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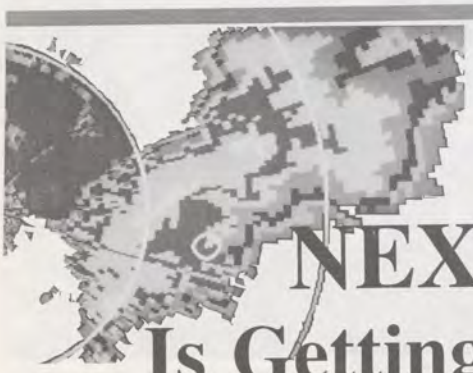

NEXRAD Is Getting Closer

By John G. Leyden

FAA's terminal Doppler weather radar test bed, operated by MIT's Lincoln Laboratories, is located in Buckley, Colo.

The next generation of weather radar (NEXRAD) is on the brink of becoming the current generation of weather radar.

This month, the Federal Government is scheduled to award the initial NEXRAD production contract, culminating an eight-year joint-development program that has involved FAA and the U.S. Air Force, together with the National Weather Service of the National Oceanic and Atmospheric Administration. NWS/NOAA is the lead agency and project manager.

FAA's Deputy Associate Administrator for Engineering Neal Blake said that NEXRAD represents a major step forward in the detection of severe weather phenomenon. Unlike present weather radar, NEXRAD will be able to "see" inside storms and measure the velocity and direction of wind-driven precipitation and other particles suspended in the air.

The result will be more accurate forecasting of severe weather, Blake added. Among the various NEXRAD weather "products" will be data on wind shear, turbulence, precipitation, hail, frontal activity, icing conditions, mesocyclones/tornadoes and hurricanes.

This kind of information is especially important in aviation where, year-in and year-out, weather is a factor in 40 percent of all fatal accidents. Weather also is the cause of approximately two-thirds of all flight delays in the air traffic control system.

A 25-year veteran, Mr. Leyden is manager of the Public & Employee Communications Division, Office of Public Affairs.

The two companies competing for the NEXRAD production contract are Raytheon and Unisys (formerly Sperry). Both have built pre-production prototypes under previous contracts and have been involved in a "fly off" for more than a year.

The initial limited production contract will cover 10 NEXRAD systems. This

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CAAG Life In the Desert

Doing as the Romans do when in Rome may be all right for tourists. But when FAA's representative in a Civil Aviation Assistance Group (CAAG) is working in a foreign country, he must handle cultural differences with understanding and equanimity, but never with criticism or by copying his hosts.

William Beisiegel recently returned from a five-year stint in Kuwait with a full appreciation for the virtues of patience. It was not the first overseas assignment for the electronics and navaids installation expert, who is now the special projects officer in the Airway Facilities Division of the Great Lakes Region. He had served in Oman, also on the Persian Gulf.

His recent tour took him to a nation bent on transforming itself from a bedouin trading center to a modern state. Kuwait's original one-runway international airport was poorly built in the 1960s. In 1974, Kuwait enlisted the FAA's help in the construction of a new passenger terminal. When the government wanted a second runway in 1981, one built to FAA specifications, it again requested the assistance of a CAAG group.

Kuwait wanted a spare runway and to reconstruct the rapidly deteriorating original runway. Other priorities were to construct a crash, fire and rescue com-

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FAA World

August 1987

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Seattle FSDO inspector Tom Carter presents Alaska Airlines Capt. Bill Morin (left) with a fishing rod—required equipment for his next flight if he persists in catching airborne salmon. Looking on its first officer John Burns.

A Fish Story

By Dell Arthur

There is something fishy about this story. Pilots are accustomed to a variety of experiences, and anyone who has spent anytime behind the controls of an aircraft has a favorite story to tell. But getting others to believe some of the tales can be difficult, as Tom Carter, an air carrier safety inspector for the Seattle Flight Standards District Office can attest.

Carter, a seasoned FAA veteran, enjoys his work, which includes the responsibility for monitoring air crew performance. It was during one of these enroute inspections aboard an air carrier Boeing 737 that he was involved in a one-in-a-million encounter.

The flight received its clearance to depart Juneau, Alaska, on a clear and sunny March morning.

"Everything was completely normal," Carter recalled. "Both pilots were expertly handling the check list and runup in preparation for take-off. During take-off, the aircraft smoothly pulled off the runway with its nose pointing skyward and commenced its climb to 10,000 feet."

During the ascent, Carter scanned for traffic through the cockpit window and noticed simultaneously with the flight crew a large bald eagle circling just ahead and above the airplane.

"I could see that we were going to pass under the eagle with plenty of separation, but as we did, we heard a loud 'thump' from the left side of the fuselage near the forward entrance door," Carter recounted. Both pilots also heard the noise and quickly scanned their instruments.

What happened?" the captain asked. "Did we hit that bird?"

"I didn't think so," Carter replied, "unless there was another one we didn't see." All the instruments were normal and nothing seemed to affect the aircraft's handling. The engines continued to hum and no vibration was noted.

Striking birds with a jet airplane could prove dangerous—especially if the bird is ingested into an engine's intake. Jet engines do not run well on feathers.

Convinced that nothing serious had occurred, the crew contacted both the airline's operations office and air traffic control while continuing to Yakutat, their intended destination. The company advised the crew to standby after landing to await an inspection team to check for damage.

As the 737 proceeded along the airway, Carter and the pilots fruitlessly scanned the instrument panel looking for the first hint of an abnormality. At the same time, Carter proceeded with the pilots' en route check ride, monitoring their aircraft handling, communication and following of air traffic control procedures.

Nearing its destination, the airplane was cleared to descend from altitude. Again the crew reviewed the check list in preparation for landing and found no abnormalities. Crossing the end of the runway, the craft smoothly rounded out and the tires gently kissed the pavement with a hint of smoke.

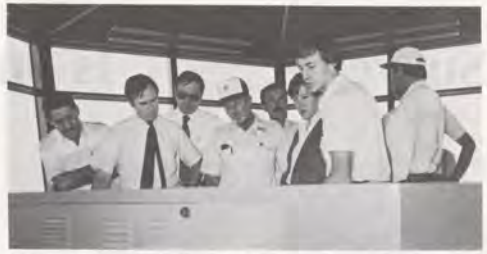
Safely back to earth, the crew applied the thrust reversers and slowed to taxi speed. Turning off the runway, the airplane was directed to the Alaska Airlines parking area to await an inspection team from the company's maintenance control division.

"When the mechanics arrived and inspected the airplane," Carter said, "their jaws—along with ours—nearly hit the pavement. What they found was the remains of a three- to four-pound salmon wedged in near the forward door and the wing root.

