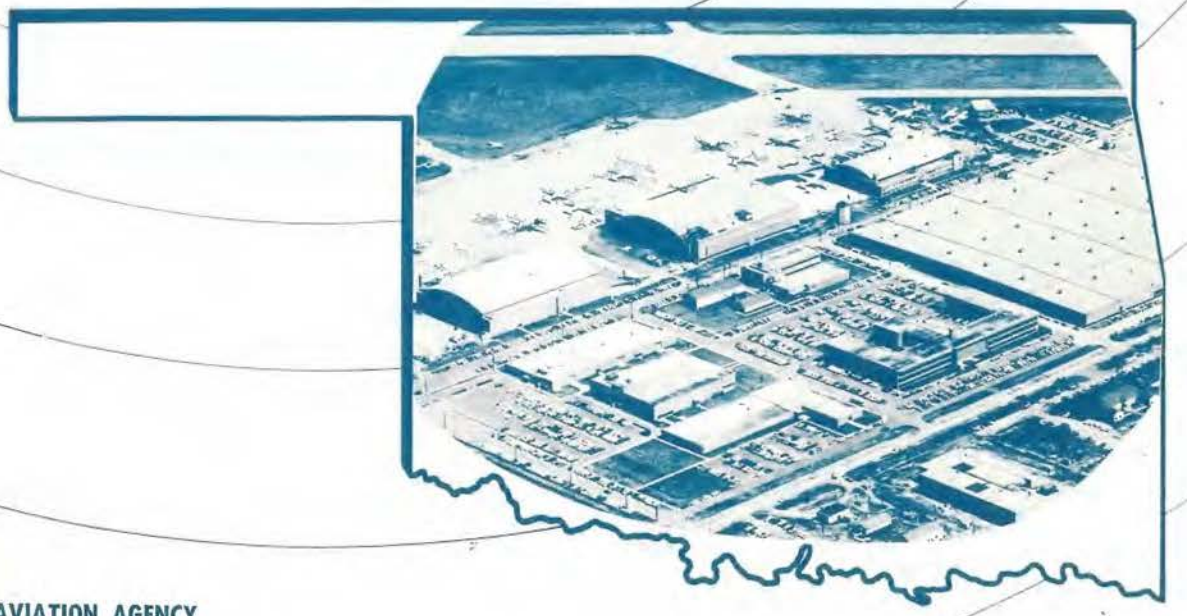
BEACON

FEBRUARY, 1960



FEDERAL AVIATION AGENCY

AERONAUTICAL CENTER

OKLAHOMA CITY

POINT OF VIEW

If there ever was evidence that the "far-seeing look" of the pioneer is still alive in this jet and space age technology today, it can be found in the Southwest and Oklahoma.

Consider Oklahoma City! A little over 60 years ago this city -- now ballooning toward a half million citizens -- didn't exist. There was just prairie land.

Look southwest of the heart of Oklahoma City. Look toward the west side of Will Rogers Airport and see the university-style buildings that make up the Federal Aviation Agency's Aeronautical Center. Four years ago less than 400 persons worked in old war-type wooden buildings; today nearly three thousand technicians in all aviation fields work there and bring into Oklahoma City a payroll estimated at more than $14,000,000 a year.

This burgeoning "University of the Air" has set its sights on twice the number of current employees and, with the increase in air traffic control training, radar, avionics, flight operation and inspection, some 16,000 students annually.

Perhaps the giant and cohesive element of this fantastic growth is seen in the community spirit. Here government and civic leaders have worked hand in hand to breed a new and strong "Community Image" at the Aeronautical Center and a new "Center Image" within the community.

It is this "pioneer spirit," this will to cooperate, that continues to make Oklahoma a place with a future.

John Jarman

John Jarman
United States Representative

Dr. P. C. Tang, Neurophysiologist

James A. Green, Physiologist (Medical)

Dr. Robert Clark, Acting Director,
Civil Aeromedical Research Institute

J. D. Allred, Audio Visual Services Chief

M. C. Oviatt, in charge of
Research Engineering Services

MEDICAL RESEARCH CENTER

The boundary markers of the FAA Aeronautical Center stretched from Will Rogers Field at Oklahoma City southward this month to the former Naval Air Technical Training Center at Norman.

