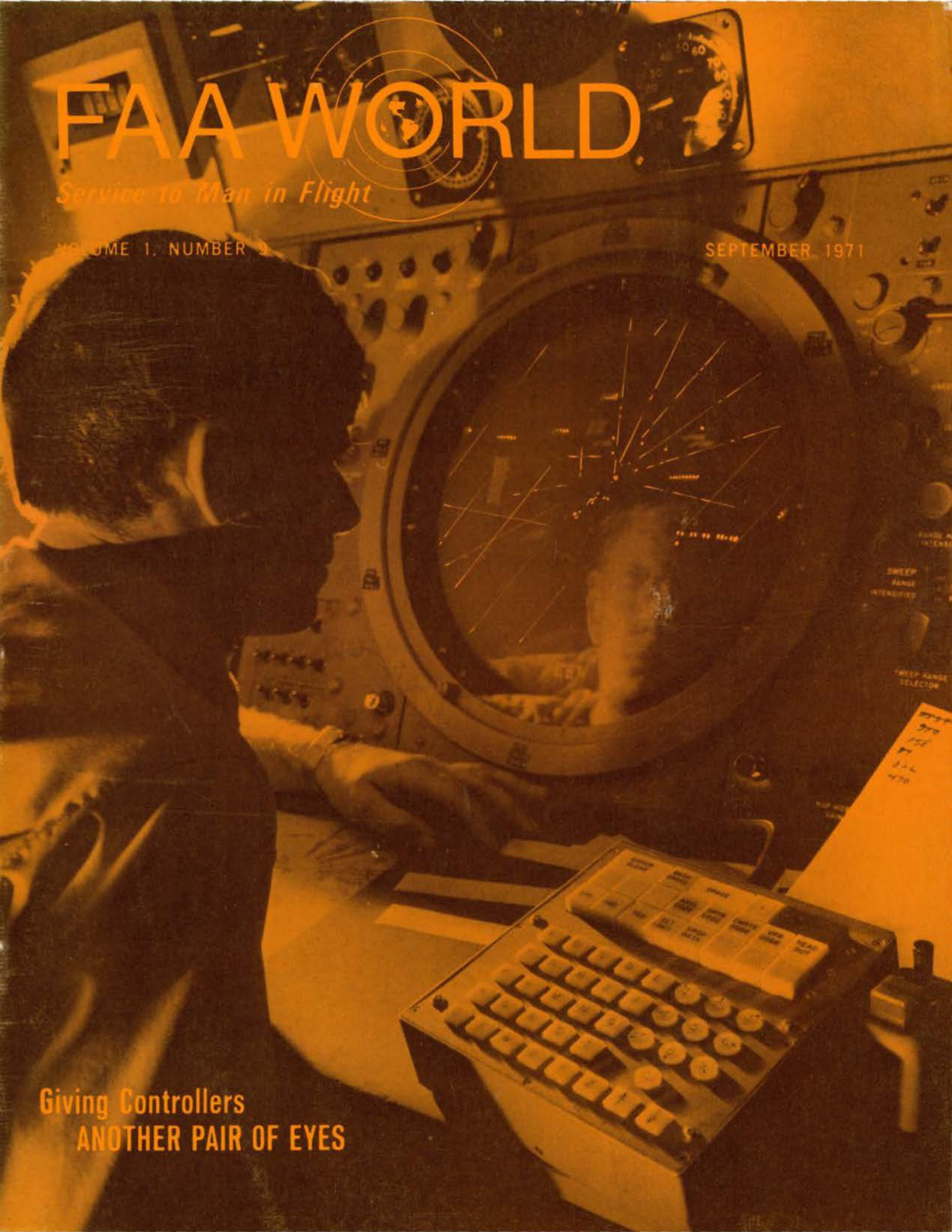

FAA WORLD

Service to Man in Flight

VOLUME 1, NUMBER 9 SEPTEMBER 1971

Giving Controllers ANOTHER PAIR OF EYES

The Cover: In the Knoxville, Tenn., TRACON, the world's fastest computer is being tested to alert another computer of flight-path conflicts and instantaneously flash an alert on the radar scope. Controller Earl Aery was captured by famous New York lensman Joe Ruskin as he controlled simulated air traffic on a spare test scope. Alphanumerics show upcoming traffic, aircraft identity, altitude, speed and other data of the ARTS II system.
—Photo courtesy McGraw-Hill, Inc. Corporate Graphic Arts

SEPTEMBER——1971

Contents

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Technical Crew Teamwork —It Works!

A billion parts! 100,000 pounds! 42 room-size boxes! 600 cables! 750 connections! And *only* 62 hours! The task of relocating a large, highly complex current-generation digital computer in mere hours is so great as to stagger the imagination. Yet, at Oakland, California, such an unprecedented job was not only attempted but satisfactorily completed in just 62 hours and by FAA personnel.

Yet, I had fully expected the computer move to be completed on schedule, since the work was to be performed by FAA airway engineers and technicians from Airway Facilities Sectors. They came principally from the Oakland ARTCC, but also from Boston, Jacksonville, Seattle and Denver, from regional offices and from the Washington headquarters. My expectations in this matter, in fact, serve to emphasize the confidence I have in the technical expertise and teamwork of our technicians and engineers to promptly and expertly accomplish tasks of unusual scope and technical complexity.

To move and reinstall the 9020 computer in the new computer wing at the Oakland ARTCC so deftly required four elements, without any of which the project could not have come off:

- Planning
- Technical expertise
- Teamwork
- Will to do

There was extensive advance planning. This was effectively accomplished over many months, even though some of the people involved were physically separated much of the time by the entire continent. We also mustered in-depth technical expertise. Individual self-improvement study, the results of extensive agency-conducted specialized training and practical experience with data-processing hardware all were highly evident. On the personal side, intricate teamwork was amply demonstrated repeatedly in the advance preparations and most particularly during the progress of the work. Finally, the desire to do a job—always the hallmark of FAA technicians and engineers. This was especially in evidence on this project from inception to completion.