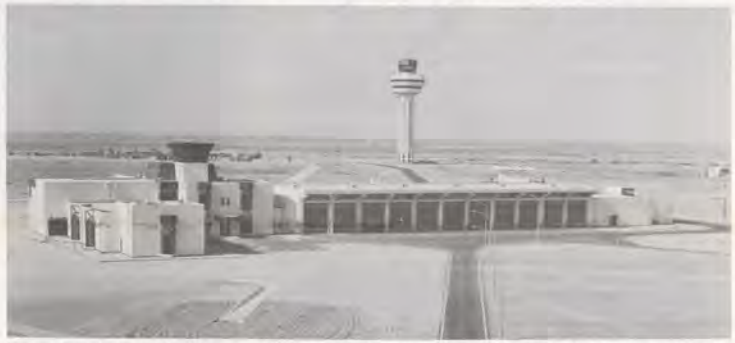
Apparently that eagle they had sighted was holding the fish, Carter explained. "There was no doubt about it; that was one smart bird! At that altitude, carrying a large fish was enough of a chore without taking on a 737." Prudence being the better part of valor, the eagle yielded his prize to the airplane, as smaller birds so often do when attacked by larger ones.

It's not often that one gets to tell an airborne fish story, but this one is true to boot. ■

A commercial pilot now at the Seattle Flight Standards District Office, Mr. Arthur is a former newspaper reporter and a national newspaper award winner.



Bill Beisiegel (in baseball cap) looks over the air traffic control console in Kuwait's new tower with U.S. Ambassador Anthony Quainton (second from left), consultants, Kuwaiti officials and other embassy personnel, including the DCM and the assistant economics officer.



Kuwait's modernized international airport sports a new control tower and crash, fire and rescue complex (foreground), which includes a dormitory and administrative area (at left). During an accident, the CFR watch supervisor holds forth in his own tower cab.

CAAG

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plex, a new air traffic control tower and the associated facilities, such as a Category II instrument landing system for both approaches, radio and voice-switching equipment, controller consoles and airfield lighting and runway visual range (RVR) systems.

The requirements were not unlike those he found in his earlier tour in Oman, setting up the basic structure for a flight information region and modernizing Salalah Airport and Seeb International Airport in Muscat.

As part of an overall technical assistance agreement with the Federal Highway Administration, FAA civil engineer Donald Cochran arrived in Kuwait, followed by Beisiegel. "Don was one of the best supervisors I've ever had," Beisiegel commented. "He probably could have written the book on human relations in supervision." Cochran retired in 1985.

The Kuwait CAAG was unique, Beisiegel noted. All other CAAGs were assigned to the civil aviation authority (the FAA equivalent). Because the Kuwait Ministry of Public Works is responsible for all major construction projects, the CAAG was assigned at a higher level as adviser to that ministry.

"Our initial task was to review all specifications and drawings of the ministry's Dutch consultant and review bids for equipment and installation," Beisiegel said. "And we were to advise the ministry on the project's adherence to FAA standards, identify problem areas and recommend ways to eliminate delays. Later, our duties expanded to include inspection of installations and [new equipment] tune-ups."

Eliminating delays was a tough item—it had a cultural twist to it. During the summer months, progress slows considerably because of 135-degree heat. The same thing happens during the religious month of Ramadan, when all Islamic personnel fast during the day. "During these periods, no one is very energetic, even indoors in offices and stores," Beisiegel said.

"Americans moving to a foreign assignment have to learn to deal with different ways of doing things and different ways of thinking. In arabic-speaking countries, a lack of concern with problems or hurry to remedy them is expressed in *Boukra In-Shallah*, which means 'tomorrow, God willing.' People there just don't get very excited about an erratic water supply, a stuck drain, air conditioning breaking down in the hottest part of the day or the lack of hot water or heat when the temperature drops to 33 degrees on winter nights. You may hear *Boukra In-Shallah* for two- three- or more days-running on a single problem."

The heat's impact on efficiency is compounded by dust storms that can last for days, even almost every day for a month. It sometimes makes it very difficult to drive for want of visibility. Beisiegel notes that the fine sand penetrates everywhere, keeping people busy cleaning up.

The workweek in Kuwait and throughout the Gulf area begins on Saturday and runs through Wednesday from 7 a.m. until 2 p.m. Rounding out a 40-hour week is Thursday from 7 a.m. until noon. This schedule avoids some of the worst heat of the day.

Beisiegel had to actively participate in instrument landing system ground checks and flight inspections prior to commissioning of the equipment. The Kuwait Civil Aviation Authority doesn't own any flight inspection aircraft but contracts for the use of Saudi Arabian flight inspection aircraft.

Frequency interference on the glide slope of the instrument landing system showed up during flight inspection. With Beisiegel's help, a Civil Aviation Authority investigating team found that the military was broadcasting on a UHF transceiver tuned to the glide slope frequency. That was quickly stopped.

Intermittent interference continued, however, which created tensions as a critical deadline approached. It was January 1987 and the construction and installation not only of aviation facilities but of roads and a spectacular Islamic Conference Center had to be finished in time for the Fifth World Islamic Conference only a few days later.

Few technically qualified personnel from the American/Kuwaiti contractor were available on site, So Beisiegel undertook the detective work himself, determining that it wasn't interference but a defect in the glide slope monitor itself. A new monitor was installed and all facilities placed in operation just in time for the conference.

Noting American foreign policy problems in the Gulf area, U.S. Ambassador to Kuwait Anthony Quainton praised the positive impact of the technical assistance personnel. "The Kuwaitis respect the professional expertise of the U.S. officials" and depend on them to be forthright and honest on the job, he said.

FAA employees and their families at such posts are members of the U.S. embassy community. Indeed, one of Beisiegel's responsibilities was to keep the ambassador briefed on the CAAG project, and he worked closely with the embassy's economics officer.

Employee salaries and expenses were reimbursed by the Government of Kuwait. This included a post allowance, danger pay for one year, a car allowance and a cost-of-living allowance. Many items that Americans take for granted may be rare or expensive imports. Tang, for example, cost Beisiegel about $3.50, and a stalk of celery brought $6.00.

But Beisiegel finds a foreign tour of duty stimulating and career enhancing. "It offers an excellent opportunity to learn about the aviation community in other parts of the world," Beisiegel points out. "I learned not only about aviation in the Middle East but in Europe as well because of the presence of ICAO representatives.

"One of the best things about the job is the independence you enjoy. You more or less can set your own policy in dealing with the local government and earn a great deal of respect at the same time. I think FAAers should look into CAAG opportunities." ■

Survey Action Is on All Fronts

By Dr. Mary Weltin

The 1986 Employee Attitude Survey today is only partially history as FAAers find follow-up action plans are being implemented in their workplaces. What they may not be aware of is that a survey support team has already begun to deal with national issues as well.

Right after the Administrator's Management Team heard the briefing on the survey results by Dr. William Collins, manager of the Human Resource Research Branch at the Civil Aeromedical Institute, Associate Administrator for Human Resource Management Gene Weithoner convened a task force of line managers from the field (see box at right) to review the findings and identify matters of national import. These were ones that would be beyond the scope of any individual line manager, but Weithoner encouraged the task force members to draw upon their line experience while embracing a national perspective.

