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**Federal Aviation
Administration**

Robert Rolling operates the 9020A system console at the FAA Academy one last time as (left to right) Bill Shackelford, George Yauk, Ken Lynch and Johnie Nolen look on.

Photo by Jack Iman

End of an Era

"Ol' Faithful" was retired in December 1984. No, the geyser in Yellowstone National Park wasn't turned off, but a just-as-reliable fixture of the National Airspace System was.

The IBM 9020A computer that was a basic component of air traffic training at the FAA Academy for more than 17 years ended its days at the hands of the original five-man 9020A team, which was invited to say farewell to Ol' Faithful.

Section supervisor Ken Lynch introduced the original group, recalling their reaction to switching from primary electronics to computer logic.

"I remember that in 1967 computer logic was brand new to all of us. All of us had to take 36 weeks of schooling at the academy—28 weeks in 9020 computer theory and six of hands-on as the new equipment was installed. The original five on the team were George Yauk, Johnie Nolen, Robert Rolling, Bill Shackelford—since retired—and myself."

The remaining members of the team had the melancholy job of tearing down the 9020A to make room for a future host computer, which will be much smaller but more adept at its job. The host model has not yet been selected, but it is expected to be incorporated into National Airspace System courses in August of this year.

Lynch explained that the dismantled 9020A will be cannibalized for parts to serve the equipment still in operational use. ■

At the FAA, we are working to improve the many parts of the complex system that people will need for air travel in the years ahead. We can sustain and improve the technology to support safe air travel and achieve the airport capacity to handle aviation growth if we have the will to do so and dedicate ourselves to making our decisions work.

In short, aviation will become what we choose to make it. I am confident that aviation achievement can be as high as we set our sights. Let us always act worthy of the dreams of a great and free people.

—Donald D. Engen

Front cover: *New airship designs are getting FAA busy developing standards. British Airship Industries has applied for a U.S. type certificate for its Skyship 500, which uses vectored-thrust propellers to increase its maneuverability. The British CAA has already certificated it for passenger carriage. At the same time, Airship Industries and Westinghouse have teamed up on an R&D project on the feasibility of installing radar on airships.*

Photo by Ken Peppard
Office of Aviation Safety

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Richard Myer—Northwest Mountain Region
Jack Barker—Southern Region
Geraldine Cook—Southwest Region
Vacant—Technical Center
Barbara Abels—Western Pacific Region

By Charles Spence
An aviation free-lance writer, he was senior vice-president for public relations at AOPA and served 15 years with Hearst newspapers.

Saving Public-Use Airports

Airports Offices Rise to Challenge of Aviation Growth

Palwaukee Airport near Chicago was an anomaly and one that epitomized the problems of the nation's airports.

Only two other airports in Illinois —O'Hare and Midway—had more air traffic than Palwaukee, yet it was in danger of closing because spiraling land prices and the costs of operation were swamping the private owners. Seemingly a Catch-22, if there ever was one.

Today, however, two communities own the facility jointly, and Palwaukee Airport's place in the air transportation system is assured. This is thanks in large measure to the concerns of local and state governments, a federal grant-in-aid of $6 million and the work of FAA's Airports offices.

"The grant-in-aid program is what most people think the Airports organization does," says William Shea, Associate Administrator for Airports, "because it is a high-visibility activity."

But, he points out, giving the nation a viable airport system is more than just providing financial help. It requires diversified talents and efforts covering planning, setting standards, providing technical guidance and fostering research and development.

"Planning to provide for the development of an adequate national public-use system of airports has been going on for about 40 years," says James Mottley, manager of the National Planning Division of the Office of Airport Planning and Programming. "Currently, the draft

Chicago Palwaukee Airport, with a Level II tower, was the third busiest tower in Illinois but had to be saved from closing by concerned public officials and FAA.

National Plan of Integrated Airport Systems (NPIAS) identifies over 3,600 airports and heliports of all levels. We can say that with the implementation of the plan, most communities in the country will have access to a safe and adequate airport, ranging from large primary air carrier terminals to metropolitan general aviation reliever airports and smaller general aviation airports."

In addition to funding the maintenance and upgrading of existing airports and expanding the system to assure adequate capacity, Airports personnel develop the standards for the efficient design and safe operation of airports.

For example, the Office of Airport Standards establishes guidelines for runway pavement design and surface characteristics, airport configurations, lighting and safety equipment performance standards and safe operational procedures. To this end, Airports will request and monitor studies and tests at the FAA Technical Center.

Bringing airports up to standards, improving their facilities and increasing airport capacity is an urgent matter. In his first public speech after becoming administrator, Donald Engen stressed the need to increase airport capacity, and he has sounded that theme in almost every public appearance since.

The present airport system dates back to World War II. Prior to that, government planners hoped that

With aircraft delays at metropolitan airports like Florida's Tampa International and projections showing future strains on capacity, the NPIAS identifies existing and potential reliever airports. The latest here identified by FAA and being sought through Hillsborough County is privately owned Vandenburg Airport.

private enterprise would develop a system of landing fields. The demand—the number of operations or number of aircraft—wasn't there, especially in the midst of the depression. With the coming of the war and the crash programs to train pilots and manufacture an aerial armada, some 600 airports were built for training and defense, often sited near population centers, making them useful when turned over for civil use in the post-war period.

In the mid-60s, the growth of jet travel strained the system. Improvements in air traffic technology and the passage of the Airport and Airway Trust Fund in 1970 for sustained funding of development and expansion helped improve the airport system and expand its capacity in an attempt to satisfy the growing demand.

Once again, the expansion of aviation in the 80s, abetted by deregulation, is pressing at the limits of some heavily used airports.

In San Jose, Calif., for example, a twin-engine Cessna 414 touched down on Runway 30R, rolled onto a taxiway and stopped between rows of closely spaced parked aircraft. Ground control told the pilot that his passengers could disembark at the general aviation terminal at the other end of the field but that the aircraft would have to take off again immediately. No aircraft parking space was available!

During the past dozen years, about 1,150 public-use airports have become

Manassas, Va., Municipal Airport in 1979 (above) and today. It replaced an earlier locked-in facility at a different location. FAA grants-in-aid totaling $11.8 million under the Federal Aid to Airports Program (FAAP), the Airport Development Aid Program (ADAP) and the Airport Improvement Program (AIP), beginning in 1966, helped in site acquisition and continuing development. Its growth includes a parallel runway, precision instrument landing system and, at the lower portion of the photo, the start of a corporate operations area.

unavailable for public use. Most were privately owned. Some of these airports still exist, but the owners decided that environmental concerns, high taxes, liability and other problems associated with public use simply outweighed the benefits.

Real estate developers also have taken their toll. In the Chicago area, for example, 52 public-use airports operated at the close of World War II. Now, there are only 16, and a fourth of these are expected to close within the next 15 years unless steps are taken to preserve them, like Palwaukee.

On Long Island, adjacent to New York City, Nassau County boasted 40 airports 40 years ago. Often termed a "cradle of aviation" because of historic events like Lindbergh's flight to Paris from Roosevelt Field and Jimmy Doolittle's first instrument landing at Mitchel Field, there are no airports in the county today.

Last spring, Brian Vincent, manager of the Airports Division in the Eastern Region, set out to determine how serious the problem was. He found that in a 10-year period, public-use airports in the region had declined from 734 to 626. Of the seven states and the District of Columbia in the region, only West Virginia showed on the plus side, with a gain of four airports since 1973. All other states lost from three to 49 airports in that time.

The picture has been similar in most regions. Southern California has been called a "disaster area" for airports. Only last September, San Fernando closed, displacing 250 aircraft based there. Many of these planes moved to nearby Whiteman Field, but a study two years ago by the California Division of Aeronautics forecast complete saturation of all airports in the Los Angeles basin by this year.