I am understandably proud of this close teamwork and high degree of technical expertise demonstrated by those who participated in the Oakland move. It represents a milestone of technical achievement in overpowering the "it can't be done" philosophy, and this "extra" effort typifies the high degree of dedication and the professional competence existing throughout our Airway Facilities Service.

John H. Shaffer

JOHN H. SHAFFER
Administrator

Once again FAA technicians prove that by planning ahead and pooling their talents they could polish off . . .

THE JOB THAT COULDN'T BE DONE

An FAA technician calmly sorting out a maze of wires that seemed hopelessly scrambled, looked up from his work thoughtfully and said, "Sure, FAA people here are getting together to make this move. The whole thing is cooperation. But the FAA is like that no matter where you go."

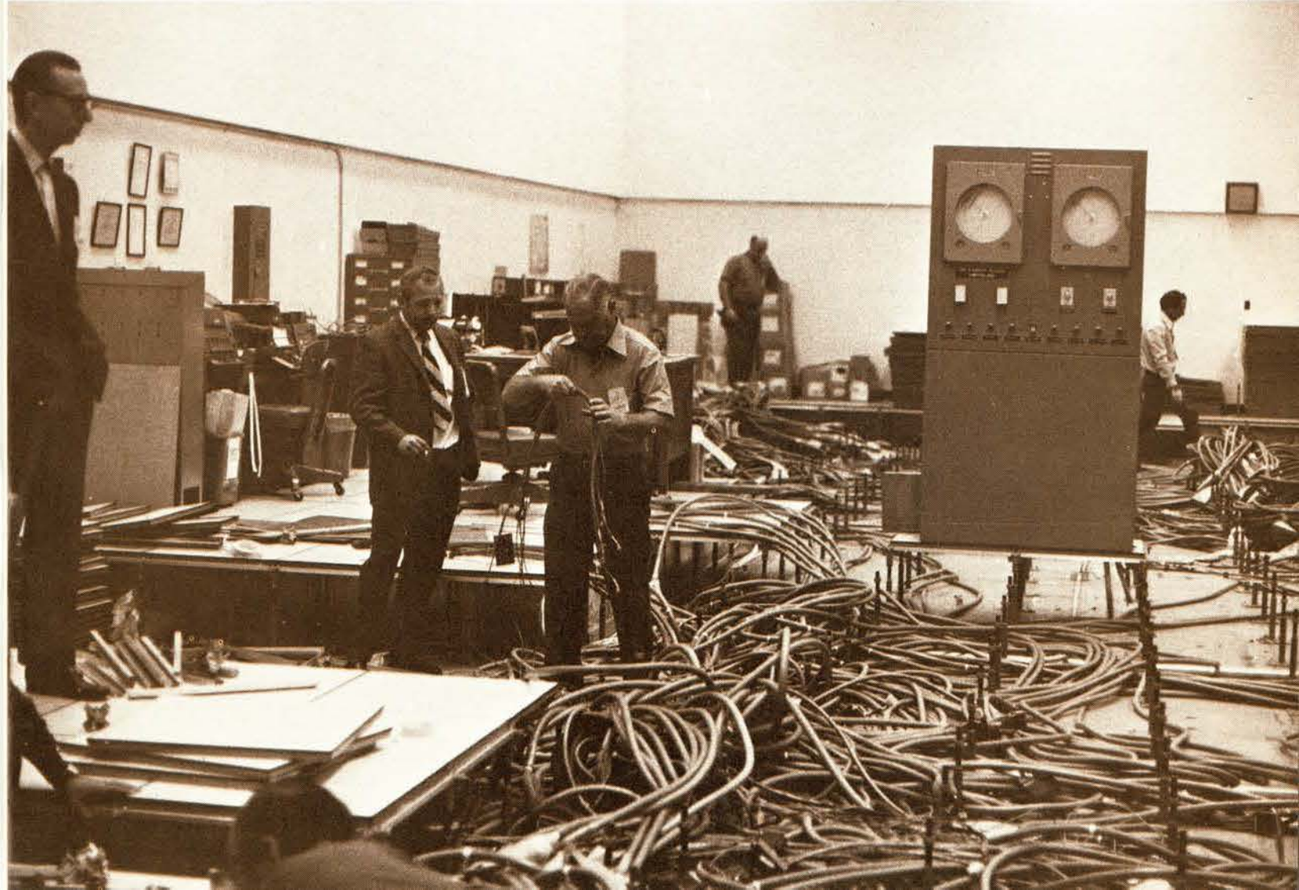
And that's the way it worked out in Oakland, Calif., last month when a vast computer complex was moved by FAA technicians in one-tenth the time that industry wanted to do the job. It was the classic job that "couldn't be done," but these technicians did it—in spades.

The technicians and the planners came from the far corners of the country—from Boston and Jacksonville, Fla., Seattle and Denver, from the regional offices and from Headquarters.

Quiet men they were, working harmoniously with strangers, speaking a common factual language that gets the job done: "Pull the bottom part of the loop there—over the top—I need the loop."

The new automation wing at the Oakland en-route center had been completed. But the vast computer room, with its raised floor replete with an orange-brown carpet, was still empty. The 9020 computer complex, which had been used to automatically process flight-plan data for over a year, had to be moved, as will the computer complexes at Seattle, Denver, Boston and Jacksonville during the next year. The technicians

FAA technicians prepare cables from the old Oakland computer spaces for labeling and shipment to the Seattle en route center for its forthcoming equipment move to a new automation wing. This re-use is expected to save the FAA about $80,000.



