't exactly enjoy listening to, they are used only when needed.

"Direct voice contact between the controller and aircraft is highly useful when there is a misunderstanding about a clearance," Covell explained.

ARINC was born Dec. 2, 1929, when the airlines pooled $100,000 to set up their own means for communicating by voice over standardized frequencies on one common network of stations and facilities, rather than by radio telegraphy (CW), or Morse code. Each aircraft user determined how much of ARINC's services it wanted to use.

While the Department of Commerce had initiated air-ground radio

At first glance, this might look like a flight service station, but Bill Fedric is an ARINC radio operator at its New York Communications Center talking to an airline pilot.

telephony in seven of its radio communications stations (the forerunners of flight service stations) in 1928 and was expanding that network, it was not prepared for new programs. When the airlines clamored for en route traffic control, the Aeronautics Branch suggested that the airlines establish their own centers in 1935. It was the next fiscal year when the government was able to take over the three centers so established, and ARINC was already the communications vehicle for relaying 'r traffic control information by voice.

It wasn't until about 1951 that the Civil Aeronautics Administration provided direct air-ground voice communications for the centers, a reflection of the growing airway congestion and need for faster communications turnaround time. ARINC continued its primary misssion of serving the airlines' business needs, as well as providing the trans-oceanic high-frequency capability.

Now, ARINC has major field offices in New York, Chicago, San Francisco, San Diego, Santa Ana (Calif.), Honolulu and San Juan (Puerto Rico) and employs about 500. Its billings at the time of its fiftieth anniversary topped $100 million a year.

For billings, the operator at an ARINC station assigns an "A," "B" or "C" to each message. An "A" message—such as one giving position, time, altitude and route—is totally charged to the FAA account. A "B" message would be information that both FAA and the airline want to know, and the cost is split. A "C" message—such as the airline wanting a wheelchair to meet an arriving flight—winds up on the automated billing system that month as fully chargeable to the airline concerned.

A quarterly audit and adjustment of billing is made with airline representatives and FAA logistics personnel to ensure that ARINC is within the bounds of its contracts and does not generate a profit. Its not-for-profit charter demands that it provide its service at cost.

Time reports are extremely important to the airlines, particularly "OOOI"

ARINC maintenance men climb communications antenna poles. The company's daily radio traffic is 14,000 VHF and 2,700 HF voice messages.

times, meaning "Out, Off, On, In." For years, the flight engineer had to call in times away from the gate, when taken off, when landed and when back at the gate. These critical times of record are now picked up automatically from ARINC's data-link system for domestic flights. Called ACARS, for ARINC Communications Addressing and Reporting System, it can be keyed to report all types of flight information, including flight times and maintenance data and also to spill out in the cockpit printouts of updated weather data.

Providing this nearly instantaneous weather to en route airliners is another service. American Airlines already has some 747s equipped with sensors that capture the plane's position, altitude, outside air temperature and wind—all calculated through the plane's inertial navigation system. Every seven minutes,

A sister company, ARINC Research Corp., has been working with FAA on collision avoidance, testing flight crew reactions to systems installed on Piedmont 727s.

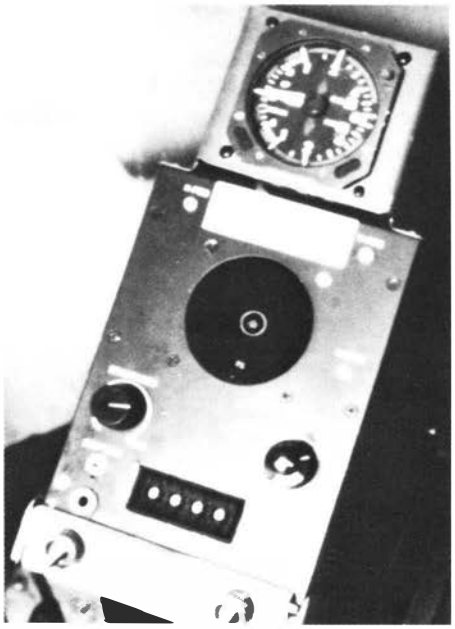
the sensors make six observations, which are sent automatically via the message switching system (ESS) to the National Weather Service as input for its forecasts. This contrasts with past reporting for forecasts that were six to 10 hours old.

As new airline aircraft, such as 757s and 767s, come off the assembly lines, they will be wired with many sensing devices. "Theoretically, a guy on the ground would know as much as the flight engineer sitting at the aircraft's panel," said Covell. "Actually, the sensing will be made to operate in terms of 'exceedances'—things out of tolerance—which would cause a message to be sent."