"We've set out to halt this trend and reverse it," says Associate Administrator Shea. "We're talking not just about airports, but heliports, helistops, seaplane bases and expanded capacity at existing hub airports."

All FAA regions are actively making efforts to help convert key privately owned airports to some form of public ownership or public use.

In January, $1.3 million in Airport Improvement Program funds were allocated for purchasing Tulip City Airport in Holland, Mich., from its private owner by the city.

In the Southern Region, discussions are progressing with the airport authority of Hillsborough County, Florida, for converting privately owned Vandenburg Airport with its 260 based aircraft into a public airport that would be a reliever for Tampa International. Near Atlanta, Stone Mountain Airport is a preservation target for Airports personnel. Specific programs are underway in Trenton, N.J.; Hampton Roads, Va.; Cincinnati, Ohio, and elsewhere to reverse the decline. Since 1982, 29 new public-use airports have been constructed and 12 have been acquired from private parties.

Under the authority of the 1982 Airport and Airway Improvement Act, federal funds for the first time may be made available to assist privately owned airports designated as reliever airports in the National Airport System Plan that are open to the public. So far, six of these airports have received financial grants. Recipients must agree to maintain the airport for a specified number of years and keep it in the inventory of active fields.

"Most communities could solve their airport problems easily enough, Administrator Engen told an aviation audience, "if they had carte blanche to pour all the concrete they need for runways and taxiways and no one complained about noise."

But that is not the case, although the problem could yield to some extent to effective education of local politicians and the public. The general public often doesn't realize —as their local officials sometimes do—the economic benefits of having airports. Airports are business and sometimes big business, and they attract business.

Aeronautical activities in Texas have been estimated to have an $18 billion positive impact on the state's economy. JFK Airport is believed to be the largest single employer on Long Island. Bradley International Airport in Connecticut employs 2,269 people and brings $184 million annually to the Hartford-Springfield area.

At the other end of the aviation hierarchy, a report for the Florida Department of Transportation in 1983 indicated that general aviation accounts for nearly 10,000 jobs and over $600 million in business in that state.

"An often overlooked value of the airport and federal assistance," says Clark Sharp of Southern Region's Civil Rights Staff, "is the opportunities for businesses operated by minorities and women. In places like Miami, Orlando, Fla., and Atlanta, Ga., we see significant examples of this spin-off advantage."

This message of the benefits of airports needs to be spread. One new method is FAA's aviation education program. This year's essay contest for students in grades 4 through 12, sponsored by the FAA, the Air Traffic Control Association and the National Aeronautics Association, is on the subject: "The Importance of Airports to Your Community."

The Central Region, for one, hosts annual meetings with airport sponsors to update them on the latest information on the Airport Improvement Program.

Quieter jet engines, better zoning practices and retrofitting noise-impacted buildings with improved insulation can help the noise problem.

The North Central Texas Council of Governments recognizes the importance of the 39 airports in its area and estimates that at least a third will reach their capacity within 15 years.

The FAA can advise, prod, encourage and help to finance, but the initiative for seeking federal aid must come from local jurisdictions and must be combined with action. For every dollar the federal government puts into airports from the Aviation Trust Fund, localities and states must invest three.

Arapahoe Airport near Denver, a reliever for Stapleton, is a good example of how good land-use planning and community and business relations can help turn a general-aviation airport into the fourth busiest in the country in 12 years. It has more than 1,000 planes based there, including 125 jets, and a new 130-foot tower to handle over 400,000 operations.

Some states, like Pennsylvania, have recently passed legislation placing state taxes on fuel earmarked for setting up airport development programs.

The NPIAS lists 3,219 current airports as essential for interstate air commerce and recommends the construction of 449 new facilities. But, Shea points out, "States have their own plans; so do many regional government groups. These plans include airports that are not listed in the national plan."

Whether an airport is in the plan or not, however, Airports personnel have an interest in it. "We have standards people providing even such engineering services as detailed electrical surveys," says an FAAer in the Great Lakes Region.

The task, in Administrator Engen's words, is that "we urgently need to increase public awareness of our airport problems if we are going to meet the challenge of aviation growth."

That work is going forward in the regional airport divisions and airport district offices, as well as Washington headquarters. "We're proud of what our airports people are accomplishing," says Shea. ■

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

She Shows Her Stuff

FAA Architect Blows Horn for FAA Designs

Jane Jacobsen, architect/engineer in the Great Lakes Region's Airway Facilities Division, is a believer in the adage, "If you want something done, do it yourself."

She learned of a planned exhibition of work by women architects just two weeks before she was to report to the Federal Highway Administration for 90 days under the Secretary's Professional Exchange Program. Nevertheless, she became a participant in the exhibition sponsored by the Chicago Historical Society and Chicago Women in Architecture (CWA). The exhibition runs until this month and then travels throughout the Midwest for two years as part of the Illinois Art Council's traveling exhibit program.

The theme of the exhibit is "Progress and Evolution, 1974-1984" in honor of the tenth anniversary of CWA, of which Jacobsen is a charter member and the only member working for the federal government. Its purpose is to increase visibility of women architects and women in related professions.

FAA architect Jane Jacobsen (left) poses with her entry in the Chicago Historical Society exhibit on women architects and exhibit curator Sabra Clark.

With such a short time remaining to her, she had to review her FAA work quickly to decide which projects to select and do it without delay.

She realized that the architectural community as well as the general public had little knowledge of what architectural work is done by FAA. So she decided to emphasize the Great Lakes Region's role in constructing air traffic control facilities and based the exhibit on four of her major projects: the base building and the tower at Carbondale's Southern Illinois Airport, the TRACON addition at Muskegon, Mich., and the base building for a new tower at General Mitchell Field in Milwaukee, Wis.

Jacobsen took all her own photographs and prepared the exhibit at home at her own expense and effort. Her entry fit into a shadow box 30× 30×3 inches, which gave her the opportunity to mount drawings and photographs at different depths for a three-dimensional effect. She had to make the display structurally strong enough to withstand a five-month Chicago exhibition and a two-year road show.

Her entry was one of a limited number selected for both exhibit programs. Before its submission, it was displayed at the Federal Highway Administration's regional office because she already was on duty there.

Each of the exhibitors had half a page devoted to her display in *Inland Architect*, a Chicago architectural bimonthly magazine, which published an exhibit catalog as a special insert.

Prior to coming to FAA, Jacobsen worked for two of Chicago's most prestigious architectural firms, as assistant chief of military planning and architect for the U.S. Corps of Engineers and for the Environmental Protection Agency. ■

People

The information in this feature is extracted from the Personnel Management Information System (PMIS) computer. Space permitting, all actions of a change of position and/or facility at the first supervisory level and branch managers in offices are published. Other changes cannot be accommodated because there are thousands each month.

Aeronautical Center

■ **Charles W. Edwards,** unit supervisor in the Operations Section, Supply Management Branch, FAA Depot, promotion made permanent.

■ **William P. Ford,** unit supervisor in the Technical Operations Section, Airway Facilities Branch, FAA Academy, promotion made permanent.

■ **Eugene R. Imes,** manager of the Fleet Management Branch, Fleet Programs and Plans Staff, Aviation Standards National Field Office, promotion made permanent.

■ **Charles P. Jewell,** manager of the Tokyo, Japan, Flight Inspection Field Office, from the Honolulu, Hawaii, FIFO.

■ **Charles G. Lowery,** unit supervisor in the Records Section, Aircraft Registration Branch, Airmen and Aircraft Registry.

■ **Vernon C. Nolen,** unit supervisor in the Training Operations & Support Section, Training Methods & Operations Branch, FAA Academy.

■ **Lawrence L. Ruby,** unit supervisor in the Special Services Section, Air Traffic Branch, FAA Academy.

■ **James D. Sparks,** manager of the Quality Control Branch, FAA Depot.