The agency hopes to better balance people-management objectives with the operations-management side of the job.

The issues identified were broken down into:

1. Evaluating managers and supervisors on human resource management (HRM),
2. Providing training for managers and supervisors,
3. Involving employees in decision making,
4. Providing support to employee participation groups and
5. Communicating with employees promptly about national plans.

As you and your supervisors, along with union representatives, may have grappled with survey issues and corrective action plans in your own local workgroup, so did the task force on its level.

The action items the group referred to the Administrator for his review last November followed the issue breakdown:

- FAA employees should be given an opportunity to evaluate the HRM competency of their supervisors and managers. Because some managers may not be aware of the effect of their actions and words on employees, constructive feedback might help. In addition, HRM should be made a significant part of the supervisors' and managers' performance standards. The task force noted that if the agency wants to demonstrate that it values HRM as much as it values technical and operations management, then HRM critical job elements should be part of the performance appraisal.
- The Management Training School program should be improved by making its courses more skill-based and experiential rather than lecture oriented.
- Employees should be involved more in the decisions that affect their work. There should be a more participative-management style.
- The agency already has in place some mechanisms for achieving employee participation, which deserve added support. These include Employee Participation Groups (EPGs), Facility Advisory Boards (FABs), Supervisory Committees (SUPCOMs), Human Relations Committees (HRCs) and union-management quality-circle groups. The question is, how well they are working?
- The FAA must ensure that its national plans consider the impact of key decisions on employees. There must be a process for getting employee input before final decisions are made and then communicating with them better about the coming changes.

As 1987 dawned, the plans turned to action.

A psychologist in the Office of Human Resource Planning and Evaluation, which coordinates the employee attitude survey and HRM evaluation, Dr. Weltin has written on personnel psychology in journals and reports.

The AMT Survey Task Force

Melvin Asher, manager, Southwest Region HRM Division
Daniel Beaudette, manager, Air Transportation Div., Office of Flight Standards
Edward Curran, director, Office of Personnel and Technical Training
Fred Gilmore, director, Acquisition and Materiel Service
Harold Hansen, manager, NAS Program Management Staff, Office of Associate Administrator for Development and Logistics
Joseph Noonan, director, Office of Labor and Employee Relations
James Payne, manager, Dayton, Ohio, ATCT
William Pollard, director, Great Lakes Region
Addison Reynolds, manager, Miami, Fla., Flight Standards District Office
Howard Richardson, director, Office of Organizational Effectiveness
Cyril Schulze, manager, Tampa, Fla., Airway Facilities Sector
Lane Speck, manager, Systems Plans and Programs Div., Air Traffic Plans and Requirements Service
John Stiglin, manager, Southern Region Airway Facilities Division
Ann Tucker, manager, Management Studies Branch, Management Analysis Div., Office of Management Systems.

Employee View of Managers

Dick Rice of the Career Management Division, Office of Organizational Effectiveness (AOE), put together a group of employees, supervisors, managers and union representatives from the field and headquarters, which helped design a pilot national supervisory feedback system. It included a questionnaire for evaluating supervisors' and managers' HRM performance. Although there are several regional employee feedback projects, this would be the first national system with standard rating elements common to all occupations.

In July, the questionnaire went out to 10 sites in the Western-Pacific and Great Lakes regions, asking personnel about supervisors' performance management, employee involvement and equal employment opportunity behavior.

In September, the supervisors rated will receive questionnaire feedback compiled at the workgroup level.

Employees should be involved more in the decisions that affect their work.

If the test works out, a national supervisory feedback system will be implemented next spring, giving employees a chance to tell their supervisor anonymously about his or her HRM skills. Following that, decisions will be made regarding whether and when to provide feedback to the supervisor's rating official for consideration as an important part of a performance appraisal.

Setting HRM Standards

To be able to develop that questionnaire, we had to have a common set of HRM critical job elements to rate. Judy Branting, a personnel management specialist in AOE, had already devoted months to gathering opinions on what behaviors indicate satisfactory and above-average performance. As a result of this effort, the agency hopes to better balance its people-management objectives with the operations-management side of the job by requiring at least a 30 percent weight to the three HRM standards—which became mandatory in August.

Participative Management

A management style that offers employees a say in achieving company goals is not entirely new to FAA. While the FAA has a long history of using participation groups, it has not until recently studied what is needed to help these groups be more effective in dealing with important issues. The various kinds of groups are used in different ways, depending on the facility or office involved. Facility Advisory Boards usually deal with operational problems, for example, and human relations committees deal with people problems.

The Employee Attitude Survey data suggested that EPGs are fairly effective in raising employee concerns to management. On the other hand, employees did not perceive that management took action to implement EPG recommendations.

An extensive study by AOE development specialist Harold Alexander pointed to the need for establishing a tracking system for employee recommendations to keep people better informed of the status and disposition of them. We are planning to beef up the training given to new EPG members and managers involved in participative management.

A New Approach to Training

Good management training pays off in improved people-management skills. Beth Yoest, program manager for managerial training, AOE, is in the process of redesigning the supervisory courses at the Center for Management Development, formerly the Management Training School. The intention is to make the courses job related and skill based so that FAA supervisors will acquire the skills and knowledge necessary for effective supervisory performance. To accomplish this, she first looked into defining the basic tasks of first-line supervisors, then conducted a study to distinguish the basic skills that were needed. Yoest expects to repeat this process for the center's managerial courses.

Human resource management should be made an important part of supervisors' performance standards.

Mitigating the Impact of Change

The final initiative that came out of the survey is one of the most important because it involves the long-range effects on employees' jobs of key decisions, like those on facility consolidations, National Airspace System (NAS) Plan implementation and facility automation. The survey showed that FAA was not always active enough in soliciting employee input before or after these decisions were made.

Terry Snyder, a personnel management specialist in the Office of Human Resource Planning and Evaluation, has drafted an action notice to implement a Human Resource Impact Evaluation (HRIE). When the action notice receives final approval, HRIE will be made a part of all our national plans and decisions that are subject to review by the Administrator. This is to ensure planning to minimize negative impacts, involving employees in developing and/or implementing decisions and specifying how the agency will communicate the decisions.

Specific attention is being paid to NAS Plan programs. Steve Walker, in the same office as Snyder, has developed guidance for evaluating the effectiveness of human resource planning for addressing employees' HRM concerns in the various review processes. Deployment Readiness Reviews and Major System Acquisition (MSA) reviews now contain specific criteria related to human resource issues. NAS program managers have already begun to cover these issues in their quarterly MSA program reviews to the Administrator.

Dr. Shelley Thomas, who leads Snyder and Walker on the research team, along with Lilith Ren, has been studying the impact of the new Host Computer implementation to determine how future systems implementations will likely affect employees and what the FAA can do to better prepare for them.