The FAA will find the data from this automatic sensing of interest in fixing more accurately the number of hours between overhauls. Fine tuning of maintenance requirements can be based on this highly accurate data.

The company has also developed selective calling of aircraft, so a flight crew member no longer has to listen over a noisy headset for information that doesn't concern him. ARINC now assigns four-letter codes to aircraft so ground radio operators may reach selected aircraft by setting off a chime in the cockpit. It says, figuratively, "Hey, pick up the phone."

Co-located in Annapolis with ARINC is a separate company that is operated for profit—ARINC Research Corporation. The airlines needed someone to 'ruggedize' vacuum tubes, which vibrated and made communications equipment troublesome. ARINC



Equipment being used in the Piedmont Airlines test include an instantaneous vertical speed indicator (IVSI) that presents climb or descend advisories and a combination transponder and CRT intruder display.

Research then grew into working on all aspects of reliability and maintainability of avionics. Some of its innovations have been used in police and fire communications systems in Los Angeles.

There is some crossfeed between the two companies. They worked together to simplify navigation and communications problems with helicopters operating 100 miles offshore in the Gulf of Mexico. Using ARINC's VHF extended-range technique, FAA put in two radio stations in Brownsville, Tex., and Houma, La., remoted to the Houston ARTCC. Now, most Gulf traffic communications are handled directly by pilots and controllers.

Tom Berry of ARINC Research Corp. has been working for five years on FAA's collision-avoidance program as senior project leader. An early step was to modify a United Airlines simulator so pilots could tell what data they needed from a collision-avoidance system.

Now, his group has installed collision-avoidance equipment in a pair of Piedmont Airlines 727s to study the human-factors aspects of the planned Traffic Alert and Collision Avoidance System (TCAS) that Administrator Helms decided would be implemented (See FAA WORLD, January 1982).

Berry is now in the third phase of testing TCAS in the real world, recruiting pilot-observers to evaluate it on passenger flights. Tape cassettes of more than 900 hours of track data of the TCAS-equipped aircraft will be put on a computer for analysis. The work of that volunteer pilot group will contribute to guidelines for air crew operating procedures when TCAS is implemented.

On the FAA side of this evaluation are Thomas Williamson, the project manager from Systems Research and Development Service, and test program manager Loni Czekalski of the FAA Technical Center.

The sophisticated developments of its sister company aside, ARINC itself is continuing to improve air-ground communications. The cooperative venture served the birth of air route traffic control and, while some of its functions have changed in nearly half a century, it's still helping FAA ensure flying safety. ■

Q&A

Tower "A" and Tower "B" are Level 2 VFR facilities five miles apart. Tower A faces a possible downgrading to Level 1. Practically all the journeymen will retain their GS-11 grades for two years.

Will all GS-11 vacancies at Tower B be offered to controllers at Tower A who have grade retention? If such offers are made by seniority and the senior controller declines the position, will he immediately lose grade retention and be reduced to GS-10? If pay retention is not authorized, which GS-10 step would a GS-11, Step 4, go to? Would the Tower B vacancy then be offered to the next most senior, and so on, or would it be filled by other means after the first refusal? Which step of GS-10 would a GS-9, Step 4, controller in retraining go to when reaching full performance, if he had been a GS-11, Step 2?

Since a transfer to Tower B would be considered undesirable, could vacancies be filled by volunteers from A by seniority or even by the least-senior controller, so that downgrading could proceed from the bottom up?

Would a refusing controller with 25 years of service or 20 years at age 50 be eligible for a discontinued-service annuity?

Would a staff study of hours of operation of Tower A be required before closing, since a change in one hour of operation could restore the Level 2 designation?

The Priority Placement Plan in Appendix 2 of Order 3550.11 covers employees entitled to grade retention under the Civil Service Reform Act. Under this plan, employees at or above GS-6 could be made a reasonable offer at their retained grade level for any location within the region during the two-year grade-retention period. If the employee declines a reasonable offer, as defined in the order, it will result in the loss of grade retention. In the case cited, the salary would be set at GS-10, Step 7. Offers are not made by seniority, but a list of priority-placement eligibles is referred to the selecting official having an appropriate vacancy. The official may select the most-suitable condidate. If one of these is not selected, the official must furnish an acceptable justification for not doing so. If the "retraining" query referred to a facility training failure who was placed in another option, the salary would be set at GS-10, Step 3. A training failure does not get the benefit of the highest previous salary.