Helping the moving contractor move this element of the computer are two FAAers. At far right is Gene Nobles of the Jacksonville Center, and wearing the striped shirt in the foreground is Don Mathews of Oakland.

from these places who helped do the job at Oakland were there to learn as well as to work. At Oakland all the plans and theories were tested.

You can't just pick up and drag a computer like this from one room to another. The version at Oakland is housed in 42 "boxes," each the size of several telephone booths. All told, it weighs about 100,000 pounds —about the same as the furniture in 15 average-sized family houses. Also, the whole complex is made up of billions of sensitive parts and is "plugged in" in over 700 places.

So just moving the boxes and over 600 separate heavy cables was part of the problem. The other part, the sticky part, was that the move had to be made in a very short period of time. Industry wanted two to three weeks to do the job, but the aircraft kept safely on their appointed rounds by the team at Oakland, were not about to stop flying for two to three weeks.

FAA planners—and the planning for the job started with a month-long session in Washington almost a year ago—figured out a way to get the job done in 72 hours. The solution, in the words of James Lougheed, Assistant Systems Engineer, and the on-site supervisor for the move, was to "assemble enough people with the right talent in the right place."

"Actually we did the job in 62 hours," explained Airway Facilities Sector Chief James Thomas, "—from the time we shut down the computer Friday night until it was checked and back on the line Monday morning."

Thomas went on to say that the problems encountered over the weekend were so minor, they were funny. For instance, after the arduous work of disassembling, moving and reassembling the room full of boxes was completed, technicians stood by with baited breath as the main power was turned on. But in the first two boxes that were checked, nothing happened.

After a moment of high anxiety, the electricians discovered to their embarrassment that someone had forgotten to plug the thing in.

When the power first came up there were a few other problems. No one knew the extent of the trouble and no one was about to guess, but the technicians calmly went about the business of finding out what was wrong.

In one instance, a major circuit card had shaken loose; in another, a transistor had failed; and in the third, one cable was connected to the wrong socket—one connection out of 750, all of which to the outsider would look identical. It had been plugged into one of equally identical female sockets.

Once the equipment was running, the computer's brain had to be checked out. The data-systems people —like so many electronic surgeons—arrived on the scene.

Speaking a language which only superficially resembled English, they probed the computer's memory, typing messages to it and watching it spit out the answers on automatic typewriters. When finally cornered, one of the data-systems technicians explained that they were feeding simulation programs into the system to make sure that it was still coming up with straight answers.

I learned that other data-systems men were visiting field positions—such as the Oakland Flight Service Station—to make sure that the input devices from these remote locations were working properly.

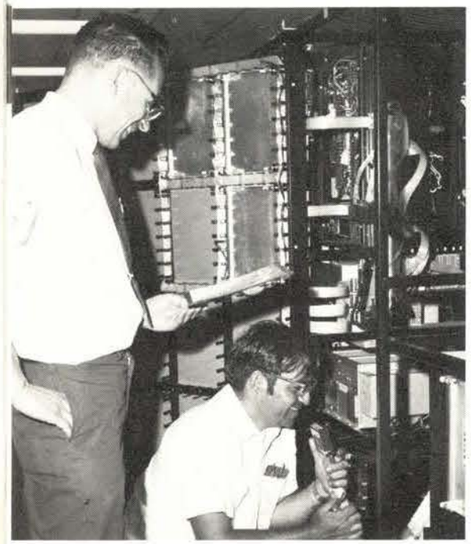
Even as the inner workings of the $7 million computer complex, now secure in its new home, were being tested, technicians were labeling and preparing to ship the old cables to the center in Seattle for a similar move. Ted Ellis, Assistant Systems Engineer at the Seattle Center, and his assistant, Larry Chang, explained that by using the old cables from Oakland at Seattle, they would save the agency about $80,000.

Chang and Ellis, who were at the center to help get the job done as well as to observe in anticipation of the move at Seattle, went back to work whenever I paused between questions, hauling the heavy cables from under the false floor in the old computer spaces.

And I walked the length of the main control room to see how the controllers working the flight-data desk were getting along without the help of the computer. They told me that after an initial period of confusion, things were coming along quite smoothly. They explained that before the computer was shut down they had made up about 60,000 flight strips covering military and civilian scheduled flights for a two-week period.

They said that if there were any snags about getting the computer up again, they were prepared for a two-week outage. But they confided that they didn't think there would be any such trouble, and they would be just as happy if there weren't any. There wasn't—the computer was out only two-and-a-half days.

In the words of the center's assistant chief, Jack Thomas, the technicians "surpassed our wildest dreams. The preplanning was excellent and the execution superb." But then, teamwork and professionalism are commonplace in the FAA. **—By Theodore Maher**

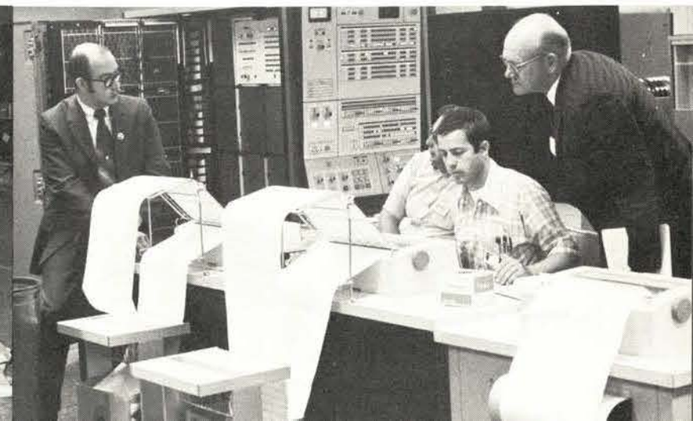


Don Fanell examines a plug before connecting it, while Terry Lamper checks his progress. Both men are from Oakland.

Writing out flight-progress strips by hand while the computer is "down" are Carl Theall, (seated), Harley Greenwood and Herbert Young (background).

