HORIZONS

Read About FAAers' Role In Epic Moonshot Pages 1 and 4

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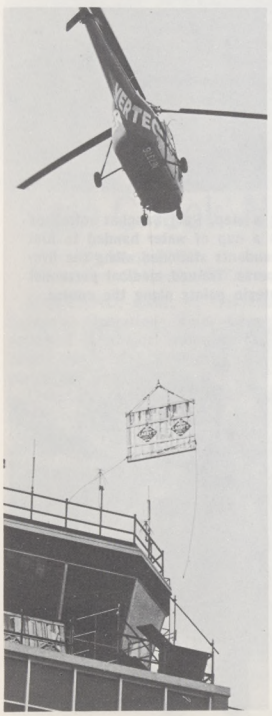


Airborne Windows

For a lifting job requiring a gentle touch, a helicopter was recently used to replace window panes in the Minneapolis Tower cab. The job was completed without a hitch, and controllers now have improved visibility for directing traffic.

Inspector's Skill Helps Save Baby Aboard Aircraft

FORT WORTH—Designing an effective emergency respiratory device for airborne use can take development engineers months or even years.

But Raymond Butters, operations manager with the FAA Air Carrier District Office in Dallas, recently devised a suitable mask in minutes to handle an in-flight emergency.

For his ingenuity, he received a Special Act Award, citing him for assisting a 19-month-old child stricken with a high fever, convulsions and apparent shock during a flight between Keflavik, Iceland, and Argentia, Newfoundland.

Butters was aboard the American Flyers' airborne flight when the baby's mother asked for help and the plane's captain asked Butters to do what he could.

Because the regular oxygen masks were for adults, and not designed for babies, Inspector Butters devised a mask on the spot out of a paper cup and hooked it to the oxygen source.

A registered nurse who was a passenger helped Butters apply the "instant mask," and they had the baby responding more normally in a half-hour.

Butters and the nurse continued to watch over the child for the hour and 40 minutes it took the plane to divert to Goose Bay, which Butters recommended so that the baby could be rushed to a hospital.

Agency Plays Vital Support Role In Successful Apollo 11 Mission

By Thom Hook

WASHINGTON—During the eight exciting days that kept the world's eyes glued to the flight of Apollo 11, FAA employees in widely scattered areas contributed a vital support function. For weeks prior to the 9:32 a.m. July 16 launch from Cape Kennedy, work was underway in FAA's Southern Region, in the Central Altitude Reservation Facility (CARF) at Headquarters and in Pacific Region offices so that air traffic ran smoothly in space operations areas.

By splashdown July 24, some 910 miles southwest of Honolulu FAA offices, the safety record was perfect, despite increased air activity generated by the support needed for the event.

At Washington Headquarters, CARF was a focal point for worldwide coordination for Apollo as America's astronauts pioneered man's pathway to the moon. CARF, whose Chief is Addison D. Scott, and its staff of ATC specialists experienced in separation criteria for the entire Northern Hemisphere (excluding Iron Curtain countries) worked closely coordinating plans with all space task force units plus centers at Miami, New York, San Juan and Bermuda.

Since areas used for launching and re-entry and the operation of support aircraft engaged in recovery of components are so vital to the mission, air traffic not actually involved in the operations had to be prevented from entry.

CARF's role is the assignment of airspace from surface to infinity to protect all aircraft from interfering with launching and recovery operations. Activities of all aircraft participating in the space vehicle recovery in the Pacific involved stationary airspace reservations approved by CARF for the numerous mission support aircraft.

On the Site

"All signals are still 'Go'," reports FAA ATREP Robert Deason (right) to Secretary of Transportation John Volpe on his arrival at Patrick AFB aboard FAA's JetStar Nan-1 to witness Apollo's liftoff for the Moon at Cape Kennedy.

Pre-Planning

Attending the second in a series of joint conferences at Patrick AFB prior to the Apollo 11 moonshot were (left to right): Orlando Controller Mike Bozzi (back of head shown), Lt. Col. H. Moody, U. S. Air Force; Tower Chief Dan Brown and FSS Chief C. A. McAllister, Melbourne; O. J. Cowart, Operations Officer, Miami ARTCC; Otto Warren and Ernie Silva, Air Traffic Branch, Miami Area; FAA ATREP Robert Deason, Patrick AFB; SMSgt. John Hannan, RAPCON Supervisor; SMSgt. Robert Rowe, RAPCON Chief; Jerry O'Niel, Tower Chief, Cape Kennedy Skid Strip; CHMSgt. Ben Ledford, Patrick Tower Chief; Air Force Major William Cannon, Flight Facilities Officer; Major George Mong, Chief, Base Operations and Training Division, Patrick AFB.

All photographs illustrating the report on the FAA role in the historic Apollo 11 Moonshot were taken by Ernie Silva, SATCS, Miami Area Office.

Center Betterment Is Planned

LOS ANGELES — An initial $950,000 contract for preparation of plans to expand and modernize 19 air route traffic control centers has been awarded to the Ralph M. Parsons Company.

The contractor will develop engineering and architectural drawings, specifications and standards adaptable to each of the 19 center locations. This work is a major step toward enlarging the buildings to accommodate additional equipment and personnel needed to serve the air traffic growth forecast in the decade ahead.

The ARTCCs control aircraft operating under instrument flight rules between airports in the United States. A typical center such as the Washington Center at Leesburg, Va., controls 110,000 square miles of airspace and is staffed by 600 air traffic controllers, electronic technicians and supervisory and administrative personnel.

Under the contract, the architect-engineering firm is required to design electrical and mechanical systems and develop architectural and structural expansion and improvements to the buildings.

Splashdown! . . . Pacific FAAers Participated

By George Miyachi

HONOLULU—As President Richard M. Nixon stood by aboard the aircraft carrier U. S. S. Hornet to welcome Astronauts Armstrong, Aldrin and Collins back from their epic moon-landing voyage July 24 at 6:49 a.m. Hawaii time 910 miles to the southwest, FAA controllers at the ARTCC in Diamond Head crater were participating directly.

For Martin Amidon, Honolulu Center's military liaison and security specialist, working on the moon exploring space mission was "the biggest one yet," but was not exactly new. Amidon has worked with the military in the tracking and recovery phase of the space program since the Mercury series.

In preparation for the spaceship's parachute-assisted drop into the Pacific, Amidon coordinated with EZTF-130, the combined task force to clear air traffic out of an air space 200 miles long and 25 miles wide, so that recovery of the Apollo 11 space capsule would not be jeopardized. All aircraft except those directly involved in the recovery mission were diverted around the splashdown area.

Assigned to work the splashdown sector were Watch Supervisor David Traglio, Crew Chief John Van Dusen and William Cissel (low altitude position) and Herbert Mahelona (high altitude position).

Overall responsibility for the operation of the Honolulu Center located near Waikiki was its Chief, Jack Richards. Not as directly involved but charged with important responsibility in the space program were Francis Blatt, Chief of Airway Facilities Sector 115 and Herbert Williams, Chief of AFS 111. Blatt and Williams saw to it that the 18 transmitters and 41 receivers at the FAA Pacific Region facilities for Apollo missions were operating and maintained properly.

Transmitters used to communicate with tracking and recovery ships and aircraft are located in the Ewa Transmitter Station on the island of Oahu, which is also the site of the Honolulu Center. The Receiver Station is at Hoolehua, Molokai, in the Hawaiian islands.