The loss of grade retention as the result of refusing a reasonable offer would not qualify an employee for discontinued-service retirement.

The facility level is determined by maintaining and monitoring records of hourly traffic density for 12 consecutive months. If this results in a facility downgrade, it is not agency policy to reduce hours to maintain the facility level.

I am a GS-856-11 technician charged with the maintenance of an instrument landing system and a high-altitude enroute VORTAC in the Southwest Region. For the past two and a half years, efforts to get a shutdown for modification and maintenance have been refused by the ARTCC. They term this and one other VORTAC in the next region as "critical" to a corridor for air traffic because of military considerations. A higher level of maintenance is required and provided—despite staffing reduction—than is required of "gateway" VORTACs in this area. They are able to get shutdowns as scheduled and needed, yet this facility apparently is more critical than gateways. Why, then, is the grade and recognition withheld from facilities considered more critical?

GS-856 electronics techician positions are classified by reference to the (1) Office of Personnel Management Position Classification Standard for Electronics Technician Series GS-856, December 1965, (2) 1962 Agency Guide: formerly the FAA Single Agency Standard for the GS-856 ET Series, (3) Department of Transportation Classification Guide for ET Positions, GS-856, December 1972, and (4) Supplemental Instructions for Use of the DOT Guide.

Only positions meeting the criteria for coverage by the DOT Guide, such as those maintaining Terminal Instrument Procedures (TERP) facilities, can be classified at the GS-12 level. Facility shutdowns are not considered a factor in determining the criticality of a facility. Rather, it is the number of instrument operations at the facility that determine whether or not the facility is critical to the National Airspace System. If you believe your position is improperly classified, you may appeal it. FAA Order 3510.8 contains the procedures for doing so.

Incidentally, your region states that every VORTAC in the region has had scheduled preventive maintenance shutdowns within the past two and a half years.

By Charles Wray
Photos by Mike Blizzard
The Press of Atlantic City

Pilots' Foul-Weather Friend

Inspection Pilot Ensures Accuracy of Landing/Navaids

When pilots pray for guidance during foul weather landings, they are really praying that other pilots like Linda Barber did their job; otherwise, their prayers might not be answered.

A 26-year-old Atlanta, Ga., native, Barber is what FAA calls an airspace systems inspection pilot. Although most pilots will never meet her, she is the most-valuable "foul-weather friend" they may ever have.

Based at the FAA Technical Center at Atlantic City, Barber flies for a Flight Inspection Field Office, one of seven such FIFOs in the conterminous United States that reports to the flight Standards National Field Office in Oklahoma City.

She flies approach after approach at major airports in the Northeast to check navigational aids and airport lighting systems. The FIFO's job is to ensure that the signals and lights provide adequate and accurate guidance to aircraft as well as to take initial flight readings to assist engineers in establishing the facility, commissioning flight inspections, periodic recertification flight inspections, special flight inspections to assist in modifications and checks after accidents.

In addition, the FIFO develops instrument flight procedures for the navigational aids.

If these mechanisms aren't within prescribed tolerances, bad-weather approaches are next to impossible.

"I was surprised at all the things they do check," said Barber. "If I had known, I would have felt a lot safer flying these approaches."

If Barber hadn't begun working with the FAA as a secretary in Atlanta, she might never have become a pilot. A year out of high school, Barber found herself giving written exams to aspiring pilots, prompting her to decide, "I want to try."

After marrying a flight instructor in Atlanta, she not only tried, she eventually succeeded as a flight instructor herself, an FAA flight examiner, corporate pilot and air taxi pilot, finally taking an FAA job. She worked as a secretary and flight instructor in Atlanta, "trying to build up time and experience."

"I was looking at this job for quite a while," she admitted. "In the history of the FAA, I've only known of two others [women doing the same job]."

To accomplish the inspections, the Atlantic City FIFO uses a fleet of five Jet Commanders and a twin-engine Cessna, each one packed with electronic gear and staffed with a crew of three: two airspace system inspection pilots and a flight inspection technician.

Barber must sometimes fly as many as 18 airport approaches in 2½ hours, including below the glide path or "barely above the trees," while the on-board technician checks various guidance systems.

But it's not always the flying which takes its toll. "It gets a little old, night after night, lugging that suitcase around," said Barber.

The small twin-engine Jet Commanders are sleek on the outside but severely functional on the inside, with very little leg room and not enough head room to stand erect.

