World

September 1980
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U.S. Department
of Transportation
**Federal Aviation
Administration**

Research Highlights

''It is now our prime responsibility to test aircraft structures. interiors and furnishings to make sure they provide adequate, survivable space for the occupants and crew in a crash,'' says Caesar A. Caiafa, chief of the Technical Center's Crashworthiness Branch.

In line with this, he is conducting a feasibility study for a 2,000-foot catapult capable of propelling a transport aircraft fuselage at speeds up to 175 knots via two J-79 jet engines. This catapult would be superior to all others in the United States, according to Caiafa.

The center's present catapult, powered by compressed air, is 300 feet long and can propel a test vehicle weighing up to 6,300 pounds at a maximum speed of 56 knots. This is sufficient for the light aircraft shown, which was hurtled into a man-made rock barrier to test the concept of crash-resistant fuel tanks.

In addition, the branch is looking into advanced structural materials, such as composite non-metals like boron and graphite.

It is also planning to refurbish its drop-test facility, which is being used to evaluate general aviation aircraft seats. ■

***The cover:* Like facets of a jewel, the skylight atop the new Technical Center building reflects on itself. It provides light to a four-story atrium corridor that separates the laboratories from the administrative area.**

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Getting Ready for Tomorrow
The FAA's ''new'' Technical Center (née NAFEC) made its debut at the end of May, and the fanfare was well justified. The agency's modern research facility is well equipped to tackle the airspace system's problems of the 80s and beyond.

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An FAAer's love of the splendor of Alaska nearly cost him his life, but the lesson learned was not retreat. Wiser for the experience, he is still enchanted by the wilderness.

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The concept of combining an automobile with an airplane seems to be a logical one, and has repeatedly fired inventive genius. Alas, it's still only an idea. Hybridizing and economic problems have kept it out of John Q. Public's garage.

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The New England Employee Assistance Program may well be saving lives, families and the services of highly trained, productive employees as it provides counseling for those with personal problems, alcoholism or drug addiction.

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Secretary of Transportation
Neil E. Goldschmidt
Administrator, FAA
Langhorne M. Bond
Assistant Administrator—Public Affairs
Jerome H. Doolittle
Chief—Public & Employee Communications Div.
John G. Leyden
Editor
Leonard Samuels
Art Director
Eleanor M. Maginnis

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Mark Weaver—Aeronautical Center
Clifford Cernick—Alaskan Region
Joseph Frets—Central Region
Robert Fulton—Eastern Region
Neal Callahan—Great Lakes Region
Mike Ciccarelli—New England Region
Ken Shake—Northwest Region
George Miyachi—Pacific-Asia Region
David Myers—Rocky Mountain Region
Jack Barker—Southern Region
George Burlage—Southwest Region
Michael Benson—Technical Center
Alexander Garvis—Western Region

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

Getting Ready for Tomorrow

FAA's 'New' Technical Center

There's a spanking new four-story building complex in the Atlantic City, N.J., area, and it's no casino. It's the FAA's $50 million Technical Center building—the largest complex of modern laboratories and computer equipment dedicated to air traffic research and development in the world.

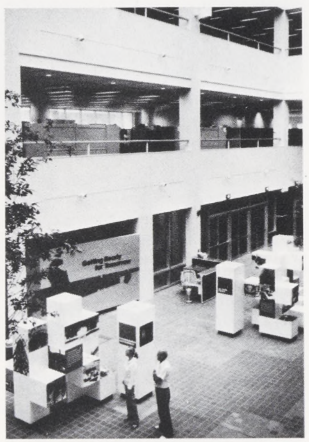
The 516,000-square-foot building, with nearly as much floor space as the famed Atlantic City Convention Hall, is the staging area for the air traffic control system of tomorrow. Here, 1,600 professionals will perform the final shakedown on DABS, collision avoidance, the replacement program for the IBM 9020 computer system and hundreds of other pieces of air safety hardware and software.

The Technical Center was dedicated on May 29, 1980, and the ceremonies featured appearances by Vice President Walter Mondale, New Jersey Governor Brendan Byrne and FAA Administrator Langhorne Bond. Visually compelling as well as utilitarian in its design, the Tech Center was constructed on the same site as its titular predecessor, the National Aviation Facilities Experimental Center (NAFEC), and renamed by Administrator Bond. Now the term "Technical Center" applies both to the new building and the entire test facility.

More than a new face on an old function, FAA officials believe that the complex will launch a new age for aviation safety and will draw air safety experts and visitors from around the world.

Why all the fuss over a building? Well, as persons familiar with NAFEC's history will point out, the Tech Center is not only compelling in its own right but stands in marked contrast to the shanty town exterior of the agency's old test and evaluation installation. The new structure replaces 36 run-down wooden buildings constructed in 1942–43 for the Naval Air Station which preceded NAFEC on the site.

According to building program manager Thomas F. Brennan, the single biggest factor in justifying the new center was the inefficient, scattered layout of the World War II buildings. "Studies showed we were losing 100 man-years per year because of people just traveling among these buildings," cites Brennan.

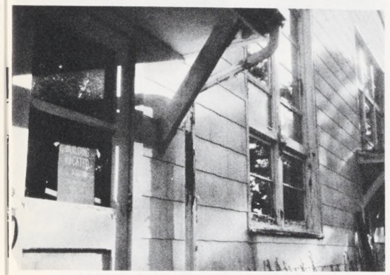


The lobby-Visitors' Center, illuminated by a skylight four stories above shows many of the exhibits that explain the role of the Technical Center.

NAFEC was also a maintenance man's nightmare. "The old buildings leaked, were cold in winter and hot in summer," recalls Bob Yanetti, Brennan's associate on the building program. The first computer lab at NAFEC, for example, was a reconfigured warehouse that had to be equipped with a new floor and a humidity-free environment. Every time SRDS sent up a new piece of air safety equipment for testing, Yanetti says, "we would ask ourselves: 'Will the floor hold up? Is there enough a/c in the building? Can we generate adequate power?'—a whole laundry list of maintenance problems." From these standpoints, the Tech Center is a welcome improvement.

The new building is really two buildings in one. Over 120,000 square feet of its space is enclosed in a climate-controlled two-story air traffic control laboratory edifice that is the heart of the complex. Here are housed $120 million in advanced computers and related equipment used to support and enhance this nation's air traffic control network.

Each floor of the laboratory section is the size of a football field . . . including the end zones. Distinguished by its red masonry walls, which help to maintain a constant environment within, the lab area houses the center's terminal and en route support and simulation facilities and associated computer and communications networks.



Like night and day—the new technical and administrative complex contrasts markedly with the World War II-vintage wood buildings (left) that housed the center's operations for a score of years.

Moving $120 million in computers from various locations around the center into the new labs, by the way, was accomplished with a minimum of user interruption and less than $100 in damages. This lab structure, which already is well occupied, also contains facilities devoted to aviation weather, navigational satellite, human factors and other air safety projects.

Surrounding the laboratory building on two sides is a four-story administrative structure, which holds offices and specialized working areas. Center employees have just begun to move into the administrative area, but final preparations for the library, credit union and other service facilities have yet to be made; however, everyone is expected to be in his or her office by October 1.

The modular design of the office area allows for future changes in layout without expensive alterations, and the bridges that link it with the lab building across an atrium make for convenience and efficiency.

Yanetti is enthusiastic about the flexibility inherent in the Tech Center design. "The latitude in the new building is like that of a Hollywood sound stage: We can make any kind of work configuration we want now," he says. "We won't be constantly fighting the limitations of the physical environment that we had in the past."

The FAA's new R&D facility is also an energy miser. By recycling heat generated in the large computer operations, among other techniques, the designers of the complex estimate that it will be 58 percent more fuel efficient than most structures of comparable size and configuration.

The heat captured from the computers will be recycled to heat the entire complex. According to program manager Brennan, only when the outside temperature dips below 10° F. will the building draw from its auxiliary heating plant. During summers, waste heat will help to energize the center's air conditioning system.

The Technical Center doesn't just work better, it is an undisputed visual success. The connecting roof for the complex features a skylight vaulting over a four-story atrium, which also illuminates the lobby-reception-Visitors Center area. The Visitors Center contains exhibits, films, photos and displays depicting the Technical Center's work and what it means to aviation. There are no interior walls except in the core area around the elevators, the conference rooms and the laboratory structure. Everything opens onto balconies that encircle the atrium at each level.

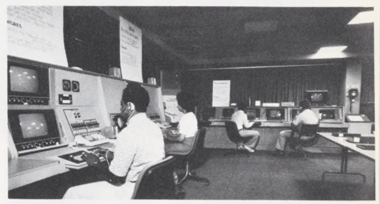
FAA officials in Atlantic City no longer feel like they must apologize for their work setting. Mike Brandewie, who oversees the technical program as director of the Engineering Management Staff, hopes that ''the physical properties of the building, along with an on-site graduate engineering program affiliated with a university of stature, will allow the Technical Center to attract the right kind of professional people, equipped with the changing educational capabilities that it requires.''

A mere 10 miles from downtown Atlantic City, the Tech Center appears to have a bright future as a conference and workshop meeting place for the agency and the aviation community as a whole. Along with 10 training rooms equipped for audiovisuals scattered through the building, there is—just off the lobby behind a thick, curved blue glass wall—a 250-seat auditorium for staff meetings, presentations and news conferences.

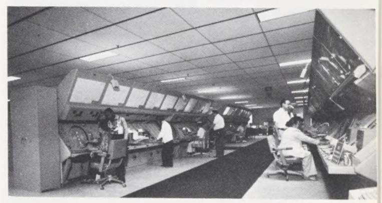
In keeping with FAA Administrator Bond's wish to see the Tech Center used as an ''agency focal point for the exchange of aviation technology and policy issues,'' FAA officials in Atlantic City have established a Conference and Visitors' Affairs staff there. Briefings and/or conferences for ICAO, the Society of Women Engineers and the Institute of Electrical and Electronics Engineers have already been held or are entered on the Technical Center's calendar of events.

Long overdue, according to agency officials, the new complex is the building that almost never was. The center was originally envisioned as Phase II of a three-phase building program approved in principle by the agency in 1963. The following year, then FAA Administrator Najeeb Halaby gave the go-ahead for construction of the modern aircraft maintenance facility (hangar), fire/crash station and central utility plant, which are situated in the Aviation Safety R&D area of the former air station. Since their completion in 1968, these facilities have fostered the development of improvements in airport lighting, runway designs, airplane crashworthiness, airport fire-fighting techniques and navaids. Phase II of the building program, however, repeatedly came up a day late and a dollar short in the spending decisions of the FAA or the Congress.

Center librarians Mildred Morton (left) and Mary Williams select computer tapes from among the 35,000 in the Master Computer Tape Library used to support the center's automation laboratories.



Development work for the modernization of stations goes on in the Flight Service Station Laboratory, slated to move into the new building in a few months. At the inflight position is specialist William Brodie (left); specialist Norma Plenty is at an EFAS console; and engineer Scott Stemple and specialist John Henline are at the preflight consoles.



The largest of the three automation laboratories in the new building is the En Route System Support Facility.

During 1973-74, nothing could have been farther from the agency's mind than a new building program for NAFEC. Disenchanted with the huge expense of operating the center's delapidated, sprawling ''temporary buildings,'' the FAA was considering a study group's recommendation to move the testing and evaluation operation from NAFEC to Oklahoma City.

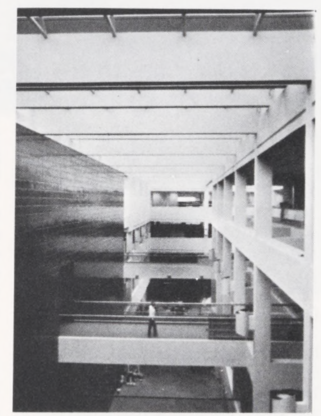
Two groups of dedicated local citizens responded to the threatened closing by putting the building program on track again. The ''Save NAFEC Committee,'' made up of a former Atlantic City mayor and the first NAFEC director, among others, proposed building a new structure that would not be so expensive to operate, and would obviate a costly moving operation. Once this *ad hoc* group had gained the ear of the agency, the Atlantic County Improvement Authority (ACIA), an organization of unsalaried citizens empowered and qualified to follow up on the recommendation of the ''Save NAFEC Committee,'' entered the fray.

Vice President Walter Mondale dedicated the new Technical Center on May 29.

While the rest of the nation was absorbed in the high drama of Watergate, the ACIA was preoccupied with the narrower drama of saving NAFEC. Through their investment advisors, ACIA was able to bring in Irving Trust Company and Prudential Insurance Company of America to finance the complex. After the financing agreements were signed, ACIA coordinated with the architect, construction manager, interior designer, Egg Harbor, N.J., Township officials and the Federal Government to bring the long-awaited Technical Center to fruition.

The center's renaissance was a tribute to patience and human perseverence, as well as a ''symbol of cooperation and of government doing things right,'' as Vice President Mondale remarked at the dedication. Its role in its new lease on life will not be limited to testing and evaluation, as was the case with NAFEC. ''Because of rapid advances in technology, budget constraints and major system changes that are being proposed, the Tech Center is transitioning from a test and evaluation facility to a facility that is more involved in conception and front-end work,'' states Center Director Joseph Del Balzo.

''I see the center evolving into what I like to call a national center for research and development that will reduce the time it takes from concept to implementation and do it within a limited amount of dollars,'' adds the director. The transfer from Washington to the Tech Center of the developmental responsibilities for the agency's Aircraft Safety and Landside (airport) programs would support Del Balzo's contentions.