The Federal Aviation Agency, through Doctor Robert T. Clark, Director of the new Civil Air Medical Research Institute, announced that temporary headquarters for the Institute would be set up at the old NATTC area.

Work already has started on the remodeling of the administration building and the construction of laboratories and other buildings at Norman. The Civil Air Medical Research Institute will operate out of the Norman buildings for about 18 months. Plans call for the construction of a permanent multi-million dollar Medical Center at the Will Rogers Aeronautical Center.

Some 18 professional people are on hand now. The staff will be increased to about 150 in the next two years.

Director Clark is a biologist and physiologist. One of his recent responsibilities was preparing the monkey, Sam, for that 55-mile ride into space aboard the Project Mercury capsule. That successful flight took place in December.

The 43-year old scientist has been head of the U-S Air Force Aerospace Medical Center at San Antonio, Texas.

Clark and his staff—many came with him from the Air Force Medical Center—hope to begin research at Norman within a few weeks on such problems as pilot fitness at various ages; the survival and protection of airline passengers forced down in the Arctic or desert.

Doctor Clark says that age is no longer considered as a chronological factor, at least not in the flying game. Some men are physically out-moded, worn out, at forty or forty-five; others are still showing the youthful reaction time, nervous reaction and physiological make-up of the young man at fifty-five or sixty years of age. The stress of supersonic flight in this day, lined against the almost-in-space and Mach Two airline flights just around the corner, highlight the need for complete study in this field.

On the question of survival and protection under extreme conditions, tests will be carried out under conditions that simulate—almost to the degree of temperature—the actual survival factor of extreme cold or heat. Tests have already been carried out on the endurance of the human body in sub-zero temperatures and under temperatures that climb as high as 130 degrees.

What happens to the pilot's senses if his oxygen fails? That's an old story and a well-known one. The pilot blacks out above certain altitudes. The Civil Air Medical Research Institute plans to continue experiments in altitude research; conditioning subjects to the art of living at altitudes of fourteen thousand feet or even higher. Doctor Clark recalled some past experiments along this line. He mentioned a fifty-five year old man who had been conditioned to live at an altitude above fourteen thousand feet. In a pressure chamber test the man was able to perform nearly normal functions at an altitude of nearly thirty thousand feet for over an hour. The normal man, accustomed to sea level pressure, blacks out in just a few seconds.

The question of pilot reaction time will also be one of the problems Clark and his group will study intensely. In this jet age . . . pilots need almost super-human reaction time to be able to cope with the nervous strain of flying at extreme altitudes and at speeds when an object in the sky can be upon a fast-treveling plans quicker than the eye can relay the message to change course. That will be one of the problems to be studied.

Doctor Clark expects to work closely with the Oklahoma University School of Medicine faculty and with local doctors in the Oklahoma county area. In his spare time—if he has any—he will also go back to an old love, teaching.

The doctor and his wife have three children. And—recently—were nominated by the PTA in New Braunfels, Texas for the title, "National PTA family."

CARI PUBLISHES RESEARCH

Members of the Civil Aeromedical Research Institute, Aeronautical Center, Oklahoma City, have published an analysis of emergency exit operations based on a research project conducted when the laboratory was located at Ohio State University.

The paper entitled "THE MAGNITUDE AND DIRECTION OF FORCES THAT MAN CAN EXERT IN OPERATING AIRCRAFT EMERGENCY EXITS" was published in the November, 1959, issue of the Journal of the Human Factors Society. The article by E. B. McFadden, J. J. Swearingen and C. D. Wheelwright describes the muscular contraction, duration, and direction of force required to operate emergency exits.

The subject, a student nurse, attempts to apply her maximum strength to the emergency exit operating handle. Instruments outside the mockup wall record the magnitude, direction and duration of the force applied.

The experimental phase of the project was carried out in a spcially-designed mockup of a Convair 240. Student nurses and airline hostesses constituted a majority of the female subjects tested. Male subjects consisted of students and laboratory personnel. In addition, a few children were tested.

A four year old child attempts to operate the emergency exit. Children of various ages were tested in order to evaluate the possibility of inadvertent operation of exits by children. (A remote possibility but such an incident has occurred.)