Although you already may see desired changes taking place on the home front, the big picture has not been ignored. The survey follow-up is a lengthy process that proceeds on both the local and national levels simultaneously to accomplish the improvements that will make the FAA a better place in which to work. ■

Retiree Address Changes

FAA retirees or spouses who moved or wish to discontinue receiving FAA WORLD must request the changes of the region from which the FAAer retired, which is where the mailing list is maintained.

Write to the public affairs officer:

FAA Alaskan Region HQ, 701 C St., Box 14, Anchorage, AK 99513.

FAA Central Region HQ, 601 E. 12th St., Kansas City, MO 64106.

FAA Eastern Region HQ, Fitzgerald Federal Bldg., JFK Airport, Jamaica, NY 11430.

FAA Great Lakes Region HQ, 2300 E. Devon Ave., Des Plaines, IL 60018.

FAA New England Region HQ, 12 New England Executive Park, Burlington, MA 01803.

FAA Northwest Mountain Region HQ, 17900 Pacific Highway S., Seattle, WA 98168.

FAA Technical Center, Atlantic City Airport, NJ 08405.

FAA Western-Pacific Region HQ, P.O. Box 92007, Worldway Postal Center, Los Angeles, CA 90009.

Retirees from Washington Headquarters should send changes to: FAA WORLD, APA–330, 800 Independence Ave. SW, Washington, DC 20591.

The Aeronautical Center, Southern Region and Southwest Region do not now have an active retiree mailing list.

NEXRAD

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will enable the winner to establish his production line and complete testing before the government commits to full production. The full production contract is scheduled for award in July 1988.

The plan calls for deployment of a national network of 113 NEXRAD units in the contiguous United States (CONUS) and additional units in Alaska, Hawaii and the Caribbean, with deliveries beginning in late 1989. FAA will be responsible for the installation and maintenance of 20 percent of the CONUS systems and all of the non-CONUS units.

In addition, the Air Force plans to make a separate buy of 44 NEXRAD systems, most of which will be installed at overseas bases. All of these will be funded by the military.

NEXRAD will replace the present network of conventional NWS and Air Force Air Weather Service radars that dates from the late 1950s. Although this equipment provides useful data on storm intensities, it lacks the capability to measure the forces at work within a storm. The equipment also represents vacuum-tube technology, which means it is expensive to operate and maintain and spare parts often are difficult to obtain.

The principle behind NEXRAD was first described by the 19th Century Austrian physicist Christian Doppler. He discovered that an object's speed and direction can be determined by the wave lengths or frequency its emits— be they light waves, sound waves or radio waves. This "Doppler Effect" is most often illustrated by the example of a train whistle—that is, the motion of the whistle away from the observer has the effect of lengthening the sound waves and, thereby, lowering the pitch.

Doppler radar transmits a round, narrow "pencil" beam to target objects as small as raindrops or minute dust particles and then tracks their movements by measuring the frequency shift. Raindrops blowing toward the antenna, for example, emit a higher frequency than those moving in the opposite direction.

High-speed computers then analyze this data and translate them into color "signatures" that enable meteorologists to read a storm's wind patterns. Shades of red indicate wind moving away from the radar at various speeds, whereas shades of green indicate wind moving toward it.

FAA will use NEXRAD to provide hazardous and routine weather radar data for all altitudes above 6,000 feet throughout the contiguous U.S., except in the western mountainous areas, where the floor will be 10,000 feet. NEXRAD coverage also will be provided for selected areas in Alaska, Hawaii and the Caribbean.

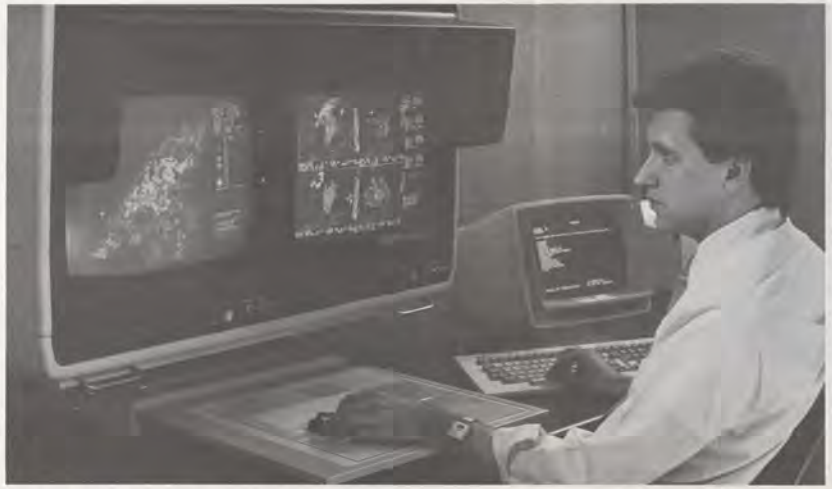
FAA currently is developing the central weather processor (CWP) for the distribution and display of NEXRAD data at each center. The CWP will collect data from many NEXRAD systems and mosaic the data into a regional composite picture for FAA users. Some data will be presented directly on the radar displays used by controllers, such as outlines of severe weather areas.

Blake said that processed NEXRAD information also will be available to pilots that have the new Mode S transponder with automatic data-link capability in their aircraft. They will be able to call up specific weather information for display or print out in the cockpit.

Government-sponsored research in the development of Doppler radar for weather detection has been underway for several decades. The largest such program was the Joint Doppler Operational Project (JDOP) initiated by NOAA in 1976, which used the facilities of the U.S. National Severe Storms Laboratory at Norman, Okla. It resulted in a proposal to establish a single national Doppler weather radar network to serve the needs of the Departments of Commerce, Transportation and Defense.

In August 1979, a Joint System Program Office (JSPO) was established to manage and direct NEXRAD development. Its staff was drawn from the national Weather Service, FAA and the Air Force.

Three contractors were selected to participate in the initial System Definition Phase—Raytheon, Sperry (now Unisys) and the team of Westinghouse/Ford Aerospace. Then, in May 1983, Raytheon and Sperry were picked to proceed with the development and test of pre-production prototypes. Evaluation of these systems has been underway for more than a year and will culminate in the selection of one company to proceed with production.



The Unisys configuration of Principal User Processor (PUP) subsystem display, which is designed for use in an ARTCC's Central Weather Processing Unit.

Blake said NEXRAD was initially conceived to be a program that would meet the en route weather needs of the FAA, NOAA and the Air Force, as well as FAA's terminal weather needs. However, he added, subsequent research—particularly with regard to the microburst phenomenon—established the need for a separate terminal system to provide low-altitude coverage with fast updates to air traffic controllers directly on their radar displays.

