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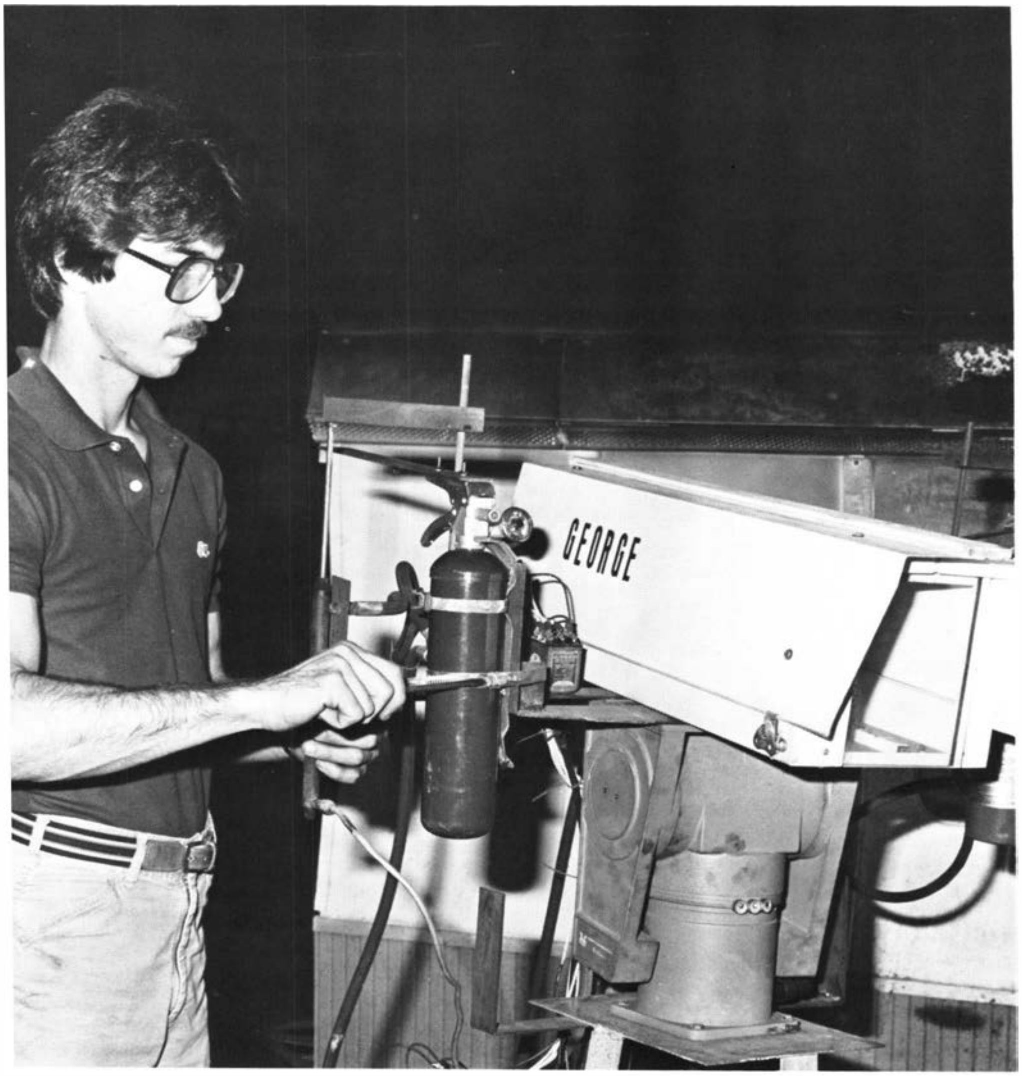

Research Highlights

An unlikely looking robot named George is helping FAA Technical Center engineers test aircraft fire extinguishers.

The robot, which operates by pneumatic pistons, was designed by Charles Huber, an Embry-Riddle Aeronautical University student on a work-study program. Huber is working toward a degree in aeronautical engineering.

"George" is used to test hand-held fire extinguishers and extinguishing agents that are being evaluated for effectiveness in galley and seat cushion fires. The robot consists of a TV camera on a swivel base with an extinguisher mounted on each side of the camera. Huber operates it by remote control.

Richard Hill, aerospace engineer with the Fire Safety Branch, says the robot was needed because of the fear that some chemicals under test might give off toxic fumes, as well as to protect against injury from splash back, particularly in galley fires.

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The Jones

Employee-Management Relations Document Points the Way

Houston Intercontinental Airport Tower and Houston ARTCC photos by Ken Maginnis

Unofficially, it's known as the Jones Report after Lawrence M. Jones who chaired the three-member task force that spent five months after the PATCO strike studying management-employee relationships in FAA. Released at a press briefing in Washington, D.C., on March 17, the 149-page report represents a blueprint for upgrading the agency's work environment in the years ahead.