Equipment installed by the FAA for the Air Force Western Test Range (AFWTR) is valued at well over $2 million.

Though the role of FAA employees in the Apollo 11 mission was "on the sidelines," they took real pride in playing some part, however small, in the astronauts' monumental achievement.

And most FAAers would agree with Astronaut Michael Collins who told a worldwide television audience while the capsule was approaching earth: "This trip of ours to the moon may have looked simple and easy. I want to assure you that this has not been the case."

Blastoff!

By Gerrie Cook

CAPE KENNEDY, Fla.—More than a million observers and spectators poured into the small, sundrenched Florida towns of Titusville, Cocoa Beach, Melbourne and surrounding communities to watch the Saturn 5 rocket, nearly as tall as the Washington Monument, rise from complex 39A of the Kennedy Space Center.

Air traffic expanded to 20 times normal as more than a thousand aircraft of every type and description brought VIPs to witness the historic launch.

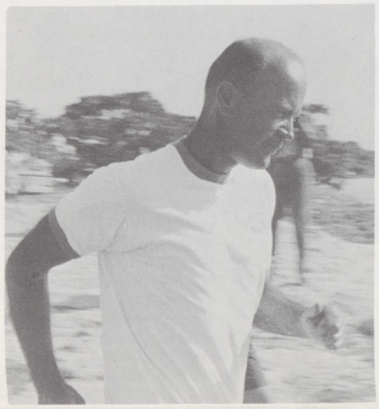
Among the planes were those carrying Vice-President Spiro Agnew, former President Lyndon Johnson, many Congressmen, top government departmental leaders including DOT Secretary John Volpe, members of the nation's diplomatic corps, numerous rulers and ambassadors of foreign nations, U.S. industry presidents and

(Continued on Page 4)

FAA Chaplain Jerome Larson, founder of the Wake Island Road Runners Club, believes jogging provides a tremendous outlet for frustrated, tired people. A former college track star, he teaches physical fitness at Wake Island's "university."

◄ Coming down the home-stretch is Susan O'Dell, winner in the girl's division, and Curtis Tarah, who placed third in the boy's division. The youngsters ran a two-mile course while the adults ran five miles.

► Women runners on Wake Island who run in the weekly Jog-ins, which mix exercise with fellowship, are (left to right): Karen O'Dell, Mrs. Pat O'Dell, Susan O'Dell, Mrs. Trisha Albaugh, Mrs. Tammy Brothers and Mrs. Jerome Larson.



"Aerobics Central," Wake Island's new physical fitness headquarters, was officially opened by Pacific Region Director Phillip Swatek who led a group of 30 enthusiastic joggers on a three-mile run after the ribbon cutting. As Chaplain Larson explains it, "it was all the joggers could do to keep up with their boss, who is a physical fitness buff." The Center houses a giant scoreboard showing the distance and time of all runners.

Raising his arms as a sign of a victory, Wilbur Mills comes in first in the first Joggathon meet held on Wake Island. Mills covered the five-mile course in 37 minutes and 6 seconds, averaging 7:25 minutes per mile. Mills is an outstanding example of what jogging can do for a person—not only is he in great shape, but he lost 20 pounds in the process.

Never losing a step, Raul Sanchez refreshes himself with a cup of water handed to him by water attendants stationed along the five-mile race course. Trained medical personnel were at strategic points along the course.

For Family Health, For Fellowship . . .

The Road Runners of Wake

By George Miyachi

Members of the Wake Island Road Runners Club, unlike the club's symbol—the speedy long-tailed desert bird—run slowly and for a good reason: better health.

Dedicated to good health and fellowship through jogging, the club was founded by FAA Chaplain Jerome Larson, a former college track star. He became a jogging advocate last year when a confirmed jogger "sold" him on the idea of forming a club.

Now, Chaplain Larson preaches almost as fervently from the jogger's bible—"Aerobics"—as he does from the Holy Bible on Sunday. "A healthier person is a happier person," he said. "Jogging is tremendous therapy for the frustrated and the tired."

Since formation of the club early this year, residents of all sizes and shapes, male and female, can be seen trotting along the sandy shoulders of Wake's main street, which runs the length of the island. You'll also see them trotting around the concrete-slabbed water catchment, where a measured four-mile course has been laid out. The main road on this isolated atoll has been marked off with mileposts.

Chaplain Larson teaches a non-credit course on physical fitness at Wake Island "university." The textbook is the best seller, "Aerobics," authored by Maj. Kenneth Cooper, an Air Force flight surgeon. Seventy-five students, ages 25 to 65, are enrolled. The jogging club supplements the course by holding organized jogging events at least once a week.

One popular weekly activity is the "Jog-in." A family affair, the typical "jog-in" starts with limbering up exercises and jogging around the four-mile course. Women and children normally run a mile; hubbies do from two to four miles.

Afterward, exhausted joggers meet at a member's patio for refreshing iced tea and fellowship. Once a month, a "jog-in" is held on the nine-mile course. The monthly session is highlighted by a delightful potluck supper at the lagoon beach.

Bursting with pride, David Larson watches Thomas Skates pin second place boy's division ribbon on his shirt. David is son of Chaplain and Mrs. Jerome Larson.

An island-wide jogging meet, held recently, marked the island's first five-mile race. It had all the atmosphere of a Boston marathon. More than 50 islanders entered. The course extended from the west end of Wake's 9,000-foot runway to Dryer Field at the island's northern tip. Medical and water stations were set up all along the five-mile track.

Only men and children participated. "The women were quite shy," explained Chaplain Larson. "They do jog, but they feel funny about a crowd."

Of the 50 who responded to the starting gun, only two-thirds finished. Even so, the affair was considered a huge success and Wake Islanders are pondering holding a big meet every three months.

Those who diligently apply themselves to the program testify to better health and slimmer waistlines.

Says Chaplain Larson, "My wife is a good example of what jogging can do for you. In Canada, where we lived for a while, she was constantly on medication for relief of asthma. Now, she is almost completely off medication. Naturally, she's a great jogging advocate."

Thunderstorms Pinpointed By Radar at Albuquerque

ALBUQUERQUE — Radar at the ARTCC here is being used to hunt thunderstorms for the Weather Bureau while the primary mission of air traffic control surveillance continues uninterrupted.

The two-agency enterprise was initiated during a recent official ceremony at which E. D. Jacobson, Albuquerque Area Manager, represented the FAA and H. L. Jacobson, the Weather Bureau. The two men are not related.

Using special radar repeater scopes, a small staff of Weather Bureau meteorologists in the Center plot thunderstorm locations and heavy rain areas. The information is recorded on a single chart, using returns from widely scattered air route surveillance radars at El Paso, Amarillo, Mesa Rica, Albuquerque, Silver City and Phoenix.

Copies of these charts are provided to local controllers.

Both Use It

Looking at radar screen at the Albuquerque Center are H. L. Jacobson, Weather Bureau (left), and E. D. Jacobson, FAA Area Manager, who represented the two agencies in initiating a new program under which the weathermen use the agency's ARTC radars.

'Rain Check' Milestone Marked

By Harry Little
Controller, Oakland ARTCC

OAKLAND, Calif. — Oakland Center's Operation Rain Check achieved a major milestone recently when the 1,000th pilot completed the program.