Because of their different operational roles, NEXRAD and terminal Doppler have different software requirements, especially for clutter suppression, data update and automation. For example, there is no time for a meteorologist to interpret the data provided by terminal Doppler, so the equipment must be fully automated and updated every minute in order to provide adequate advanced warning of wind shear conditions. NEXRAD data, on the other hand, will be much more comprehensive in scope and will be updated every five minutes.

Accordingly, FAA has initiated a separate terminal Doppler program to develop a short-range, fully automatic version of NEXRAD that will be keyed to the detection of small, low-level wind shears and microbursts in the immediate airport area. Wind shear is especially hazardous during takeoff and landing, since aircraft generally lack the speed and altitude to recover safely from an encounter. It has been blamed for as many as 25 fatal accidents worldwide over the past 10 years.

A production contract for the terminal Doppler system is scheduled for the end of Fiscal Year 1988, with deliveries beginning in FY 1992. FAA's FY 1988 budget request includes $130 million for the initial procurement of 24 systems of a possible 102 systems.

An earlier FAA NEXRAD test bed for both terminal and enroute configurations placed this 30-foot parabolic antenna at Olive Branch Airport, 10 miles from Memphis, Tenn., International Airport, in 1984.

However, in order to provide wind shear detection at major airports as early as possible, FAA plans to adapt 17 NEXRAD units for terminal use, with 16 going to busy airports and the other to the FAA Technical Center at Atlantic City, N.J. Once the terminal Doppler radar becomes available, FAA will begin replacing the modified NEXRAD systems. They will be remodified and deployed as part of the NEXRAD network, primarily in Alaska, Hawaii and the Caribbean.

FAA's share of NEXRAD national radar network production costs is estimated at approximately $160 million, with another $100 million required for the 17 NEXRAD units for terminal use. The National Weather Service is picking up 60 percent of the network production costs and the Air Force the remaining 20 percent. In addition, FAA will bear the total cost of the terminal doppler program, which currently is pegged at $550 million for a full production run of 102 units.

Blake believes the money represents a sound investment in terms of improved safety and flight efficiency. Moreover, he pointed out that NEXRAD and terminal Doppler are only part of FAA's "aggressive program" to deal with the problem of wind shear. Other examples include the recently published wind shear training program for pilots, a notice of proposed rule making that would require "present position" wind shear detection systems on all airliners, a five-year research program with the national aeronautics and Space Administration to develop a predictive airborne system and the upgrading of more than 100 low-level wind shear alert systems already installed at airports across the country to improve their capability to detect microbursts.

In addition, Blake emphasized that the multi-billion dollar National Airspace System (NAS) Plan has made improved weather services to pilots one of its major goals, and the results are increasingly being reflected in the field. It all goes to prove that maybe Mark Twain sold us all short when he wrote, "Everybody talks about the weather but nobody does anything about it." Somebody is doing something, after all. ■

Feeling Fit

The Plane Tooth

If you're flying in an unpressurized cockpit, whether as pilot or passenger, you could find yourself with an airborne toothache, which commonly makes its presence known at altitudes above 5,000 feet.

Differences in barometric pressure may cause pain from a number of dental and oral conditions that at best is annoying and at worst may interfere with piloting.

The explanation is that air at ground-level air pressure becomes trapped in tooth walls. Pain arises as this trapped air tries to equalize with lower pressure at altitude, expanding and exerting pressure on tooth pulp and root canal. Experiments have demonstrated that pressure within the tooth can loosen fillings and cause them to come out. Relief in most cases can be obtained by flying at a lower altitude.

The onset of pain on the climb has a positive side, however. It means that the tooth is still alive and the nerve and blood supply have not yet been destroyed. Such pain obviously should be sufficient warning to get you to a dentist.

Not all dental pain caused by altitude is acute. Indeed, the altitudes at which most general aviation pilots fly—10,000 feet or below—are more likely to produce a dull ache, unless a major dental problem exists. Airborne tooth pain generally can be traced to inflamed dental pulp, which contains the nerve and blood supply of the tooth, or cavities or cracked fillings. A dull toothache at altitude also can be caused by pyorrhea. In this condition, the tooth itself is sound, but the surrounding tissue is not.

Similarly, a toothache at altitude can sometimes be traced to an adjacent structure in the head. The large sinuses on either side of the skull, just above the upper rear teeth, could be the source. In fact, it's a likely source of tooth pain in people with a history of sinusitis.

Certain dental medications, particularly sedatives and local anesthetics send up a red flag for flying. It's a matter for an aviation medical examiner to decide. Bleeding following treatment also is a warning to stay on the ground.

Whenever dental work is done, it is a good idea to ask the dentist if there is any restriction on flight. In some cases, it is wise to stay on the ground for at least three days, whether you're in the left seat or not. ■

This article was adapted from the Alaskan Region's The Pilot's Corner.

Facility and Man of the Year

On the day that B. Keith Potts (left), Associate Administrator for Air Traffic, presented the Facility of the Year Award to Raleigh W. Beach (third from left), manager of the Providence tower at Green Airport, Rhode Island Gov. Edward D. DiPrete (third from right) was waiting with a citation for the tower and a proclamation of a statewide Raleigh Beach Recognition Day. Looking on is New England Region Director Robert Whittington (second from left).

This locker area, the wall behind it and the ceiling above at LaGuardia Airport were blown apart by a bomb on Dec. 29, 1975

Disaster at LaGuardia

By Edmund Preston

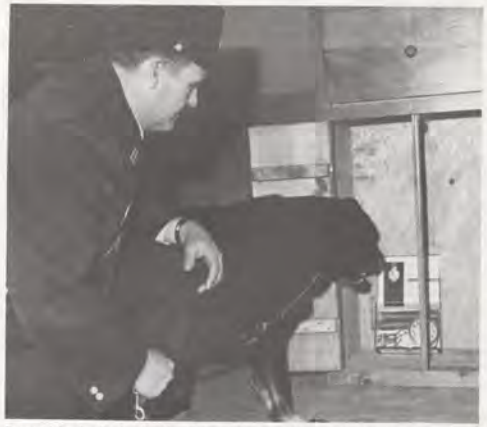
The American public's concern about air transportation security was on the wane at the time John McLucas became FAA's Administrator in November 1975. For nearly three years, all passengers and their carry-on baggage had been subjected to electronic search before they were allowed to board airliners. Though attempts at air piracy persisted, this program maintained an almost perfect record of prevention.

The security system had potential weaknesses, however, including vulnerability to sabotage. In September 1974, a TWA flight originating in Israel crashed as it crossed the Ionian Sea. An explosive device had apparently been concealed in baggage loaded into its cargo hold during a stopover in Athens. The loss of 88 lives made this the world's most catastrophic inflight bombing until that time. It was not a direct test of American security practices, however, and the domestic reaction was not particularly severe.

An article published the following summer cited FAA security chief Richard Lally on the difficulty of getting the public to appreciate that bombs were a continuing hazard: "They don't read about hijackings in this country much any more, because we've got that situation pretty well under control. So they think the aviation security problem is a thing of the past."