The Laboratory area at left is joined to the administrative building by bridges across the skylighted atrium.

What can we expect from the Technical Center in the months and years ahead? At the present time, some 200 projects are underway at the new building and the aircraft safety area.

One of the most closely followed of them is the Beacon Collision Avoidance System (BCAS), which will alert pilots to any dangers posed by other aircraft in their vicinity and direct them how to avert an aerial disaster.

Unlike the airborne BCAS, the Discrete Address Beacon Sytem (DABS) is an upgraded version of the ground-based ATC system now in use. DABS will allow controllers to interrogate single aircraft at a time without receiving multiple, overlapping responses from all the aircraft in the same area as the one interrogated.

Perhaps the most momentous R&D undertaking targeted for the 1980s is the development of the en route ATC systems program which will supersede the IBM 9020 program now in use. Just as NAFEC served as the test bed for NAS En Route Stage A, the Technical Center is destined to play the key role in perfecting the new system. ''We can't start the hardware or software development in that replacement system until we have answered the philosophical questions having to do with the role of the human beings in the system related to the automation capability on the ground,'' claims Del Balzo. He adds, ''The only way to answer those questions is through simulation and experimentation in an honest to goodness hands-on environment.

And, we should add, the only place that can happen is the FAA's multi-million Technical Center—a place which should have a lot to say about how the aviation community ''gets ready for tomorrow.'' ■

An Arctic Ordeal

But the Wilderness Continues To Beckon

Breaking camp on a summer backpacking trip, Griffith is a lonely figure on the vast, trackless Arctic tundra.

When George Leigh Mallory was asked why he wanted to climb Mt. Everest, he replied, "Because it's there." When Dick Griffith was asked why he makes treks into the Arctic wilderness, his reply was, "You'll never get an answer out of me on that one; I have absolutely no idea. I just know I'll be doing it until the day I die, as long as I'm physically able."

Perhaps it's the challenge—a human need to overcome—to triumph against odds. Perhaps, too, it's a need to return to our original challenge—man against nature.

Griffith, a civil engineer with the Alaskan Region's Airports Division, came to Alaska in 1954 "because there were fewer people," he says candidly. "It's why everybody comes up here—for the hunting and fishing; that's what they say, anyway." He's been with FAA for the last dozen years.

A native of Colorado, he has long pursued the lonely adventure. In 1949, at age 22, and again in 1951, he rafted on the Green and Colorado Rivers from Wyoming to—on the second trip—Boulder Dam, a distance of 1,200 miles.

Griffith's love of the North's "outback"—the sweeping grandeur of hundreds of miles of unpeopled wilderness—has led him on numerous trips summer and winter, including several across the Brooks Range, the most recent of which nearly cost him his life.

His first trek across this northern range of mountains was with a dog team from Barter Island on the Beaufort Sea to Anaktuvuk Pass in 1959, a trip of about 200 miles. The dogs couldn't make it all the way. Another trip, two years ago, with a companion, was a 450-mile excursion from Anaktuvuk Pass west to Kotzebue. They hiked to the headwaters of the Noatak River where kayaks were air-dropped for a downstream run to the coastal city. He's also skied from the mouth of the Colville River on the Beaufort Sea to Anaktuvuk Pass. His wife, Isabelle, sometimes accompanies him on his wilderness trips, and his son, Barney, a cinematography student, has run the Susitna River through Devil's Canyon four times—more than any other person.

So, Griffith's trip this year was to be—for him—routine. He set out March 11 from Anaktuvuk Pass southward. His first leg was to Bettles—100 miles of Arctic away—where FAA has a flight service station. His destination was another 100 miles further—Tanana on the Yukon River.

"I set out for Bettles skiing down the John River," he recounted, "pulling a 15-pound sled—called a pulk—loaded with about 50 pounds of supplies. The sled had a pair of bars out front that prevents it from running over you. It was 30 below zero, with a steady wind blowing icy veils of snow.

"Six hours out of Anaktuvuk that first day, I was skiing downhill through open country, the icy wind continually pounding my back. Suddenly I noticed a chilling but not painful sensation—no more than the kind you'd get from shaving—running along my back. I didn't pay much attention to it then; now, I know that frostbite was setting in.

"Then, a lot of things started to go wrong. My fingers began getting very cold, even in my Arctic mittens. After I dug down in the snow for shelter and laid my sleeping bag out, I had trouble getting it unzipped. I finally opened it and crawled in. Then, a torrent of prolonged stabbing pains poured down my lower back.

"The next day, freezing sensations along my lower back grew worse. Even when I got into the treeline area on the third day, every step was hard going—a battle with the wind and cold. I then knew I was in bad shape. It was all I could do to crawl out of my sleeping bag and get onto my skis. Just forcing myself to get out of the sleeping bag and keep moving was the worst; it would have been so much easier just to give up, not to struggle any more against the wind, the cold and the pain every time I moved.

"The fifth day, things got grim. I had to force myself every step of the way, but I knew that I was getting close to Crevice

Though he had to kill a bear once in defense, Griffith takes along a rifle only to help feed himself when provisions run short on a long wilderness trip.

No roads guide Griffith on his treks in the North, only streams and mountains he can find on his map. Even in the Arctic summer, a hood of mosquito netting is essential equipment.

Creek—95 miles from Anaktuvuk. Darkness set in. The wind was howling and the snow blowing, but I was determined not to stop—not now.

''Then, at about 9:30 at night, I finally spotted the cheerful lights of Bill Frickus' cabin, but those last few hundred feet to the cabin seemed like miles. Frickus, who has a homestead and mining operation at Crevice Creek, along with a couple of airplanes, saw the shape I was in and said, 'We've got to get you to the hospital—and fast.' Bill flew me into Bettles, and from there I took another plane to Fairbanks and Anchorage.''

In the ensuing weeks at Providence Hospital, doctors began a series of painful skin grafts, after cutting away large areas of dead, frostbitten tissue.

The ordeal in the Arctic, the surgery and the convalescence have not dampened his enthusiasm for lonely Arctic treks. Last spring, he had already gotten in some cross-country skiing.

Says Griffith: ''Go out again? Why not? I'll just keep coming south from Crevice Creek. What happened just made me mad. Foolishly, I left behind just one item of clothing. If I'd have taken along a bib-type pair of windproof Arctic trousers, it wouldn't have happened. Sure, I'll be back up there; I'm planning the same trip for next year.''

Griffith may be an unrequited and forgiving lover of wilderness, but he's been reminded that wilderness is a stern and unforgiving mistress. ■

Q&A

I would like a clarification on the power and role of the Flight Standards offices. I have dealt with them in four cities as a student, pilot, flight instructor and FSS journeyman. I've found inconsistencies in the giving of check rides, where the results seem to be at the whim of the inspector. It becomes increasingly difficult to prepare a student for a check ride on this basis.

I am a journeyman specialist and designated as a Class I, II and III FAA pilot to evaluate flight services under Order 4040.9. This spring, I went for an FAA pilot check ride that the inspector said would be similar to a Part 135 check ride.

During the check ride under the hood doing steep turns, I experienced vertigo, exceeding the tolerances of a commercial and an IFR check ride. The inspector wasn't very helpful and afterwards said I didn't meet the requirements of my instructor or instrument rating, let alone the commercial certificate, and could not perform under my instructor or instrument ratings. I was to receive a letter to that effect and perform a new check ride within 10 days to the tolerances of my ratings or he would start proceedings to rescind my licenses.

Weeks went by without notification, and I had to put my students on hold. Was I threatened? Did the inspector overstep his bounds?

Under section 609 of the Federal Aviation Act of 1958, as amended, the Administrator or his representative is authorized to reexamine an airman at any time. When an inspector has reason to believe that a certificate holder is not qualified to retain a certificate or rating, a reexamination may be required. The extent of the reexamination will be determined by the inspector, with the standard of performance the same as for the original issuance of the certificate or rating.

A wide variety of maneuvers or procedures may be selected by an inspector to determine competency. Factors influencing the choice may include geographical concerns, common accident causes, special emphasis or marginal piloting techniques. These factors may differ from area to area, but the objective is the same: to determine a pilot's ability to operate safely.

Inspectors and pilot examiners attend initial and recurrent training at the FAA Academy or at the pilot examiner standardization unit, which travels to each regional district. These courses emphasize the latest testing techniques and policies and serve as a standardization forum.

If an airman is to be reexamined, he will be notified in advance by letter of the time, place and subject of the exam. Until such notification is received, the airman is entitled to exercise the privileges of the certificate or rating.

According to your description, the minimum standard of competence was not attained, which would appear to uphold the inspector's judgment in requesting a reexamination. His role during the flight check is to observe and evaluate, to remain a nonparticipant.

While failing a check ride may be hard on the ego, failing in the air may be fatal. Be thankful and take advantage of the opportunity to improve your skills through recurrent or proficiency training.

Many of us in flight service stations are optimistic about and believe that the FAA plan for the modernization and consolidation of the FSS system is FAA's first real and workable FSS plan in 20 years.

Historically, changes to the FSS option have been made with limited or no input from FSS field personnel, or input was solicited only from the large Level III FSSs, probably because they happen to be near large metropolitan areas that have large numbers of pilots. With today's computer technology and remote communications, it makes litte difference whether an FSS is 10 miles or 150 miles from the pilot as long as he can contact the FSS for service.

Assuming approval of the FSS plan, will you advise FSS personnel of what plan the FAA has to ensure that we in the field will be solicited for input on recommendations for geographically locating these super FSSs within a state or flight service area?

The proposed plan for a modernized FSS system was written to provide for an objective selection of facilities. The exact number and location of these FSSs will be determined by using the selection criteria in the plan. These are, in summary: general aviation activity, the satellite airport program, geographical distribution of facilities, equalized workload and possible use of existing facilities.

The proposal was announced in the April 17 issue of the *Federal Register* and was under public review until August 15. FSS personnel and others will also have the opportunity to participate in developing individual facility consolidation plans that will be required in the latter phase of the program.

By Joseph Garonzik
A historian and a free-lance writer on aviation and urban affairs, he was on the staff of the Office of Public Affairs this past summer.

Auto-Planes: The Idea That Failed

If the idea ever caught on, really caught on, O. J. Simpson wouldn't have to sprint through airports anymore.

And Lord only knows what would happen to the stock prices of rent-a-car companies.

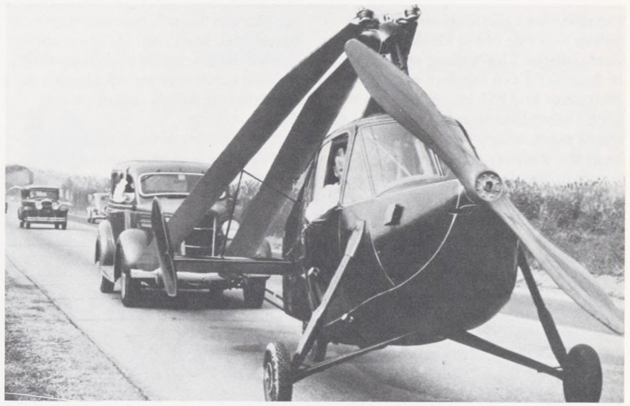
Fortunately for them, the idea of an auto-plane, a machine equally at home on the highways and skyways, is no closer to reality today than before. In fact, it may be an idea whose time has passed.

Backyard inventors have been working to develop a roadable airplane since the early 30s. More than 30 models have been turned out since that time, but only two ever earned FAA certification.

Former FAA inspector Richard Sliff says that "even the most ingenious of the auto-planes suffered from a split personality: It was awkward in the air and on the road. As an overweight aircraft with wheels exposed, it produced heavy drag and cruised at low speeds. A lightweight automobile, it could be unstable in high winds, featured a stiff ride and touchy steering and was prone to spark plug fouling."

But Smithsonian Institution Fellow Joseph J. Corn contends that "the biggest obstacle to auto-planes for the urban multitudes is safety. If the entire workforce at O'Hare were to fly to their jobs, rather than just those who live at Casa de Aero [a housing development with community airstrip], Chicago's busy sky would become perilously overcrowded. And if all of the city's ground-traveling commuters were to take to the air, the heavens could become a place of daily carnage."

The first true roadable airplane was the Arrowbile, designed by aviation pioneer Waldo Waterman during the Depression. A witness at Glenn Curtiss's successful test flights in 1911 of the first amphibious airplane, the Triad, Waterman was inspired to emulate that feat with a conveyance equally at home in the sky or on land.



James Ray drives his Pitcairn AC-35 autogyro in November 1936, the first roadable aircraft built. Its rotors (here, folded back) autorotated.
Smithsonian Institution photo

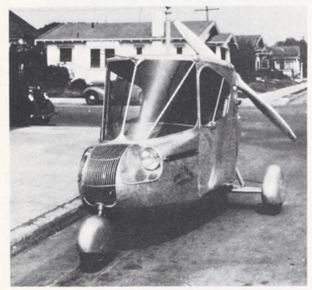
The Arrowbile's design was adapted from Waterman's prize-winning aircraft in the "Safety Airplane" competition sponsored by the Bureau of Air Commerce. The auto portion of the Arrowbile was a Studebaker. The dashboard displayed an aircraft compass, altimeter and airspeed indicator, in addition to the customary auto instrumentation. Perched on three wheels, the Arrowbile featured a pusher propeller attached to the rear of the craft that was driven by the Studebaker engine. The same engine also supplied power to the rear wheels for road transportation. The aircraft's detachable wing assembly, which fastened to the car with six cables, was stored at the airport when not in use.