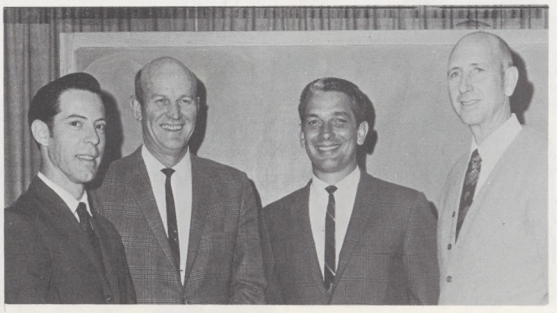
David Austen of Palo Alto was the airman with the "lucky number." He received a special certificate from Donald E. Pearson, Assistant San Francisco Area Manager.

Austen, 24, holds a commercial license with instrument, instrument ground and instrument flight instructor ratings. He has logged more than 750 hours, including 55 hours of actual instrument time.

Operation Rain Check, which originated at Oakland Center, is now completing its second year. Bay TRACON personnel joined Center instructors in conducting the program, designed to orient general aviation pilots in air traffic control procedures.

Concern with the growing numbers of general aviation aircraft and the increasing numbers of general aviation flights conducted under IFR prompted the Oakland Center to inaugurate Operation Rain Check in September 1967. It was felt that a knowledge of how the air traffic system functions and the problems it faces would enable pilots to make better use of the system and also help the system through better informed and more capable instrument pilots.

After it was launched, Operation Rain Check received immediate national acclaim and soon was being conducted at many ARTCCs and terminal facilities.



Rain Check Checkers

Instructors from the Oakland Center who are promoting aviation safety by showing pilots how the air traffic system functions are (from left): Gordon Heritage, Joe Basham, Joe Harrell and Harry Ewing.

From Bay TRACON

Joining Oakland Center instructors to conduct Operation Rain Check is this trio of instructors from Bay TRACON (from left): Harold Heinrichs, Sally Biegler and Keith Henrickson.

The Graduate

A certificate recognizing Operation Rain Check's 1,000th graduate is given to David E. Austen (left), by Kay S. Springer, Oakland Center instructor. Donald Pearson (right), Assistant San Francisco Area Manager, looks on.

Cost Study Authorized On Jet Noise Reduction

CHULA VISTA, Calif.—A contract award of $107,762 has been made by the FAA to the Rohr Corporation to conduct an economic feasibility study of retrofitting commercial jet transports with acoustically-treated engine nacelles to reduce jet airplane noise.

Under the contract, the company is required to submit a report to the FAA by May 12, 1970 containing optimum cost-effective design configurations for acoustically-treated nacelles and ducts applicable to low bypass turbofan engines in the Boeing 707, 720, 727, 737 and the Douglas DC-8 and 9.

The contractor will estimate noise levels using single-engine acoustically-treated nacelles and ducts under both ground runup and predicted airborne operating conditions. Three engine power settings will be used: 100 per cent thrust for takeoff, 80 per cent for noise abatement cutback, and 40 per cent for approach power.

Acoustical materials of both a non-structural type, such as fiberglass or plastic, will be used, as well as structural classes of materials, the latter representing load-bearing components. Acoustical materials in various combinations will be installed around the primary sources of jet engine noise, such as engine compressor fan inlets, fan exhaust areas, and in the areas of the jet exhaust stream. Each configuration will be evaluated for its ability to provide a maximum reasonable reduction in "effective perceived noise level" (EPNL) for each of the six aircraft models compared to their current noise levels.

Evaluate Tradeoffs

Tradeoff evaluations on the several kinds of acoustical materials will be made by the contractor on the basis of at least four combinations: sound absorption versus weight, sound absorption versus cost, structural efficiency versus weight, and structural efficiency versus cost. Determination then will be made of the minimum retrofit costs for each of the six aircraft models considering optimum reductions in noise levels based on initial cash outlay and changes in direct operating costs.

Cost estimates will be based on retrofitting all aircraft models currently being operated by a selected group of 15 U.S. air carriers, the modifications to be made over a three-year period beginning Jan. 1, 1972. An evaluation then will be made of the ability of each airline, and the industry as a whole, to absorb the cost of the retrofit program both with and without a fare rate increase based on the return-on-investment policies established by the Civil Aeronautics Board.

The FAA currently has under consideration noise standards for all new subsonic transport airplanes, including a number now in development.

Symposium Deadline Set

OKLAHOMA CITY — Persons who wish to present technical papers or serve on technical panels at FAA's Fifth Annual Aviation Maintenance Symposium here Dec. 9-11 at the Skirvin Hotel are invited to notify the agency of their intentions before Aug. 15.

Participants in the symposium, whose theme is "Advances in Aviation Maintenance Technology," will be issued a copy of the agenda and notified of final arrangements by Oct. 15.

Those planning to participate should notify Symposium Manager Robert Phillips, Maintenance Division, FS-300, giving name, position and title of paper if planning to present one.

Exhibitors planning to display either static and-or operable exhibits related to aviation maintenance should contact the Maintenance Branch, AC-230 by Oct. 15.

According to Harry A. Turnpaugh, Chief, Maintenance Division, FAA Flight Standards Service, the annual aviation maintenance symposium has been attracting greater participation each year from such varied aviation interests in both the U. S. and abroad as aircraft manufacturers, airlines, military, service organizations, government agencies, schools and colleges, aircraft owners and operators, pilots, engineers and maintenance specialists.

"It would seem," Turnpaugh said, "that the symposium is definitely accomplishing its purpose in providing those who are either professionally involved or who have some other concerned interest in the unique opportunity to exchange technical data and otherwise share views and experiences in an open discussion on recent progress and problems related to the aircraft maintenance techniques, skills and programs."

Ex-Controller Gets Key Job

ATLANTIC CITY—A veteran in the field of air traffic control automation, Lyle G. Alverson, has been appointed Chief of NAFEC's Human Engineering Branch. He succeeds Dr. Richard Van Saun, who retired recently.

In his new position, Alverson will examine equipment operated by pilots and controllers to make sure designs are efficient from a human factors standpoint.

Alverson was formerly Assistant Chief of the Air Traffic Control Systems Branch.

In 1956, he programmed the first computer used in operational ATC work. After two years at the Technical Development Center, he came to NAFEC in 1959.

With the agency since 1947, Alverson first worked as a controller at the Cincinnati and Indianapolis Centers. During World War II, he flew B-24s in combat in Europe. He is a native of Bellevue, Ky.

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Blastoff!

(Continued from Page 1)

directors, top military leaders and thousands of everyday citizens. Their safety in the air—and the safety of the hundreds of thousands on the ground—were primary to FAA.

This deluge of aviation was handled without a single incident.

Flawless air traffic operations during the three crucial days did not just happen. For weeks before liftoff, FAA specialists from the Miami Area planned, coordinated and conducted many conferences. Arrangements were made with Titusville Airport Director James Cooper to provide a suitable structure and space for a temporary FAA control tower and flight service station while the tower was manned by controllers from Orlando Tower. Flight service specialists from Melbourne, Orlando and Vero Beach staffed the temporary FSS. These facilities were operated on July 15, 16 and 17.

Specialists Aid Pilots

Flight service specialists provided hundreds of briefings on weather, restricted and warning areas and other pertinent data to the continually arriving and departing pilots. Controllers calmly and expertly provided advice, guidance and safe separation to a steady stream of airplanes and helicopters. Many of these aircraft flew dozens of extra flights, shuttling VIPs into Titusville, Patrick and the Cape Kennedy strips, some from as far away as Tampa on the west coast of Florida.