■ **George Torres,** unit supervisor in the Avionics Maintenance Section, Aircraft & Aviation Maintenance Branch, Aircraft Maintenance & Engineering Division, Aviation Standards National Field Office.

■ **Neil C. C. Wilson, Jr.,** manager of the Engineering and Production Branch, FAA Depot.

Alaskan Region

■ **David B. Epstein,** supervisor of the Environmental Section, Maintenance Operations Branch, Airway Facilities Division, from the Juneau AF Sector.

■ **Alvis B. King,** foreman of the Technical Support Staff sector unit, Fairbanks AF Sector.

■ **Steven R. Palmer,** area supervisor at the Anchorage ARTCC.

■ **Michael P. Pumphrey,** area officer at the Anchorage ARTCC.

■ **Michael A. Tallman,** area supervisor at the Anchorage ARTCC, from the Jacksonville, Fla., ARTCC.

■ **Daniel R. Truesdell,** area manager at the Dillingham Flight Service Station, from the Hutchinson, Kan., Tower.

■ **Jimmie L. Vaughan,** manager of the Anchorage ARTCC, promotion made permanent.

Central Region

■ **Joseph M. Jirschele,** area supervisor at the Wichita, Kan., Tower.

■ **Michael A. Gifford,** supervisor of the Contracts and Payables Section, Accounting and Disbursing Branch, Accounting Division.

■ **Louise M. Lathrop,** supervisor of the Financial Accounting Section, Financial and Cost Accounting Branch, Accounting Division.

■ **Robert L. Miller,** manager of the Systems & Equipment Branch at the Atlanta, Ga., Aircraft Certification Office, promotion made permanent.

■ **Marilyn Siffre,** supervisor of the Cost and Property Accounting Section, Financial and Cost Accounting Branch, Accounting Div.

■ **Frank A. Tomes,** area supervisor at the Offutt Air Force Base RAPCON in Bellevue, Neb.

■ **Patricia E. White,** manager of the Miami, Fla., Manufacturing Inspection District Office, promotion made permanent.

■ **Harold M. Wolters,** area manager at the St. Louis Tower.

Eastern Region

■ **Paul A. Alexander,** assistant manager for technical support in the Tri-State Airway Facilities Sector in Trenton, N.J.

■ **Boyd V. Archer, Jr.,** assistant manager of the Norfolk, Va., Tower, from Washington headquarters' Air Traffic Service.

■ **John C. Bell,** area supervisor at the Newark, N.J., Tower, from the Air Traffic Division.

■ **John Buono,** manager of the Control, Reports & Analysis Branch, Accounting Division.

■ **Frank P. Cavallaro,** crew chief in the New York TRACON AF Sector Field Office, Metro New York AF Sector, promotion made permanent.

■ **Thomas J. Dawson,** area supervisor at the Rochester, N.Y., Tower.

■ **Donald J. Grant,** manager of the Oakdale, Pa., AF Sector Field Office, Pittsburgh, Pa., AF Sector.

■ **Wayne C. Johnson,** manager of the Safety Analysis & Management Branch, Flight Standards Division, promotion made permanent.

■ **Louis S. Natale,** assistant manager of the JFK International Tower, from the Westchester, N.Y., Tower.

■ **David F. Richardson,** traffic management coordinator at the New York ARTCC.

■ **Gilbert L. Shade,** area supervisor at the Parkersburg, W.Va., Flight Service

Station, from the Martinsburg, W.Va., FSS.

■ **Natalie D. Tyler,** area supervisor at the Washington ARTCC, from Washington headquarters' Office of Personnel & Training.

■ **Louis W. Vengilio,** area supervisor at the New York ARTCC.

■ **Charles L. Wynkoop, Jr.,** area supervisor at the New York ARTCC.

■ **Walter K. Zittle,** manager of the Harrisburg, Pa., AF Sector, from the Buffalo, N.Y., AF Sector.

Great Lakes Region

■ **Gerald R. Akers,** manager of the West Lafayette, Ind., Airway Facilities Sector Field Office, Indiana AF Sector.

■ **Tommy R. Brown,** area supervisor at the Chicago Palwaukee, Ill., Tower, from the Air Traffic Division.

■ **Thomas M. Burks,** systems engineer in the Indianapolis, Ind., ARTCC AF Sector.

■ **Thomas J. Delkers,** unit supervisor in the Minneapolis AF Sector Field Office, Minnesota AF Sector.

■ **Willis W. Finical,** area supervisor at the Cleveland, Ohio, ARTCC, promotion made permanent.

■ **Gordon C. Fries,** area supervisor at the Minneapolis Flight Service Station, from the Hibbing, Minn., FSS.

■ **Danny M. Houdeshell,** area supervisor at the Cleveland ARTCC, promotion made permanent.

■ **Jerry J. Keszler,** unit supervisor in the Sioux Falls, S.D., AF Sector Field Office, Dakota AF Sector, from the Michigan AF Sector.

■ **Chester F. Lament,** manager of the Columbus, Ohio, AF Sector Field Office, Ohio AF Sector, from Washington headquarters' Program Engineering & Maintenance Service.

■ **Gregory E. Morrissey,** area supervisor at the Janesville, Wis., Tower, from the Sioux Falls Tower.

■ **Horst Schultz,** area supervisor at the Cleveland ARTCC, promotion made permanent.

■ **Barbara A. Williams,** area supervisor at the Cleveland ARTCC, promotion made permanent.

■ **Maureen Woods,** manager of the St. Paul, Minn., Tower, from the Champaign, Ill., Tower.

New England Region

■ **Judge R. Coles,** area supervisor at the Boston, Mass., ARTCC.

■ **Donald F. Cronk,** assistant systems engineer in the Boston ARTCC Airway Facilities Sector.

■ **William L. Green,** area supervisor at the Bangor, Maine, Tower, from the Logan Airport Tower, Boston.

■ **Donald L. Lombard,** assistant manager for technical support in the Boston AF Sector, from the Airway Facilities Division.

■ **Walter J. Macomber,** supervisor of the Nav/Visual Landing Aids Section, Facilities Establishment Branch, AF Division.

■ **John J. Magner,** manager of the New York Manufacturing Inspection District Office, Qasar Branch, Aircraft Certification Office, Teterboro, N.J.

■ **Jeffrey W. Taylor,** area supervisor at the Bradley Field Tower, Windsor Locks, Conn., promotion made permanent.

■ **Rodman D. Williams,** supervisor of the Interfacility & Communications Flight Information Section, Facilities Establishment Branch, AF Division.

Northwest Mountain Region

■ **David A. Bennett,** manager of the Renton, Wash., Tower, from the Hillsboro, Ore., Tower.

■ **Robert T. Broadbent,** unit supervisor in the Salt Lake City, Utah, Flight Standards District Office.

■ **Roger W. Clark,** assistant manager, plans and programs, at the Denver, Colo., ARTCC.

■ **Boniface Frank,** area supervisor at the Billings, Mont., Tower, from the Great Falls, Mont., Tower.

FAAers past and present invaded Switzerland to ski in January. Among the participants in Johnnie's Gang's trip to Klosters, Switzerland, were (left to right) Washington National controller Charles Shelleman, Jr.; Thom Hook, headquarters public affairs (retired); Washington National area supervisor Stan Gromelski; Miami ARTCC controller Frank Alexander; Johnnie Morgan Lowe, Management Systems (retired); and Bob Lowe, Management Systems.

Photo by Thom Hook

■ **Alfred I. Hilton,** navaids/communications specialist in the Seattle, Wash., Airway Facilities Sector.

■ **Michael P. Hipsher,** area manager at the Denver ARTCC.

■ **Arthur C. Jones,** manager of the Seattle Flight Standards District Office, from Washington headquarters' Office of Flight Operations.

■ **Stephen P. Kolb,** section supervisor in the Propulsion Branch, Los Angeles Aircraft Certification Office, Long Beach, Calif., promotion made permanent.