Transportation Secretary Drew Lewis, who initiated the study in collaboration with FAA Administrator J. Lynn Helms, said the findings and recommendations of the task force had identified significant "people problems" in FAA that have reduced both em-

Report

to a Better Work Environment

ployee morale and effectiveness. "I am confident that, acting on their findings and recommendations, we will get to the root of the problems that have troubled us in the past and make the FAA a much better place to work in the future," he added.

Copies of the report—officially titled "Management and Employee Relationships Within the Federal Aviation Administration"—have been distributed to the facility level and are available to all employees. Here, FAA WORLD presents a synopsis of the report covering the work climate leading up to the strike and the recommendations for improving it.

A History of Conflict

The interrelationships between the controller's task and the management systems became the focus for the task force as it began its search for what had gone wrong in past years. It was likely that factors affecting both managers and employees over the years stretching from 1965 to 1981 had turned the close teamwork that had characterized the FAA in earlier years to a divided house of "them" and "us."

Few organizations were able to escape the kind of experiences that beset the FAA. Things were changing rapidly and radically in the society. Many work groups suffered internal disarray and tension-filled relationships.

The years 1960 to 1975 represented a period of rapid growth in most areas of the society. Work pace was pushing and being pushed to stay up with demand. Technology was exploding. New work skills and relationships were being required to deal with a new technology that was radically different and often immature and unreliable.

New work skills and relationships were being required to deal with a new technology that was. . . often unreliable.

Bob Sands, Reno, Nev., AF Sector electronics technician. Photo By Barbara Abels

In this onslaught of change, some organizations reponded by reinforcing the management style that had worked before: sharper commands, tighter discipline and no fraternization, and they became systems under siege. Some organizations surrendered and became servants to change at a cost of depreciating quality and productivity.

A few organizations judged that changes in work technology and culture required new management systems and different working relationships. Work was constantly less physical and more mental. Organizational effectiveness no longer was noted by specialization of tasks but by the interconnections among skills. People needed to be involved in the decisions about what the job demanded from them because they now governed what they would give of themselves to the job. A good bargain produced commonality between the goals of the organization and the needs of the people. A commitment to mutual goals was the force driving the talent of the new worker and not the old bargain of discipline in return for wages. Those organizations prospered.

The air traffic control system has been an organization under siege. It still is. Its management has performed admirably under those conditions, but the cost to managers, employees and the public has been high.

The situation might well have been different. Air traffic controllers enjoy their work as much as or more than any other group; they like each other; they and their managers work in relatively small groups; all managers begin as controllers, creating a common ground and creating upward mobility opportunity; non-supervisory employees in the FAA receive good pay and benefits; employees find it exciting to be a part of the aviation community; and they are intensely proud of their skills and aware of their responsibilities. There is a feeling of being special, elite, as a part of the air traffic control system. Many other organizations would envy these attributes in attempting to construct teams instead of adversarial groups.

These favorable factors, however, were not those that determined management-employee relationships within the FAA. Most managers had military backgrounds and were comfortable with an emphasis on structure, command, duty and discipline. As controllers, they had become proficient in determining what to do with an airplane and commanding it to do so. It was not surprising that as managers they would vector people in much the same way. As controllers, they could not be patient, or perhaps even civil, with a non-responsive airplane in a busy sector; as managers, they were inclined to handle a challenging, questioning, recalcitrant employee in a similar fashion.

Air traffic controllers worked hard, were very proud of their skill and very much together. They tested their leaders constantly but were obedient when it counted. It was this group that organized PATCO and participated in the sickouts of 1970. They wanted more controllers and better equipment and they were impatient with the inability of the system to get these things done.

Managers, wanting the same things from Congress, not so subtly encouraged the tactic and the concessions were won. These controllers became the managers of the system in the next 10 years. They, too, were ready for a little more peace and stability, but another generation of controllers and a new set of technological challenges denied them such tranquility.

Air traffic management knew its duty. The job of the FAA was to create a federal airways system and manage it safely and efficiently and promote all

forms of civil aviation. This became a task described in terms of airways, radios, airplanes, airports, radars, etc. It was not viewed significant that this process was really controllers talking to pilots and to other controllers in a people-intensive, rather than technological, environment. Technical resources were provided prime attention, but the development of human resources was never made a critical concern. The sickouts were interpreted as demonstrations about technical, not human, needs.

As people and equipment were rushed into the system by the FAA to handle pressing peak volume, managers were confronted with difficult problems of handling increasing idle time during low-traffic periods. Much of the equipment involved new automated, computerized systems. Equipment outages occurred for many reasons, causing irritations and frustrations at and between all levels of employees. Finally, there were times when personality conflicts and frequent

The ARTS III supervisor's console at the Dallas-Fort Worth TRACON.

changes occurred in the offices governing the FAA.

If managers had limited people skills and even less time for dealing with the needs of employees, PATCO proved an eager and able substitute. The union had earned its position by working successfully to secure certain needs of the system, and it began using its power to press for the desires of controllers. Repeatedly, the union went over the heads of FAA management to gain special benefits for its members.