FAA area personnel highly praised Air Force air traffic personnel for their outstanding services and cooperation. Radar approach control services for Patrick AFB and the Cape Kennedy Regional Airport at Melbourne are provided by base military controllers. The base's RAPCON and tower are staffed exclusively by Air Force personnel, working closely with Bob Deason, FAA's Air Traffic Representative at Patrick.

IFR flights into Central Florida were handled en route by the Miami Center, handed off to the Air Force RAPCON at Patrick, then again handed off by the military facility to appropriate control towers at Cape Kennedy, Melbourne, Patrick and Cape Kennedy Skid Strip near the launch site or Titusville. Personnel of the FAA, the Air Force and NASA worked together as a team to achieve safe and expeditious flow of air traffic under difficult conditions.

Many celebrities, such as hotel magnate Conrad Hilton, movie actor Hugh O'Brian and CBS network President Stanton, flew in. One executive jet landed at Titusville from West Germany and an Air France Boeing 707, leased by *Paris Match* magazine, brought in its full staff to cover the launch.

Helicopter Monitors Operations

GADO operations and maintenance inspectors from St. Petersburg traveled to the Cape and set up a base of operations at Titusville on July 15 and 16. Ed Karvonen headed the GADO team and piloted an FAA rented helicopter to monitor operations during peak days.

Together, the St. Petersburg GADO, Miami Area FS and AT staff members and Air Force personnel developed a two-color "Special Notice" to assist the hundreds of pilots coming into the area for the first time. NASA printed 2,500 copies for distribution by GADO personnel. This "Special Notice" reproduced pertinent portions of the aeronautical section chart. Tower and FSS services, procedures and frequencies were clearly indicated. Restricted and Warning Areas protecting the launch site were illustrated, and pilots were warned of the abnormal density of air traffic to be expected.

To further alert the flying public, the notice was published in a local newspaper as a public service. Although final statistics have not been compiled, estimates indicate that air traffic operations handled during the three-day period by FAA and Air Force facilities in the area reached a volume 20 times heavier than normal. At one time, on July 16, some 700 visiting aircraft were counted on the ground: 135 at Cape Kennedy Regional Airport, 95 at Patrick AFB, 300 at Titusville, 75 at Central Brevard, 11 at Cape Kennedy Skid Strip, 57 at Arthur Dunn Air Park and 27 at Green's Air Park.

Joint Effort Eight Years

FAA-USAF-NASA cooperation has been evidenced since inception of America's space program eight years ago. Joint effort is put forth each time a launch takes place. Appropriate operational and airspace clearance actions have been designed, agreed on and implemented to protect all aviation activity so that no aircraft—private, military or airline—will be endangered by inadvertently traversing affected airspace at the Cape and for hundreds of miles down-range in the South Atlantic.

They Also Contributed

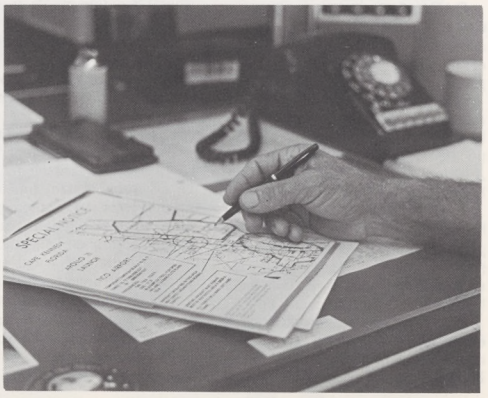
Among those who contributed to the overall effort in support of the Apollo mission were: Miami Area Manager Richard Skully; Assistant Area Manager Johnson (Jim) Frazier; John Graffius, Otto Warren and Ernie Silva, Miami AT Branch; ATREP Robert (Bob) Deason, Patrick AFB; Operations Officer O. J. Cowart, Miami Center; Tower Chief Howard Cone, Orlando; Tower Chief Dan Brown, FSS Chief C. A. McAllister and AFS Chief David McAnally, Melbourne; GADO Supervisor Frank Wignall and Operations Inspector Ed Karvonen, St. Petersburg. Others included all Patrick AFB personnel under the leadership of Lt. Col. William Wilson, base commander; NASA's Charles Buckley, Security Division, Kennedy Space Center; Frank Horn, Apollo 11 Program Officer; and Gordon Harris, Chuck Hollingshead and Jack King, Space Center.

Others included James Pound, Chief of the Jacksonville Center and his controller complement who handled the heavy load of outbound en route IFR traffic following the launch.

Among top officials who came in FAA aircraft Nan-3 to observe the Apollo 11 launching were Richard Van Dusen (left), Under Secretary for Housing and Urban Development, and Under Secretary of Transportation James Beggs.

Monitoring operations of the 1,000 aircraft flying into and out of the area during three hectic days of moonshot activities was Operations Inspector Ed Karvonen of St. Petersburg, who flew the helicopter the agency rented for the occasion.

One of the thousand aircraft visiting Cape Kennedy Regional Airport for the moonshot is "talked" to a safe landing by controller Wayne Farrington as Melbourne, Fla., Tower Chief Dan Brown points out the 135 planes already parked to Aviation Director Ed Foster and FAA Air Traffic Representative Robert Deason. Controller Al Pont (seated) gives taxiing instructions to yet another aircraft.



A key factor in keeping all pilots in the launch area informed of restricted areas was a Special Notice giving times and showing areas closed to air traffic during the hectic days around the July 16 launch. The notice also was reproduced in a local newspaper.

Busy RAPCON room at Patrick Air Force Base played a key role in handling heavy influx of air traffic into the Florida area surrounding the launch site. FAA personnel worked closely with the military in coordinating air traffic control activity.

This team of specialists at Melbourne FSS briefed hundreds of pilots of weather, routes, navaids and the like as they landed and departed during moonshot week: (from left), Howard Rose; C. A. McAllister, FSS Chief, Frank Groves and Robert Lane.

Smuggling Peril Outlined at Meet

ATLANTIC CITY — Problems created by the ever-increasing use of aircraft in smuggling narcotics and other dangerous drugs over the U.S.-Mexico border were highlighted at the Compliance and Security Investigations Seminar held here recently.

Actual case histories in which the agency was instrumental in helping track down and apprehend smugglers in the Southwest and Western Regions were presented and discussed.

Air Traffic, Flight Standards and Compliance and Security personnel worked closely with law-enforcement agencies in helping to stem the illegal over-the-border traffic.

Max Shaffer of the Southwest Region's C&S Division chaired a discussion panel on narcotics matters. He cited the high incidence of drug abuse in the nation today, particularly among young persons. Deleterious effects of dangerous drugs on holders of FAA airman medical certificates were explored and details concerning the investigation of such violations were discussed.

Discussions at the Investigations Seminar ranged over the wide scope of C&S investigative responsibilities in air safety matters. Other topics included criminal violations of the Federal Aviation Act, special fact-finding missions to support the needs of FAA management, tort claims and employee responsibilities and conduct.

NAFEC Director Jack Webb, and Acting Director of Compliance and Security Carl Maisch, discussed policy, ethics and missions of the FAA and C&S. Stressed by Maisch was the C&S philosophy of fair and objective investigations, professionalism within the ranks of C&S, the policy against invasion of privacy and the need to assure timely, equitable and uniform resolution of matters involving employee responsibilities and conduct.