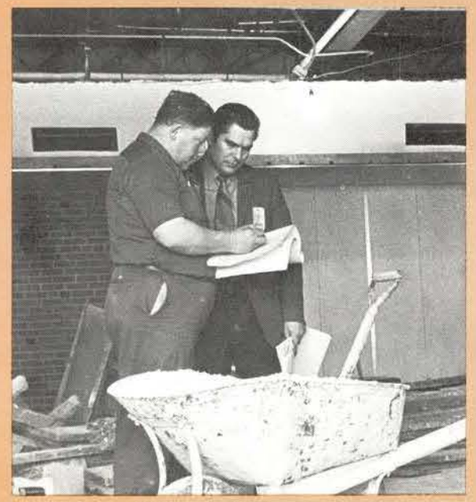
After the computer was plugged in in its new quarters, the trouble-shooting began. Here Tony Sanner of the Oakland Center checks various circuits.

Before the move was completed, the unconnected cables and plugs stuck out of the floor of the near-empty room. After the move (below right), preliminary tests on the computer were made by (from left) Jerry Miller of IBM, Bob Fiorucci from NASPO at Headquarters, Al Laws from Seattle and Art Hocker from Chicago.



FACES AND PLACES

MOONSCAPE—*Ice blocks and crevices cover a Galena, Alaska, runway after the area's worst flood. Looking over the scene are (l-r) Jack Webb, Region Director; Mrs. Webb; Helen Russell, secretary to the Galena Station Coordinator, who remained on the job during the emergency, and Ralph Westover, Defense Readiness Officer. FAA dependents had been evacuated.*



DIGGING IN—*With many FAA projects underway, engineers like Al Zukauskas (right) and Jim Jernstad are kept on their toes. Here, they confer during the recent remodeling of the Chicago Center's cafeteria.*

ACT OF VALOR—*For rescuing eight people—an elderly couple, two pregnant women and four small children—caught in high winds on Lake Ponchartrain, Ronald J. Vivaudais (right), a controller at New Orleans' Lakefront Airport, received the FAA Decoration for Valor from Southwest Region Director Henry L. Newman. In a second presentation, Vivaudais and two other controllers, Edward A. Daspit and Warren J. Llado, accepted Special Achievement Awards. The airport tower was evacuated July 4, 1970, when 85-knot winds suddenly struck the area, but the three controllers requested and were granted permission to stay on to direct a small aircraft to a safe landing. Vivaudais then spotted the people on the lake from the tower cab and rushed to their rescue.*

DISTRICT CHAMPS—*Coached by two Denver ARTC Center employees, the Longmont, Colo., Legion "A" team has won its first district championship since 1953. The proud trainers are Assistant Coach Mearl Solberg (right rear), ATC Specialist, and Coach Ray Lansbery (left, first row), ATC Data Systems Specialist.*

SAFEST IN GOVERNMENT—*At the annual Federal Safety Council of Hawaii awards luncheon, Rear Adm. Thomas B. Hayward of the 14th Naval District presented a safety plaque to FAA Pacific Region Deputy Director John Hilton. The first place award honored the region's 2 million man-hours of industrial safety. The Pacific Region also placed second in the motor-vehicle category.*

VIETNAM SERVICE VET—*For his work at Long Binh from 1967 to 1970, Electronics Technician Joe Zaremba, now in the Southwest Region, recently received a Vietnam Service Medal. Zaremba was wounded by shrapnel during a Viet Cong attack on Ton Son Nhut Airfield.*

HE FLEW AWAY—*Completing his agency career didn't mean that GADO man Jim Dewey would leave aviation. He's now in Santa Paula, Calif., giving FAA Designee checks to pilots of twins and helicopters, instructing in his son's flight school and flying his own rebuilt Luscombe "Phantom," pictured alongside him.*

FIRST CLASS—*Students who completed the first class in "FAA Aircraft Accident Investigation Procedures" at the Transportation Safety Institute at Oklahoma City's FAA Aeronautical Center are (seated, from left): Marlin D. Loverud, Minneapolis ACDO; Harold Laroux, Dallas ACDO; Dr. L. W. Snider, Fort Worth; William Caulfield, East Boston GADO, and John Jutsum, Anchorage GADO. Standing are (from left): Ernest Kidder, Atlanta; Thomas Smith, St. Petersburg GADO; Ralph Stokes, instructor; David Kress, West Chicago GADO; Robert Creson, institute director; Donald Montgomery, Santa Monica; Arthur Crouch, Valley Stream IFO, N.Y.; Aeronautical Center Director A. L. Coulter; George Downey, Newark Terminal; William Allen, instructor; Robert Baker, Jamaica ACDO, N.Y.; James Grady, Honolulu Air Traffic; Thomas Cook, San Jose GADO, and George Bernard, San Diego, GADO. All of the participants had already had some experience in this field.*

At Knoxville ATC Tower,
FAA Is Testing
The World's Fastest Computer
To Give Controllers . . .

To get instant identification from the computer of a "blip" on the scope in the Knoxville Terminal Radar Approach Control (TRACON) room, controller Raymond Hawkins queries the location by manipulating the "joy stick" or PEM—positional entry module. The PEM moves a "bug" over the aircraft blip and the computer replies with an alphanumeric report giving plane's identity, altitude and speed. The controller can erase the entire screen except for the wind, altimeter line at base.
—Photo by Joe Ruskin, McGraw-Hill, Inc., Corporate Graphic Arts

ANOTHER PAIR OF EYES

Controllers at Knoxville's McGhee Tyson Airport are pioneering for all other air traffic control specialists at enroute and terminal facilities.

They're participating in a flight-conflict-detection program aimed at automatically alerting controllers to aircraft converging on one another.