"Try sitting like this for five hours," Barber said as she took the pilot's seat. But the cramped quarters and repetitious flight patterns are apparently overshadowed by Barber's love of flying and speed. "I enjoy just being up and flying around," she said. "The jet—that makes it a little more exciting."

Besides routine checks of airport approach guidance systems, Barber also inspects navigational aids on regularly traveled airways and on Navy ships at sea. And if there's an aviation accident, she must often repeat the same approach to make sure faulty guidance equipment was not to blame for the accident.

A pilot since 1974, Barber seems immune to the built-in skepticism that greets many women pilots. "You're not accepted like a guy," she admitted. "You've got to prove yourself. When I tell some people I fly, they say, 'Oh, you're a stewardess.' "

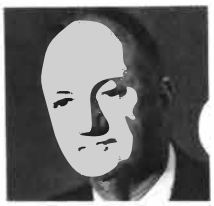
She also recalled student pilots who balked at flying qualification flights with her. "I've been in the business long enough that it doesn't bother me," she said. "But it used to."

Although she would like to do more aerobatic flying and might consider becoming a commercial airline pilot "sometime down the road," Barber is content with her current job because "it's amazing what you can learn."

"I think it's pretty glamorous," she said. "It beats being a secretary." ■

This story is adapted with permission from the *Sunday Press*, Atlantic City, N.J.

By George Burlage
The public affairs officer in the Southwest Region, he is a former career Marine and combat correspondent who was widely published.



50 Years a Fed

When I.A. Smith transferred to the Southwest Regional Office in April 1956, his friends thought that he was well on his way to completing a career in Federal service—26 years in the military, Border Patrol and the Civil Aeronautics Administration.

But that's not what Smith thought. So, it came to pass that last fall his co-workers in the Airway Facilities Division gave him a surprise luncheon to honor him on the completion of a half-century of Federal service.

And, he's not done yet. Smith said he would continue to work as an engineer in the Electronics Engineering Branch.

Smith began his career in 1930 in the Army Air Corps at Langley Field, Virginia, where he flew B-6, B-9, B-10 and B-17 bombers; installed and taught the use of the Link trainer (for learning instrument flight); instructed pilots in the use of the low-frequency radio range; installed, maintained and operated the first Army Air Corps tower, which was at Langley in 1934; and attended every Air Corps and Signal Corps electronics school.

After eight years, he took a Civil Service job with the Border Patrol of the Immigration and Naturalization Service. He was senior radio electrician/communications officer for the southern border of the U.S. in El Paso, Tex. In his four years with the Border Patrol, he helped establish a mobile communications system that's still in use.

The old CAA beckoned in 1942, and he moved to Winston-Salem, N.C., as sector manager. About a year later, he transferred to Wink, Tex., as sector manager, which, he says, was one of the most enjoyable assignments in his career.

After a dozen more years as sector manager throughout what is now the Southwest Region, he came into the regional office in 1956 as assistant chief of the Communications Engineering Section. Having qualified in 1949 as an electronics engineer, he was able to take a promotion to engineer in 1959.

He worked a variety of assignments until he was forced to take a disability retirement in 1969. Smith gathered no moss, and, fully recovered the next year, he returned as the region's first re-employed annuitant as a general engineer. When his current branch was established in 1976, he was reassigned to it as staff engineer.

Now, Smith is into his second half-century, and why not? He's making his long experience available to his country and doing what he likes best—even if his annuitant's salary is less than half of what he earned a quarter-century ago. ■

By Fred Farrar
A public information specialist in the Office of Public Affairs, he is a former Washington correspondent for the *Chicago Tribune*.

An Assist from the Sidelines

She was, to say the least, an improbable warrior in the battle to keep the planes flying. She was the wife of a physician, the mother of a 17-month-old girl, and she lived 75 miles away from the control tower that was her old duty station. But she had a skill that was in short supply, and she offered to help.

Her offer was accepted, and on October 26, 1981, Emmie M. Turner went back to work alongside non-striking air traffic controllers at the Columbia, S.C., Tower—the tower where she had been a controller for more than four nd a half years before leaving to get arried in November 1978.

"I supported the President in his firing of the strikers," said Mrs. Turner, now of Greenwood, S.C., "and I was aware of the burden the strike put on the controllers who didn't strike. So, I offered to help out in any way I could."

And she did it at no little personal sacrifice. She had to arrange for someone to take care of her daughter, and she had to commute the 75 miles between Greenwood and Columbia.