Participating in the seminar, as both speakers and panelists, were John E. Marsh, Chief, Policy and Evaluation Branch, General Counsel; Dr. Herbert C. Haynes, the agency's consulting psychiatrist and Dr. John P. Skelly, Eastern Regional Flight Surgeon. Others included: Jack Embrey, Chief, Employee Management Cooperation Division, Office of Personnel, and Albert L. Butler, Chief, Air Carrier Operations Branch, Flight Standards.

Hosting the seminar was NAFEC's C&S staff headed by Thomas S. Chopin. George E. Dane, Chief, Investigations Division, acted as seminar moderator, assisted by Donald T. Heiman, Louis V. Sills, Robert J. Cole, Jay R. Adsen and Lamar Trammell, of the Investigations Division staff at headquarters.

Other participants and attendees at the seminar included: Central Region; Mrs. Marge B. Graf, William A. King, William G. McKim and C. Wayne Zinn; Eastern Region, Elliott H. Blue, Leonard LaRosa and Michael J. Micucci; Western Region, William Slade Hardee and Richard E. Robey; Headquarters C&S Staff, John Warholic and Leo J. Siclari; Southwest Region, John C. Adams and Max Shaffer; Southern Region, Herbert R. Davis; and NAFEC, Russell E. Miller.

At C&S Conclave

Participants in the recent Compliance and Security Investigations Seminar held recently at Atlantic City included (seated, left to right), C&S personnel Leonard LaRosa, Eastern Region; Marge Graf, Wayne Zinn, Bill McKim and Bill King, Central; Russell Miller, NAFEC; John Adams, Southwest; Donald T. Heiman, Louis V. Sills and George E. Dane, Headquarters; Carl F. Maisch, Acting Director of C&S; Thomas Chopin and Doris Bagwell, NAFEC; Herbert Davis, Southern; W. Slade Hardee and Richard Robey, Western; John Warholic, Leo J. Siclari and Lamar Trammell, Headquarters. Standing (left to right), Michael Micucci and Elliott Blue, Eastern; Al Butler, Flight Standards; and Robert J. Cole and Jay R. Adsen, Headquarters.

Major Achievements Marked by L.A. Center

PALMDALE, Calif.— The Los Angeles Center had two achievements to celebrate recently.

First, the center was the recipient of the Air Traffic Facility of the Year Award.

Then, for the first time in its history, the center handled more than a million IFR operations within a year's time.

Both honors were celebrated at a "Mega-Ball" here, attended by more than 250 employees and their wives.

At the ball to present the national award to the center was William M. Flener, Air Traffic Service Director. Also present was Arvin Basnight, Western Region Director, who presented a regional award to a representative trio of center personnel—Controller Hugh Adams, Crew Chief Barney Evans and Airway Facilities Sector Chief Wally Ward.

The center was named Air Traffic Facility of the Year in recognition of its efficiency in handling exceptionally heavy traffic at a time when extensive remodeling was in progress to accommodate installation of automated equipment. During the remodeling, more than 60 per cent of the center's control sectors were relocated or changed and 27 new consoles added.

On May 14, 1969, the center achieved a new milestone by providing air traffic control service to the one-millionth IFR flight in a 12-month period, the first time such a record has been set by a center.

During the first eight months of 1968, the center handled as much air traffic as it did during the entire previous year.

Honor for L.A. Center

Coveted Air Traffic Facility of the Year Award is presented to Los Angeles Center Chief Ben Freiman (left), by William M. Flener, Air Traffic Service Director, during ceremonies in Palmdale.

Masters Four

After almost three years of continuous study every weekend for 125 consecutive weeks, these four FAAers have achieved their academic goals: master's degrees in public administration from the University of Georgia. Congratulating each other are (from left), Lt. Col. Leland Cantlebary, the Southern Region's Army liaison representative; William Green, a watch supervisor at Macon's RAPCON-tower; and William Drotts and Orbin Clark—both Airway Facilities engineers. Their summer plans: no more studying.

Long Distance Commuters Granted Advance Degrees

ATLANTA—School is over for a quartet of long-distance commuters, FAAers William Green, William Drotts, Orbin (Bud) Clark and Lt. Col. Leland Cantlebary now that they have their hard-earned graduate degrees. Each commuted an average of 15,000 miles over the past 33 months to obtain master's degrees in public administration.

The "weekend scholars" moved up the academic ladder the hard way—working for the agency full-time during the week, and doing graduate study weekends for 125 continuous weeks.

Their regular work kept them in Atlanta and Macon. The greater part of their studies were accomplished at the University of Georgia in Athens.

Green, watch supervisor at the busy RAPCON-Tower at Macon, joined the FAA as an air traffic controller at the Atlanta Center in October 1959. He received his bachelor's degree in aeronautical administration at Auburn University. An Air Force veteran, he served six years as a jet fighter pilot. He and several co-workers are presently building an experimental biplane.

Drotts, Chief of the Facilities and Equipment Section in the Airway Facilities Division in the Southern Region, joined the agency in 1957. A World War II veteran, he spent three years in the European and Pacific Theaters with the Army. He received his bachelor's degree in civil engineering at Texas A&M. He devotes his spare time to painting, coin collecting and reading.

Clark, an electronics engineer in the Communications Section of the Airway Facilities Division, is a native of Kingsport, Tenn. He joined FAA as an installation engineer in December 1958. During the Korean conflict, he spent three years as a central fire control gunnner on B-29 and B-50 aircraft.

Colonel Cantlebary, who served as the Army's regional representative in the Atlanta regional office for three years, was recently transferred to Vietnam. He is a 28-year Army veteran and Master Army Aviator, with both fixed wing and helicopter ratings. Prior to departure for Southeast Asia, he was decorated with the Army's Legion of Merit for distinguished service while assigned to the Southern Region.

Grateful Light Plane Pilot Praises Center Personnel

FORT WORTH—"We were continually in voice contact with the Fort Worth ARTCC, receiving vectors around thunderstorms and pilot-in-flight reports from the controllers," a grateful general aviation pilot wrote to Southwest Region Director Henry L. Newman recently.

"For the two hours that we were on the gauges, we had the feeling of receiving personal attention, even though the Center was busy with airline traffic," the pilot said in describing an IFR flight from El Dorado, Ark., to Fort Worth's Meacham Field.

The pilot also expressed gratitude for the courtesy and consideration shown him by FAA controllers.

"My wife made several phone calls to the Center to track my flight," the pilot wrote. "The people with whom she spoke were courteous and informative. When we were identified in the Dallas area, they informed her and gave her my estimated time of arrival at Meacham. This letter cannot adequately express my thanks and appreciation to the personnel of the Fort Worth ARTCC, but maybe it will, at least, stand as a mark in the 'good work' column," the pilot's letter concluded.

FAA Gets Its First Executive Intern

By Carol A. Langguth

WASHINGTON — Eileen E. Kraus, from Mercyhurst College, Erie, Pa., has been selected as an FAA Executive Intern under a new program to place outstanding college and graduate school students in important offices throughout the Federal government this summer.

Eileen is among the 75 interns now working for various Federal agencies in Washington.

In her new job with the Manpower and Planning Staff in the Office of the Associate Administrator for Personnel and Training, Eileen has been assigned a project involving the new two-year experimental program for training air traffic controllers in 20 junior colleges.