To appreciate the tense concentration and pressure of keeping air traffic safely separated and realize why controllers need this promising automated "back up," one need only visit the dimly-lit Terminal Radar Approach Control (TRACON) room there. Tower Chief Robert P. (Bob) Swanson, a veteran of nearly 30 years with FAA (and who looks and talks somewhat like the late President Eisenhower), took us around one evening recently before the normal shift ended at 10 p.m.

Two controllers worked each of the two radar scopes, with a spare scope inactive nearby. West radar, with final approach responsibility, covered its half of the 40-mile radius and east radar the other half. The radars continuously scan every four seconds.

Recognizing some of the symbols, you realize what a skill it is to know them all, why it takes professionals, why clutter is unwanted and how critical is the need not to mistake one target for another.

Let's see—those crutch-shaped lines are IFR departure routes . . . the "football" is an Instrument Landing System outer marker . . . those "X"s are airways intersections . . . the upside-down "V"s are TV towers or obstructions . . . the solid white line is heavy ground auto traffic . . . and the tiny letters and numbers by targets are ARTS II identification with altitude of transponder-equipped planes.

"Our Univac 1230 computer tells the controller through alphanumeric readout on the scope that this blip of 'rice' is aircraft November 14 Juliet at 4,500 feet and under visual flight rules (VFR)," Swanson explained. "This other blip is United 332, altitude 4,200; see the digits bleeding off in 100-foot increments—he's descending.

"This blip," Swanson said, pointing, "is Southern Airways Flight 81 at 8,600 and climbing, squawking 0532 beacon code, which our ARTS II computer identifies discretely on the scope simply as Southern 81."

Traffic finally dwindled and the shift changed. The spare scope brightened into operation. Alphanumerics were shut off the active scopes, so that the Univac 1230 was free for graveyard-shift work with the innovative Goodyear associative array processor (AAP) computer in the conflict-detection program. Every night, for half-a-year, computer experts and a night-shift controller are programming and controlling air traffic on the spare scope to develop automatic notification on the scopes of potential conflicts and ultimately also to provide their resolution.

From this past May until November, the main thrust of a "night-owl" delegation of Goodyear and Univac engineers, technicians, program planners and FAA's Herbert Wachsman of Systems Research and Development Service is to see whether this promising advance in computer technology answers the need for a back-up system to ease a controller's critical decision-making and automatically point out potential aircraft conflicts.

Installation of the equipment in May came less than a year after Goodyear Aerospace Corp. unveiled what it calls "the world's fastest computer"—the STARAN IV associative array processor (AAP)—to FAA management. Deputy Administrator Ken Smith directed that it be evaluated, and without delay Knoxville was selected as the site. The facility there has a fairly constant volume of traffic (200 operations daily), is served by five airlines with Mode C transponder-equipped aircraft and has surrounding terrain suitable for eventual terrain-avoidance programming into the computer.

Herb Wachsman explained that the Knoxville installation has, in effect, "one kind of computer programming another."

"The associative processor takes data from up to 60 aircraft simultaneously, analyzes and compares every radar target in millionths of a second and then sends only the potential conflicts to the Univac 1230 for reporting on the scope."

As far as executing an instruction based on a single word of data is concerned, the AAP is slower than the Univac serial processor, but the associative processor excels in performing swift parallel calculations.

On July 21st, two FAA Gulfstream aircraft dispatched from NAFEC flew controlled erratic patterns over Knoxville. Four FAA test pilots—John Presley and Harry White in Nan 376 and Irving Budoff and Gerald Decker in Nan 377—flew "overtakes" and "crossovers" for reinforced-radar transponder-beacon tracking tests. Below, in the TRACON, Radar Controller Joe Fowler worked the spare radar scope, with SRDS' Herb Wachsman and computer engineers observing every blip. Each time the Gulfstreams intercepted each other on planned "collision" courses (with built-in altitude separation), the coupled computers provided the scope with constant identification and altitude, and those involved watched to see that the alphanumeric tag stayed with its proper blip. The tests isolated remaining problems.

"Operational evaluation of the system is scheduled for mid-August," Wachsman reported of the day's flight tests. Aided by the knowledge gained, Wachsman remained after completion of this simulation to start contractor teams on the debugging of the conflict-detection programs which will be tested in September.

"First, we are looking at the reliability of conflict detection," said Wachsman. "That is, we don't want too many 'false alarms' of potential conflicts cluttering up the scopes. Then we'll look at conflict resolution."

As the system is perfected, Wachsman indicated that a controller alerted to an upcoming conflict could simply push a button, and the computer could tell him how to resolve the conflict, such as "turn American Flight 332 to 060 degrees," or the like.

In the Knoxville system, the new AAP computer provides radar-beacon tracking for up to 60 aircraft at

The two computers that make up Knoxville's conflict-detection system include the Univac 1230 with its magnetic-tape memory banks (left), being checked by Herbert Wachsman, FAA sub-program manager for the Systems Research and Development Service, and the Goodyear associative-array-processor computer (below), which works parallel to the Univac. Looking into the AAP are Wachsman and Russ Gall, Goodyear Aerospace Corp. engineer. *—Goodyear photos*

On a rotating basis, every air traffic control specialist at Knoxville, in addition to regular duties in the tower cab and the TRACON below it, assists in the nightly evaluation work on the Associative-Processing/Conflict-Detection program. At work in the tower (from left): Homer White, Deputy Tower Chief James Russell (standing), James Kilgore (behind Russell), trainee George Carter and James Beasley.

once, alerting the controller to air-traffic conflicts by flashing on the scope information in one of three different ways, according to the seriousness of the situation.

The first prediction type will concern aircraft under control but with altitude information incomplete (no Mode C transponder) or of given altitude but which in a minute will have less than 500 feet vertical separation from another target. An "alert bar" or illuminated line by the target will blink for three scans, then remain "on" until the conflict is remedied by radioing corrective instructions to the pilots and the controller shuts it off.