This complacency favored those who objected to the expensive and irksome airport search procedures. Some airlines were mounting a strong campaign to limit the program, recalled one member of McLucas's staff, and they had secured the Administrator's sympathetic attention. Then the situation was transformed by a violent event at the close of 1975.

Cruelly timed to coincide with the evening rush and the holiday travel season, a powerful bomb ripped through the ground floor of New York's LaGuardia Airport just after 6:30 on December 29. Hidden in a coin-operated locker, the device was composed of high-intensity explosives that were the equivalent of 25 sticks of dynamite. It opened a broad gap in the floor of the waiting room above, shattered windows and twisted heavy metal doors. Fire followed spreading smoke through the devastated area. Eleven persons died and 54 suffered injuries, most as the result of flying glass and metal fragments.



Dogs with local police handlers have been used successfully to sniff out bombs in terminal areas and aircraft, here shown in a training demonstration.

The emergency closed LaGuardia for 27 hours and disrupted air travel over a wide area. "Every time you have an incident like this," remarked one airline official to *The New York Times*, "all of the rats come out of the woodwork and put dimes in telephones." In this case, an unusually heavy rash of threats by hoaxers prompted evacuations at many airports and FAA facilities. For New York, the disaster was the most-destructive bombing since the notorious Wall Street blast of 1920. Like that crime, it remained unsolved.

The news from LaGuardia reached President Gerald Ford as he neared the end of a skiing vacation in Colorado. Leaving for Washington the following day, Ford promised a maximum effort to prevent recurrence of the outrage. Secretary of Transportation William T. Coleman, meanwhile, held an early morning meeting of representatives from the aviation community and concerned federal agencies. He appointed McLucas chairman of a special government-industry task force to investigate both immediate and long-range security measures.

This coordinated response contrasted sharply with the reaction to the 1973 terrorist attack in Rome, when the Department's rush to take the initiative brought FAA resistance.

On the evening following the bombing, Coleman and McLucas joined Justice Department officials in briefing the President. Speaking with reporters on the way to the meeting, Coleman described several of the alternatives under consideration. Among these were procedures aimed at increasing the security of airport lockers by random checks of the compartments or by dispensing their keys from a central point.

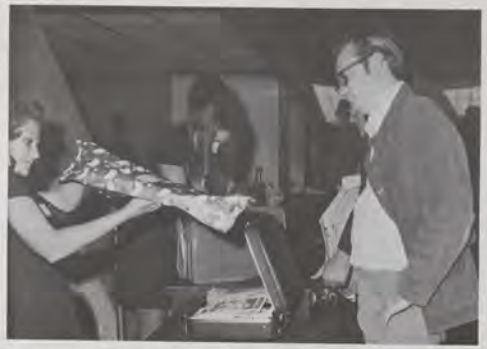
Authorities in the New York area went further than this, removing all lockers from service at the three major terminals. A less-drastic option was to move the units behind passenger screening checkpoints. Los Angeles International had taken this step during the previous summer after three persons were killed by a device placed in a locker by the insane "alphabet bomber." That event had produced no more than local changes, unfortunately, but the bloodier New York tragedy had greater impact.

In its report to the Secretary on Jan. 9, 1976, the task force recommended that lockers be relocated to secure areas at all air terminals where this was feasible. At FAA urging, almost all of the nation's airports eventually adopted this policy. In addition, the agency conducted tests of the effects of explosions on lockers, gaining useful information on methods of minimizing destruction.

Perhaps because the LaGuardia explosion occurred in a baggage claim area, initial press reports contained speculation that the bomb had been in a suitcase unloaded from an arriving flight. Although no evidence was found to support it, this theory focused attention on the security of checked luggage.

Unlike carry-on bags, checked items were exempt from routine search because a hijacker would have no access to them in flight. The possibility remained, however, that a saboteur might use trickery to introduce a bomb into a checked bag. One FAA report ranked the press coverage given to this vulnerable point in the security system as another of the tragedies of the LaGuardia affair.

Despite the risk that such publicity entailed, however, it was an effective antidote for the apathy that Lally had complained about during the previous summer. Checked luggage was now processed with more attention to security, and some now proposed that all such bags be x-rayed before they were loaded aboard airliners. Rep. John Murphy (D-NY), who had passed through LaGuardia only a half hour before the blast, announced that he would sponsor a bill requiring such an inspection.



A traveler at Washington Dulles Airport has his luggage and a Christmas gift checked for weapons and explosives by airline personnel.

Given the existing state of detection technology, Murphy's plan would have imposed a formidable drag on air transportation. Since 1972, however, FAA had been trying to develop systems that would improve the speed and accuracy of baggage inspections. These devices used non-imaging x-rays, electronic sniffers and a variety of other techniques to identify luggage that might contain dangerous objects.

In its January 9 report, the task force said that this research would be accelerated. Later that month, McLucas told reporters that the agency planned to test such equipment at selected airports. He estimated that full baggage screening might cost an additional $100 million per year and cause a pre-flight delay of up to three hours.

Although presented only as a possibility, this prospect was enough to stir public resistance. In the view of one outraged citizen, for example, such plans meant "fighting random insanity with organized insanity."

FAA eventually decided to steer a middle course between the defenders of airline facilitation and security advocates such as Murphy. The agency implemented a new version of the profile system that had been developed for use against hijackers before the advent of total passenger screening. FAA provided confidential criteria that airline personnel could use to identify items, estimated at two percent of all checked luggage, for security inspection.

This profile system was inaugurated on April 15, four days before the task force submitted its final report. By year's end, FAA was able to report that the procedure was working smoothly without significant impact on airline operations. Although no bombs had yet been detected, the system's effectiveness was demonstrated by the discovery of weapons and other evidence of criminal activities.

The profile solution probably went as far as political reality allowed, for few Americans were likely to accept the inconvenience of arriving at the airport several hours before their flight's departure. Total inspection of checked baggage awaited a technological breakthrough. In the meantime, however, sensitive canine noses provided a highly effective supplement to the most advanced gadgetry. For over three years, FAA had been encouraging local authorities to form doghandler teams for explosives detection.

Tapping the expertise of Air Force trainers and the funds of the Law Enforcement Assistance Administration, this cooperative effort made units available to investigate bomb threats to terminals or aircraft. Airports joining the program in the six months following the LaGuardia disaster brought the total number of participating sites to 24. ■

Dr. Preston is a member of the FAA history staff, Office of Public Affairs. This article is extracted from his forthcoming Troubled Passage: The Federal Aviation Administration, 1973-1977, *the fifth volume in the FAA narrative history series.*

People

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■ **Lawrence E. Duncan,** group supervisor, Aircraft Maintenance Section, Aircraft & Aviation Maintenance Branch, Aircraft Maintenance & Engineering Division, Aviation Standards National Field Office (ASNFO), promotion made permanent.