■ **Danial T. Mawhorter,** area supervisor at the Denver ARTCC, from the FAA Academy.

■ **John D. Newsome,** area supervisor at

(Continued on page 19)

Retirees

Anderson, Robert W.—AC
Bleton, Eldon S.—AC
Brown, Charlie E.—AL
Burger, David W.—AC
Bussing, Norman L.—AC
Bussing, Walter K.—AC
Cieneskie, Carl A.—AC
Clark, Paul L.—AC
Collins, Fred J.—AC
Cook, Claude F.—AC
Coy, Calvin N.—AC
Darc, Helen J.—AC
Dillier, Lewis E.—AC
Dwyer, Lawrence C.—AC
Eden, Richard M.—AC
Forbes, Clyde R.—AC
Gerald, Paul R., Jr.—AC
Gilmore, Albert—AC
Glover, Philander W.—AC
Graham, William G.—AC
Greer, John D.—AC
Growney, Edward J., Jr.—AC
Hill, Francis J.—AC
Huddleston, Bills J.—AC
Hunt, Everett W.—AL
Law, Mas C.—AC
Lloyd, James M., Sr.—AC
McCoy, Lawrence R.—AC
McKim, William R.—AL
McNabb, Janelle—AC
Milligan, Paul E.—AC
Pascarelli, John J.—AC
Perkins, Thomas W.—AC
Phillips, Dale F.—AC
Samuelian, Samuel V.—AC
Sands, Mercedes R.—AC
Seaton, Glenn E.—AC
Shull, Hubert—AC
Slyman, Clyde H.—AC
Smith, Gale E.—AC
Smith, Joe O., Jr.—AC
Sullivan, Charles T.—AC
Taylor, Reuben R., Jr.—AC
Turner, Virgil J.—AC
Wallace, Donald W.—AC
Welch, Russell G.—AC
Williamson, Jon R.—AC
Wilson, Wallace L.—AC
Wilson, William C.—AC
Worthy, Oda—AC

Fujimori, Jerome K.—AL
Gray, David, Jr.—AL
Jones, Arland C.—AL
Lockard, James N.—AL
Morris, Eugene G., Jr.—AL

Agosta, Charles J.—CE
Bowsher, Harold L.—CE
Braswell, George A.—CE
Coleman, Robert W.—CE
Demmerly, Harry W.—CE
Dewendt, Charles W.—CE
Dubay, Edward J.—CE
Ewbank, Lewis G.—CE
Fleischman, Leo H.—CE
Franklin, John R.—CE
Froiburghorst, Edward W.—CE
Gauldin, John W.—CE
Hambelton, William M.—CE
Hiland, Dwaine E.—CE
Jackson, Robert L.—CE
James, K. Hugh—CE
Jensen, Einar J.—CE
Johnson, John C.—CE
Laurent, Harold L.—CE
McKeever, John M.—CE
Mendoza, Henry—CE
Moore, Gerald S.—CE
Morgan, Merritt C.—CE
Peck, William A.—CE
Reissener, Norris D.—CE
Robertson, Don L.—CE
Scrivner, Loren E.—CE
Steinkrauss, Gordon R.—CE
Todd, Robert Dean—CE

Brennan, Thomas F., Jr.—CT
Clark, Robert A.—CT
Connolly, Donald W.—CT
Defeo, Henry J.—CT
Delany, Hugh D.—CT
Gittelson, Karl F.—CT
Haynack, Elmer M.—CT
Howell, Wayne D.—CT
Larson, Russel H.—CT
Lovell, Joseph C.—CT
Mark, David C.—CT
Maslanka, Edward S.—CT
Mayer, William J.—CT
McGuinn, William J.—CT
McHugh, Franklin T.—CT
Romei, Joseph M.—CT
Sisti, Allen A.—CT
Woodall, James F.—CT
Zemgulis, Dorothy R.—CT

Adkins, William E.—EA
Ascher, Ida E.—EA
Barbieri, Joseph W.—EA
Barnard, William D.—EA
Bergman, John F.—EA
Bianchini, Albert W.—EA
Blankenship, Leslie E., Jr.—EA
Bowers, John W.—EA
Boyce, William F.—EA
Brown, Harold L.—EA
Cartier, Robert N.—EA
Childress, Wiley A., Jr.—EA
Chrobak, Rudolph C.—EA
Cohen, Seymour—EA
Cummings, Foster B., Jr.—EA
Davis, James T.—EA
Deeth, William E.—EA
Denney, Chester N.—EA
Dubison, Clifford—EA
Dunn, Florence S.—EA
Falco, Anthony—EA
Fearns, William F.—EA
Fernsten, Ernest P.—EA
Fischer, John D.—EA
Franz, Thomas B.—EA
Freed, George F., Jr.—EA
Friedly, Nelson F.—EA
Glatter, Morris G.—EA
Goldberg, Phillip—EA
Gomeringer, Albert E.—EA
Grandy, John W., III—EA
Grasso, Ernest—EA
Harper, Charles H.—EA
Harris, Thomas—EA
Harter, Donald A.—EA
Headley, Howard T.—EA
Hylton, William A.—EA
Johnson, Norman W.—EA
Johnston, Eunice E.—EA
Kahn, Richard V.—EA
Kean, Thomas B.—EA
Kirkpatrick, Dallas C.—EA
Lucas, Emerson R.—EA
MacDonald, Joseph R.—EA
Machia, Paul H.—EA
Mansiseri, Alfred—EA
Michael, John—EA
Morris, Victor J.—EA
Nida, Paul M., Jr.—EA
O'Connell, Edward T.—EA
O'Leary, Joseph H.—EA
O'Reilly, Frank J.—EA
Pfeiffer, Lawrence C.—EA
Pevourow, Marvin J.—EA
Reynolds, Bernard C.—EA
Rubenstein, Howard—EA
Russell, Frank A.—EA
Russo, Louis R.—EA
Ryman, Charles K.—EA
Sanomes, Ray R.—EA
Sherline, Bernard L.—EA
Slomka, Edward W.—EA
Tamosaitis, Edward J.—EA
Toombs, Charles K.—EA
Tumminia, Joseph J.—EA
VanDyne, Walter J.—EA
Weaver, Emil H.—EA
Wenn, Richard W.—EA
Whitehead, Raymond S.—EA

Auri, George M.—GL
Allen, Lester F.—GL
Anderson, Walfred M.—GL
Berndt, Donald C.—GL
Bishop, Leonard E.—GL
Bramble, Robert J.—GL
Brunson, Henry J.—GL
Brooks, James F.—GL
Brown, Floyd R.—GL
Carlson, Archie T.—GL
Cassity, Jewell H., Jr.—GL
Condiff, Robert A.—GL
Curry, Norman F.—GL
Damian, Stephan—GL
Daley, Jimmy D.—GL
Deutsch, Rudolph J.—GL
Gavin, Stuart P.—GL
Gould, Richard E.—GL
Hansen, Richard E.—GL
Hill, Wallace—GL
Hood, James E.—GL
Ihs, Robert P.—GL
Jorgensen, Russell W.—GL
Kroll, Duane O.—GL
Langlois, Vincent J.—GL
Mackie, James E.—GL
McBroom, Opie A.—GL
McGhee, Clarence—GL
Mick, Leon H.—GL
Mingus, Bills E.—GL
Murreaus, Edward J.—GL
Myers, Robert L.—GL
Nowell, Robert, Jr.—GL
Poe, Kenneth W.—GL
Prairie, William W.—GL
Ridgeway, Loren R.—GL
Ridley, Frederick F.—GL
Sanborn, Maurice R.—GL
Schmidt, Arthur—GL
Schlildman, Richard S.—GL
Schultz, Lee W.—GL
Stammer, Francis D.—GL
Stroup, Gary R.—GL
Strozzo, Richard E.—GL
Taylor, James W.—GL
Tri, Delbert V.—GL
Trockenbrod, Robert H.—GL
Wetzel, Paul A.—GL
White, Richard A.—GL
Wick, Donald E.—GL
Woodbury, John H.—GL
Wright, John E.—GL
Zielie, Edward J.—GL
Howes, William B.—MA
Heffner, Charles F., Jr.—MA
Jackson, Curtis H.—MA
Kastner, James F.—MA
Kemp, Pender—MA
Rowell, Howard C.—MA
Brison, Roland O., Jr.—NE
Borriello, Paul J.—NE
Brodbeats, William L.—NE
Cialek, Stanley J.—NE
Dimlori, Joseph T.—NE
Flanigan, Gerald F.—NE
Koerner, Edward J.—NE
LaClair, Vernon R.—NE