Waterman first tested his auto-plane in February 1937. Later that year, two Arrowbiles flew from his Santa Monica, Calif., facilities to take part in the National Air Races held in Cleveland, Ohio.

The Arrowbile's auspicious start was abbreviated by a succession of events beyond Waterman's control: a serious personal illness, withdrawal of financial backing by Studebaker during the 1937 "Roosevelt recession" and the forced interruption of civil aviation development brought about by World War II.

In 1943, Waterman resumed his work on enhancements for the Arrowbile. He continued to experiment with the roadable airplane as late as 1957, long after his retirement. The Arrowbile was never mass produced, however, nor was it ever certificated by the Civil Aeronautics Administration.

Is it a plane? Is it a car? No, it's the Aerocar, Moulton Taylor's remarkable flying automobile taking off in 1956.
Smithsonian Institution photo



Waldo Waterman and the first roadable monoplane—the Arrowbile—at Santa Monica, Calif., Airport in 1937 and on the street, minus its wing assembly.
Smithsonian Institution photo

An even earlier flying car was the roadable Pitcairn Autogyro, a kind of everyman's helicopter. In November 1936, Autogyro Company vice president James G. Ray demonstrated the practicality of his aircraft by landing it on a grassy field and driving the Autogyro to the steps of the Air Commerce building in Washington.

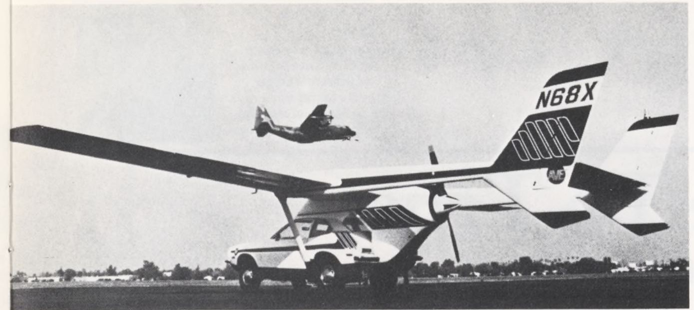
Another winning entry in the Government's safe airplane contest, the Autogyro was not exactly a miniature helicopter. Rather, it was powered by a conventional 135 h.p. aircraft engine and propeller and held aloft by a freely revolving rotor, which could be tucked over the tail section during terrestrial travel.

Following Skyway Engineering Company's purchase of the rights to the Pitcairn AC-35 from Ray's Philadelphia-based firm, the roadable helicopter faded into obscurity.

The high point of flying-car popularity occurred at the end of World War II, inflated, as it were, by bullish forecasts for general aviation. Surveys conducted by Crowell-Collier publishers and others suggested that as many as 1,000,000 persons were interested in buying privae planes. Even CAA Administrator Theodore P. Wright predicted that 400,000 planes would crowd the airways by 1955.

Nor was this optimism without foundation. The discharge of thousands of wartime pilots and the eligibility of private flying lessons under the G.I. Bill promised to create a huge new market for light planes. In addition, the civilian population, which had grown to accept air travel as a basic means of transportation and a new form of recreation, now had the disposable income to act upon those notions. To established aircraft manufacturers and inventor-entrepreneurs alike, the skies held forth a bonanza.

Consolidated Vultee worked on the



Two more-recent entries in auto-plane design around 1973 were the AVE Mizar (top), a combination of a Ford Pinto and a Cessna Skymaster, and the home-built Bryan III, its wings folded for driving around Highland, Mich. Both were subsequently involved in fatal crashes.

Photos courtesy of *AOPA Pilot*

roadable airplane after the war. Its Convair Model 118, dubbed the "Stinson Air-car," after the division in charge of its manufacture, was designed by T. P. Hall, who already had some experience with auto-planes. Although Consolidated had expected to mass market its flying car, a non-fatal crash near Chula Vista, Calif., and the industry sales slump of 1948 compelled Convair to liquidate its Stinson division.

It was left to two returning GIs, Robert Edison Fulton and Moulton B. Taylor, to design the first roadable planes ever certificated by the CAA. Both men believed that the flying car was a "natural" in the new aviation climate. The auto-plane, they reasoned, would improve on conventional light aircraft by solving the nagging problem of how to arrange ground transportation—sometimes at night—from small private airstrips frequently situated far from built-up population centers.

Fulton, reportedly a descendant of the famous builder-promoter of the steamboat, patented and test flew his Airphibian in 1949. The next year, the CAA awarded him a "type certificate." Former FAA Airframe Branch chief Nelson Shapter observed that it flew fine but didn't perform well because of weight and drag.

Like the Arrowbile, Fulton's invention had detachable wings, which were stored on stilts at the airport. When not airborne, the plane's three-blade conventional propeller was removable and could be hooked onto the fuselage. Fulton claimed that an individual could convert the Airphibian into a ground vehicle in less than five minutes.

The Airphibian was capable of a maximum air speed of 120 mph and 50 mph on the ground. The three hand-crafted models built by Fulton and partner Octavio J. Alvarez at their Danbury, Conn., workshop ultimately logged 200,000 combined air and ground miles. Although Fulton had hoped to market the Airphibian for just under $10,000 and tried to interest the Army in it as a special-use vehicle, he was unable to raise the necessary seed capital and eventually sold out to group of investors no more successful than himself.

Failure to line up capital for mass production spelled the undoing of the most tenacious of all flying car boosters—Moulton Taylor. Taylor's concern for the subject was sparked by his wartime experience as a commander in the Navy's pilotless-aircraft and guided-missile program at Johnsonville, Pa. Following his discharge, Taylor and a team of engineers and designers constructed a small factory in Longview, Wash., near Mount St. Helens, where the development of the "Aerocar" proceeded over three decades.

The Aerocar's design was the most sophisticated of all the roadable airplanes. While the pusher prop feature resembled the Arrowbile, the plane's wing and unique tail section were easily folded up and towed behind the car for its road departure from the airport. Thus, in addition to its other advantages, the Aerocar allowed its owner to park the plane in his garage, thereby avoiding airport rental fees.

Richard Sliff, former chief of the Aircraft Engineering Division in FAA's Los Angeles office, awarded Taylor his first "type certificate" in 1956. According to Sliff, who was one of the first persons to test fly the Boeing 707 and 727, the Aerocar was "solidly engineered," and Taylor was an "inventive genius" of the first order. The Aerocar's airborne performance compared favorably with that of conventional small planes, while its four-wheel base afforded greater road stability than the Airphibian and other flying car prototypes. The Aerocar's 143-h.p. engine got about 15 miles to the gallon of fuel on the road and burned 8 gallons per hour in the air. The single set of controls in the Aerocar represented a refinement on all previous auto-planes, which were dual-controlled. Classified as a high-wing monoplane, the Aerocar could cruise at 100 mph and attain speeds of 55–60 mph on the road.

Moulton Taylor labored valiantly to keep the Aerocar competitive and attractive. He eventually designed wheel wells for the plane's landing gear, which substantially reduced aerodynamic drag. Hal Joines, an FAA engineering test pilot in Seattle, claims, "Taylor devised a unique clutch arrangement that allowed the propeller to free-wheel when uncoupled from the engine during a glide pattern and re-engage when power was applied." Taylor eventually scrapped the Crosley auto chassis of the original in favor of the sportier road vehicle appearance of the Aerocar III. He was also able to reduce the unit price of his invention from $25,000 to $10,000 an achievement which brought him 278 firm deposits for production models.

As the likelihood of financing dimmed, new obstacles arose to shatter Taylor's dream once and for all. Although the Aerocar easily satisfied CAA and FAA certification standards, highway safety and pollution equipment and an automobile excise tax imposed virtually untenable weight and cost constraints on the design. Today, four of the seven hand-built Aerocars are in museums, two remain at the Longview workshop, and one was wrecked in South Dakota.

The notion of a flying car did not end with Moulton Taylor. Since 1936, more than 30 flying car designs have been filed with the U.S. Patent Office. But the more recent emergence of home-builts—that is, not intended for a commercial market—indicated that the auto-plane was becoming an aviation curiosity, consigned to the world of the sport aviator and the tinkerer.

Why did the auto-plane fail to roll off the assembly line? James Pope, then chief of the Industry and Government Liaison Division of the Office of General Aviation, commented in 1978 that "The critical variables of interest and people have been lacking." According to aviation historian John R. M. Wilson, "A small infusion of research money might have spurred the aircraft manufacturing industry to develop such a plane, but Congress proved unwilling to make the investment, and the dream was never realized."

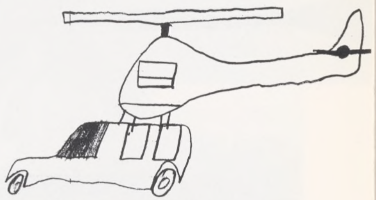
As recently as the 1970s, roadable car inventors failed to design a prototype that would sell for less than the combined cost of a car and airplane. The additional burden of maintaining a dual-purpose engine and delicate aeronautical equipment over thousands of miles of highway driving might eliminate all but a tiny segment of the marketplace. Even if a purchaser could afford the cost of upkeep, where could he/she find a mechanic to work on the contrivance?

Despite their admiration for Moulton Taylor, FAA experts Sliff and Joines concur that the roadable airplane represented an unfortunate compromise at best. Because of the critical weight/drag problem, the auto-plane design must inevitably sacrifice either roadability or flying performance, wrote aeronautical engineer Ralph Upson in 1945, "while saddling the owner with a costly vehicle that has no get-up-and-go on the road or in the air." It would be far better, Upson argued, to improve the present generation of aircraft in future designs, rather than resort to the inherently unsatisfactory auto-plane.

Sliff, Joines and Upson were right. The Aerocar, Airphibian, Arrowbile and the others were not the planes of the future so much as they were responses to the imagined postwar market and to the postwar inaccessibility of small airports. The increase in general-aviation enthusiasm, real though it was, failed to approach the projections of 1945. More important in sealing the fates of the auto-plain entrepreneurs, perhaps, were the mushrooming growth of the suburbs that brought the majority of small plane owners much closer to small airports, improved ground transportation services or even a kiss'n ride with a relative or friend.

In short, because other forces altered the aeronautical and demographic status of general aviation after 1945, the "automobile that flies" has been relegated to the Rube Goldberg Mausoleum of Benighted Contraptions—at least for now. ■

Tomorrow's Designer



The idea of the auto-plane isn't new, but each generation "rediscovers the wheel." The following letter received in the Office of Public Affairs proves that inventive genius arises again and again. This six-year-old may become tomorrow's aeronautical engineer.

"Name Andrew Reilly Grade 1 Take a helicopter Weld it on a car so you can drive on the hieway and can fly in the air. To department of transportation" ■

By Theodore Maher
The editor of *Intercom* and a frequent contributor to FAA WORLD, he is a former editor of *Our Navy* and associate editor of the *Navy Times*.

Someone To Trust

Personal Problems Find a Needed Shoulder

Joanna had seen her husband lose his temper before, but never had he shoved her with such insane violence. She lay on the floor like some discarded doll, waiting to hear her sometimes loving husband slam the front door as he stalked out for another drink at the corner tavern.

At first, Joanna was relieved because the menace was gone, but her relief cut both ways—she also was alone. The man she depended on was on another binge. It would be days, she knew, before she would be able to talk to him.

She lifted herself up on one knee before she hunched over weeping again. There was no place to turn to; there was no one to trust.

Along with their two children, they had only recently moved here. She had no friends and hardly any acquaintances.

While she wiped her eyes with the back of her hand, she thought about a pamphlet that described a regional Employee Assistance Program, which her husband had brought home from his FAA job. But she shook her head. She didn't believe in those government programs and, besides, she wasn't the employee. She couldn't imagine getting help there, but her loneliness became unbearable as time went on. She longed to hear the sound of another human voice, so she finally called the number given for the program.

EAP couldn't solve all of Joanna's problems right away, but it did get her started in the right direction. Just by being there—at the other end of the telephone line—the counselor made her feel less alone and less forgotten. Because she felt less cut off from the rest of the world, the next morning she was emboldened to speak matter-of-factly with her husband.

Hung over and now unsure of himself, Harry reluctantly agreed to talk to the counselor. Although he was certain that none of those "do-gooders" would be able to help him, he thought, "what the hell . . ." and went along with it.

Chatting with the counselor, who knew when to be sympathetic and when to be tough, did more for Harry than he'd imagined it could. He also was tired of being alone, and he at last had found someone he could trust. He was more surprised than anyone when he agreed to sign up for treatment.

Harry was asked to become involved in an intensive outpatient program near his home. After a few weeks of classes on alcoholism and attending Alcoholics Anonymous meetings, he almost magically stopped drinking and began to look like a new man.

In truth, he was a new man in more ways than just appearance. He thought differently. His own ego no longer filled his thinking from horizon to horizon. Although he wasn't quite well yet, he was on his way. With a little effort, Harry would be able to alter the self-destructive thinking patterns he had developed during 10 years of alcoholic drinking.

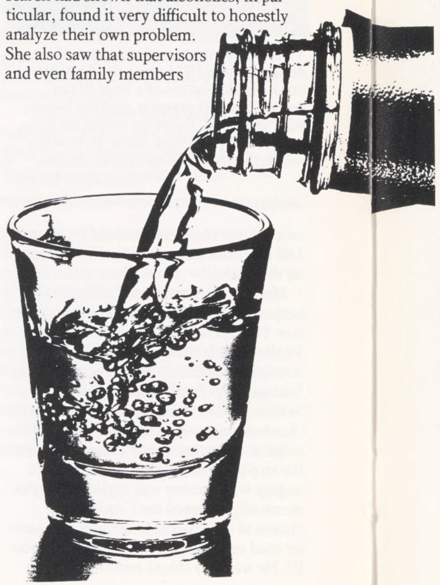
Harry and Joanna are fictitious, but the scenario is not. What happened to this couple actually did take place with an FAA couple in the New England Region.