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Alaskan Region

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■ **Ruben L. Jackson,** unit supervisor, Engineering Services Section, Establishment Branch, AF Division.

■ **Robert J. Phillips,** manager, Bethel Tower, from the Anchorage Tower.

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■ **Vaughn L. Patterson,** area supervisor, Wichita, Kan., Tower.

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■ **William J. Stehling,** chief, Quality Assurance Staff, Air Traffic Division.

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Great Lakes Region

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■ **William H. Fischer, Jr.,** area supervisor, Grand Forks AFSS.

■ **Thomas C. Gardner,** assistant manager for training, Wold Chamberlain Tower, Minneapolis, Minn.

■ **Gary L. Griffin,** area supervisor, Grand Forks AFSS, from Jamestown, N.D.

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■ **Vera E. Stewart,** area supervisor, Kankakee AFSS, promotion made permanent.

■ **Lyle H. Wicken,** assistant manager, Grand Forks AFSS.

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■ **Richard E. Lemanski,** area supervisor, Burlington AFSS, from Albany, N.Y., FSS.

■ **Ronald F. Outwater,** area supervisor, Burlington AFSS, from the New York AFSS.

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■ **Richard F. Wise,** area supervisor, Boston ARTCC.

Northwest Mountain Region

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■ **Howard A. Gore,** unit supervisor, Denver Flight Standards District Office.

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Southern Region

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■ **Donald Cass,** supervisor, North Operations Section, Operations Branch, Air Traffic Division.

■ **Ronald G. Cooper,** assistant manager, Pensacola, Fla., Tower.

■ **Eugene P. Cope, Jerry M. Cosby and Gerald A. Zipper,** area supervisors, Jacksonville, Fla., ARTCC, promotions made permanent.

■ **Charles B. Davis; Philip A. Griswold; David C. Hicks, Jr.; Charlotte A. Hood; Bobby W. Moore; Clinton A. Nichols; George G. Simmons; and Andrew Wyper III,** area supervisors, Memphis ARTCC, promotions made permanent.

■ **Harold H. Downey,** area supervisor, Miami ARTCC.

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■ **Robert E. Newkirk,** area supervisor, Jackson, Tenn., FSS, from FAA Academy.

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■ **William R. Price,** area supervisor, Standiford Field Tower, Louisville, Ky.

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■ **Aldean R. White,** area supervisor, St. Petersburg, Fla., AFSS.

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Southwest Region

■ **Jesus J. Aguilera,** area supervisor, Fort Worth, Texas, Automated Flight Service Station, from Abilene, Texas.

■ **Prentiss M. Andrews,** manager, Amarillo, Texas, FSS, from De Ridder, La., FSS.

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■ **Earl Hamlin,** unit supervisor, Dallas-Fort Worth Regional Airport AF Sector.

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■ **Roy J. Taylor,** manager, Support Services Coordination Staff, AF Division.

■ **Felipe Villarreal,** unit supervisor, San Antonio AF Sector.

■ **Major C. Watts,** area supervisor, Jonesboro, Ark., FSS, from Little Rock.

Technical Center

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■ **David R. Blake,** technical program manager, Fire Safety Branch, Aviation Safety Division.

■ **Daniel W. Riley III,** technical program manager, Aviation Security Branch, Aviation Safety Div., promotion made permanent.

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■ **Clarence O. Barou,** manager, Administrative & Budget Branch, Management Staff.

■ **Timothy D. Booth,** manager, Management & Evaluation Branch, Management Staff.

■ **Charlotte M. Harrison,** manager, General Accounting Branch, Accounting Operations Div., Office of Accounting.

■ **John G. Richardson,** manager, Traffic Flow Management Branch, Operations Div., Air Traffic Operations Service.

■ **Emily Marshall Trapnell,** assistant chief counsel, General Legal Services Div., Office of the Chief Counsel.

■ **William A. Tusaie,** program manager, Program Management Staff, Associate Administrator for Policy & International Aviation.

Western-Pacific Region

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■ **James E. Brown,** manager, Metropolitan Airport Tower, Sacramento, Calif.

■ **Lloyd T. Crumrine,** group supervisor, Los Angeles FSDO, promotion made permanent.

■ **Clifford D. Gibbons,** manager, Fresno, Calif., FSDO.

■ **Paul F. Giras,** manager, Materiel Management Branch, Logistics Division, promotion made permanent.

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■ **Karolyn Grimes,** administrative officer, Sacramento Airway Facilities Sector.

■ **Harry C. Kanarr,** unit supervisor, Long Beach, Calif., AF Sector Field Office.

■ **William D. Marino,** manager, Burbank, Calif., Tower, from the Las Vegas Tower.

■ **John Mayrhofer,** manager, Los Angeles Tower, from Windsor Locks, Conn.

■ **Kenneth E. Pender,** manager, Hilo, Hawaii, Tower, from Reno, Nev., Tower.

■ **William M. Reidy,** manager, Santa Maria, Calif., Tower, from AT Division.

■ **Albert N. Riedel, Jr.,** manager, San Jose, Calif., Tower, from AT Division.

■ **Walter S. Smith,** manager, Santa Rosa, Calif., Tower, from Monterey, Calif.

■ **Larry E. Wright,** area supervisor, Miramar Naval Air Station TRACON, San Diego, from McClellan AFB TRACON.

Retirees

AERONAUTICAL CENTER
Cook, Myron E.
Dunn, Albert J.
McCoy, Mary E.
Morse, Robert E.
O'Guinn, Delbert

ALASKAN REGION
Ashworth, Edmond L.
Beaman, James P.
Donohoe, Paul S.
McKee, William H.
Moore, Dale W.

CENTRAL REGION
Christopher, Gerald
Pierce, Marion R.
Schultz, Pauline B.
Scott, Elizabeth E.
Simkins, Vernon B.
Zoogker, Merle Jo

EASTERN REGION
Conser, Eola S.
Edmondson, Warren L.
Ferguson, Gerald A.
Hartman, Lyle C.
Long, Charles R., Jr.
McCoy, Hensel L.
McKee, Donald I.
O'Donnell, Gerald F.
Park, Warren S.
Soriero, Leonard
Stevens, Franklin D.
Taylor, Robert G.
Wade, Richard B.

GREAT LAKES REGION
Auchenman, Robert G., Jr.
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Donaghue, Thomas O.
Geimer, Robert W.
Hays, Ruth M.
Kimball, Robert E.
Luyett, Walter M.
Masters, William E.
Senyak, Ronald R.
Slater, Adam M.