(Continued)

Retirees continued

Lane, Frederick J., Jr.—NE
Lindenauer, Martin M.—NE
Marley, Frank J.—NE
Mullen, John P.—NE
Musacchio, Louis R.—NE
Myllmaki, Edward E.—NE
Nutter, John P.—NE
Ryan, John A.—NE
Schmidt, George R.—NE
Shelley, John J.—NE
Silva, Anthony R.—NE
Wood, Frederick W.—NE

Allm, Hal K.—NM
Bohi, Darrell L.—NM
Booth, Harry D.—NM
Bryant, William D.—NM
Chambers, Robert M.—NM
Connell, Paul T.—NM
Cox, Clifford V.—NM
Crum, Charles A.—NM
Curran, Thomas F.—NM
Daley, William F.—NM
Fortmann, Guenther O.—NM
Frederic, John—NM
Fry, Kenneth M.—NM
Glenn, William S.—NM
Gordon, Lloyd C.—NM
Grieve, John O.—NM
Hansen, Carl T.—NM
Harris, Kenneth E.—NM
Irwin, Harry J.—NM
Larsen, Alan H.—NM
Lauver, Robert E.—NM
Martinson, Glenn M.—NM
McDonald, Michael C.—NM
McKay, Douglas W.—NM
Morris, James A.—NM
Mumford, Dale A.—NM
Norman, Marvin K.—NM
Olinger, Walter C.—NM
Olsen, W. David—NM
Pearson, Gerald C.—NM
Preston, William H.—NM
Quint, Leona M.—NM
Rash, Forest E.—NM
Raynal, Andre F.—NM
Rich, Leland C.—NM
Ritzen, Norman L.—NM
Scott, Arden R.—NM
Short, Ray M.—NM
Smouse, Richard N.—NM
Thorne, Wilfred D.—NM
Uliana, Anthony A.—NM
Urich, William L.—NM
VanHouweling, Paul A.—NM
Walsh, Jack R.—NM
Walters, Junior E.—NM
Williams, Dee J.—NM
Wito, Harold F.—NM

Abrams, Paul W.—SO
Bale, George F.—SO
Barlow, Roy A., Jr.—SO
Boles, Sanford R.—SO
Bone, Marvin R.—SO
Boyd, William T.—SO
Bozzi, Michael E.—SO
Browne, Ronald W.—SO
Coleman, William G.—SO
Davis, Cecil C.—SO
Dill, Clyde A.—SO
Duncan, William B.—SO
Felder, Harry E.—SO
Flood, Joseph A.—SO
Folsom, Ralph R.—SO
Gabel, Herman H.—SO
Holbrook, Thomas C., Jr.—SO
Julbe, Manuel, Jr.—SO
King, James F.—SO
Kreps, Frederick W.—SO
Kruger, Arno L.—SO
Landreth, Thomas B.—SO
Little, Harold E.—SO
Morris, Ernest S., Jr.—SO
Naglich, John W.—SO
Neece, Louis T.—SO
Neiman, Paul J.—SO
Neumann, Rachel L.—SO
Owen, Sam P.—SO
Pacher, Austin F.—SO
Parker, Oscar M., Jr.—SO
Patterson, James T.—SO
Pennell, James J.—SO
Perry, Allen K.—SO
Pimm, Donald A.—SO
Poteet, Franklin R.—SO
Price, David F.—SO
Remington, Marcus M.—SO
Rogers, Anthony A.—SO
Roxby, John R.—SO
Sandusky, Carl P.—SO
Schmitz, Ernest M.—SO
Schulze, Raymond L.—SO
Seely, Joseph R.—SO
Shelton, Thomas J.—SO
Smith, Hansford V.—SO
Smith, Thomas R.—SO
Sosnowski, Edwin W.—SO
Spivey, Emerson Leo, Jr.—SO
Spivey, William F.—SO
Tallmadge, Ronald L.—SO
Thompson, Billy R.—SO
Wasserman, Ethel E.—SO
Wiese, Harris E.—SO
Wise, Pauline E.—SO

Atherton, Tom B.—SW
Ballard, Robert C., Jr.—SW
Barfield, William D.—SW
Belchet, Orville E.—SW
Bennett, Charles F.—SW
Berrier, Gene C.—SW
Bierscheid, Robert C.—SW
Binkley, Harold O.—SW
Blackmon, Dee O.—SW
Bradley, Duane W.—SW
Brown, Dorothy R.—SW
Christopher, Varnal A.—SW
Cloud, James W.—SW
Conover, Fred M.—SW
Cook, Alta E.—SW
Cruise, Bob J.—SW
Dove, Curtis M., Jr.—SW
Ellison, Herbert O.—SW
Farmer, Robert A.—SW
Franks, Melvin T.—SW
Gibson, Ramon J. A.—SW
Goad, C. Cramer—SW
Gridley, Oleta B.—SW
Grounds, Weyman R.—SW
Haack, Francis E.—SW
Hankins, James C.—SW
Harms, Desmond R.—SW
Harner, Robert L., Jr.—SW
Harrell, Charles E.—SW
Hendrickson, Walter E.—SW
Herron, Devon E.—SW
Kemp, Clifford E.—SW
Kerr, Grace L.—SW
Kilcrease, A. Y., Jr.—SW
Kincaid, Robert R., Jr.—SW
Long, Lyndel W.—SW
Lott, Luther M.—SW
Lutz, Eunice C.—SW
McElhaney, Robert F.—SW
McGoveran, Cleo R.—SW
Miller, Charles R.—SW
Mitchell, Joseph A.—SW
Murphy, Cletis L.—SW
Musmanno, Joseph H.—SW
Oldham, Herschel J.—SW
Page, Robert L.—SW
Pierce, Jack B.—SW
Pradarits, Joseph F.—SW
Ramos, Edgar C., Jr.—SW
Redman, Earl L.—SW
Rowbottom, Clifford—SW
Sanford, Fannie L.—SW
Singleton, Ralph D.—SW
Stockton, Johnnie W.—SW
Taylor, Lamar E.—SW
Teague, Joe F.—SW
Turner, Charles E.—SW
Vannatta, George S.—SW
Wacker, James R.—SW
Walcott, Melvyn Boyce—SW
Walton, David E.—SW
Watson, James R.—SW
Wells, Willis L.—SW
Wenzel, Clarence W.—SW
Williams, Fred H.—SW
Woehr, James R.—SW

Aragona, Daniel J.—WA
Burkhart, Charles H.—WA
Cayot, Jack E.—WA
Clark, Leo T.—WA
Cochran, Donald G.—WA
Cubbison, James G.—WA
Cunningham, John J.—WA
Douglass, Lauren N., Jr.—WA
Ego, Michael J., Jr.—WA
Godfrey, Edward W.—WA
Heston, Wayne E.—WA
Hook, Thomas S.—WA
Hutcheson, Charles W.—WA
Irons, Lambert P.—WA
Knauff, Carl J.—WA
Kolmetsky, Sylvia—WA
Krone, Dorothy E.—WA
LaRue, Charles E.—WA
Lugowski, Stella F.—WA
McIntire, Owen E.—WA
Melville, Phillip L.—WA
Miller, William L.—WA
Milner, Samuel—WA
Mitchell, Waldemar J.—WA
Orr, Robert H.—WA
Rusk, Roger E., Jr.—WA
Saunders, Vivian M.—WA
Stanley, Carl W.—WA
Thompson, James L.—WA
Vecs, John, Jr.—WA
Weathers, Luke J.—WA
Wright, Clarence L.—WA