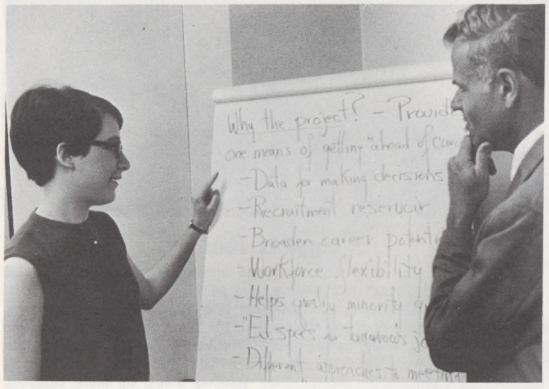
She will develop a plan to evaluate trainees taking these college programs and compare them with trainees lacking this background. The evaluation will also produce data as to the value and effectiveness of different educational programs.

Students selected as Executive Interns gain a firsthand knowledge of the functions of government while doing meaningful work. They are chosen on the basis of high marks received in Civil Service examinations for summer employment, sincere interest and school records.

With 30 other young people, Eileen has been active in a YMCA project in which students meet twice a week to discuss government problems. It was due partly to this project that Eileen became interested in the Executive Intern program.

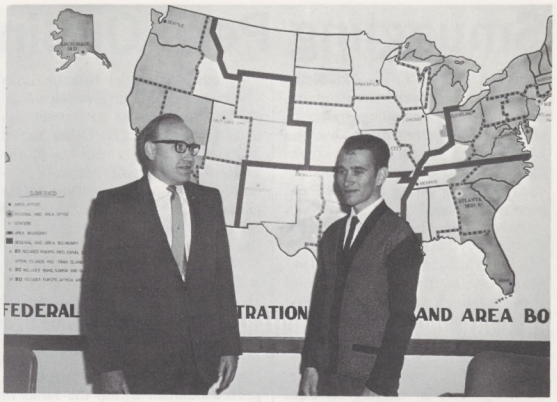
Eileen will be entering her fourth year of college in the fall. She is majoring in modern history and plans to teach high school civics or history for a few years after graduating and then work toward a master's degree. Her ultimate aim is to work in curriculum development in the social sciences.

"I am very pleased to have the opportunity to come to Washington and meet the many interesting people associated with the intern program," Eileen said. "I look forward to a fruitful and exciting summer in my new job."



Executive Intern

FAA's Executive Intern Eileen Kraus discusses the new intern program with her supervisor in the Manpower and Planning Staff, Lawrence M. Bott, as both look over a "flip-chart" presentation.



Schoolmates

Standing in front of a wall map showing FAA domestic regions are Fred W. Lebhart (left), 48, and his son, Fred N. Lebhart, 22, who recently were enrolled together in air traffic control classes at the FAA Academy.

It's A Real First!—Father, Son Are Classmates at Academy

OKLAHOMA CITY—A first in air traffic control training was chalked up recently when father and son both attended classes at the FAA Academy at the same time.

Fred W. Lebhart, the father, has been with FAA 28 years and has worked in air traffic control the entire time. His CAA-FAA career started at Amarillo, Tex., in the control tower.

When he left Amarillo, he transferred to the Air Route Traffic Control Center at New Orleans. Lebhart also has worked at ARTCCs in Honolulu, Albuquerque and Seattle. He started his aviation career with the Air Force, serving in the Pacific during World War II.

At Oklahoma City he was enrolled in the NAS Data Systems Coordinator Course.

Lebhart's son, also named Fred, 22, is following closely in his father's footsteps, although he isn't quite as far down the road. He, too, began his aviation career as an Air Force controller. He attended a four-month course in air traffic control at Keesler AFB and served overseas in Germany.

As a new FAA employee, the younger Lebhart will work at the Denver ARTCC at Longmont. He thinks he would like to transfer to the Seattle Center after his father retires, but perhaps may change his mind and stay in Colorado.

He is enrolled in the Air Traffic Control en route training option at the Center.

FAAer Sets Glider Record

ROSWELL, N.M.—A high-soaring flight service specialist has reached new heights in glider flights over New Mexico.

Benny A. Sapyta of the Roswell FSS set a new altitude record for the state in a multi-place glider with an absolute altitude of 20,570 MSL. His altitude gain was 10,728 feet.

Flying a Schweizer 2-32 with his partner, John Anderson, a former glider instructor, Sapyta set the record over the Sierra Blanca Mountains near Ruidoso.

A sailplane enthusiast for several years, he was contest coordinator last year for a regional sailplane meet at Roswell Industrial Air Center in which contestants flew 7,000 miles in a total of 182 hours without incurring a single accident.

Newman Named Dallas-Ft. Worth FEB Chairman

FORT WORTH—New chairman of the Dallas-Fort Worth Federal Executive Board for the coming year is FAA's Southwest Region Director Henry L. Newman.

Newman, who succeeds a Navy captain in the position, will preside over the work of directors from more than 50 Federal agencies and offices in the area.

The board—one of 16 located in major U. S. cities—works to foster better cooperation and understanding of programs among the Federal establishment. Another aim is the promotion of closer relationships among representatives of Federal offices and state, county and city officials.

'De-clutter' Device Is Studied

By Alex F. Garvis

JACKSONVILLE — A three-month field evaluation by the FAA of a solid-state, low-cost electronic device designed to reduce weather clutter (precipitation) is scheduled for completion in September.

Technicians and air traffic controllers will conduct evaluations of the "de-clutter" equipment at the Jacksonville Tower.

Called the Log-FTC-Antilog, the instrument in its final version will be about the size of a table model radio and is attached to existing ASR radar units. Although previously used with radar receivers to eliminate weather clutter, its application to a radar using a moving target indicator (MTI) is unique. MTI circuitry is designed to remove ground clutter returns—such as buildings—while still retaining aircraft target returns.

It was previously believed that the Log-FTC-Antilog circuitry and the MTI circuitry were not operationally compatible. Development of a Log-FTC-Antilog circuit compatible with the MTI circuit would provide a means whereby the ground clutter and the precipitation clutter could be removed from the radar display simultaneously, while still retaining aircraft returns.

Laboratory evaluation of the declutter equipment was completed by the FAA last month at NAFEC. The tests were conducted by Systems Research and Development Service, under the direction of Kenneth E. Coonley, Washington program manager, and William Herget of NAFEC, project manager of the testing program.

The test unit has been leased by the agency from the Westinghouse Electric Co., its developer.

Center Hosts Senator

Highlight of Sen. Edmund Muskie's recent tour of the Boston Center was seeing operations of the Bangor, Me. Sector and other services provided New England aircraft. William Cullinan (pointing), Boston Area Office Manager, conducted the tour for the Maine Senator who was accompanied by (left to right): Frank O'Brien, Center Operations Officer; Charles Glenday, president, Nashua Chamber of Commerce; Nathan Talbot, Airway Facilities Sector Chief; and Sidney Poe, Chief of the Boston Area Air Traffic Branch.

Community Worker

Accepting a $1,000 contribution for the Longmont Museum fund drive is Denver Center Controller Louis Lombard (left), president of the museum's board of directors. Les Von Hagel, vice president of the Longmont Board of Realtors, presents the certificate of deposit to Lombard.

Denver Center Controller Gets $40,000 for Museum

LONGMONT, Colo. — Denver Center Controller Louis Lombard has raised nearly $40,000 for the Longmont Historical Museum during the past six months.