Without the Employee Assistance Program, there's no saying what might have happened to this couple. Among the more likely prospects were unemployment and divorce.

The New England EAP, which was established as a result of FAA's national order, is still in the experimental stages, but, so far, it seems to be doing the job. The order, 3700.5A, Feb. 29, 1979, set up FAA's policy of creating employee assistance programs and provided guidance for setting up programs of employee referral to community facilities for the treatment of alcoholism and drug abuse problems.

The first in-house coordinator of the program in the region was Judy Devine, a personnel specialist. She knew that research had shown that alcoholics, in particular, found it very difficult to honestly analyze their own problem.

She also saw that supervisors and even family members



and friends found it difficult to confront alcoholics and other drug addicts, who, even more than other employees, did not want the agency to stick its nose into their, indeed deplorable, business.

For these reasons, Devine decided that the program should be built on a foundation of professional counselors who were not in the agency.

At the same time, she recommended that the region have a broad-based assistance program, rather than just an alcoholism and drug-abuse program. She reasoned that employees had other personal problems and would be more likely to associate themselves with a program that treated problems that did not carry the stigma of addiction. A program of this type had been in existence for some time at the Boston ARTCC and was well received by employees.

Research for technical assistance in operating such a program led her to the Appleton Treatment Center, a part of McLean Hospital—particularly well known for its work with alcoholics—which, in turn, is a division of the renowned Massachusetts General Hospital. There, she was referred to Bruce Davidson of the Industrial Consultation Service, which was hired to run the FAA program.

At this point, Rod Minklein, also of the Personnel Division, replaced Devine as in-house coordinator. He continued to work with Davidson and a regional employee committee, which included union representatives, that was set up to oversee the program.

To get the program started, the region sent out letters to all employees and held special briefings for all supervisors.

Regional Flight Surgeon Dr. John Cahill, who attended a special course in the treatment of alcoholics, cooperated fully in the development of the program. When supervisors, who have already been briefed through meetings and directives, have special problems, they can call Dr. Cahill. He advises the supervisor to counsel the troubled employee and strongly urges his referral to the EAP, providing the employee with the 24-hour telephone number. In addition, he suggests that the supervisor follow up the next day to see if the employee did make the EAP contact.

Dr. Cahill stresses that the program is not monitored by the Medical Division, so that complete anonymity is the rule.

If, in the process of the annual physical examination for air traffic control specialists, a controller admits to alcoholism, drug abuse or emotional problems and say he or she is in the recovery program, the regional flight surgeon or asssistant flight surgeon will make a direct inquiry to detrmine if the program is working for the controller.

Because of the organization of the EAP, the identification and treatment of the employee's problem is taken out of the agency's hands. Identifying the problem and recommending a treatment source is the primary function of the contract counselors.

The program has been in operation since Oct. 1, 1979. During the first two quarters of operation, according to Davidson, the counselors reported that 31 employees called in with problems that have been identified. Quarterly reports are required by the contract.

Minklein explained that the agency is paying the consultant firm $6.50 per employee in the region. This comes to roughly $13,000 per year, which seems reasonable to regional officials when one considers what the agency is getting. It is getting a 24-hour confidential consulting answering service and three trained and qualified counselors to help employees or their families. The employees get the help they need without compromising their privacy, and supervisors can concentrate on the work instead of employees' personal problems.

"All in all," Minklein says, "it looks like a good deal for FAA." He notes that FAA has a considerable investment in its employees. For example, it takes about $100,000 to train a controller. If the program saved only one controller a year, it would be financially justified. What the intangible benefits are from the service is not as easy to define, but they can be counted in meaningful human lives. ■

People

Alaskan Region

■ **Edmond L. Ashworth,** chief of the Palmer Airway Facilities Sector Field Office, Anchorage Sector.
■ **Richard D. Mathews,** team supervisor at the Anchorage International Flight Service Station, from the Gulkana FSS.
■ **Rex T. Morris,** chief of the Investigations & Internal Security Branch, Civil Aviation Security Division, from the Air Security Branch.
■ **Margie E. Morrow,** team supervisor at the Anchorage ARTCC.

Central Region

■ **Americo B. Carnevale,** team supervisor at the Sioux City, Iowa, Tower, from the Maui, Hawaii, Tower.
■ **Billy L. Daniels,** chief of the North Platte, Neb., Airway Facilities Sector Field Office, Grand Island, Neb., Sector, from the Wellfleet, Neb., SFO.
■ **Gene T. Schumacher,** unit supervisor in the Grand Island AF Sector, from the North Platte SFO.
■ **Roger E. Voss,** proficiency development and evaluation officer, Grand Island AF Sector, from the North Platte SFO.

Eastern Region

■ **Stanley G. Bartlett,** team supervisor at the Rochester, N.Y., Tower.
■ **James S. Duffy,** team supervisor at the Baltimore, Md., Tower.
■ **William H. Frame,** team supervisor at the Rochester Tower.
■ **Robert D. Goldman,** manager of the Airway Facilities Sector at the JFK Tower, New York, from the Maintenance Operations Branch, Airway Facilities Division.
■ **Roland H. Jenkins,** chief of the Maintenance Operations Branch, from the New York ARTCC AF Sector.
■ **Gilbert Magnan,** team supervisor at the Binghamton, N.Y., Tower, from the Dulles Tower, Washington, D.C.
■ **Richard Schroeder,** supervisor of the Central Computer Complex at the New York ARTCC AF Sector.
■ **James A. Stephenson,** team supervisor at the Dulles Tower.
■ **Michael R. Timmins,** maintenance mechanic foreman at the Camp Springs, Md. (Andrews AFB) AF Sector Field Office of the Washington National Airport AF Sector.
■ **Manny Weiss,** chief of the Real Property Branch, Logistics Division.

Great Lakes Region

■ **Donald B. Beeson,** assistant chief at the Chicago ARTCC.
■ **Brian S. Burbank,** chief of the Emmet County, Mich., Airway Facilities Sector Field Office, Grand Rapids, Mich., AF Sector.
■ **James R. Burton,** unit supervisor at the Springfield, Ill., AF Sector.
■ **William L. Calhoun,** crew chief at the Minneapolis ARTCC AF Sector.
■ **Fabio F. Dioguardi, Jr.,** chief of the Meigs Field Tower, Chicago, from the Chicago O'Hare Tower.
■ **William A. Houck,** chief of the Terre Haute, Ind., Flight Service Station, from the Indianapolis, Ind., FSS.
■ **Leroy R. McCarthy,** manager of the Chicago ARTCC AF Sector, from the Chicago O'Hare Sector.
■ **Hortense McGehee,** chief of the Cincinnati, Ohio, General Aviation District Office, from the Dallas, Tex., GADO.
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■ **Walter E. Ryness,** assistant manager of the Chicago ARTCC AF Sector.
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■ **Donna A. Gropper,** team supervisor at the Worcester, Mass., Tower, from the Islip, N.Y., Tower.
■ **Robert W. Nichols,** chief of the Lawrence, Mass., Tower, from the Bedford, Mass., Tower.
■ **Joseph Rogus,** chief of the Manchester, N.H., Airway Facilities Sector Field Office, Burlington, Vt., AF Sector, from the Facilities Establishment Branch, Airway Facilities Division.
■ **Robert A. Viera,** team supervisor at the Quonset Point, R.I., Tower.

Northwest Region

■ **Michael L. Hopkins,** team supervisor at the Medford, Ore., Tower, from the Seattle-Tacoma, Wash., Tower.

Pacific-Asia Region

■ **Noboru Nakao,** unit chief at the Kahului, Hawaii, Airway Facilities Sector Field Office, Maui AF Sector.

Rocky Mountain Region

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■ **Nancy A. Murdock,** chief of the Minot, N.D., Flight Service Station, from the Los Angeles FSS.
■ **Dennis A. Rominger,** team supervisor at the Denver ARTCC.

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■ **Donald J. Bishop,** team supervisor at the St. Croix, V.I., Tower.
■ **Drewey M. Clack, Jr.,** team supervisor at the Wilmington, N.C., Tower.
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■ **Tommy T. Ray,** team supervisor at the Tulsa Tower.
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■ **James H. Wright,** program support officer at the El Paso AF Sector.
■ **Jimmy C. Yates,** program support officer at the Lubbock AF Sector, from the El Paso AF Sector.

Technical Center

■ **Thomas J. Owen,** correction: assistant chief of the Supporting Services Branch, Logistics Services Division, from the Building Program Management Staff.

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■ **Donald J. Chapman,** assistant chief at the Oakland ARTCC, from the Air Traffic Operations Branch, Air Traffic Division.
■ **Beverly J. Clark,** team supervisor at the Red Bluff, Calif., Flight Service Station, from the Anchorage, Alaska, FSS/IFSS.
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■ **Richard N. Wiening,** team supervisor at the Los Angeles Tower.
■ **Steven G. Wilkins,** team supervisor at the Los Angeles Tower.

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Update

Solar Marches On

Last month, FAA dedicated its first newly built solar air traffic control towers at Springfield, Ill., and South Bend, Ind. (See "Rediscovering the Sun," FAA WORLD, May 1978.)

These first two solar installations under "Concept II," as Joe Morelli likes to call it, consist of black-painted cinder-block south-facing walls of base buildings that are double-glazed, creating an air space in front of the wall. Morelli is an engineer in the Terminal En Route Facility Branch, Environmental Systems Division, Airway Facilities Service. Water-filled tubes within the building serve as a heat storage medium, and fans distribute the heat to the work areas when needed.

Concept I is represented by modifications to the Spirit of St. Louis Tower in Chesterfield, Mo., in which the water tubes were in the solar wall itself.

Other Concept II towers—those involving 11,000-square-foot TRACON buildings—now under way are at Oklahoma City, Rochester, N.Y., Nashville, Tenn., Baton Rouge, La., and Chattanooga, Tenn. Their operational target date is spring 1982.

The third approach—a still more efficient one, according to Morelli—is a sloped collector that consists of double glazing over a black chrome-plated surface and dispenses with the cinder-block wall. This is planned for non-approach-control tower administrative buildings, such as at Santa Ana, Calif., New Haven, Conn., and Farmingdale, N.Y., which is slated for construction in the spring of 1981.

Future FAA solar towers will likely use more advanced technology that will provide the more desirable solar air conditioning. ■

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**Federal Aviation
Administration**

Research Highlights

''It is now our prime responsibility to test aircraft structures. interiors and furnishings to make sure they provide adequate, survivable space for the occupants and crew in a crash,'' says Caesar A. Caiafa, chief of the Technical Center's Crashworthiness Branch.

In line with this, he is conducting a feasibility study for a 2,000-foot catapult capable of propelling a transport aircraft fuselage at speeds up to 175 knots via two J-79 jet engines. This catapult would be superior to all others in the United States, according to Caiafa.

The center's present catapult, powered by compressed air, is 300 feet long and can propel a test vehicle weighing up to 6,300 pounds at a maximum speed of 56 knots. This is sufficient for the light aircraft shown, which was hurtled into a man-made rock barrier to test the concept of crash-resistant fuel tanks.

In addition, the branch is looking into advanced structural materials, such as composite non-metals like boron and graphite.

It is also planning to refurbish its drop-test facility, which is being used to evaluate general aviation aircraft seats. ■

***The cover:* Like facets of a jewel, the skylight atop the new Technical Center building reflects on itself. It provides light to a four-story atrium corridor that separates the laboratories from the administrative area.**

World

U.S. Department of Transportation
Federal Aviation Administration

September 1980
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Getting Ready for Tomorrow
The FAA's ''new'' Technical Center (née NAFEC) made its debut at the end of May, and the fanfare was well justified. The agency's modern research facility is well equipped to tackle the airspace system's problems of the 80s and beyond.

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An Artic Ordeal
An FAAer's love of the splendor of Alaska nearly cost him his life, but the lesson learned was not retreat. Wiser for the experience, he is still enchanted by the wilderness.

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The concept of combining an automobile with an airplane seems to be a logical one, and has repeatedly fired inventive genius. Alas, it's still only an idea. Hybridizing and economic problems have kept it out of John Q. Public's garage.

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Secretary of Transportation
Neil E. Goldschmidt

Administrator, FAA
Langhorne M. Bond

Assistant Administrator—Public Affairs
Jerome H. Doolittle

Chief—Public & Employee Communications Div.
John G. Leyden

Editor
Leonard Samuels

Art Director
Eleanor M. Maginnis

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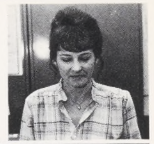
Mark Weaver—Aeronautical Center
Clifford Cernick—Alaskan Region
Joseph Frets—Central Region
Robert Fulton—Eastern Region
Neal Callahan—Great Lakes Region
Mike Ciccarelli—New England Region
Ken Shake—Northwest Region
George Miyachi—Pacific-Asia Region
David Myers—Rocky Mountain Region
Jack Barker—Southern Region
George Burlage—Southwest Region
Michael Benson—Technical Center
Alexander Garvis—Western Region

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



Getting Ready for Tomorrow

FAA's 'New' Technical Center

There's a spanking new four-story building complex in the Atlantic City, N.J., area, and it's no casino. It's the FAA's $50 million Technical Center building—the largest complex of modern laboratories and computer equipment dedicated to air traffic research and development in the world.