A second type of conflict-prediction alert will blink for three radar scans by the target in the normal situation calling for a traffic advisory, and a vector will indicate the point of conflict.

The third and most serious case of predicted conflict will erase the entire alphanumeric display, except for the crisis. Once solved, the controller simply hits two buttons to regain the full display.

Further refinements in evaluating the AAP and Univac computers working together will be in developing detection of target turns and altitude-tracking to support conflict detection. Another possibility is computer-activated Visual Flight Rules Advisory service independent of the controller, freeing him to concentrate fully on his IFR traffic. Another benefit would come from loading the computer with terrain information—the encompassing mountains, TV towers, etc.—to permit generating warnings to any Mode C transponder-equipped planes flying too low. When all problems are worked out in connection with the use of the Univac 1230 and the STARAN IV AAP, the benefits to controllers and the aviation community should be considerable.

According to Henry J. (Jack) Buck, Sub-Program Manager at Washington Headquarters for the ARTS III enhancement at Knoxville, the facility is serving as a feasibility test bed.

"Provided the tests prove out between now and November," Buck said, "the work being done will be considered as an add-on to the ARTS systems. This is only a fore-runner of the planned improvements to systems for satisfying the capacity and safety requirements of large terminals."

—Article and Photos (unless credited otherwise) by Thom Hook.

Knoxville Air Traffic Control Tower Personnel

Administrative Staff: Robert P. Swanson, *Chief;* James Russell, *Deputy Chief;* Jeannie Gilliland, *Secretary;* and Lloyd Alley, *Evaluation and Proficiency Development Specialist.*

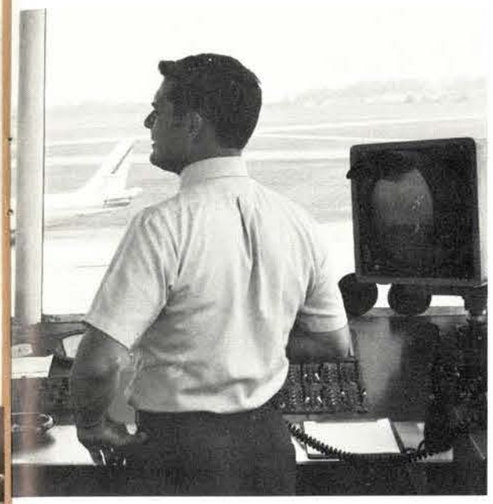
Supervisors: Gene Cash, John Harbin and Bill Wheeler.

Crew Chiefs: Jim Inman and Curley Wainwright.

ATC Specialists: Jim Beasley, Max Bolt, Delmer Carpenter, Mike Coleman, Richard DeVore, Charlie Douglass, Ted Fipps, Edward Forbes, Joe Fowler, Raymond Hawkins, George Hughes, Ralph Jones, Howard Kilgore, Jim Kilgore, Lewis Lang, Charles Lepeard, Art Mabry, Howard Peavler, Tommy Platt, Raymond Poole, Bill Sedgwick, Bill Wear and Homer White.

Developmental Controllers: Earl Aery, Jack Bartlett, Jr., Douglas Bell, James McDaniel, Thomas Perry, Richard Ruth and Donald Stowers.

Trainees: George Carter, Ronald Jenkins and Bill Newby.



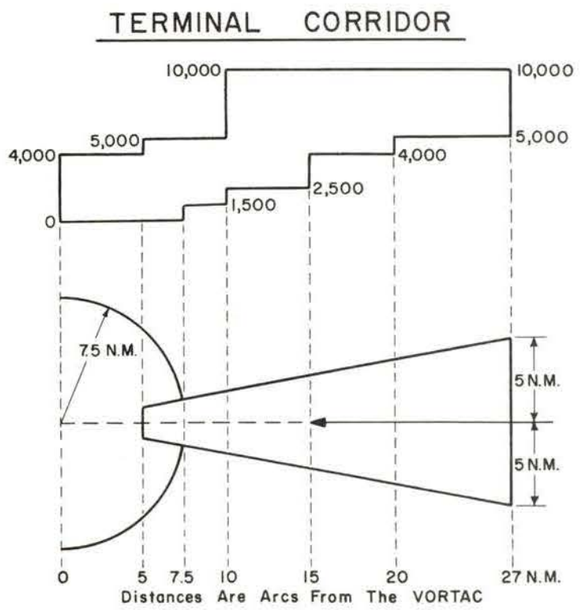
In the latter stages of evaluation of the proposed conflict-prediction-and-resolution system, the BRITE radar at Specialist Jim Beasley's right will be mounted on a track and digital radar information will be available in the cab. One camera will photograph the alphanumerics and another will get the radar picture. Both will be superimposed via closed circuit to the monitor display in the cab.

From 11 p.m. until 6 a.m., when air traffic is at its lowest, computer experts work on programming the Univac 1230 computer. Tower Chief Bob Swanson (right) looks in on two members of the graveyard shift: Univac programmer Katherine Freitag and field engineer Roger Christensen.

Knoxville TRACON crew on duty are (from left): data man Bill Sedgwick and Radar Controller George Hughes at the west radar, east Radar Controller Charles Douglass and data man Art Mabry. Out of picture at right is spare scope used in test of radar-beacon tracking during evening, when crew switches from alphanumeric to manual control.—Goodyear photo

THE LIGHTS GO DOWN FOR BOSTON AIR-CORRIDOR SHOW

Three performances daily—dual screens—minute-by-minute narration—live and videotape action—no, it wasn't wrestling matches or Apollo 15 landing on the moon, but a simulation of controlled-airspace corridors at Logan Airport in Boston. Produced and directed by the FAA team and based on ideas proposed by the aviation industry, the simulation opened to the aviation public for a four-week run in the old National Guard building on the airport grounds.