Most of the time, she did this in her Beech Bonanza. "I was doing two of the things I like best—flying and controlling air traffic," said Mrs. Turner, who got her pilot's license at 17 and later earned commercial, instrument and multi-engine ratings. "But I'll be lucky if I break even, as far as money goes."

Herman Drake, the deputy chief of the Level Three tower and acting chief at the time, pointed out that Mrs. Turner, a 1972 graduate of the University of

Photo by Jack Barker

South Carolina, was recertified on all postions in the tower cab within 22 days of coming back to work.

"We lost half of our 30 controllers to the strike," Drake said, "and for a while there, seven of those we had left were on TDY to other towers. So, we needed all the help we could get, and Emmie's offer couldn't have come at a better time. She had a skill that was needed and her country's best interest at heart."

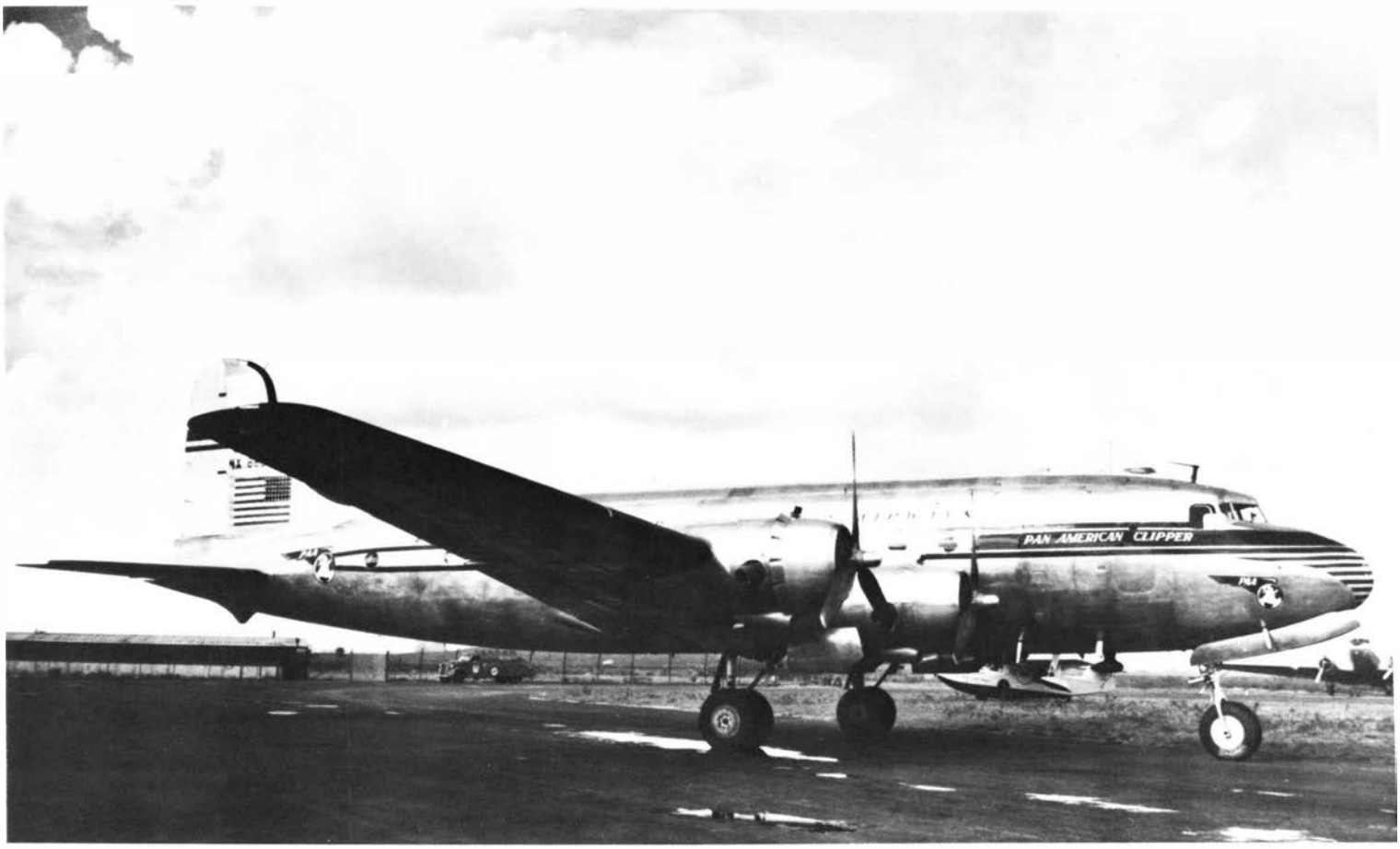
Even with recertification and putting in a full eight-hour day Monday through Friday, Mrs. Turner said that going back to work in the tower was much easier than she had expected it to be. "We had a lot of aircraft to handle with not many people, but it wasn't hard when everybody works together in harmony."