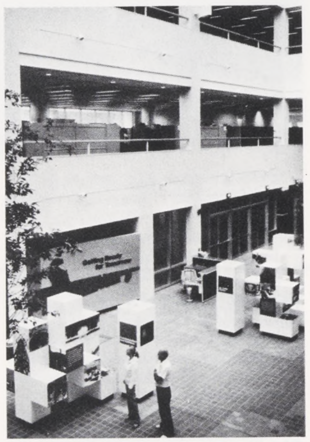
The 516,000-square-foot building, with nearly as much floor space as the famed Atlantic City Convention Hall, is the staging area for the air traffic control system of tomorrow. Here, 1,600 professionals will perform the final shakedown on DABS, collision avoidance, the replacement program for the IBM 9020 computer system and hundreds of other pieces of air safety hardware and software.

The Technical Center was dedicated on May 29, 1980, and the ceremonies featured appearances by Vice President Walter Mondale, New Jersey Governor Brendan Byrne and FAA Administrator Langhorne Bond. Visually compelling as well as utilitarian in its design, the Tech Center was constructed on the same site as its titular predecessor, the National Aviation Facilities Experimental Center (NAFEC), and renamed by Administrator Bond. Now the term "Technical Center" applies both to the new building and the entire test facility.

More than a new face on an old function, FAA officials believe that the complex will launch a new age for aviation safety and will draw air safety experts and visitors from around the world.

Why all the fuss over a building? Well, as persons familiar with NAFEC's history will point out, the Tech Center is not only compelling in its own right but stands in marked contrast to the shanty town exterior of the agency's old test and evaluation installation. The new structure replaces 36 run-down wooden buildings constructed in 1942–43 for the Naval Air Station which preceded NAFEC on the site.

According to building program manager Thomas F. Brennan, the single biggest factor in justifying the new center was the inefficient, scattered layout of the World War II buildings. "Studies showed we were losing 100 man-years per year because of people just traveling among these buildings," cites Brennan.



The lobby-Visitors' Center, illuminated by a skylight four stories above shows many of the exhibits that explain the role of the Technical Center.

NAFEC was also a maintenance man's nightmare. "The old buildings leaked, were cold in winter and hot in summer," recalls Bob Yanetti, Brennan's associate on the building program. The first computer lab at NAFEC, for example, was a reconfigured warehouse that had to be equipped with a new floor and a humidity-free environment. Every time SRDS sent up a new piece of air safety equipment for testing, Yanetti says, "we would ask ourselves: 'Will the floor hold up? Is there enough a/c in the building? Can we generate adequate power?'—a whole laundry list of maintenance problems." From these standpoints, the Tech Center is a welcome improvement.

The new building is really two buildings in one. Over 120,000 square feet of its space is enclosed in a climate-controlled two-story air traffic control laboratory edifice that is the heart of the complex. Here are housed $120 million in advanced computers and related equipment used to support and enhance this nation's air traffic control network.

Each floor of the laboratory section is the size of a football field . . . including the end zones. Distinguished by its red masonry walls, which help to maintain a constant environment within, the lab area houses the center's terminal and en route support and simulation facilities and associated computer and communications networks.

Like night and day—the new technical and administrative complex contrasts markedly with the World War II-vintage wood buildings (left) that housed the center's operations for a score of years.

Moving $120 million in computers from various locations around the center into the new labs, by the way, was accomplished with a minimum of user interruption and less than $100 in damages. This lab structure, which already is well occupied, also contains facilities devoted to aviation weather, navigational satellite, human factors and other air safety projects.

Surrounding the laboratory building on two sides is a four-story administrative structure, which holds offices and specialized working areas. Center employees have just begun to move into the administrative area, but final preparations for the library, credit union and other service facilities have yet to be made; however, everyone is expected to be in his or her office by October 1.

The modular design of the office area allows for future changes in layout without expensive alterations, and the bridges that link it with the lab building across an atrium make for convenience and efficiency.

Yanetti is enthusiastic about the flexibility inherent in the Tech Center design. "The latitude in the new building is like that of a Hollywood sound stage: We can make any kind of work configuration we want now," he says. "We won't be constantly fighting the limitations of the physical environment that we had in the past."

The FAA's new R&D facility is also an energy miser. By recycling heat generated in the large computer operations, among other techniques, the designers of the complex estimate that it will be 58 percent more fuel efficient than most structures of comparable size and configuration.

The heat captured from the computers will be recycled to heat the entire complex. According to program manager Brennan, only when the outside temperature dips below 10° F. will the building draw from its auxiliary heating plant. During summers, waste heat will help to energize the center's air conditioning system.

The Technical Center doesn't just work better, it is an undisputed visual success. The connecting roof for the complex features a skylight vaulting over a four-story atrium, which also illuminates the lobby-reception-Visitors Center area. The Visitors Center contains exhibits, films, photos and displays depicting the Technical Center's work and what it means to aviation. There are no interior walls except in the core area around the elevators, the conference rooms and the laboratory structure. Everything opens onto balconies that encircle the atrium at each level.

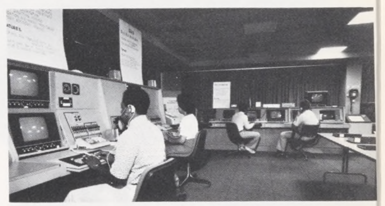
FAA officials in Atlantic City no longer feel like they must apologize for their work setting. Mike Brandewie, who oversees the technical program as director of the Engineering Management Staff, hopes that "the physical properties of the building, along with an on-site graduate engineering program affiliated with a university of stature, will allow the Technical Center to attract the right kind of professional people, equipped with the changing educational capabilities that it requires."

A mere 10 miles from downtown Atlantic City, the Tech Center appears to have a bright future as a conference and workshop meeting place for the agency and the aviation community as a whole. Along with 10 training rooms equipped for audiovisuals scattered through the building, there is—just off the lobby behind a thick, curved blue glass wall—a 250-seat auditorium for staff meetings, presentations and news conferences.

In keeping with FAA Administrator Bond's wish to see the Tech Center used as an "agency focal point for the exchange of aviation technology and policy issues," FAA officials in Atlantic City have established a Conference and Visitors' Affairs staff there. Briefings and/or conferences for ICAO, the Society of Women Engineers and the Institute of Electrical and Electronics Engineers have already been held or are entered on the Technical Center's calendar of events.

Long overdue, according to agency officials, the new complex is the building that

Center librarians Mildred Morton (left) and Mary Williams select computer tapes from among the 35,000 in the Master Computer Tape Library used to support the center's automation laboratories.



Development work for the modernization of stations goes on in the Flight Service Station Laboratory, slated to move into the new building in a few months. At the inflight position is specialist William Brodie (left); specialist Norma Plenty is at an EFAS console; and engineer Scott Stemple and specialist John Henline are at the preflight consoles.

The largest of the three automation laboratories in the new building is the En Route System Support Facility.

almost never was. The center was originally envisioned as Phase II of a three-phase building program approved in principle by the agency in 1963. The following year, then FAA Administrator Najeeb Halaby gave the go-ahead for construction of the modern aircraft maintenance facility (hangar), fire/crash station and central utility plant, which are situated in the Aviation Safety R&D area of the former air station. Since their completion in 1968, these facilities have fostered the development of improvements in airport lighting, runway designs, airplane crashworthiness, airport fire-fighting techniques and navaids. Phase II of the building program, however, repeatedly came up a day late and a dollar short in the spending decisions of the FAA or the Congress.

During 1973-74, nothing could have been farther from the agency's mind than a new building program for NAFEC. Disenchanted with the huge expense of operating the center's delapidated, sprawling "temporary buildings," the FAA was considering a study group's recommendation to move the testing and evaluation operation from NAFEC to Oklahoma City.

Two groups of dedicated local citizens responded to the threatened closing by putting the building program on track again. The "Save NAFEC Committee," made up of a former Atlantic City mayor

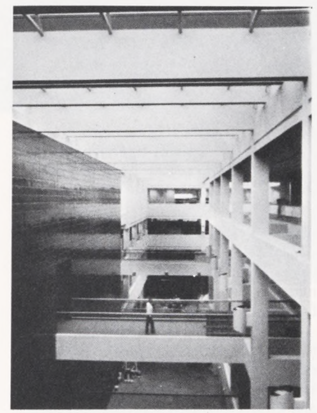
Vice President Walter Mondale dedicated the new Technical Center on May 29.

and the first NAFEC director, among others, proposed building a new structure that would not be so expensive to operate, and would obviate a costly moving operation. Once this *ad hoc* group had gained the ear of the agency, the Atlantic County Improvement Authority (ACIA), an organization of unsalaried citizens empowered and qualified to follow up on the recommendation of the "Save NAFEC Committee," entered the fray.

While the rest of the nation was absorbed in the high drama of Watergate, the ACIA was preoccupied with the narrower drama of saving NAFEC. Through their investment advisors, ACIA was able to bring in Irving Trust Company and Prudential Insurance Company of America to finance the complex. After the financing agreements were signed, ACIA coordinated with the architect, construction manager, interior designer, Egg Harbor, N.J., Township officials and the Federal Government to bring the long-awaited Technical Center to fruition.

The center's renaissance was a tribute to patience and human perseverence, as well as a "symbol of cooperation and of government doing things right," as Vice President Mondale remarked at the dedication. Its role in its new lease on life will not be limited to testing and evaluation, as was the case with NAFEC. "Because of rapid advances in technology, budget constraints and major system changes that are being proposed, the Tech Center is transitioning from a test and evaluation facility to a facility that is more involved in conception and front-end work," states Center Director Joseph Del Balzo.

"I see the center evolving into what I like to call a national center for research and development that will reduce the time it takes from concept to implementation and do it within a limited amount of dollars," adds the director. The transfer from Washington to the Tech Center of the developmental responsibilities for the agency's Aircraft Safety and Landside (airport) programs would support Del Balzo's contentions.



The Laboratory area at left is joined to the administrative building by bridges across the skylighted atrium.

What can we expect from the Technical Center in the months and years ahead? At the present time, some 200 projects are underway at the new building and the aircraft safety area.

One of the most closely followed of them is the Beacon Collision Avoidance System (BCAS), which will alert pilots to any dangers posed by other aircraft in their vicinity and direct them how to avert an aerial disaster.

Unlike the airborne BCAS, the Discrete Address Beacon Sytem (DABS) is an upgraded version of the ground-based ATC system now in use. DABS will allow controllers to interrogate single aircraft at a time without receiving multiple, overlapping responses from all the aircraft in the same area as the one interrogated.

Perhaps the most momentous R&D undertaking targeted for the 1980s is the development of the en route ATC systems program which will supersede the IBM 9020 program now in use. Just as NAFEC served as the test bed for NAS En Route Stage A, the Technical Center is destined to play the key role in perfecting the new system. "We can't start the hardware or software development in that replacement system until we have answered the philosophical questions having to do with the role of the human beings in the system related to the automation capability on the ground," claims Del Balzo. He adds, "The only way to answer those questions is through simulation and experimentation in an honest to goodness hands-on environment.

And, we should add, the only place that can happen is the FAA's multi-million Technical Center—a place which should have a lot to say about how the aviation community "gets ready for tomorrow." ■

An Arctic Ordeal

But the Wilderness Continues To Beckon

Breaking camp on a summer backpacking trip, Griffith is a lonely figure on the vast, trackless Arctic tundra.

When George Leigh Mallory was asked why he wanted to climb Mt. Everest, he replied, "Because it's there." When Dick Griffith was asked why he makes treks into the Arctic wilderness, his reply was, "You'll never get an answer out of me on that one; I have absolutely no idea. I just know I'll be doing it until the day I die, as long as I'm physically able."

Perhaps it's the challenge—a human need to overcome—to triumph against odds. Perhaps, too, it's a need to return to our original challenge—man against nature.

Griffith, a civil engineer with the Alaskan Region's Airports Division, came to Alaska in 1954 "because there were fewer people," he says candidly. "It's why everybody comes up here—for the hunting and fishing; that's what they say, anyway." He's been with FAA for the last dozen years.

A native of Colorado, he has long pursued the lonely adventure. In 1949, at age 22, and again in 1951, he rafted on the Green and Colorado Rivers from Wyoming to—on the second trip—Boulder Dam, a distance of 1,200 miles.

Griffith's love of the North's "outback"—the sweeping grandeur of hundreds of miles of unpeopled wilderness—has led him on numerous trips summer and winter, including several across the Brooks Range, the most recent of which nearly cost him his life.

His first trek across this northern range of mountains was with a dog team from Barter Island on the Beaufort Sea to Anaktuvuk Pass in 1959, a trip of about 200 miles. The dogs couldn't make it all the way. Another trip, two years ago, with a companion, was a 450-mile excursion from Anaktuvuk Pass west to Kotzebue. They hiked to the headwaters of the Noatak River where kayaks were air-dropped for a downstream run to the coastal city. He's also skied from the mouth of the Colville River on the Beaufort Sea to Anaktuvuk Pass. His wife, Isabelle, sometimes accompanies him on his wilderness trips, and his son, Barney, a cinematography student, has run the Susitna River through Devil's Canyon four times—more than any other person.

So, Griffith's trip this year was to be—for him—routine. He set out March 11 from Anaktuvuk Pass southward. His first leg was to Bettles—100 miles of Arctic away—where FAA has a flight service station. His destination was another 100 miles further—Tanana on the Yukon River.