A part of PATCO leadership was convinced that controllers were the key to the system and should exert the ultimate power of unified action in order to dictate both how air traffic should be operated and how controllers should be benefited. This group assumed direction of the union and began preparing for a system-wide strike if the tactic became necessary to gain its objectives. Facilities were organized and spouses were included in meetings. Peer group pressure was used extensively, and the authority of fully qualified controllers to provide position certifications was employed to convince new employees to cooperate.

Air traffic managers were harassed with a number of tactics to demonstrate the power of the union. Though union hooliganism toward controllers and actions hamstringing operations in facilities were nefarious and irresponsible acts, a strong majority of controllers needed little persuasion. Most controllers were insistent on change and more attention to their needs, their problems and their complaints.

The pressures of the work and PATCO were only part of the managers' troubles. Congress had mandated a pay cap on the salaries of Federal employees. In addition, premium pay was allowed beyond the pay cap for overtime hours for controllers but not for supervisors. It became not unusual for some controllers to make more money than supervisors, who, in turn, could earn as much as ascending levels of management. This pay inequity and compression angered managers and destroyed their motivation and their interest in promotions.

Traditionally, a management career in the FAA had been based on moving through various jobs in different facilities. With the personal cost of moving becoming burdensome, particularly in respect to selling and buying houses, and promotions often not offering any greater compensation because of the pay cap, the mobility policy for management development penalized those being promoted.

The pressures within the air traffic control system caused the organization to centralize more and more authority in Washington, leaving less in the regional and field facility offices.

People at all levels in the FAA developed an anxiety that they were walking the edge of failure in a task where any error could be tragic. Many were bothered by a feeling of losing control over both the tasks and the people who performed them.

This, then, was the background against which negotiations for a new contract began early in 1981. Participants on both sides were unhappy about their own situations and unhappy with each other. The best efforts of those within President Reagan's closest team were unable to stop, though they forestalled for a time, the confrontation that had been brewing for many years.

The Recovery Period

The PATCO strike and its consequences represented a dramatic change. After the strike on Aug. 3, 1981, attitudes and working relationships improved among the somewhat older group that remained, as all hands pitched in to replace "on the boards" those who had walked out. The changes included:

- President Reagan, Secretary Lewis and Administrator Helms provided strong, firm and consistent decisions and leadership much appreciated by all working employees.
- The contingency plans proved well designed, and a surprisingly quick and safe recovery was achieved.

Many employees in the air traffic system were nearing the time they could retire and expressed an intention of doing so. Those who had hoped for a new day were becoming dispirited, seeing little basic change, anticipating another union among new controllers and fearing the consequences of future changes in Administrators, Secretaries and Presidents.

Plans for a major restructuring of facilities and technology were announced by the FAA, which were impressive and exciting in technical terms but involving complicated adjustments in human terms.

As Secretary Lewis and Administrator Helms had suspected, the FAA needed urgently to initiate actions to strengthen management and employee relationships, particularly within the air traffic control system.

- The harassment and pressure of PATCO was outside, not within, facilities.
- Field managers were delegated by necessity the authority to tailor operations to individual conditions.
- A communication system innovated by Mr. Helms and his associate, Mr. Fenello, tied everyone together.
- A spirit of courtesy and cooperation developed between working controllers, pilots and FAA technicians.
- The crisis stimulated everyone to a high level of concentration and performance.
- The incident was seen as an opportunity by some to correct the deficiencies of the past.
- The systems of flow control and General Aviation Reservation Program both reduced traffic volume and tended to level peaks and valleys.
- The controllers and supervisors who remained and other FAA employees worked long hours and with great determination to provide an operative and a safe air traffic system.

But, as the months passed, the crisis became a tiring routine; the traffic was tending to push toward greater volume and variability, and air traffic managers were often reverting to the heavy-handed supervision that had been repressed by the union.

FAA technicians had long objected that the air traffic control system and controllers receive attention and benefits greater than that accorded technicians. Airway Facilities employees and their union, PASS, seemed eager to redress this perceived inequity.

Conclusions and Recommendations

The analyses and conclusions of this report argue that four basic changes have to occur within the FAA in order to create employee and management relationships capable of delivering professional service to a growing and changing airways system:

1. The FAA needs to emphasize in its statements, in its planning, in its actions

Continued on page 18

on the job

The Reno AF Sector

Dean DeShazo, sector manager, is also the Reno area FAA representative.

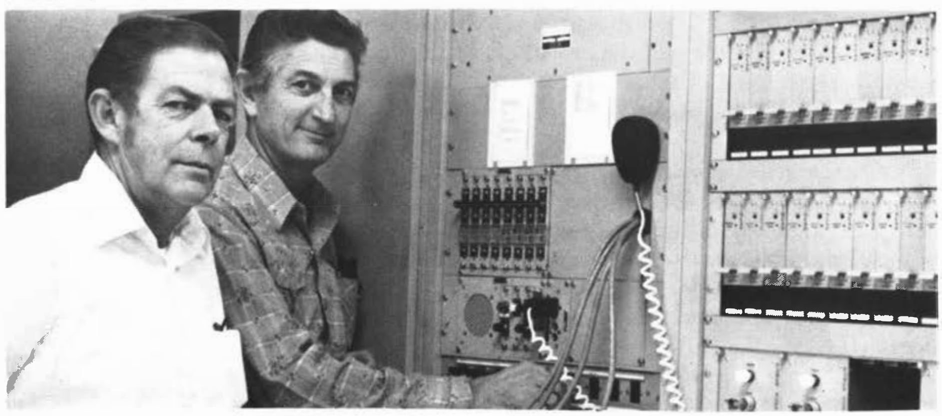
Ron Sandoval, chief of the sector's Environmental Support Unit.