A "movie" screen and a plexiglass plotting board were set up side by side, the former for projection of live traffic within a 55-mile range exactly as displayed on radar scopes in the Logan control tower, the latter to show where the same aircraft would be if terminal control corridors were established. The dual display offered immediate comparison of real and simulated flight paths.

In the blacked-out test room, aviation industry representatives and FAA officials from Washington and the New England Region viewed the demonstrations, while a team of air-traffic controllers from the Logan tower and the Boston en route center executed a highly precise procedure to simulate aircraft positions on the plotting board.

At the sound of a gong once each minute, controllers from the Boston en route center, hovering behind the face of the 6-by-7 foot simulation board and clad in specially prepared dark clothing, moved luminescent plastic shrimp boats to mark hypothetical positions of aircraft in the vicinity of the airport. Controllers from the Logan tower, sitting in front of the simulation board, maintained continuous communications with both the en route center and the tower and issued clearances—headings, altitudes and speeds—to the men managing the shrimp boats. Larry Kinney and Jack Ryan from the Logan tower coordinated the overall control procedure at the test site.

Watching the simulation board, William Clemens, procedures specialist in the New England Region Air Traffic Division, announced flight-by-flight progress of the aircraft. Controllers on special assignment in the center and tower relayed arrival and departure data for all reported traffic during each simulation run, which lasted an hour or more.

The simulation was not merely a theatrical exercise.

Controllers directing simulation plots during practice demonstration are (left to right) Logan Airport tower controllers Daniel Tucker, Joseph Mann, William Corbo and James McElaney.

Airspace at low-to-medium altitudes surrounding airports is the most heavily trafficked area in the skies, with the greatest risk of midair collisions or near misses. In the last few years, FAA has established circular terminal control areas (TCA) around busy airports in Washington, Chicago and Atlanta, with more to be added. All entering aircraft are identified and directed by air-traffic controllers.

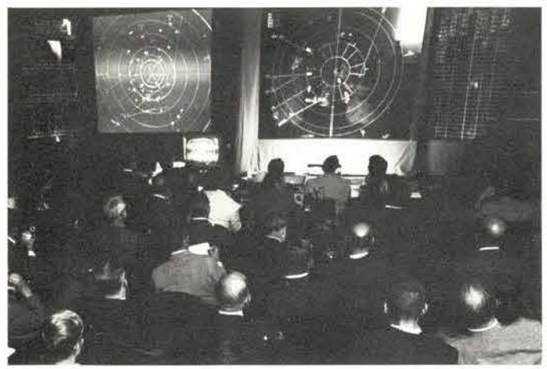
The FAA staged the unique simulation at Logan Airport to test the control-corridor concept, designed and advocated by private aviation groups as an alternative to the circular TCA pattern. Logan Airport was the agency's choice for the tests due to its good mix and dense load of commercial transports and light aircraft. The project produced reams of data for careful analysis by FAA people and met the agency's responsibility to consider public proposals before taking regulatory action.

Four different airspace diagrams were marked on separate simulation boards for successive display. Three looked like many-bladed propellors—corridors extending several miles from the airport and aimed down runway centerlines—and one was a bull's-eye pattern of concentric circles centered on the airport.

In the audience for one of the demonstrations was Deputy Administrator Ken Smith, who was personally involved in developing the simulation method. He remarked after the presentation, "The exceptional efforts of everyone in the project made a success of the technique, which may well become a standard for evaluation of future airspace configuration."

Preparing plastic markers (shrimp boats) for the simulation screens are (left to right) Charles O'Hara, Logan tower; David J. Kinney, Boston Center; Gayle Mathews, Public Affairs Office; William A. Corbo, Logan tower; Robert R. Gray (face hidden), Boston Center; John Holmes, Logan tower, and Arnold Ries, Boston Center. The markers glowed in the dark test room.

The test underway: The left screen displays live traffic as viewed by controllers in the Logan tower; the right screen simulates aircraft positions under positive control in a 60-mile range.



The New England Region project team ran daily simulations at noon, 2 p.m. and 4 p.m. "We had virtually no technical problems, except for a couple of shrimp boats which momentarily slipped off the board," said Harry Collignon, the on-site project officer from the New England Region Air Traffic Division.

Some 60 FAA people contributed their talents to the effort, which was spearheaded by project manager Dan Enright of the Washington Air Traffic Service.

"I've never seen more cooperation on any project since I've been with the FAA," said Ferris Howland, New England Region Director. "Flight Standards people in Boston assisted the Air Traffic Division in working

out simulated instrument approaches to the airport, and Airway Facilities crews installed and maintained the simulation and communications equipment; Earl Chiulli and Harvey Sanford never seemed to leave the site. The New York common IFR room lent us the live traffic projection screen and Jim Pousont to run it. Air-traffic controllers from the Boston en route center and Logan tower practiced nearly three months to orchestrate the relay and display of traffic information and markers. The test results are still under study, but aviation groups have already praised the objectivity of the presentations, and I'm sure we met that requirement."

NAFEC supplied videotape equipment which was used to record heavy air traffic as a substitute for live action in case bad weather curtailed flights during the simulations. Al Lolli of the Experimental Center remained at the test site for weeks to prepare the video hardware. The weather was good, but videotape was used on many occasions to illustrate the simulation technique's flexibility.

The Massachusetts Air National Guard loaned several men and three huge generators to power the kaleidoscope of electronics.

Now the curtain has closed on the tests; the results are under review. The stage was managed by the FAA, but the real stars—unseen and unaware—were the thousands of people aboard aircraft displayed in the simulations, which had one ultimate purpose: to make flying safer. —*By Don Braun*

Speaking to the audience of aviation representatives and FAA officials at the formal demonstration is Deputy Administrator Ken Smith. Seated around the table (clockwise) are several project team members who received flight information and directed shrimp-boat movements: Jack Ryan (back to camera), Logan tower; William Clemens, New England Region Air Traffic Division, project narrator; Adrian Ouellett, Boston Center; Charles O'Hara, William A. Corbo, Joseph J. B. Mann and Tony Serino, all of the Logan tower. Standing are Joseph F. Gallagher, Richard DiMartino and Jack McGee of the Boston Center—three men who worked behind the simulation screen.