METRO. WASHINGTON AIRPORTS
Adkins, Glen F.
Alger, Billy G.
Anderson, Jane G.
Armstrong, John H.
Bean, Roy F.
Bell, Joseph R.
Bennison, Frank M.
Boothe, Robert C.
Brockington, Louise A.
Buckley, Ronald G.
Carlson, Donald L.
Cissers, Harry C.
Cordell, Charles W.
Costello, Wilbur L.
Costello, William H.
Davis, Dexter P.
Dorsey, George
Dunne, Gerald J.
Edwards, Edward F.
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Frazier, Herbert M.
Garrison, James E.
Gillispie, Ellen Money
Haller, James W.
Hefner, James P., Jr.
Hickerson, Rayburn
Hupp, Frank R.
Hupp, Michael J.
Ivy, Stanhouse C.
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Johnson, Gilbert L.
Jones, Robert B.
Jones, Russell M.
Knight, James L.
Koss, A. Jean
Kuzmiak, David P.
Lee, Gordon W.
Leopold, Mary A.
Levelace, Jessie T.
Maloney, Thomas W.
McGhee, Claud C.
Mizrolo, Leo J., Sr.
Miles, Vera C.
Moore, Jefferson R.
Moon, Marion H.
Moore, Oscar L.
Murphy, Robert J.
Nett, Marvin F.
Nunley, Herbert C.
Pace, Donald R.
Pearrell, Owin B.
Pennington, Howard L., Jr.
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Repine, Robert M.
Rowe, Edward G.
Schaeffer, Eldridge L.
Schmitz, Robert C.
Schwien, William C.
Sharpe, Mildred B.
Sheckels, Michael K.
Simpson, Robert E.
Sisolli, Bernard A.
Smith, Robert G.
Tate, Carleton T.
Terra, George N.
Thompson, Thomas E., Jr.
Valentine, Wilbury E.
Whitmer, Merle E.
Williams, Lewis Q.
Williams, Norman K.
Willingham, Elizabeth C.
Winmer, Janice M., Jr.
Windle, Calvin W.
Woods, Raymond D.

NEW ENGLAND REGION
Driscoll, Donald W.
Lucenti, Salvatore J.
Morrissey, James R., Jr.
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Owens, Donald L.

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Gillam, Lindell E.
Gilsdorf, Joseph G.
Graham, Robert N.
Grampp, Bruce A.
Holmes, William H.
King, Sheldon S.
Lilak, John K.
McClain, Robert G.
Midland, Richard G.
Nesbey, Robert E.
Payne, Evan F.

SOUTHERN REGION
Alexander, John E.
Anderson, Gene M.
Burgess, Newman L.
Byous, Robert L.
Craig, Robert I
Crossley, William H.
Davis, Donald D.
Davis, Wayland H.
Doherty, John P.
Drinkwater, Fred
Forbess, Billy W.
Gibson, Robert P.
Gore, William E.
Harrington, Jack K.
Henderson, Charles M.
Hunt, Edgar L.
Kaufman, Edward B.
Keller, George W.
Kimmer, Guy B
Moran, Patrick T.
Odenwald, Henry C., Jr.
Phelps, Randolph B.
Pommill, Rowland W.
Rice, William E.
Shiflett, Joseph M.
Whiteman, Raleigh W., Jr.

SOUTHWEST REGION
Bennett, Donald E.
Bido, Robert B.
David, Peter P., Jr.
Gill, Ophelia N.
Jablonski, Leon A.
Lewis, Lloyd M.
Licurance, Patrick R.
Moose, Carl M.
Morgan, Howard L.
Murchison, C.E., Jr.
Patzig, W.J.
Ramirez, Waltamiel
Smith, John B.
Swan, Jerry M.
Taggart, Max K.
Vazquez, Federico, Jr.
Young, John

TECHNICAL CENTER
Bartlick, Lewis O.
Horner, Donald R.
Wastin, Frederick

WASHINGTON HEADQUARTERS
Burt, Richard E.
Cathell, Jack S.
Chin, Willie J
Giese, Jeanette G.
Pettinati, Rudolph A.

WESTERN-PACIFIC REGION
Ball, John D.
Calfison, Rex R.
Heath, James C.
Jemison, Napoleon C.
Lum, Leon Y.L.
Mastin, John A.
Moore, Rose H.
Sam, Floyd
Scott, John A., Jr.
Vanvleck, Harry K.

Federal Notebook

THE DILEMMA CONTINUES: CSRS VS. FERS

The season of decision is upon federal employees, but you have until the end of the year. However, it's not very long to muster the information many need to make the "right" decision about whether to stay with the Civil Service Retirement System or switch to the new Federal Employees Retirement System.

For one, if you've had military or private industry employment under Social Security coverage, you need a complete statement of those earnings, but so will perhaps over a million other federal employees whose requests on Form SSA-7004 FERS will flood Social Security offices.

For another, at this writing, Congress seems on the verge of eliminating an attractive loophole that some employees want to jump through. The House would extend the spousal Social Security benefit offset to FERS retirees. As it stands, a federal employee under CSRS whose spouse has earned Social Security benefits could switch to FERS, work for a day and retire and collect spousal Social Security benefits along with the federal annuity. This "windfall" is not likely to survive.

PLUMPING FOR EARLY OUT

For want of Congressional or union support, Sen. William Roth (R-Del) is asking for letters or petitions from federal employees to their senators supporting his bill for early retirement (S-42), with copies to him. Opposition centers on the bill's three-year ban on backfilling the positions.

ON THE PAY FRONT

An Administration-proposed bill to change federal pay has been introduced by Rep. Gene Taylor (R-Mo). It would place greater emphasis on performance and less on seniority for raises and promotions, consolidate existing pay grades into "pay bands," allow pay rates to be more reflective of market conditions and eliminate much administrative work in job classification.

Other alternative pay systems are expected to be aired in a bill from Reps. Gary Ackerman (D-NY) and Mary Rose Oakar (D-Ohio).

Bills to expand special pay rate authority were introduced in both houses by Rep. Frank Wolf (R-Va) and Sen. Paul Trible (R-Va).

Meanwhile, in its annual report to Congress, the General Accounting Office proposed an overall federal compensation system, noting that:

* While federal salaries lagged behind those in private industry because of presidential alternative pay proposals, federal fringe benefits were sometimes better.

* Federal retirement is worth more as a percentage of average employee pay than private sector annuities.

* Private sector firms generally pay more of health insurance premiums and provide more life insurance coverage at no cost.

* The private sector offers one more holiday than the federal, offset by more generous federal annual leave.

* Federal sick leave lags behind private illness and disability plans by 0.7 percent of pay.

NO LOSS, NO GAIN

For the time being, the budget for fiscal 1988 passed by the House and Senate is neutral for federal employees. It calls for a three percent pay increase and a full cost-of-living adjustment for retirees in January. It does not change the premium-share formula for health insurance nor restore the three-year-recovery rule, and it retains the lump-sum retirement option.

NEW WITHHOLDING PROPOSED

Rep. Paul E. Kanjorski (D-Pa) has introduced a bill (HR-755) to require the Federal Government to withhold local income taxes from the pay of all federal employees. At present, the law applies only in jurisdictions having at least 500 federal employees.

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