Rarely are FAAers solo actors upon the stage. Employees are usually members of facilities, offices, sectors, teams, etc. So, FAA WORLD is picking up on an *Intercom* idea of spotlighting the troupes, beginning with the Reno, Nev., Airway Facilities Sector.

Obviously, everyone can't be shown in these features. The Reno AFS, for example, has a staff of 70 and includes five sector field offices. But you never can tell; if someone points a camera at you, smile. ■

The sector's Logistics Unit had consisted of Celia Abraham (left), chief; Donna Tellgren (right), general supply specialist; and Helen Miller, supply clerk, but Miller transferred to Alaska.

From the left, Dave Fay, radar technician-in-depth; Jack Neely, environmental technician; and Doug Johnson, the technical support officer.



Drew Stallings, chief of the Navigation/Communications Unit, with electronics technician Norm Lantrip (right).

Photos by Barbara Abels

Deena Girola-McFarlane, administrative officer, and Bill Dickinson, assistant sector manager, pause in a discussion.

Reno International Airport's surveillance radar dwarfs the sector's Radar/Communications Unit chief Jim Freeman.

By Betty Moschella
A public information specialist at the Technical Center, she was a free-lance writer and has been published in *Transportation USA*.

The Ghost of an ILS

Computer Math Modeling Conjures Up the Best Configuration

When an embankment was required at San Francisco International Airport to prevent runway flooding during certain tidal conditions, FAA Technical Center engineers were involved.

When Oneida County Airport in Utica, N.Y., planned to move its glide slope antenna, airport officials there also called upon Tech Center engineers.

And when Boeing wanted to erect a new headquarters building at the Seattle-Tacoma International Airport in Washington, center engineers again were called upon.

Whether moving or installing an antenna, building an embankment or making any other significant airport modifications, managers of bigger airports need to know how such changes will affect their instrument landing systems (ILS).

If the ILS would be affected, airport managers have to decide the most efficient and cost-effective way to go—before a building site is relocated, new antennas are purchased or some such other corrective alternative is chosen.

The Tech Center is in the business of helping airport operators make such decisions by ILS math modeling.

The math modeling approach, explains Ed Zyzys, manager for the Landing System Program within the Systems Test and Evaluation Division, is to use a computer program, or math model, to determine what kind of ILS performance to expect under certain conditions.

The computer is fed digital information on such items as terrain characteristics or the height and location of a building. It then can calculate the resulting signals emitted by different ILS ground systems and permit the selection of the most cost-effective system.

In order to understand ILS math modeling, it's necessary to understand a little about the instrument landing system itself.

An ILS uses two types of transmitters—a glide slope and a localizer. When an aircraft flys an ILS approach, it receives glide slope signals via two paths. One is the direct signal from the ground antenna to the aircraft; the second is an indirect signal that is received by the aircraft after its reflection from the ground between the antenna and the aircraft. The two signals form a path in space, which the pilot follows on his cockpit display to guide him safely to the runway.

"The glide slope transmissions are susceptible to irregularities or changes in terrain," says Zyzys. "Ideally, for a perfect glide slope, you need smooth ground in front of the antenna for several thousand feet. However, that rarely occurs.

"The localizer, which gives guidance to either side of the runway centerline, is primarily susceptible to buildings and

Math modeling program manager Ed Zyzys checks features of San Francisco International Airport on a to-scale map.

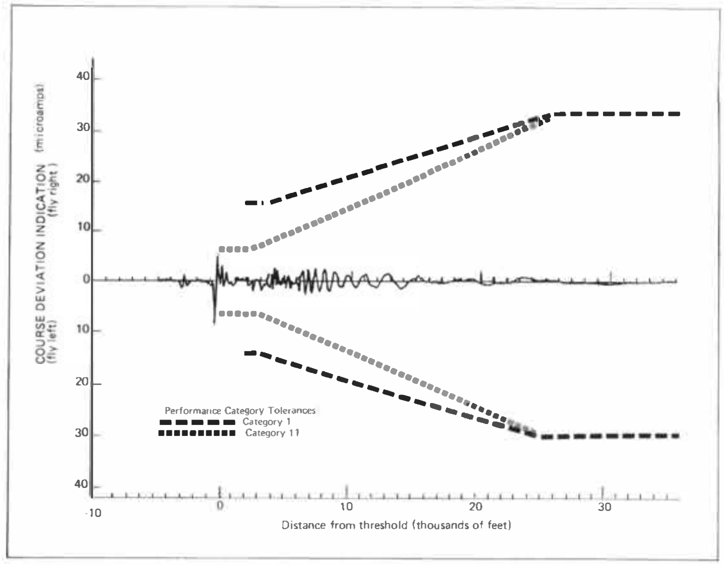


Figure 3- Course Structure Plot for Moses Lake
14 - Element Antenna Array

A graphic plot of a computer-modeled result for a Moses Lake, Wash., ILS localizer antenna. The computer input and output data is standardly in digital form.

other above-the-ground obstacles that can reflect the signals laterally and cause disturbances to the course structure," Zyzys explains.