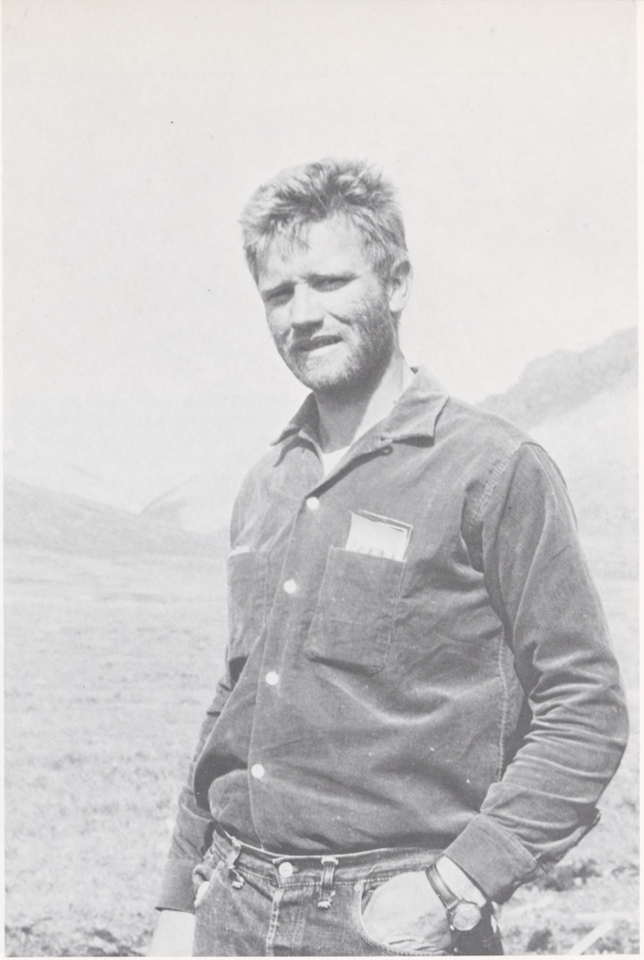
"I set out for Bettles skiing down the John River," he recounted, "pulling a 15-pound sled—called a pulk—loaded with about 50 pounds of supplies. The sled had a pair of bars out front that prevents it from running over you. It was 30 below zero, with a steady wind blowing icy veils of snow.

"Six hours out of Anaktuvuk that first day, I was skiing downhill through open country, the icy wind continually pounding my back. Suddenly I noticed a chilling but not painful sensation—no more than the kind you'd get from shaving—running along my back. I didn't pay much attention to it then; now, I know that frostbite was setting in.

"Then, a lot of things started to go wrong. My fingers began getting very cold, even in my Arctic mittens. After I dug down in the snow for shelter and laid my sleeping bag out, I had trouble getting it unzipped. I finally opened it and crawled in. Then, a torrent of prolonged stabbing pains poured down my lower back.

"The next day, freezing sensations along my lower back grew worse. Even when I got into the treeline area on the third day, every step was hard going—a battle with the wind and cold. I then knew I was in bad shape. It was all I could do to crawl out of my sleeping bag and get onto my skis. Just forcing myself to get out of the sleeping bag and keep moving was the worst; it would have been so much easier just to give up, not to struggle any more against the wind, the cold and the pain every time I moved.

"The fifth day, things got grim. I had to force myself every step of the way, but I knew that I was getting close to Crevice



Though he had to kill a bear once in defense, Griffith takes along a rifle only to help feed himself when provisions run short on a long wilderness trip.

No roads guide Griffith on his treks in the North, only streams and mountains he can find on his map. Even in the Arctic summer, a hood of mosquito netting is essential equipment.

Creek—95 miles from Anaktuvuk. Darkness set in. The wind was howling and the snow blowing, but I was determined not to stop—not now.

"Then, at about 9:30 at night, I finally spotted the cheerful lights of Bill Frickus' cabin, but those last few hundred feet to the cabin seemed like miles. Frickus, who has a homestead and mining operation at Crevice Creek, along with a couple of airplanes, saw the shape I was in and said, 'We've got to get you to the hospital—and fast.' Bill flew me into Bettles, and from there I took another plane to Fairbanks and Anchorage."

In the ensuing weeks at Providence Hospital, doctors began a series of painful skin grafts, after cutting away large areas of dead, frostbitten tissue.

The ordeal in the Arctic, the surgery and the convalescence have not dampened his enthusiasm for lonely Arctic treks. Last spring, he had already gotten in some cross-country skiing.

Says Griffith: "Go out again? Why not? I'll just keep coming south from Crevice Creek. What happened just made me mad. Foolishly, I left behind just one item of clothing. If I'd have taken along a bib-type pair of windproof Arctic trousers, it wouldn't have happened. Sure, I'll be back up there; I'm planning the same trip for next year."

Griffith may be an unrequited and forgiving lover of wilderness, but he's been reminded that wilderness is a stern and unforgiving mistress. ■

Q&A

I would like a clarification on the power and role of the Flight Standards offices. I have dealt with them in four cities as a student, pilot, flight instructor and FSS journeyman. I've found inconsistencies in the giving of check rides, where the results seem to be at the whim of the inspector. It becomes increasingly difficult to prepare a student for a check ride on this basis.

I am a journeyman specialist and designated as a Class I, II and III FAA pilot to evaluate flight services under Order 4040.9. This spring, I went for an FAA pilot check ride that the inspector said would be similar to a Part 135 check ride.

During the check ride under the hood doing steep turns, I experienced vertigo, exceeding the tolerances of a commercial and an IFR check ride. The inspector wasn't very helpful and afterwards said I didn't meet the requirements of my instructor or instrument rating, let alone the commercial certificate, and could not perform under my instructor or instrument ratings. I was to receive a letter to that effect and perform a new check ride within 10 days to the tolerances of my ratings or he would start proceedings to rescind my licenses.

Weeks went by without notification, and I had to put my students on hold. Was I threatened? Did the inspector overstep his bounds?

Under section 609 of the Federal Aviation Act of 1958, as amended, the Administrator or his representative is authorized to reexamine an airman at any time. When an inspector has reason to believe that a certificate holder is not qualified to retain a certificate or rating, a reexamination may be required. The extent of the reexamination will be determined by the inspector, with the standard of performance the same as for the original issuance of the certificate or rating.

A wide variety of maneuvers or procedures may be selected by an inspector to determine competency. Factors influencing the choice may include geographical concerns, common accident causes, special emphasis or marginal piloting techniques. These factors may differ from area to area, but the objective is the same: to determine a pilot's ability to operate safely.

Inspectors and pilot examiners attend initial and recurrent training at the FAA Academy or at the pilot examiner standardization unit, which travels to each regional district. These courses emphasize the latest testing techniques and policies and serve as a standardization forum.

If an airman is to be reexamined, he will be notified in advance by letter of the time, place and subject of the exam. Until such notification is received, the airman is entitled to exercise the privileges of the certificate or rating.

According to your description, the minimum standard of competence was not attained, which would appear to uphold the inspector's judgment in requesting a reexamination. His role during the flight check is to observe and evaluate, to remain a nonparticipant.

While failing a check ride may be hard on the ego, failing in the air may be fatal. Be thankful and take advantage of the opportunity to improve your skills through recurrent or proficiency training.

Many of us in flight service stations are optimistic about and believe that the FAA plan for the modernization and consolidation of the FSS system is FAA's first real and workable FSS plan in 20 years.

Historically, changes to the FSS option have been made with limited or no input from FSS field personnel, or input was solicited only from the large Level III FSSs, probably because they happen to be near large metropolitan areas that have large numbers of pilots. With today's computer technology and remote communications, it makes litte difference whether an FSS is 10 miles or 150 miles from the pilot as long as he can contact the FSS for service.

Assuming approval of the FSS plan, will you advise FSS personnel of what plan the FAA has to ensure that we in the field will be solicited for input on recommendations for geographically locating these super FSSs within a state or flight service area?

The proposed plan for a modernized FSS system was written to provide for an objective selection of facilities. The exact number and location of these FSSs will be determined by using the selection criteria in the plan. These are, in summary: general aviation activity, the satellite airport program, geographical distribution of facilities, equalized workload and possible use of existing facilities.

The proposal was announced in the April 17 issue of the *Federal Register* and was under public review until August 15. FSS personnel and others will also have the opportunity to participate in developing individual facility consolidation plans that will be required in the latter phase of the program.

By Joseph Garonzik
A historian and a free-lance writer on aviation and urban affairs, he was on the staff of the Office of Public Affairs this past summer.

Auto-Planes: The Idea That Failed

If the idea ever caught on, really caught on, O. J. Simpson wouldn't have to sprint through airports anymore.

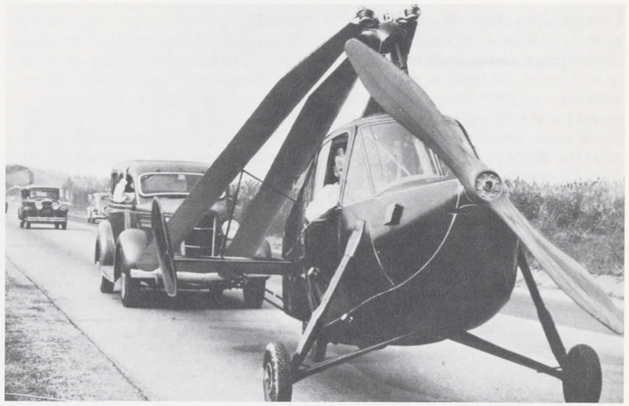
And Lord only knows what would happen to the stock prices of rent-a-car companies.

Fortunately for them, the idea of an auto-plane, a machine equally at home on the highways and skyways, is no closer to reality today than before. In fact, it may be an idea whose time has passed.

Backyard inventors have been working to develop a roadable airplane since the early 30s. More than 30 models have been turned out since that time, but only two ever earned FAA certification.

Former FAA inspector Richard Sliff says that "even the most ingenious of the auto-planes suffered from a split personality: It was awkward in the air and on the road. As an overweight aircraft with wheels exposed, it produced heavy drag and cruised at low speeds. A lightweight automobile, it could be unstable in high winds, featured a stiff ride and touchy steering and was prone to spark plug fouling."

But Smithsonian Institution Fellow Joseph J. Corn contends that "the biggest obstacle to auto-planes for the urban multitudes is safety. If the entire work-force at O'Hare were to fly to their jobs, rather than just those who live at Casa de Aero [a housing development with community airstrip], Chicago's busy sky would become perilously overcrowded. And if all of the city's ground-traveling commuters were to take to the air, the heavens could become a place of daily carnage."



James Ray drives his Pitcairn AC-35 autogyro in November 1936, the first roadable aircraft built. Its rotors (here, folded back) autorotated.

Smithsonian Institution photo

The first true roadable airplane was the Arrowbile, designed by aviation pioneer Waldo Waterman during the Depression. A witness at Glenn Curtiss's successful test flights in 1911 of the first amphibious airplane, the Triad, Waterman was inspired to emulate that feat with a conveyance equally at home in the sky or on land.

The Arrowbile's design was adapted from Waterman's prize-winning aircraft in the "Safety Airplane" competition sponsored by the Bureau of Air Commerce. The auto portion of the Arrowbile was a Studebaker. The dashboard displayed an aircraft compass, altimeter and airspeed indicator, in addition to the customary auto instrumentation. Perched on three wheels, the Arrowbile featured a pusher propeller attached to the rear of the craft that was driven by the Studebaker engine. The same engine also supplied power to the rear wheels for road transportation. The aircraft's detachable wing assembly, which fastened to the car with six cables, was stored at the airport when not in use.

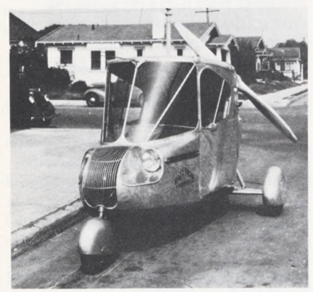
Waterman first tested his auto-plane in February 1937. Later that year, two Arrowbiles flew from his Santa Monica, Calif., facilities to take part in the National Air Races held in Cleveland, Ohio.

The Arrowbile's auspicious start was abbreviated by a succession of events beyond Waterman's control: a serious personal illness, withdrawal of financial backing by Studebaker during the 1937 "Roosevelt recession" and the forced interruption of civil aviation development brought about by World War II.

In 1943, Waterman resumed his work on enhancements for the Arrowbile. He continued to experiment with the roadable airplane as late as 1957, long after his retirement. The Arrowbile was never mass produced, however, nor was it ever certificated by the Civil Aeronautics Administration.

Is it a plane? Is it a car? No, it's the Aerocar, Moulton Taylor's remarkable flying automobile taking off in 1956.

Smithsonian Institution photo



Waldo Waterman and the first roadable monoplane—the Arrowbile—at Santa Monica, Calif., Airport in 1937 and on the street, minus its wing assembly.

Smithsonian Institution photo

An even earlier flying car was the roadable Pitcairn Autogyro, a kind of everyman's helicopter. In November 1936, Autogyro Company vice president James G. Ray demonstrated the practicality of his aircraft by landing it on a grassy field and driving the Autogyro to the steps of the Air Commerce building in Washington.

Another winning entry in the Government's safe airplane contest, the Autogyro was not exactly a miniature helicopter. Rather, it was powered by a conventional 135 h.p. aircraft engine and propeller and held aloft by a freely revolving rotor, which could be tucked over the tail section during terrestrial travel.

Following Skyway Engineering Company's purchase of the rights to the Pitcairn AC-35 from Ray's Philadelphia-based firm, the roadable helicopter faded into obscurity.