As president of the museum's board of directors, Lombard spearheaded the fund drive in his off duty time. He called at more than 1,000 homes in the area, made 63 speeches to civic, social and church groups, mailed out 10,000 circulars and arranged for publicity. Lombard also promoted an outdoor auction as part of the diversified fund-raising campaign.

The success of Lombard's campaign was evidenced by the substantial contributions made to the museum during the drive just concluded. Among the contributions was one for $1,000 from the Board of Realtors.

Lombard also finds time to coach Little Leaguers, is active in the Boy Scouts organization, the Longmont Civic Center Advisory Committee, the Centennial Commission, Toastmasters and in two fraternal organizations.

DIRECT LINE

This is your direct line to the top! Your questions will get answers! Employees are encouraged to discuss questions with supervisors or their local personnel office, but for those who do not have ready access to a personnel office, this column will provide an opportunity to get questions answered. Send your letter to Acting PT-1, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D. C., 20590. Ground Rules: • All questions must be signed. • This column should not be used to supplant formal grievance and appeals procedures. • Questions should concern personnel and training policies, programs and procedures, not operational or technical matters. What's your question?

Question: What is the Civil Service and FAA policy concerning discrimination because of age when hiring or considering applicants for promotion? Does this policy apply when considering applicants for positions in enroute traffic control centers and towers?

Answer: The law and Civil Service regulations forbid the establishment of maximum age limits when hiring or considering candidates for promotion. This policy applies to all applicants for all air traffic control positions in all options.

Question: How many times can one take the pilot weather briefing examination?

Answer: The Pilot Weather Briefing examination is administered by Weather Bureau personnel. The Weather Bureau examiner is the judge as to when, if, and how often the exam may be retaken. For further information, check with the local Weather Bureau office.

Question: Handbook 3330.6, paragraph 23, fosters in-grade interchange of personnel between overseas and parent domestic jurisdictions. Would not extension of this policy to the European Region provide a more equitable distribution of personnel and ease the burden on domestic parent organizations?

Answer: Provisions of paragraph 23 are applicable to overseas positions in grades GS-9 through GS-15 in the Pacific, Alaskan and Southern Regions. Most positions in these regions have their counterparts in the domestic service. Usually, there is at least one highly qualified employee in the parent organization available for mutual exchange because of the similarity in duties, responsibilities and qualification requirements. This is not so, however, with foreign assignments. Most foreign positions have special qualification requirements which are critical to success in a foreign environment. Experience shows that competition for these positions works out much better on an agencywide basis.

I have two questions:

Question: (1) When an employee leaves Government service before or after 15 years, may he collect all money withheld for retirement during his years of Government service?

Answer: (1) Retirement deductions are refundable to an employee regardless of years of service if he meets all the following requirements: (a) He is separated or transferred to a position not subject to Federal retirement deductions at least 31 days before the beginning date of any annuity for which he is eligible. (b) He files application for the refund at least 31 days before the beginning date of any annuity for which he would be eligible. (c) He is not currently employed in a position subject to Federal retirement deductions. (d) He is not scheduled to be employed in a position subject to Federal retirement deductions within 31 days.

Question: (2) Will any of his retirement deductions be subject to Social Security withholding?

Answer: (2) No, refunds of retirement deductions are not subject to Social Security or any other kind of withholding.

Question: Should FAA furnish foul weather protective clothing for personnel required to work occasionally during inclement weather?

Answer: Order 3900.17, Occupational Safety, provides for issuance of protective equipment, devices and clothing when their use is clearly necessary and employees would not normally be expected to furnish them. Provision of clothing and devices to protect against traumatic injury is more clear-cut than protection against the elements. The Comptroller General has indicated in several decisions that foul weather clothing can be provided if all the following additional conditions are met: (1) The work could not be done as expeditiously, from the agency's standpoint, without it. (2) The occasions requiring the clothing are of an emergency nature or are infrequent, rather than routine. (3) The clothing can be used by other employees and is not assigned to an individual. When these factors are present, your supervisor may initiate action for the necessary foul weather clothing.

Question: What is agency policy concerning an electronics technician (avionics) working at a facility alone without any help?

Answer: Direct Line assumes that you are referring to FAA policy on occupational health or occupational safety. At the present time, there is no specific agency occupational safety or health policy on electronic technicians working alone. The agency is exploring the need for issuing a policy statement on this matter. In the meantime, you should report potential hazards to your supervisor. If necessary, your supervisor may obtain assistance from the Regional Safety Officer on occupational safety matters and the Regional Flight Surgeon on health questions.

Airport Dilemma Has Real Horns; FAA Has Answer

By Joseph Crouse
Chief, Florence FSS

FLORENCE, S. C.—Availing itself of an unlatched gate, a cow recently left the local stockyard and strayed onto Florence Airport. After crossing runways, the animal wandered past the FSS.

FS Specialist Kenneth Lowery attempted, without success, to drive the cow away from the field. He then commandeered an airport emergency truck equipped with a public address system and used this to give an imitation of "cow talk" —a loud "Moo-o," hoping this would scare the animal away.

Instead of retreating the cow rushed to the truck, draped its head over the hood and gazed at Lowery. He decided to drive off in the direction he wanted the cow to go, giving off with an occasional "Moo-o". The cow galloped after the truck as it drove from the airport, and was later corraled at the stockyard.

World's Record Setter

For setting a new speed record on a flat mile-and-a-half course of 136.1 m.p.h. in his Mooney Mite, Donald C. Sinclair of Westfield, Mass., receives his certificate from FAA Administrator John H. Shaffer, on behalf of the International Aviation Federation. Also approving Sinclair's recognition for the most meritorious performance of 1969 is William H. Ottley, executive director of the National Pilots Association.

NMAC Task Force Offers Solutions

By Irv Ripps

WASHINGTON—A program of remedial actions to cope with near midair collisions was recommended today by a special task force in its final report on a "Study of near Midair Collisions (NMAC) of 1968."

The recommendations resulted from analysis of 2,230 reports voluntarily submitted to the agency during 1968, almost entirely by pilots. Reports were submitted by 938 general aviation—732 airline —and 555 military pilots. Five incidents were reported by FAA controllers.

FAA Administrator John H. Shaffer praised the cooperative efforts of the commercial, military and general aviation pilots and the air traffic controllers who participated in the study.

Of the total number of NMAC reported, 1,128—approximately 50 per cent—were classified by the study team as "hazardous." The remainder were classified as "non-hazardous," with the separation between aircraft exceeding 500 feet and up to many miles.

During the reporting period, there were approximately 52.3 million flight operations of all types made in the United States.

In defining the causes of the 1,128 near midair collisions, the report listed the problem areas:

See and Be Seen—This area covered aircraft flying in VFR weather and depending on the pilot's ability to see and avoid other traffic. Twenty-one per cent of the hazardous incidents fell in this area. The major cause listed was the fact that pilots frequently had difficulty sighting other traffic because of speed differences, aircraft silhouette, relative position or other reasons.