An example of how a building can interfere with the signal occurred at Seattle-Tacoma International Airport in Washington. Boeing was planning to erect a new headquarters building at the airport and needed to know whether the structure would affect the localizer course. Tech Center engineer Jesse D. Jones was in charge of this study.

Jones discovered by math modeling that the building would indeed disturb the course. In fact, it would disqualify the runway for Category II operations. (Airports are categorized according to the minimum height a pilot can operate to before making a decision to land. Different landing systems and lighting requirements are applicable at different category airports.)

Jones found that by rotating the building eight degrees, the airport would remain within Category II tolerances, and that is what he recommended.

San Francisco's problems were of a different nature. They included: What would an embankment that was being considered to keep water off the runway do to the performance of their glide slope system? And what type of antenna should be installed, and where?

Engineer John Walls worked on this one. He modeled the site with and without the embankment at high and low tides. He also modeled two glide slope systems at three different airport locations.

"We told San Francisco how the embankment would affect system performance," says Walls. "Our recommendations included where to locate the facility and what type of antenna system to use."

"There are three glide slope systems which vary in complexity and cost," says Zyzys. "By modeling all three, we can determine which system will do a satisfactory job at the least cost."

The center receives requests for ILS math modeling through the Airway Facilities Service in Washington. Zyzys says the requests are screened there and given a priority before coming through the center's Engineering Management Staff and into his hands.

The work is sponsored and funded by the Landing Systems Branch in the headquarters Systems Research and Development Service. There, the subprogram manager is Seymour Everett, and the associate project manager is Carl Peterson.

Since the Tech Center first started ILS math modeling for a glide slope in Tulsa, Okla., in 1978, it has modeled more than a dozen sites and has several more scheduled for this year.

One of those is similar to the San Francisco problem on the opposite coast. A proposed new ILS glide slope at LaGuardia Airport in New York might have antenna ground plane problems from tidal Flushing Bay adjacent to it and the embankments need to restrain the waters.

Some time next year, Zyzys says, he expects to begin math modeling for microwave landing systems. For these, he will use models developed by the Lincoln Laboratory of the Massachusetts Institute of Technology and by Vitro Laboratories Division of Automation Industries. ■

People

Aeronautical Center

■ **Lawrence L. Bicknell,** deputy chief of the Air Traffic Branch at the FAA Academy.

Alaskan Region

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■ **Jay B. Salzer,** team supervisor at the Des Moines FSS, from the St. Louis FSS.