Abele, Charles F.—WP
Armagost, William L.—WP
Asby, James L.—WP
Benway, Clarence A.—WP
Billica, Mary B.—WP
Cincotta, Joseph T.—WP
Cook, Marion M.—WP
Crawford, William M.—WP
Crowe, William W.—WP
Daigle, Walter H.—WP
Day, John C.—WP
Du Chateau, George L.—WP
Edgenton, Karl D.—WP
Fosdick, Phyllis E.—WP
Franklin, John E.—WP
Freeman, William H.—WP
Frydendahl, Bent—WP
Garber, William—WP
Grunseth, Dale R.—WP
Gvist, Eugene T.—WP
Haas, Glenn D.—WP
Harshbarger, Clara B.—WP
Hesla, John E.—WP
Hilton, Frederick H.—WP
Howland, James R.—WP
Justus, John S.—WP
Kalantar, Arthur A.—WP
Kealoha, Marian K.—WP
Kuhn, Dale D.—WP
Langdon, Harry A.—WP
Lee, Douglas W.—WP
Levis, William A.—WP
Linehan, Timothy F.—WP
Long, Jerry Z.—WP
Martinson, Sue L.—WP
McCrone, Edgar M.—WP
McKeever, Floyd E.—WP
Mecklenburg, Norman—WP
Merdalo, George F.—WP
Moon, Walter R.—WP
Moxley, Thornton R.—WP
Nagata, Takeo—WP
Nelligan, Raymond D.—WP
Nester, Lee N.—WP
Nestor, Robert E., Jr.—WP
Nisgore, Philip—WP
Panos, Charles F.—WP
Park, George W.—WP
Penzes, Laura J.—WP
Pinto, Anthony V.—WP
Plowman, Herbert J.—WP
Rivero, Dempsey D.—WP
Siler, Betty M.—WP
Slawinski, Chester J.—WP
Steppe, Larry A.—WP
Sweeney, Donald J.—WP
Takaki, Waichi—WP
Taylor, Maurice E., Jr.—WP
Thorson, Thor W.—WP
Tokuhama, Edwin M.—WP
Vitor, Loreto D.—WP
Washburn, Hoy H.—WP
Watson, James E.—WP
Wilton, Paul L., Jr.—WP

By Peter Demchuk
A writer-editor in the Office of Public Affairs, he came to FAA from the Urban Mass Transportation Administration.

FAA Goes Into Orbit

The Agency Helps Build a Satellite To Aid Radar

The FAA's role in the U.S. air transportation system soon will take a quantum leap into space when the space shuttle *Challenger* lifts off in late April for its seventh flight from Cape Canaveral.

Aboard will be a small receiver satellite known as NUSAT—for Northern Utah Satellite—that its designers are hoping will revolutionize the way FAA adjusts the vertical tilt of its beacon radar antennas. This is expected to greatly improve their effectiveness.

Perhaps the most remarkable thing about the beach-ball-sized satellite is

Among the prime movers for the NUSAT that will be aboard the space shuttle Challenger *this spring are (from the left) Bob Twiggs, who led the Weber State faculty for the satellite's electronics; Dr. Rex Megill, Utah State University, who named the project; Charles Bonsall, Nav/Com supervisor at the Salt Lake City Tower; Gil Moore, Morton-Thiokol, Inc.; and John Boyer, who led the faculty team on the mechanical engineering side of the design.* Morton-Thiokol photo

that it was designed in part by college students as members of a unique volunteer coalition of government, industry and the academic community, first drawn together by an aviation education specialist who recognized the potential of such a project. The venture, centered at Weber State College in northern Utah, included students and faculty from three state universities and volunteers from FAA, the National Aeronautics and Space Administration (NASA) and from top aerospace firms.

To calibrate the beacon antennas under current technology, FAA relies on expensive flight checks or time-consuming solar readings that require partial shut-downs of the system for up to six hours. NUSAT's data from a low orbit of 90 minutes per revolution will be compared with tracking information supplied by the North American Air Defense (NORAD) in Colorado Springs, Colo., which will permit calibration in a matter of minutes and without interrupting the radar signals.

The 105-pound aluminum polyhedron satellite also will be the first of the NASA-dubbed "getaway specials" to be ejected into orbit. Earlier "getaway" canisters have been used to conduct tests aboard the shuttle.

The NUSAT designers built an ejection system that will function like a space-age jack-in-the-box. The NUSAT will be compressed on a plunger-type spring and clamped into place. After opening the cargo bay doors, the shuttle astronauts will trigger a small explosive charge that will cut the clamp's bolts and hurl the satellite into space.

NASA scientists were so impressed by the ingenious simplicity of this mechanism that they adopted it as a standard shuttle feature. They will eject another "getaway" payload on this flight by the same method—of course, after giving the pioneer honors to the Weber State package.

NUSAT was born in the imagination of Charles Bonsall in February 1978. Currently the Nav/Com Unit supervisor at the Salt Lake City, Utah, Tower, Bonsall was then a radar engineer at the Salt Lake City Hub Airway Facilities Sector and a member of the Rocky Mountain Radar Beacon Improvement Committee.

He had also just taken on the additional duty as an Aviation Education Facilitator. It was at an aviation education workshop that Bonsall learned about NASA's "getaway special" at $10,000, which intrigued him because the committee had been talking about a satellite for adjusting the antennas.

NASA recommended he call fellow Utahan Gil Moore, who worked for the aerospace firm of Morton-Thiokol, was an adjunct professor of physics at Utah State University and who had purchased several "Getaway

Specials." Moore was taken with the idea of launching a satellite.

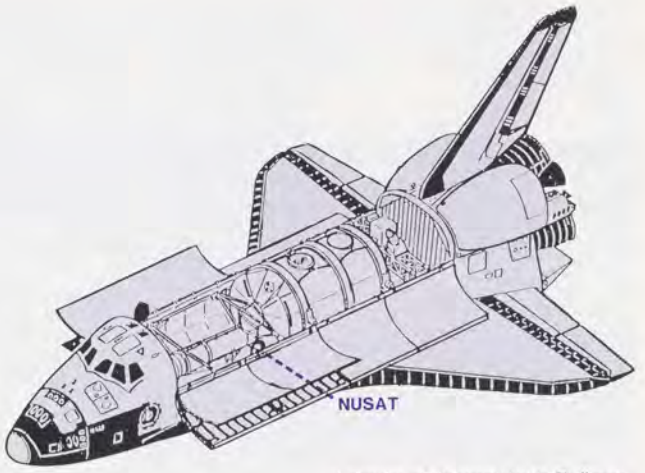
The project began that year as a seniors' project at Utah State but languished for a variety of reasons, including lack of funding and Bonsall's taking an ICAO assignment in Colombia. When he returned from South America in 1981, Bonsall found that Moore's interest had not flagged and that he had interested the faculty and students at Weber State College, Ogden, Utah, in reviving the project.

Bonsall recruited Al Tolson, who had taken Bonsall's radar engineer post, and Wes Statser, Airway Facilities Sector manager at the Salt Lake City ARTCC. These two obtained a regional contract with Weber State to develop the satellite and provide a final report on its operation. Dee Christensen, manager of the nearby Francis Peak Radar, gave technical support and provided students with a look at the sort of beacon radar that NUSAT was designed to assist. Support also came from then Administrator J. Lynn Helms and Northwest Mountain Region Deputy Director Wayne Barlow.