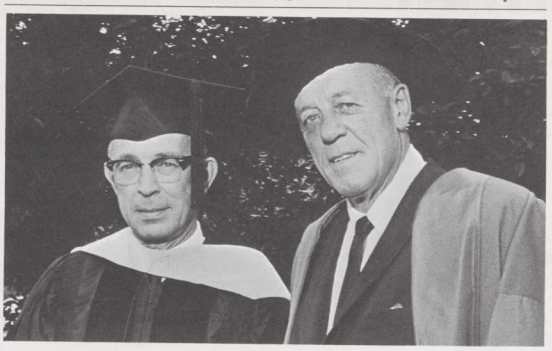
Mix of IFR/VFR Aircraft—This problem area, which concerns the uncontrolled mixture of VFR and IFR traffic, accounted for 20 per cent of the incidents with three-fourths occurring in terminal airspace. The highest causal factor involved an aircraft climbing or descending and encountering another aircraft in level flight.

Airspace Navigation—This was the third most serious problem area, figuring on 14 per cent of the incidents. The major causal factor involved aircraft converging or diverging on a navigation aid.

Traffic Pattern—This problem was a factor in 12 per cent of the incidents and consisted primarily of one aircraft cutting another out of the traffic pattern.

Pilot Deviation Indicated—In the enroute area, the major causes were pilots cruising at the wrong altitudes or failing to maintain altitude accurately. In the terminal area, the primary causal factor was pilots operating within an airport traffic area without radio communications or ATC clearances. Pilot deviation figured in 12 per cent of the hazardous incidents.

Training—Training operations also proved a major problem area, figuring in eight per cent of the hazardous incidents. The major cause involved preoccupation by pilots with training duties. Acrobatics and simulated IFR flying with hoods also were listed.



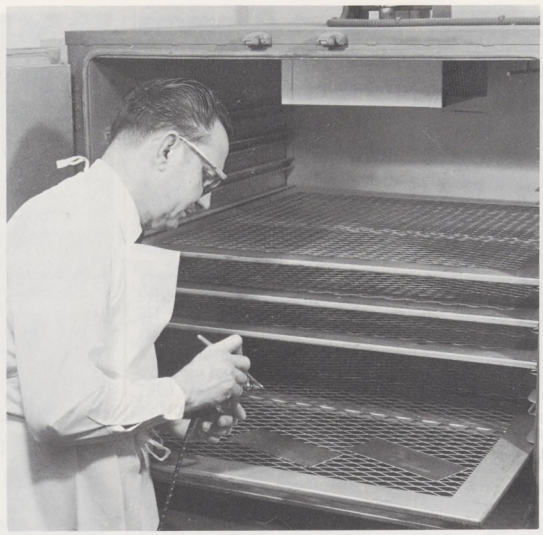
Academic Honors

Recipient of an honorary doctorate from Purdue University is John J. Swearingen (left), inventor of jet aircraft oxygen equipment and a renowned researcher in transportation safety. He is Chief of The Protection and Survival Laboratory, Civil Aeromedical Institute, at the Aeronautical Center. Purdue's new Doctor of Aviation Technology is congratulated by University president Frederick L. Hovde.

Boon to Pilots

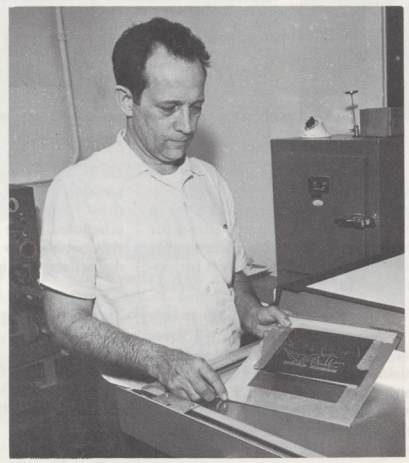
Helpful agency pamphlets are made easily available to pilots entering the FSS at Meadows Field, Bakersfield, Calif. Chief Don Edwards built aluminum racks in otherwise unused space. Visitors, such as this pilot examining the latest issue of *FAA Aviation News*, appreciate the addition.

First step in making a printed circuit board is to draw a custom layout from schematic drawings, or from a reproduction of a damaged board. The finished drawing is photographed and the negative reduced to the desired size. Here John R. Corbett of NAFEC works on a layout.



While the circuit layout is being made, a copper-coated epoxy glass board is prepared. Electronics technician Roy Dean of the Aeronautical Depot begins by spraying the copper with light-sensitive plastic.

Next, the board and an exact-size negative are brought together. Using an ultraviolet light source, the negative is printed on the board. Areas which will make up the circuit are exposed and the plastic in these areas hardens. Frank A. Rosati prepares the package for the printer.



In-House Service Cuts Delays . . .

CIRCUIT BOARDS from 'SCRATCH'

By Theodore Maher

In the past, whenever electronic equipment malfunctioned at NAFEC or the Aeronautical Center, costly delays and considerable downtime have been encountered.

Because FAA technicians at these two locations now have the know-how for making one vital electronic component on a custom basis, complex, expensive equipment vitally needed for air safety is kept from standing idle "for want of a nail."

Plants established at NAFEC and the Aeronautical Center now turn out custom printed circuit boards in a matter of hours, using a schematic drawing of the damaged board as a starting point. Since it may take weeks to get a specific board from the manufacturer, the agency's ability to produce these boards "on-site" in less than two days provides real savings in time and money. Most important, facilities vital to aviation safety are kept functioning.

Equipment needed to reproduce circuit boards is relatively simple and inexpensive. An amazing variety of boards, ranging from those no larger than a postage stamp to some larger than a man's hand, can be produced. It is possible to turn out such complex boards as those with circuitry on both sides.

The boards are used in a wide variety of vital electronic equipment, including alphanumeric generators, airborne computers and radar video digitizers which convert radar signals for transmission over telephone wires and through computers.

Since production capacity is limited, most of the boards are used locally, but some have been shipped to other facilities in emergencies. One recent important job was making "instant circuitry" for blind spot ground control equipment at Kennedy International Airport.

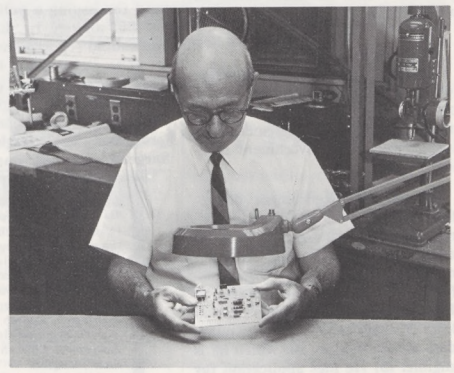
Although fabricating circuit boards is a relatively small operation, it is another good example of the agency's continuing effort to provide a better service for less money.

The ingenious process by which a relatively simple drawing is converted into a three-dimensional electronic component is illustrated in the accompanying step-by-step photos.

The board is then washed in a plastic solvent which strips the plastic form unexposed areas, but does not remove the plastic which was exposed and hardened during the photo process. With the circuit now printed in plastic material, the board is baked in an oven to further harden the plastic. Note strap girdling the board used by Roy Dean to hold board.

Now the board is dipped into an acid to which the plastic—but not the copper—is resistant. Unprotected copper is etched away and only the circuitry remains. Gene D. Tupper of NAFEC carefully places the board in the etching machine.

Finally, holes are drilled in the board, and resistors, capacitors, transistors and integrated circuits are slipped into place. Roy Dean clips the tiny parts securely to the board before the entire assembly is dipped in solder. In this one operation, all connections are soldered and the circuits are coated for additional protection.



Finished product is a completed printed circuit module, designed and fabricated by FAAers at FAA facilities. This sample of the agency's custom work is examined by Jack Rosen, supervisor of the Printed Circuit Facility at NAFEC.