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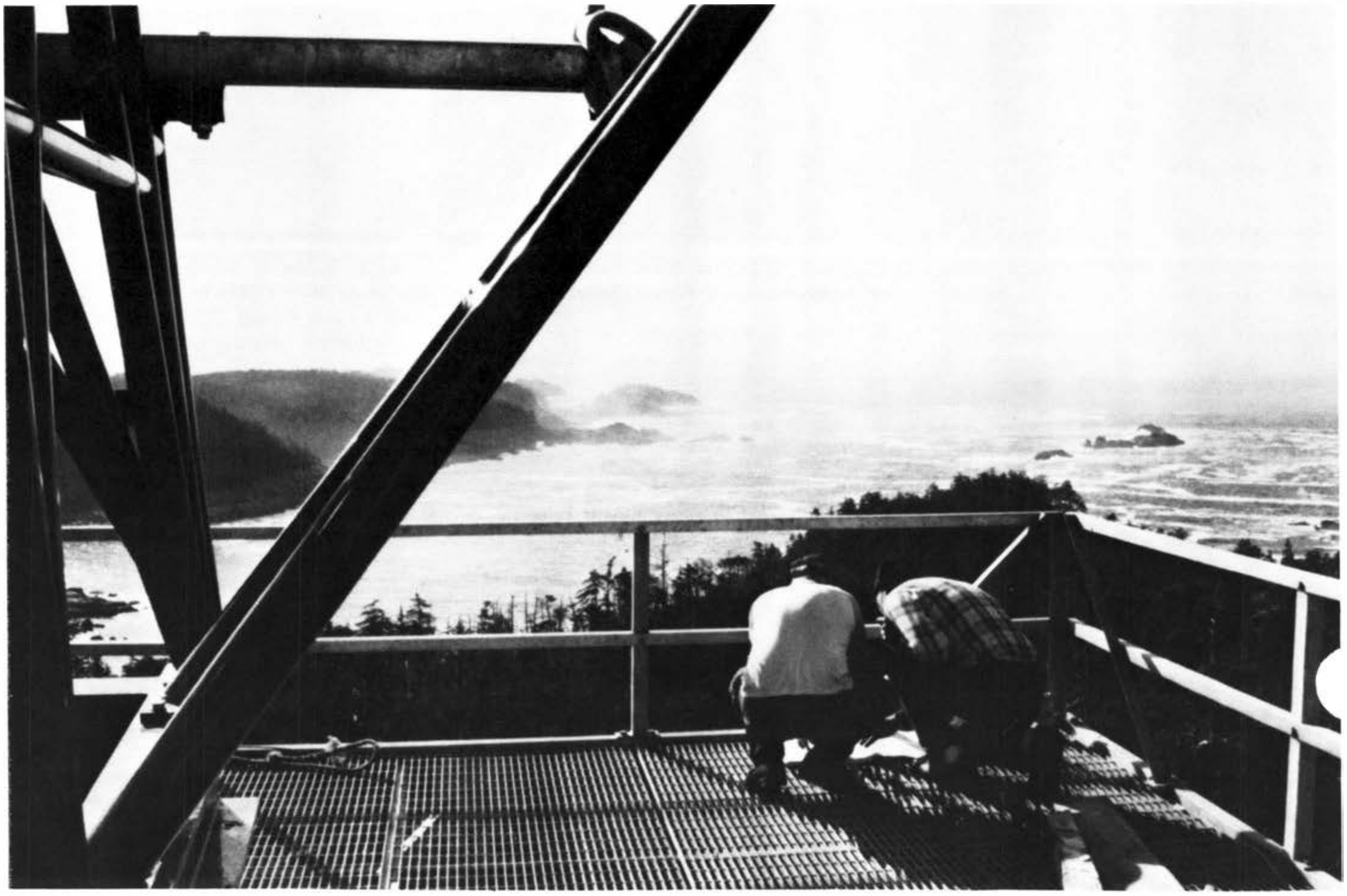
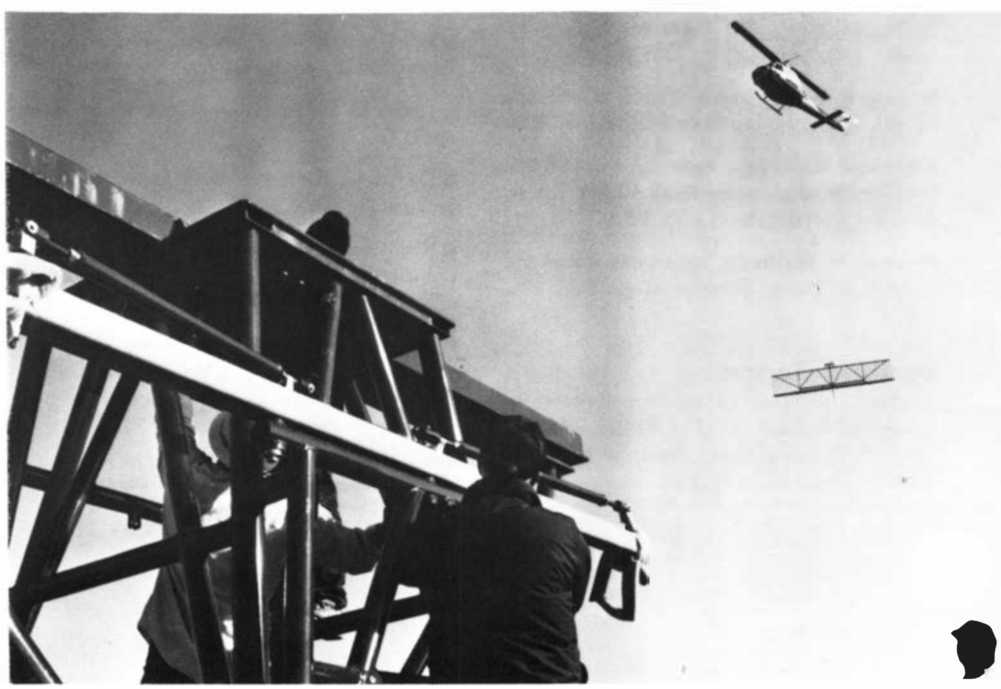
■ **Jean P. Roger,** team supervisor at the Gillespie Field Tower in San Diego, from the Lindbergh Field Tower, San Diego.

■ **Cecil W. Short,** team supervisor at the Oxnard, Calif., Tower, from the Burbank, Calif., Tower.



Cecil Osborne and Robin Masek study a manual to ensure the installation is done right. The platform provides a magnificent view of the intracoastal channel that separates Biorka Island from Baranof Island.