Mrs. Turner stayed on the job in the tower through December 12, by which time the pressure had eased some, and her family responsibilities forced her to return to being a full-time wife and mother.

"I enjoyed doing it," she says in summing up the experience, "and I like to think that what I did helped to keep the union from winning." ■

DC-4 Passed Everyone's Muster

It Was a Comfortable, Dependable Plane



The DC-4 in Pan American colors, one of 79 commercial units produced for airline use after World War II.

The DC-4 wasn't a revolutionary plane when it first flew 40 years ago this month, but it made an indelible mark on commercial and military aviation.

It was the first land-based plane to conduct scheduled commercial transatlantic service, which it did in 1945. In its military garb as the C-54, it followed its older sister, the C-47 (the DC-3 in civvies), in ferrying supplies over the Himalayas to China during World War II. And a fleet of 336 C-54s ferried supplies during the 1948-49 Berlin Airlift.

Strangely, its immediate progenitor was not the DC-3. Before the DC-4 came the DC-5 and another plane that first bore the name DC-4 and later DC-4E. The DC-5 and the first DC-4 were designed about the same time in 1936, but the DC-5 went into production first. The later DC-4 was designed in 1938.

While building on designs from the DC-3, the DC-5 was a heavier, high-wing configuration that had a poorer

payload and range. As a result, the airlines weren't interested. A dozen were built that served in military and civilian capacities during the Second World War.

The plane that came to be known as the 4E was an ambitious project that initially had airline support. It was to be twice the capacity of the DC-3—42 seats or full sleeping accommodations for 30 people. It would be powered by four 1,450-hp Pratt & Whitney 14-cylinder air-cooled radial engines. It was the first aircraft of its size to have a tricycle landing gear. It also sported power-boosted controls, an auxiliary power system, an AC electrical system, underwing fueling, complete cabin climate control and was slated to get full pressurization. Its tail assembly consisted of a strongly dihedral stabilizer with three fins and rudders.

While initially impressed by the design, the sponsoring airlines were concerned over its complexity, and a couple withdrew from the project.

One prototype was completed in 1938 and received its Approved Type Certificate from the Civil Aeronautics Authority in 1939. Flown on proving flights by United Airlines, the DC-4E was a capable plane but presented excessive maintenance problems and poor operating economics.

It was bought later that year for Japan Air Lines and lost into Tokyo Bay, according to a Japanese statement. Actually, it was dismantled by Nakajima Company for analysis in building a bomber.

Douglas turned to a new DC-4, three times the size of the DC-3, now convinced that instead of radical departures, "our progress must come by orderly evolution of sound, well-developed principles." The airlines ordered 40 of the more modestly designed DC-4, which incorporated the best elements of the DC-5 and 4E, for delivery in 1942.

But that was not to be. The U.S. Army Air Corps commandeered the order and added its own. A total of 1,162 C-54 Skymasters flew missions during the war, including 79,642 successful transoceanic flights.

After the war, 79 DC-4s were delivered to commercial operators, pending the arrival on the scene of the DC-6.

Franklin D. Roosevelt, who was the first presidential candidate to fly and the first President to fly, also was the first President to have an airplane assigned to him. In 1943, a C-54 was assigned to FDR that was dubbed by others *"The Sacred Cow."* It had an elevator built into it to accommodate Roosevelt's wheelchair. He flew in it only twice, the last time to Yalta in the Crimea in 1945 for a "Big Four" meeting. *The Sacred Cow* also served on numerous diplomatic missions.

The Sacred Cow (or as the White House preferred, *The Flying White House*) with and without President Roosevelt visited 44 countries in one year on various missions, as the miniature flags attest.

In its simplicity, dependability and economical operation, the DC-4/C-54 endeared itself to many, including Maj. Gen. Thomas Moorman, then commander of the Air Weather Service. So fond of the C-54 was he that he had a desk installed in one to use during inspection flights. This permitted him to hop into the left seat when his paperwork was done.

In many ways, that very dependability made the DC-4 the leading edge in the emergence of air transport as the major means of passenger travel. ■

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