Al Adams of NAFEC (far left) checks out video- and audiotaping equipment in preparation for a simulation run. At left, Jim Pousont, New York Common IFR room AFS, adjusts the Eidphor, which projects live and videotaped radar signals sent from Logan International Airport.

Direct Line

Q. Why aren't certain air traffic control facility supervisors and staff personnel required to undergo the same semiannual written and "over-the-shoulder" evaluation as the professional controller?

A. All air-traffic personnel are evaluated on a continuing basis in accordance with Civil Service requirements and in consonance with recognized management procedures. The primary function of full-performance controllers is the control of air traffic. Therefore they are primarily evaluated on their ability to perform the identified functions of the operational positions to which they are assigned. The primary responsibilities of supervisory air traffic controllers are those associated with supervision and they are evaluated accordingly. However, those supervisors who do perform operational duties are also evaluated on their ability in those areas. They do not routinely receive the formal semiannual proficiency check administered to controllers, but this does not preclude the identification of noted deficiencies in the operational area and the administration of any needed remedial training.

Q. I had wartime military service prior to my government service, with a gap in between working for private industry. Is such military service creditable towards retirement? If so, since I did not contribute towards retirement during that period of time, would I have to take a reduced annuity? In order to draw full annuity, could I pay in the difference, or isn't that necessary?

A. Unless you are receiving military retirement pay, the military service you describe is creditable towards civil-service retirement. You will receive full credit without contributing to the retirement fund, and no deposit of any type may be made for the military service. A number of special provisions apply to employees who are or will be receiving military retirement pay. Your personnel office can furnish details and confirm your service computation date.

Q. Is it true that all cartographic-technician positions in the ARTCCs will have the same GS rating under the new regional set-up?

A. Standard duty statements have not been prepared for cartographic-technician positions which are located within Air Route Traffic Control Centers. There is a good possibility that current variations in grade levels for such positions wlil continue to exist. The United States Civil Service Commission position-classification standards for the Cartographic Technician Series, GS–1371–0, are available for use at all FAA regional offices. Generally, variations in grades for what appear to be identical positions can be attributed to significant differences in assigned duties, responsibilities and authorities, or to exceptional performance that makes the job materially different than it otherwise would have been.

Q. Order 1100.126, effective 15 October 1970, suggests that with some authorized controller complements, the personnel be divided into four teams. A facility that is open seven days a week, 24 hours a day needs to have a work schedule that follows some sort of a routine pattern. It seems practically impossible to schedule four teams in order to have a balanced number of personnel working each day. Could you print a guideline schedule showing how four crews can equally cover a seven-day watch?

A. The Appendix to Order 1100.126 suggests the number of teams that seem feasible based upon authorized complement. The suggestion is certainly not mandatory and should be adjusted to provide a balance of personnel to workload. It is not possible to schedule four teams in a seven-day-per-week, 24-hour-per-day facility so as to have an equal number of personnel working each day.

Drop Us a Line!

The Editors of FAA WORLD would like to hear from you. "You Said It" and "Direct Line" are your forum: Is there a particular story that you would like covered? Do you have a comment or a complaint about the magazine? Is there some aspect of your life with FAA that requires a definitive answer? Write: Editor, FAA World, MN-30, 800 Independence Avenue, Washington, D.C. 20590.

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Mother Is an ATC

The most unlikely person ever to become an air traffic controller probably would be a housewife with eight children.

Yet there is such a person controlling air traffic today at the Chicago Air Route Traffic Control Center at Aurora, Ill.

She is Mrs. Betty Murphy, a controller with the agency for the past two years, who recently completed radar training in a special three-week course here at NAFEC. Prior to joining the agency, Mrs. Murphy worked for three years in a school administration job. Before that, she took care of her eight children, now ages 5 to 20, who attend school when she is at the center.

How did she ever get into the air-traffic business? "I wanted a government job and heard an FAA announcement on the radio," she says. "I inquired about controlling as it sounded like very interesting work. And it is."

Mrs. Murphy completed all phases of training, except for radar, at Aurora and at the Aeronautical Center in Oklahoma City. She found the recent radar training at NAFEC "quite worthwhile," she says. "It's one of the best training programs we have been exposed to in the FAA." She was one of a class of 18 developmental controllers from the Chicago Center that underwent a three-week session in an air-traffic-simulation lab to learn how to use radar to control traffic.

NAFEC project manager Arnold Corradino, in charge of the training, says that each trainee is exposed to traffic situations which he ultimately will encounter at his home center.

"Our lab realistically simulates the actual operation of sectors from any center," Corradino says. "The trainees work the radar and hand-off positions on sectors on which they will check out when they return home." The simulation works by duplicating aircraft

flights, communications and radar displays of any center. Targets on the display representing planes are simulated but a controller couldn't tell the difference between a simulated scope and one back at Aurora, Corradino says.

Since January, when the special classes started at NAFEC, teams of controllers from ARTC Centers at New York, Kansas City, Cleveland, Denver, Oakland, Minneapolis, Indianapolis and Chicago have been trained.

Mrs. Murphy admits her work is "difficult but rewarding."

"One of the surprises of the job has been that we never see an airplane at a center," she says. "Most people think of a controller in the airport tower, but at the center, we never even get a chance to look outdoors."

When asked how the male controllers treat a woman controller, Mrs. Murphy says, "Very nice. As long as you can do your job, you'll get along."

She advises any woman, however, not to try controlling unless she is interested in a career and not just a job. "There's an awful lot of training involved," she says. "At certain stages, we have to do much studying, more than I ever realized. But it's worth it."