The high point of flying-car popularity occurred at the end of World War II, inflated, as it were, by bullish forecasts for general aviation. Surveys conducted by Crowell-Collier publishers and others suggested that as many as 1,000,000 persons were interested in buying privae planes. Even CAA Administrator Theodore P. Wright predicted that 400,000 planes would crowd the airways by 1955.

Nor was this optimism without foundation. The discharge of thousands of wartime pilots and the eligibility of private flying lessons under the G.I. Bill promised to create a huge new market for light planes. In addition, the civilian population, which had grown to accept air travel as a basic means of transportation and a new form of recreation, now had the disposable income to act upon those notions. To established aircraft manufacturers and inventor-entrepreneurs alike, the skies held forth a bonanza.

Consolidated Vultee worked on the

roadable airplane after the war. Its Convair Model 118, dubbed the "Stinson Air-car," after the division in charge of its manufacture, was designed by T. P. Hall, who already had some experience with auto-planes. Although Consolidated had expected to mass market its flying car, a non-fatal crash near Chula Vista, Calif., and the industry sales slump of 1948 compelled Convair to liquidate its Stinson division.

It was left to two returning GIs, Robert Edison Fulton and Moulton B. Taylor, to design the first roadable planes ever certificated by the CAA. Both men believed that the flying car was a "natural" in the new aviation climate. The auto-plane, they reasoned, would improve on conventional light aircraft by solving the nagging problem of how to arrange ground transportation—sometimes at night—from small private airstrips frequently situated far from built-up population centers.

Fulton, reportedly a descendant of the famous builder-promoter of the steamboat, patented and test flew his Airphibian in 1949. The next year, the CAA awarded him a "type certificate." Former FAA Airframe Branch chief Nelson Shapter observed that it flew fine but didn't perform well because of weight and drag.

Like the Arrowbile, Fulton's invention had detachable wings, which were stored on stilts at the airport. When not airborne, the plane's three-blade conventional propeller was removable and could be hooked onto the fuselage. Fulton claimed that an individual could convert the Airphibian into a ground vehicle in less than five minutes.

The Airphibian was capable of a maximum air speed of 120 mph and 50 mph on the ground. The three hand-crafted models built by Fulton and partner Octavio J. Alvarez at their Danbury, Conn., workshop ultimately logged 200,000 combined air and ground miles. Although Fulton had hoped to market the Airphibian for just under $10,000 and tried to interest the Army in it as a special-use vehicle, he was unable to raise the necessary seed capital and eventually sold out to group of investors no more successful than himself.

Failure to line up capital for mass production spelled the undoing of the most tenacious of all flying car boosters—Moulton Taylor. Taylor's concern for the subject was sparked by his wartime experience as a commander in the Navy's pilotless-aircraft and guided-missile program at Johnsonville, Pa. Following his discharge, Taylor and a team of engineers and designers constructed a small factory in Longview, Wash., near Mount St. Helens, where the development of the "Aerocar" proceeded over three decades.

The Aerocar's design was the most sophisticated of all the roadable airplanes. While the pusher prop feature resembled the Arrowbile, the plane's wing and unique tail section were easily folded up and towed behind the car for its road departure from the airport. Thus, in addition to its other advantages, the Aerocar allowed its owner to park the plane in his garage, thereby avoiding airport rental fees.

Richard Sliff, former chief of the Aircraft Engineering Division in FAA's Los Angeles office, awarded Taylor his first "type certificate" in 1956. According to Sliff, who was one of the first persons to test fly the Boeing 707 and 727, the Aerocar was "solidly engineered," and Taylor was an "inventive genius" of the first order. The Aerocar's airborne performance compared favorably with that of conventional small planes, while its four-wheel base afforded greater road stability than the Airphibian and other flying car prototypes. The Aerocar's 143-h.p. engine got about 15 miles to the gallon of fuel on the road and burned 8 gallons per hour in the air. The single set of controls in the Aerocar represented a refinement on all previous auto-planes, which were dual-controlled. Classified as a high-wing monoplane, the Aerocar could cruise at 100 mph and attain speeds of 55-60 mph on the road.

Moulton Taylor labored valiantly to keep the Aerocar competitive and attractive. He eventually designed wheel wells for the plane's landing gear, which substantially reduced aerodynamic drag. Hal Joines, an FAA engineering test pilot in Seattle, claims, "Taylor devised a unique clutch arrangement that allowed the propeller to free-wheel when uncoupled from the engine during a glide pattern and re-engage when power was applied." Taylor eventually scrapped the Crosley auto chassis of the original in favor of the sportier road vehicle appearance of the Aerocar III. He was also able to reduce the unit price of his invention from $25,000 to $10,000 an achievement which brought him 278 firm deposits for production models.

As the likelihood of financing dimmed, new obstacles arose to shatter Taylor's dream once and for all. Although the Aerocar easily satisfied CAA and FAA certification standards, highway safety and pollution equipment and an automobile excise tax imposed virtually untenable weight and cost constraints on the design. Today, four of the seven hand-built Aerocars are in museums, two remain at the Longview workshop, and one was wrecked in South Dakota.

The notion of a flying car did not end with Moulton Taylor. Since 1936, more than 30 flying car designs have been filed with the U.S. Patent Office. But the more recent emergence of home-builts—that is, not intended for a commercial market—indicated that the auto-plane was becoming an aviation curiosity, consigned to the world of the sport aviator and the tinkerer.

Why did the auto-plane fail to roll off the assembly line? James Pope, then chief of the Industry and Government Liaison Division of the Office of General Aviation, commented in 1978 that "The critical variables of interest and people have been lacking." According to aviation historian John R. M. Wilson, "A small infusion of research money might have spurred the aircraft manufacturing industry to develop such a plane, but Congress proved unwilling to make the investment, and the dream was never realized."

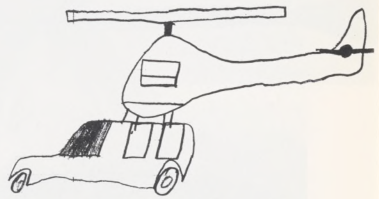
As recently as the 1970s, roadable car inventors failed to design a prototype that would sell for less than the combined cost of a car and airplane. The additional burden of maintaining a dual-purpose engine and delicate aeronautical equipment over thousands of miles of highway driving might eliminate all but a tiny segment of the marketplace. Even if a purchaser could afford the cost of upkeep, where could he/she find a mechanic to work on the contrivance?

Despite their admiration for Moulton Taylor, FAA experts Sliff and Joines concur that the roadable airplane represented an unfortunate compromise at best. Because of the critical weight/drag problem, the auto-plane design must inevitably sacrifice either roadability or flying performance, wrote aeronautical engineer Ralph Upson in 1945, "while saddling the owner with a costly vehicle that has no get-up-and-go on the road or in the air." It would be far better, Upson argued, to improve the present generation of aircraft in future designs, rather than resort to the inherently unsatisfactory auto-plane.

Sliff, Joines and Upson were right. The Aerocar, Airphibian, Arrowbile and the others were not the planes of the future so much as they were responses to the imagined postwar market and to the postwar inaccessibility of small airports. The increase in general-aviation enthusiasm, real though it was, failed to approach the projections of 1945. More important in sealing the fates of the auto-plain entrepreneurs, perhaps, were the mushrooming growth of the suburbs that brought the majority of small plane owners much closer to small airports, improved ground transportation services or even a kiss'n ride with a relative or friend.

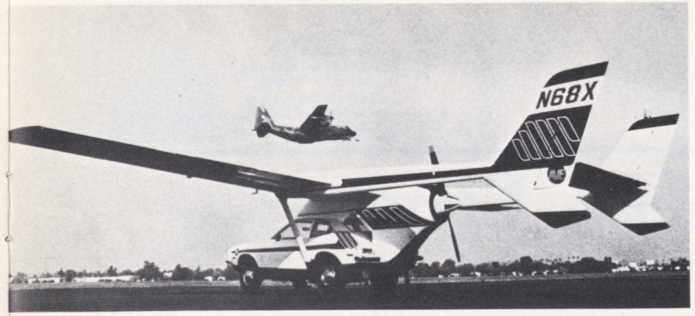
In short, because other forces altered the aeronautical and demographic status of general aviation after 1945, the "automobile that flies" has been relegated to the Rube Goldberg Mausoleum of Benighted Contraptions—at least for now. ■

Tomorrow's Designer



The idea of the auto-plane isn't new, but each generation "rediscovers the wheel." The following letter received in the Office of Public Affairs proves that inventive genius arises again and again. This six-year-old may become tomorrow's aeronautical engineer.

"Name Andrew Reilly Grade 1 Take a helicopter Weld it on a car so you can drive on the hieway and can fly in the air. To department of transportation" ■



Two more-recent entries in auto-plane design around 1973 were the AVE Mizar (top), a combination of a Ford Pinto and a Cessna Skymaster, and the home-built Bryan III, its wings folded for driving around Highland, Mich. Both were subsequently involved in fatal crashes.

Photos courtesy of *AOPA Pilot*

By Theodore Maher
The editor of *Intercom* and a frequent contributor to FAA WORLD, he is a former editor of *Our Navy* and associate editor of the *Navy Times*.

Someone To Trust

Personal Problems Find a Needed Shoulder

Joanna had seen her husband lose his temper before, but never had he shoved her with such insane violence. She lay on the floor like some discarded doll, waiting to hear her sometimes loving husband slam the front door as he stalked out for another drink at the corner tavern.

At first, Joanna was relieved because the menace was gone, but her relief cut both ways—she also was alone. The man she depended on was on another binge. It would be days, she knew, before she would be able to talk to him.

She lifted herself up on one knee before she hunched over weeping again. There was no place to turn to; there was no one to trust.

Along with their two children, they had only recently moved here. She had no friends and hardly any acquaintances.

While she wiped her eyes with the back of her hand, she thought about a pamphlet that described a regional Employee Assistance Program, which her husband had brought home from his FAA job. But she shook her head. She didn't believe in those government programs and, besides, she wasn't the employee. She couldn't imagine getting help there, but her loneliness became unbearable as time went on. She longed to hear the sound of another human voice, so she finally called the number given for the program.

EAP couldn't solve all of Joanna's problems right away, but it did get her started in the right direction. Just by being there—at the other end of the telephone line—the counselor made her feel less alone and less forgotten. Because she felt less cut off from the rest of the world, the next morning she was emboldened to speak matter-of-factly with her husband.

Hung over and now unsure of himself, Harry reluctantly agreed to talk to the counselor. Although he was certain that none of those "do-gooders" would be able to help him, he thought, "what the hell . . ." and went along with it.

Chatting with the counselor, who knew when to be sympathetic and when to be tough, did more for Harry than he'd imagined it could. He also was tired of being alone, and he at last had found someone he could trust. He was more surprised than anyone when he agreed to sign up for treatment.

Harry was asked to become involved in an intensive outpatient program near his home. After a few weeks of classes on alcoholism and attending Alcoholics Anonymous meetings, he almost magically stopped drinking and began to look like a new man.

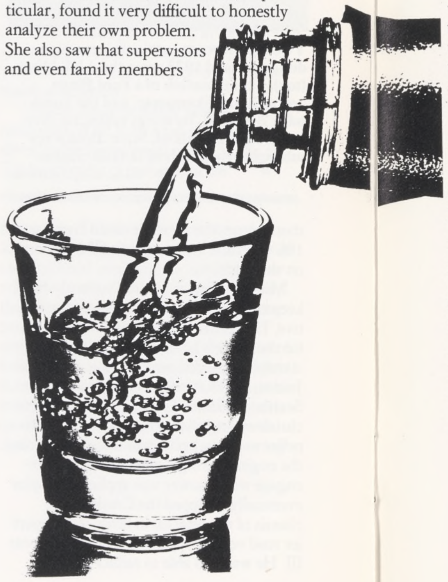
In truth, he was a new man in more ways than just appearance. He thought differently. His own ego no longer filled his thinking from horizon to horizon. Although he wasn't quite well yet, he was on his way. With a little effort, Harry would be able to alter the self-destructive thinking patterns he had developed during 10 years of alcoholic drinking.

Harry and Joanna are fictitious, but the scenario is not. What happened to this couple actually did take place with an FAA couple in the New England Region.

Without the Employee Assistance Program, there's no saying what might have happened to this couple. Among the more likely prospects were unemployment and divorce.

The New England EAP, which was established as a result of FAA's national order, is still in the experimental stages, but, so far, it seems to be doing the job. The order, 3700.5A, Feb. 29, 1979, set up FAA's policy of creating employee assistance programs and provided guidance for setting up programs of employee referral to community facilities for the treatment of alcoholism and drug abuse problems.

The first in-house coordinator of the program in the region was Judy Devine, a personnel specialist. She knew that research had shown that alcoholics, in particular, found it very difficult to honestly analyze their own problem. She also saw that supervisors and even family members



and friends found it difficult to confront alcoholics and other drug addicts, who, even more than other employees, did not want the agency to stick its nose into their, indeed deplorable, business.

For these reasons, Devine decided that the program should be built on a foundation of professional counselors who were not in the agency.

At the same time, she recommended that the region have a broad-based assistance program, rather than just an alcoholism and drug-abuse program. She reasoned that employees had other personal problems and would be more likely to associate themselves with a program that treated problems that did not carry the stigma of addiction. A program of this type had been in existence for some time at the Boston ARTCC and was well received by employees.

Research for technical assistance in operating such a program led her to the Appleton Treatment Center, a part of McLean Hospital—particularly well known for its work with alcoholics—which, in turn, is a division of the renowned Massachusetts General Hospital. There, she was referred to Bruce Davidson of the Industrial Consultation Service, which was hired to run the FAA program.