The funds came in the form of two FAA grants: a research grant of $2,500 and a production grant of $10,000. As a NUSAT volunteer later put it, "The government never got more bang for its buck."

Indeed, the grants served to legitimize the project, and action began to snowball. Gil Moore and Weber State faculty leaders Bob Twiggs and John Boyer were able to recruit aerospace engineers like Kurt Krabbe, a microwave specialist at TRW and others from firms like Rockwell International, Sperry Univac, McDonnell Douglas and Apple Corp. Rex Megill, a physics professor at Utah State, volunteered and became the chief contact with NASA.

Throughout the project, Weber State students were encouraged to



A drawing of the space shuttle Challenger *showing the stowage of the garbage-can-size "getaway specials."*

Illustration courtesy of NASA

experiment and develop satellite components while faculty and industry representatives provided oversight and did some of the more advanced technical work.

Bonsall borrows Alvin Toffler's wry term "ad hocracy" to describe this loose, creative process, which he notes was well worth the occasional problems it raised. "Many of the people who worked on NUSAT, especially those from industry, were used to working on specific, closely monitored projects, so it was great to see them catch the sense of fun and learning from the students and faculty."

Moore is equally enthusiastic: "I guarantee the FAA never had a project that benefited the educational process as much as this one did. It was a real sparkler."

This deluge of donated time, facilities and materials from organizations that also included National Semiconductor, Iomega, Hill Air Force Base, Morton-Thiokol, Boeing Co., Pacific Chromalox and New Mexico University made NUSAT a real bargain for FAA. The final tally of funds acquired came to something under $100,000, but, Bonsall suggests, if it had been contracted out by the agency, NUSAT would have been a multi-million-dollar project.

Other very real beneficiaries of the project are the students and the school. Over the course of the project, about 50 students enjoyed real-world experience that helped their studies and made them better hiring prospects afterwards.

Having hosted NUSAT, Weber State may find that its activity attracts superior students. And Bonsall reports that Weber State hopes to launch a satellite or other "getaway special" every few years. Already, students and volunteers are eager to start work on a new version of NUSAT that will be placed in a higher orbit and will last longer than the satellite going up next month.

The success of Weber State's NUSAT will have ripple effects as other institutions take note and expand their curriculums to include aerospace and aviation studies. Then, FAA's more bang for the buck may be considered also to include more effective aviation education. ■

By Leonard Samuels
The editor of FAA WORLD, he has edited and written for *Popular Mechanics* and business and government magazines.

Smoothing the Flow

Flow Control Matches Up Traffic With Airport Capacity

It used to be called Central Flow Control Facility—in pseudo-scientific notation: CF². Now, it's the Traffic Flow Management Branch, of which CF² is a part—perhaps a title more in keeping with today's sophisticated, computerized operations.

Today's facility, still on the sixth floor of Washington headquarters, is both different and the same.

Its job has always been to help match the movement of air traffic to the capacity of the facilities handling it. In the beginning—in 1970—it was mostly a communications coordination facility where Central Flow Control could phone patch facilities together. Then it saturated the airspace with airborne-holding quotas. Now, FAA tries to hold aircraft on the ground and spread out traffic peaks that strain airport capacity, aided by fast computers.

But in the early days, it was the telephone. If there was a long line of thunderstorms blocking the Kansas City Center's control area, for example, the ARTCC had to reroute traffic around the area by calling up only the Chicago or Indianapolis centers; they had no reach to the East Coast. When Central Flow Control got into the act, however, traffic departures from New York and Washington could be rerouted.

In the early 1970s, traffic built up tremendously, said Roger Brubaker, manager of the Central Traffic Management Facility—soon to take over the Great Lakes Region's Airspace and Procedures Branch. "It wasn't unusual to fly to Chicago and hold in the air for an hour and a half or even two hours. At times it got chaotic, and we got involved in 'quota flow.'

"To prevent the system from breaking down, we determined how many aircraft the Chicago Center could hold at one time. It was our job to ensure they didn't get any more than that. The rest of the aircraft were held out at long distances in the air. It was a crude effort, and it was primarily for Chicago."

"If you let the system under normal conditions flow smoothly with no restraints, there will be very few delays when every airport has optimum runways available."

Brubaker pointed out that it was a time of 13-cents-a-gallon fuel. As the 70s progressed along with fuel prices, the airlines didn't want to hold in the air any more.

"We then started the Fuel Advisory Departure Delay Program with the cooperation of the Air Transport Association," he said. This was initially designed so the maximum airborne hold time would be one hour; everything over an hour was held on the ground. We gradually reduced the airborne hold to about 30 minutes in 1978, when the facility became computerized. In 1981, we were projecting towards the end of the year to reduce that to about 15 minutes . . . when the controller strike occurred.

"Since then, we've been trying to simplify the system so there are no airborne holds. Holds do occur, but we don't plan for them."

"If you let the system under normal conditions flow smoothly with no restraints," Brubaker explained, "there will be very few delays when every airport has optimum runways available. The only time we get into action here, now, is when the weather is a factor and the airport has reduced capacity."

The current computer—an IBM 4341 at the Technical Center, which replaced an IBM 9020 at the Jacksonville ARTCC—permits the headquarters facility to work many more problems at one time because of its greater speed—100 times as fast. In simulating one airport problem, it used to take 10 minutes to get results from the computer. Juggling several simulations could make the data get pretty old. Now, the computer can spit out the results in 30 seconds, and it permits fast program revisions if conditions change.

There's still a lot of manual juggling because the computers can't deal with a lot of judgmental matters. An example Brubaker conjured up was that of Denver Stapleton Airport beset with snow and fog and limited to a single runway operation. That means 30 aircraft an hour is all that Denver could land. From a flow control program based on that alone, the computer would predict delays of five or six hours. On that basis, the airlines would cancel their entire schedules.

"You have to guess from experience how many flights are going to cancel just from the bad conditions and how many general aviation flights won't take place," he said. "You don't want to overly restrict traffic, leaving capacity at the airport with aircraft holding on the ground all over the country. You would have the airlines all over your back if you lost slots at the airport, and you would have the airport all over you if you handed them too many airplanes.

"There's a lot of judgment and manipulation to make the traffic flow smoothly, and the computer helps us make our decisions."

The computer knows what the demand on the airport is—it has the Official Airline Guide and historical data. Central Flow Control knows what the airport capacity is by talking to the supervisors at the tower and the center, the weather bureau, the meteorologists at the center and the meteorologists right at the flow control facility. Facility personnel determine the runway configuration and then consult with Central Flow Control to determine an appropriate acceptance rate. The computer reports back what the delays will be.

As 1984 moved along, air traffic built up to record levels with attending delays that the computer programs couldn't manage.

"We couldn't solve a problem that we couldn't control," said Jack Ryan, acting director of the Air Traffic Operations Service. "Something had to be done to relieve a bad situation that was getting worse."

At Atlanta's Hartsfield International Airport, for example, between 8 and 9 a.m., 90 airplanes were scheduled to arrive and about 80 of them generally did so in the first 30 minutes of that hour. No one could handle that load without extensive airborne holding, and that was in good weather. Central Flow Control was going in every morning for one hour with a ground-delay program. The same thing was happening in Newark, N.J., New York's Kennedy and LaGuardia, Chicago's O'Hare and Denver.

Working at the Central Flow Control Facility are (left to right) flow control management specialist Carl McKinney, operations manager Sam Rosenzweig, specialist Ted Young, flow control management officer Harry Eberlin (partly hidden) and George McKay, on detail from the Boston ARTCC. Rear projection screens show weather map and data and an airport layout.

The build up of those traffic peaks resulted in a meeting last fall of representatives of all air carriers for nine days to reshuffle six airports' peak-hour schedules. Called by the Air Transport Association (ATA) and FAA, with ATA chairing it, the meeting resulted in voluntary agreement to spread out the schedules beginning November 1. This ended the stop-gap flow control programs.