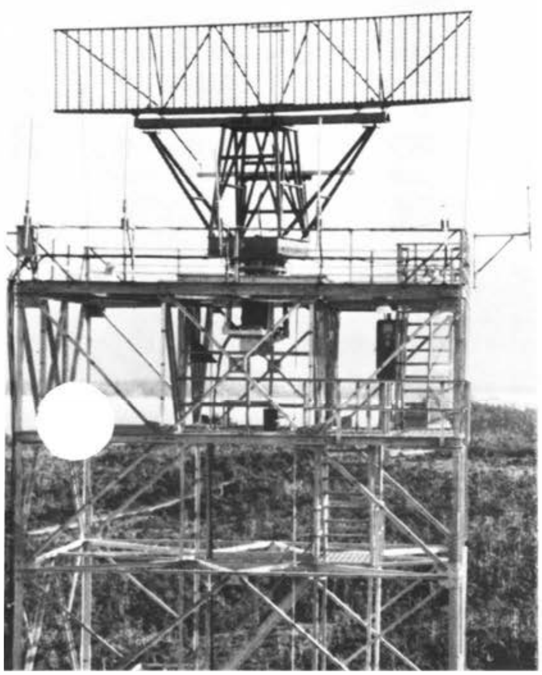


Helicopters were used extensively to haul steel to the growing structure. Here, the antenna is delivered to its nest 62 feet above ground, as technicians Lonnie Jackson and Cecil Osborne wait to position it.

By Cliff Cernick

The Alaskan Region public affairs officer, he is a former newspaper editor in Anchorage and Fairbanks.

Closing the Gap at Biorka

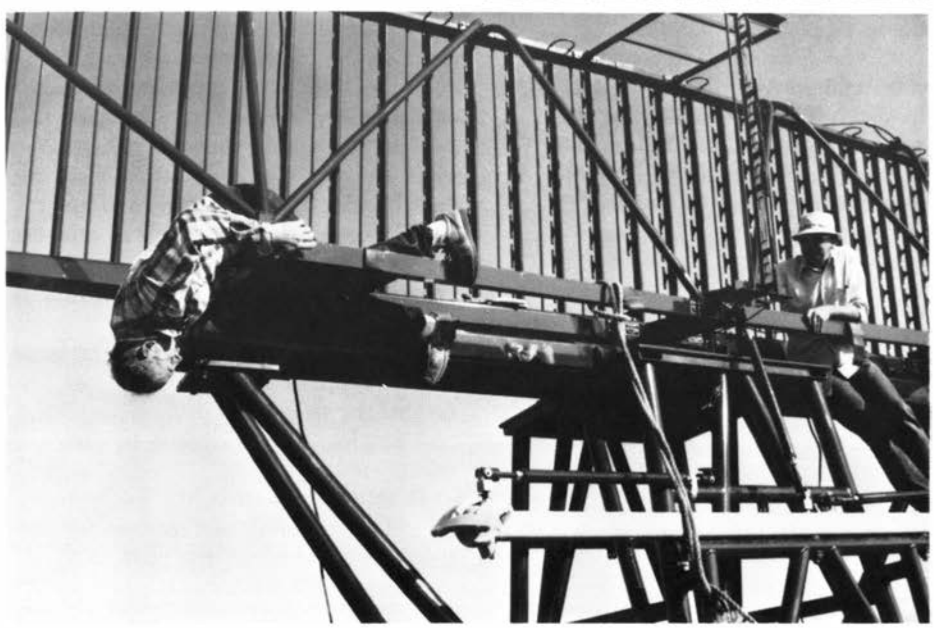


The five-foot open array on Biorka Island is a beacon-only radar for en route identification of transponder-equipped aircraft.

The next-to-last link in a chain of radar coverage for the Seattle-to-Anchorage route was forged in the Alaskan panhandle with the commissioning of the Biorka Island long-range radar last fall.

The new facility, which lies across a rock-strewn channel from Sitka, provides coverage from Yakutat in the northwest to Sandspit in the southeast. The installation of a Canadian radar at Sandspit this year will close the final gap. ■

Bob Lukacinsky, Robin Masek, Bruce Whalley and Billy Hughes (left to right) of Airway Facilities prepare a RAPPI (Random Access Plan Position Indicator) maintenance console for loading on a boat at Sitka, 15 miles from Biorka.



Robin Masek (left) and Lonnie Jackson dangle six stories up as they bolt the antenna to its supporting structure.

Photos courtesy of Robin Masek

JONES *Continued from page 9*

and to its supervisors and managers that development of human resources reflecting an appropriate concern for employees is an important and necessary responsibility.

2. The FAA needs supervisors and managers with a high level of leadership skills. A program of identifying, developing and promoting qualified supervisors and managers should include tests and interviews to help assess supervisory management interest and aptitude among employees.

3. The FAA needs to revise many of its systems in order to better match the characteristics of its task with the responsibilities of its employees. The FAA needs to control the variability in air traffic activity. A freely accessible airway system causes peak pressure on equipment, systems and people and growing idleness of these resources during the valley periods of traffic activity. This phenomenon creates inefficiency and troubled working relationships.

The FAA needs to adopt flexible staffing through part-time controllers, split shifts, overtime, assigning non-controller duties and voluntary seasonal transfers. A clearer and more appropriate delineation between staff and line authority is needed.