At this point, Rod Minklein, also of the Personnel Division, replaced Devine as in-house coordinator. He continued to work with Davidson and a regional employee committee, which included union representatives, that was set up to oversee the program.

To get the program started, the region sent out letters to all employees and held special briefings for all supervisors.

Regional Flight Surgeon Dr. John Cahill, who attended a special course in the treatment of alcoholics, cooperated fully in the development of the program. When supervisors, who have already been briefed through meetings and directives, have special problems, they can call Dr. Cahill. He advises the supervisor to counsel the troubled employee and strongly urges his referral to the EAP, providing the employee with the 24-hour telephone number. In addition, he suggests that the supervisor follow up the next day to see if the employee did make the EAP contact.

Dr. Cahill stresses that the program is not monitored by the Medical Division, so that complete anonymity is the rule.

If, in the process of the annual physical examination for air traffic control specialists, a controller admits to alcoholism, drug abuse or emotional problems and say he or she is in the recovery program, the regional flight surgeon or asssistant flight surgeon will make a direct inquiry to detrmine if the program is working for the controller.

Because of the organization of the EAP, the identification and treatment of the employee's problem is taken out of the agency's hands. Identifying the problem and recommending a treatment source is the primary function of the contract counselors.

The program has been in operation since Oct. 1, 1979. During the first two quarters of operation, according to Davidson, the counselors reported that 31 employees called in with problems that have been identified. Quarterly reports are required by the contract.

Minklein explained that the agency is paying the consultant firm $6.50 per employee in the region. This comes to roughly $13,000 per year, which seems reasonable to regional officials when one considers what the agency is getting. It is getting a 24-hour confidential consulting answering service and three trained and qualified counselors to help employees or their families. The employees get the help they need without compromising their privacy, and supervisors can concentrate on the work instead of employees' personal problems.

"All in all," Minklein says, "it looks like a good deal for FAA." He notes that FAA has a considerable investment in its employees. For example, it takes about $100,000 to train a controller. If the program saved only one controller a year, it would be financially justified. What the intangible benefits are from the service is not as easy to define, but they can be counted in meaningful human lives. ■

People

Alaskan Region

■ **Edmond L. Ashworth,** chief of the Palmer Airway Facilities Sector Field Office, Anchorage Sector.
■ **Richard D. Mathews,** team supervisor at the Anchorage International Flight Service Station, from the Gulkana FSS.
■ **Rex T. Morris,** chief of the Investigations & Internal Security Branch, Civil Aviation Security Division, from the Air Security Branch.
■ **Margie E. Morrow,** team supervisor at the Anchorage ARTCC.

Central Region

■ **Americo B. Carnevale,** team supervisor at the Sioux City, Iowa, Tower, from the Maui, Hawaii, Tower.
■ **Billy L. Daniels,** chief of the North Platte, Neb., Airway Facilities Sector Field Office, Grand Island, Neb., Sector, from the Wellfleet, Neb., SFO.
■ **Gene T. Schumacher,** unit supervisor in the Grand Island AF Sector, from the North Platte SFO.
■ **Roger E. Voss,** proficiency development and evaluation officer, Grand Island AF Sector, from the North Platte SFO.

Eastern Region

■ **Stanley G. Bartlett,** team supervisor at the Rochester, N.Y., Tower.
■ **James S. Duffy,** team supervisor at the Baltimore, Md., Tower.
■ **William H. Frame,** team supervisor at the Rochester Tower.
■ **Robert D. Goldman,** manager of the Airway Facilities Sector at the JFK Tower, New York, from the Maintenance Operations Branch, Airway Facilities Division.
■ **Roland H. Jenkins,** chief of the Maintenance Operations Branch, from the New York ARTCC AF Sector.
■ **Gilbert Magnan,** team supervisor at the Binghamton, N.Y., Tower, from the Dulles Tower, Washington, D.C.
■ **Richard Schroeder,** supervisor of the Central Computer Complex at the New York ARTCC AF Sector.
■ **James A. Stephenson,** team supervisor at the Dulles Tower.
■ **Michael R. Timmins,** maintenance mechanic foreman at the Camp Springs, Md. (Andrews AFB) AF Sector Field Office of the Washington National Airport AF Sector.
■ **Manny Weiss,** chief of the Real Property Branch, Logistics Division.

Great Lakes Region

■ **Donald B. Beeson,** assistant chief at the Chicago ARTCC.
■ **Brian S. Burbank,** chief of the Emmet County, Mich., Airway Facilities Sector Field Office, Grand Rapids, Mich., AF Sector.
■ **James R. Burton,** unit supervisor at the Springfield, Ill., AF Sector.
■ **William L. Calhoun,** crew chief at the Minneapolis ARTCC AF Sector.
■ **Fabio F. Dioguardi, Jr.,** chief of the Meigs Field Tower, Chicago, from the Chicago O'Hare Tower.
■ **William A. Houck,** chief of the Terre Haute, Ind., Flight Service Station, from the Indianapolis, Ind., FSS.
■ **Leroy R. McCarthy,** manager of the Chicago ARTCC AF Sector, from the Chicago O'Hare Sector.
■ **Hortense McGehee,** chief of the Cincinnati, Ohio, General Aviation District Office, from the Dallas, Tex., GADO.
■ **Robert S. Monell,** team supervisor at the Madison, Wis., Tower, from the Chicago O'Hare Tower.
■ **Walter E. Ryness,** assistant manager of the Chicago ARTCC AF Sector.
■ **Herbert Dale Smith, Jr.,** chief of the Minneapolis/St. Paul Air Carrier District Office, from the Program Planning and Evaluation Staff, Flight Standards Division.
■ **Andrew S. Webb,** team supervisor at the Champaign, Ill., Tower, from the Indianapolis Tower.

New England Region

■ **John J. Byrnes,** assistant chief at the Boston ARTCC.
■ **Donna A. Gropper,** team supervisor at the Worcester, Mass., Tower, from the Islip, N.Y., Tower.
■ **Robert W. Nichols,** chief of the Lawrence, Mass., Tower, from the Bedford, Mass., Tower.
■ **Joseph Rogus,** chief of the Manchester, N.H., Airway Facilities Sector Field Office, Burlington, Vt., AF Sector, from the Facilities Establishment Branch, Airway Facilities Division.
■ **Robert A. Viera,** team supervisor at the Quonset Point, R.I., Tower.

Northwest Region

■ **Michael L. Hopkins,** team supervisor at the Medford, Ore., Tower, from the Seattle-Tacoma, Wash., Tower.

Pacific-Asia Region

■ **Noboru Nakao,** unit chief at the Kahului, Hawaii, Airway Facilities Sector Field Office, Maui AF Sector.

Rocky Mountain Region

■ **James L. Bennett, Sr.,** chief of the Lusk, Wyo., Airway Facilities Sector Field Office, Casper, Wyo., AF Sector, from the Baltimore, Md., AF Sector.
■ **Thomas E. Burris,** unit chief of the Rock Springs, Wyo., AF Sector Field Office, Casper AF Sector, from the Denver AF Sector.
■ **Paul I. Henry,** team supervisor at the Denver ARTCC.
■ **Nancy A. Murdock,** chief of the Minot, N.D., Flight Service Station, from the Los Angeles FSS.
■ **Dennis A. Rominger,** team supervisor at the Denver ARTCC.

Southern Region

■ **Earl E. Aery,** team supervisor at the St. Thomas, Virgin Islands, Tower, from the Atlanta International Tower, Ga.
■ **Donald J. Bishop,** team supervisor at the St. Croix, V.I., Tower.
■ **Drewey M. Clack, Jr.,** team supervisor at the Wilmington, N.C., Tower.
■ **James A. Harper,** chief of the Winston Salem, N.C., Airway Facilities Sector Field Office, Raleigh, N.C., AF Sector.
■ **Cecil A. Hoyer,** team supervisor at the Miami ARTCC.
■ **Leonard E. Jankowski,** area officer at the Memphis, Tenn., ARTCC.
■ **Ronald J. Liszt,** assistant chief at the Memphis Tower, from the Miami Tower.
■ **Thomas A. McGonigal,** chief of the Wilmington, N.C., Tower, from the New Bern, N.C., Tower.
■ **Billy G. Peacock,** team supervisor at the Tamiami Tower, Miami, from the Miami International Tower.
■ **Baxter C. Sowell,** deputy chief of the Atlanta Flight Service Station, from the Dothan, Ala., FSS.

Southwest Region

■ **Richard Arizpe,** maintenance mechanic foreman at the San Antonio, Tex., Airway Facilities Sector.
■ **Vernon H. Drewa, Jr.,** program support officer at the Little Rock, Ark., AF Sector.
■ **Jim N. Etheridge,** unit chief at the Gallup, N.M., AF Sector Field Office, Albuquerque, N.M., AF Sector, from the El Paso, Tex., AF Sector.
■ **Betty P. Graves,** chief of the Word Processing Branch, Management Systems Division.
■ **Jack L. Hardy,** chief of the El Paso Tower, from the Tulsa, Okla., Tower.
■ **Vernie R. Hefler,** chief of the Frequency Management & Leased Communications Staff, Airway Facilities Division, from the Fort Worth, Tex., AF Sector.
■ **Leroy E. Joppie,** program support officer at the New Orleans AF Sector.
■ **Tommy T. Ray,** team supervisor at the Tulsa Tower.
■ **Billy I. Samples,** manager of the San Antonio AF Sector, from the Maintenance Operations Branch, Airway Facilities Division.
■ **Carl W. Vanalsdorf,** maintenance mechanic foreman at the Lafayette, La., AF Sector Field Office, New Orleans AF Sector, from the Houston, Tex. Maintenance Engineering Field Office.
■ **Carl R. Weiss,** unit supervisor at the Wink, Tex., AF Sector Field Office, Lubbock, Tex., AF Sector, from the El Paso AF Sector.
■ **James H. Wright,** program support officer at the El Paso AF Sector.
■ **Jimmy C. Yates,** program support officer at the Lubbock AF Sector, from the El Paso AF Sector.

Technical Center

■ **Thomas J. Owen,** correction: assistant chief of the Supporting Services Branch, Logistics Services Division, from the Building Program Management Staff.

Western Region

■ **Neil H. Brewster,** team supervisor at the Ontario, Calif., Tower.
■ **Donald J. Chapman,** assistant chief at the Oakland ARTCC, from the Air Traffic Operations Branch, Air Traffic Division.
■ **Beverly J. Clark,** team supervisor at the Red Bluff, Calif., Flight Service Station, from the Anchorage, Alaska, FSS/IFSS.
■ **Thomas S. Clawson,** team supervisor at the Palm Springs, Calif., Tower.
■ **Leslie E. Grove,** team supervisor at the Oakland ARTCC.
■ **Paul W. Harris,** team supervisor at the Oakland ARTCC.
■ **David F. Jensen,** chief of the Voucher Examination Branch, Accounting Division, from the Accounting Operations & Analysis Branch.
■ **Michael G. Johnson,** chief of the Accounting Operations & Analysis Branch.
■ **Gaylen M. Larson,** team supervisor at the Las Vegas, Nev., Tower.
■ **Gene L. Organist,** unit supervisor at the Ontario, Calif., Airway Facilities Sector Field Office, from the Green Bay, Wis., AF Sector.
■ **Warren B. Paschke,** team supervisor at the Phoenix, Ariz., Tower, from the Scottsdale, Ariz., Tower.
■ **Joseph J. Pelzel,** assistant chief at the Oakland FSS, from the Marysville, Calif., FSS.
■ **Larry L. Petersen,** team supervisor at the Oakland ARTCC.
■ **Remo J. Rosa,** team supervisor at the Oakland ARTCC.
■ **Richard W. Seiwald,** team supervisor at the Oakland ARTCC.
■ **Brent W. Shively,** team supervisor at the Los Angeles ARTCC.
■ **Archie O. Snowden,** team supervisor at the San Francisco Tower, from the Oakland Tower.
■ **Leon C. Warner,** assistant chief at the Los Angeles ARTCC.
■ **Richard N. Wiening,** team supervisor at the Los Angeles Tower.
■ **Steven G. Wilkins,** team supervisor at the Los Angeles Tower.

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Update

Solar Marches On

Last month, FAA dedicated its first newly built solar air traffic control towers at Springfield, Ill., and South Bend, Ind. (See "Rediscovering the Sun," FAA WORLD, May 1978.)

These first two solar installations under "Concept II," as Joe Morelli likes to call it, consist of black-painted cinder-block south-facing walls of base buildings that are double-glazed, creating an air space in front of the wall. Morelli is an engineer in the Terminal En Route Facility Branch, Environmental Systems Division, Airway Facilities Service. Water-filled tubes within the building serve as a heat storage medium, and fans distribute the heat to the work areas when needed.

Concept I is represented by modifications to the Spirit of St. Louis Tower in Chesterfield, Mo., in which the water tubes were in the solar wall itself.

Other Concept II towers—those involving 11,000-square-foot TRACON buildings—now under way are at Oklahoma City, Rochester, N.Y., Nashville, Tenn., Baton Rouge, La., and Chattanooga, Tenn. Their operational target date is spring 1982.

The third approach—a still more efficient one, according to Morelli—is a sloped collector that consists of double glazing over a black chrome-plated surface and dispenses with the cinder-block wall. This is planned for non-approach-control tower administrative buildings, such as at Santa Ana, Calif., New Haven, Conn., and Farmingdale, N.Y., which is slated for construction in the spring of 1981.

Future FAA solar towers will likely use more advanced technology that will provide the more desirable solar air conditioning. ■

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