As 1984 ended, record traffic and poor weather produced few delays, thanks to these voluntary scheduling agreements, as well as to enroute center capability to manipulate their own traffic through a variety of new traffic management programs. These programs use the ARTCC traffic management units, which assist CF² in calling the shots.

But the Central Flow Control Facil-

ity is on the threshold of a new approach to forecasting airspace saturation: enroute sector loading (ELOD). After the controller strike, when FAA was limiting traffic throughout the system, it became clear that the problem was really at the enroute centers, not the terminals. At the time, however, flow control didn't have the ability to look at the enroute system.

This month, ELOD will become operational. The computer will be looking at all 235 high-altitude enroute sectors. At any time when a sector is projected to exceed a predetermined level of traffic, the computer will alert Central Flow Control, which will call that center and tell them which hour they're going to have a problem. They'll be able to look at the traffic and where it's coming from and develop a strategy for relieving the overload.

Soon, Brubaker expects a flight plan for every aircraft flying in the air traffic control system to join the Official Airline Guide in the computer. "We'll know every sector the aircraft's going through and when he's projected to be there," Brubaker said. "Then we'll be able to predict situations perhaps an hour before they develop."

The facility's operations manager, Sam Rosenzweig, comments, "We've come a long way from monitoring traffic and serving in an advisory capacity to working as the main catalyst in an ever-growing system."

There's little doubt that the changes have kept flow control abreast of the demands on the National Airspace System and made it safer. ■

Flow control management officer Harry Eberlin watches specialist Louis Grilo prepare a quota flow program to limit airport landing congestion.

Flow control management specialist Gill Rhodes discusses the program as data systems specialist Terry Bynum coordinates traffic movement around anticipated airport congestion via an Apollo terminal in the Central Flow Control Facility.

Photos by Bob Laughlin

People *continued from page 11*

the Pueblo, Colo., Tower, promotion made permanent.

■ **Wilbur C. Williams, Jr.,** manager of the Cutbank, Mont., Flight Service Station, from the Seattle FSS.

■ **Hal W. Wright,** engineering equipment operator foreman in the Salt Lake City Field Maintenance Party.

Southern Region

■ **William T. Abernathy,** manager of the Miami, Fla., ARTCC, from the Washington headquarters Air Traffic Service.

■ **Yvonne Bogardus,** area supervisor at the Augusta, Ga., Tower, from the West Columbia, S.C., Tower.

■ **Wade T. Carpenter, Jr.,** manager of the Atlanta, Ga., Flight Service Station, from the Macon, Ga., Automated FSS.

■ **Claude S. Chisam,** manager of the Fort Myers, Fla., Airway Facilities Sector Field Office, Tampa, Fla., AF Sector, promotion made permanent.

■ **Howard F. Dumes,** manager of the Dekalb-Peachtree Airport Tower, Atlanta, Ga., from the Air Traffic Division.

■ **Armando S. Lambert,** unit supervisor in the Miami AF Sector Field Office, Miami Hub AF Sector, promotion made permanent.

■ **Stephen McDuffee,** area supervisor at the Montgomery, Ala., FSS, from the Brunswick, Ga., FSS.

■ **John R. Perry,** unit supervisor in the Miami ARTCC AF Sector.

■ **James J. Quinn,** assistant manager, traffic management, Memphis, Tenn., ARTCC.

■ **Johnny J. Posey, Jr.,** area supervisor at the Atlanta International Airport Tower.

■ **Edward W. Toth,** assistant manager for program support, Raleigh, N.C., AF Sector.

■ **Kenneth W. Wilson,** area supervisor in the Greer, S.C., AF Sector Field Office, Charlotte, N.C., AF Sector.

Southwest Region

■ **Daryl W. Autry,** area supervisor at the Jonesboro, Ark., Flight Service Station, from the New Orleans, La., FSS.

■ **Frances H. Babb,** manager of the Procurement Branch, Logistics Division, from Washington headquarters' Acquisition and Materiel Service.

■ **Jimmy C. Clay,** area supervisor at the Houston, Texas, FSS.

■ **Philip R. Cramer,** manager of the Dallas, Texas, General Aviation District Office, from the Flight Standards Division.

■ **Don D. Dunlap,** enroute automation supervisor at the Fort Worth, Texas, ARTCC.

■ **Robert E. Garcia,** area supervisor at the Carlsbad, N.M., FSS, from the Tucumcari, N.M., FSS.

■ **Donald F. Hensley,** assistant manager of the Dallas-Fort Worth Tower, from the Central Region Air Traffic Division.

■ **George W. House,** manager of the Airworthiness Branch, Flight Standards Div., from the Dallas-Fort Worth Air Carrier District Office.

■ **Harold E. LaRoux,** manager of the Dallas-Fort Worth ACDO, from the Flight Standards Division.

■ **Clyde S. Ledgerwood, Jr.,** area supervisor at the Love Field Tower, Dallas, from the Little Rock, Ark., Tower.

■ **Gary M. LePlatt,** assistant manager for program support in the Albuquerque, N.M., AF Sector, from the El Paso, Texas, AF Sector.

■ **Albert R. May,** assistant manager of the Oklahoma City FSS.

■ **Lawrence E. Perkins,** manager of the Hooks Field Tower, Tomball, Texas, from the Houston Intercontinental Tower.

Technical Center

■ **Barry R. Billmann,** technical program manager, Guidance & Airborne Systems Branch, Engineering Division.

■ **Thomas M. Gustavino,** technical program manager, Fire Safety Branch, Aircraft & Airport Systems Technology Division.

Washington Headquarters

■ **Michael Gariazzo,** manager of the Operational Communications Program, Interfacility & Auxiliary Div., Program Engineering & Maintenance Service, promotion made permanent.

■ **Santiago Guerra,** manager of the Quality Assurance Branch, Industrial Div., Acquisition and Materiel Service, promotion made permanent.

■ **James I. Riddle,** manager of the Certification Branch, General Aviation & Commercial Div., Office of Flight Operations.

■ **William F. White,** technical program manager, Cockpit Technology Program, Navigation & Landing Division, Program

(Continued)

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People *continued from page 19*

Engineering & Maintenance Service.

Western-Pacific Region

■ **John D. Ball,** manager of the Livermore, Calif., Tower, from the Oakland, Calif., ARTCC.

■ **James S. Cambier,** unit supervisor in the Phoenix, Ariz., Airway Facilities Sector Field Office, promotion made permanent.

■ **Donald A. Dunn,** area supervisor at the Sacramento, Calif., TRACON at McClellan Air Force Base, from the Oakland ARTCC.

■ **Thurman Gupton,** manager of the Hayward, Calif., Tower, from the San Jose, Calif., Municipal Tower.

■ **Harold R. Guthrie, Jr.,** area supervisor in the Radar Automation Section, Maintenance Operations Branch, AF Division.

■ **Richard W. Herbst,** area supervisor at the Oakland ARTCC.

■ **Jay F. Jacobsen,** manager of the Fresno, Calif., AF Sector Field Office, from the AF Division.

■ **John E. Knoebber,** area supervisor in the Van Nuys, Calif., Flight Standards District Office, promotion made permanent.

■ **Francis F. Murphy,** area supervisor in the Long Beach, Calif., FSDO.

■ **Jeanne A. Perrion,** manager of the Labor Relations Branch, Human Resource Management Division.

■ **Richard T. Polk,** area supervisor at the Phoenix Tower, from the Tucson, Ariz., Tower.

■ **Daniel S. Sato,** assistant manager in the Honolulu, Hawaii, AF Sector.

■ **Timothy B. Savage,** area supervisor at the Los Angeles ARTCC.

■ **Merrill V. Scott,** assistant manager for technical support in the San Francisco AF Sector.

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