The FAA, if it implements these recommendations, will have dedicated itself to the development of human resources. . .

4. The FAA, if it implements these recommendations, will have dedicated itself to the development of human resources, will have programs to train and promote outstanding managers, will have smoothed the demand for its services and balanced its staffing plans to variable demand conditions and will have adopted an organizational structure that is more clearly and more appropriately aligned to its functions and its future plans.

Finally, the FAA needs to incorporate several changes in what might be termed the style with which management and employee groups relate to each other.

Positive elements in the FAA that should be fostered and emphasized are good job descriptions, the excitement of the agency's mission and tradition, the dedication of its employees, the system of performance appraisals and the participation of employees in studies, projects and decisions.

More appreciation and support from supervisors, more attention to employee input on programs and improved two-way communications between management and employees should be developed.

To replace the PATCO contract's rules of the shop, the agency should publish a manual of employee rights and responsibilities, provide a new grievance system and establish a corps of human resource specialists to counsel employees.

High-time controllers should be allowed to back away from high-traffic environments through assignment flexibility, and rap sessions with supervisors that are supportive rather than critical are needed to help relieve tension for all controllers.

In addition, geographic mobility for advancement should be adjusted to the economic realities of relocation, employee opinions and attitudes should be surveyed regularly and a change is needed from the pay cap that causes salary compression and destroys the motivation to advance into supervisory positions. ■

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

A Real Travelin' Man

Gary Foster just keeps rolling along, which seems like an odd expression in an agency devoted to aviation. But it was on Texas State Highway 115 outside the oil town of Wink where he established a record last year. He rolled through the one million mile mark in a government vehicle—and without a traffic accident or a traffic ticket.

An airports inspector with the Albuquerque Airports District Office (ADO), Foster has kept accurate records of his driving since coming to the agency as a draftsman in the regional office in 1960. During slack work periods, he was given the opportunity to deliver G-cars to regional facilities.

Later, he transferred to the Airports Division and worked out of the Oklahoma City office. For a couple of years, he put more than 70,000 miles on a vehicle each year during inspections in New Mexico, which the region had acquired during a realignment. Some trips lasted up to two weeks. During this time, Foster was inspecting as many as 600 airports a year.

When the Albuquerque ADO was set up in 1965, Foster was installed there and continued his inspections in New Mexico, West Texas and parts of the Texas panhandle.

"In those days, we would inspect anything that could be identified from the air," he said. Even though he could reach the site easily enough, he could still get in trouble.

"Once in the Big Bend country of West Texas," he recalls, "a rancher stuck a gun in my ribs as I checked an airfield and asked how fast I could get off the property. I was already moving when I answered, 'real fast'."

Foster credits defensive driving and a bit of good luck as factors in his safety record. Being single and without family obligations permitted him to be on the road without personal worries.

Oh, yes, he did not let his isolated location bother him when he hit the million-mile mark; he just continued a few miles further to Pecos and celebrated with a big dinner at the country club. ■

Feeling Fit

Edited by Henry J. Christiansen

What is Stress? Stress is a condition with which we are all familiar, yet the term is so widely misused that it is often subject to confusion. Most people automatically assume that stress is bad; but, it may or may not be harmful, depending on the circumstances.

It is useful to distinguish between what causes stress and what it is. The various pressures or demands from the external environment—which stem from your family, job, friends or outside interests—are called external stressors. The various pressures or demands from your internal environment are called internal stressors. They include the pressures you put on yourself by being ambitious, competitive and aggressive. In many of us, these internal stressors have more intense an effect then do the external stressors. However, the important point is that these external and internal pressures are identified by the term stressors.

The bodily response to these stressors is what we call stress. The human body has a stereotyped response to demands, whether pleasant or unpleasant. The stressors may be different, but they all elicit the same biological response. The response, in turn, can be harmful or beneficial.

You have probably had the experience of nearly crashing into someone on the highway. If you are driving along and someone cuts in front of you, you experience alarm or an emergency response.

Uncertainty and novelty are stressors. Anything that happens which you can't immediately make sense of can trigger stress. Normally, you quickly figure out what is going on, and the stress reaction stops. Also, if you can't figure out what's going on, but can find some constructive ways of handling the situation, the stress reaction also will stop. Your individual perception of the situation and how you individually cope with it determine the level (or lack) of stress realized.

(Source: "Managing Stress—A Business Person's Guide" by Jere Yates)

Be sure to see this column next time to read that "Stress May Be Good For You." ■

Mr. Christiansen is the Southwest Region's Special Projects Coordinator, as well as an inveterate runner (his third year in the Boston Marathon) and health buff. This column was coordinated with the Regional Air Surgeon.

Five former FAA administrators appeared before the House Public Works and Transportation Subcommittee on Aviation to testify in favor of the National Airspace System Plan. From the left are Alexander Butterfield, 1973-75; John H. Shaffer, 1969-73; Najeeb E. Halaby, 1961-65; John L. McLucas, 1975-77; and Langhorne M. Bond, 1977-81.

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