The findings of the research group is expected to assist engineers in the standardization and design of better and more reliable exit operating mechanisms.

SECOND EXECUTIVE

SCHOOL UNDERWAY

The second FAA Executive School opened February 7th at the Oklahoma City Aeronautical Center. It runs through the 19th of the month.

The school is for the top management personnel of the Federal Aviation Agency. The first session was held at the Center in October of last year.

James Pyle, deputy FAA administrator made the opening talk in the Oklahoma City Biltmore Hotel the night of February 7th.

This Executive School is under the direction of A. Erick Bubeck of the FAA training division in Washington. Doctor E. E. Olson, dean of the school of public administration, University of Southern California, again acted as consultant to the school.

Some of the sessions were held at the University of Oklahoma with professors from the school of management in charge.

Among the speakers during the school were Major General Thomas P. Gerrity, commander of the Oklahoma City Air Materiel Area, Tinker Air Force Base, and Doctor Robert Blake, professor at the University of Texas.

Others taking part in the school will be: Brigadier General Carl I. Hutton, FAA Director of Training; J. D. Blatt, FAA Region One Manager, New York; J. Meisel, FAA Personnel Chief; Doctor Warren H. Schmidt, assistant director of extension for the University of California in Los Angeles; Harold B. Alexander, FAA deputy budget chief; Fordyce Luikart, FAA assistant administrator for personnel and training; J. Gordon Bennett, special assistant to the FAA Administrator; Lt. Colonel Charles W. Denning and Ellis Woody, FAA Training Division, and Doctor Elliot P. Roberts, FAA Office Management Services:

Some 25 top executives are in the school. All regions, the Washington headquarters and the Aeronautical Center will be represented.

CENTER TO HOST RTCA MEETING

The Aeronautical Center at Will Rogers Field will play host to the Spring convention of the RTCA in late May.

The Radio Technical Commission for Aeronautics is made up of engineers from electronic firms and representatives of various governmental agencies and departments that deal with aeronautical electronics.

James Clericuzio, co-ordinating officer for the FAA in Washington and program chairman for the up-coming meeting, expects more than 300 radio and electronic engineers to attend.

The major portion of the sessions during the three day meeting will be held at the Aeronautical Center. Clericuzio explained that the RTCA felt it would be ideal to give the technical papers and then visit the facilities where the theory discussed in the paper is being used in actual practice.

He added, "Most of the papers will be on 'little black boxes!' Here at the Center we can give a picture of what those little black boxes do in aeronautics."

Some of the sessions will be held in a downtown Oklahoma City hotel. The exact location had not yet been determined as the Beacon went to press.

The theme of the spring meeting will be "Men and Electronics in Federal Aviation."

WASHINGTON NOTES

The FAA is working closely with the Civil Aeronautics Board to provide medical participation in the investigation of fatal air accidents.

There were more than 300 casualties in commercial airline operations in 1959. So, a "human factors" team will be assigned to each investigation; will carry out investigations to determine whether any physical disability of the human mechanism may have contributed to the accident. This team will also try to reconstruct the events which led to the accident.

The FAA's Office of the Civil Air Surgeon and the Armed Forces Institute of Pathology is providing the personnel to the "human factors team" to carry out the medical phase of the investigation. With that—arrangements are being made to get expert aviation pathology consultant services at strategic locations throughout the country.

The medical approach to accidents is carried out in a manner similar to the study of epidemic diseases in terms of aircraft accidents. These involve study of the operating personnel, the aircraft and the conditions aloft.

The FAA is proposing a number of mandatory requirements for jet flights in radar advisory areas that would increase operational safety and efficiency. The proposal would apply to both U-S and foreign carrier turbojets, operating above 24-thousand feet over the continental U-S.

The special civil air regulation would require all turbojet air flights to fly in jet advisory areas. Such flights would be equipped with a functioning radar beacon transponder at all times. This would supplement primary surveillance radars based on the ground.

The new rule also proposes to standardize lateral dimensions of the jet advisory areas to 16 statute miles on either side of the jet routes between 24-thousand and 39-thousand feet, inclusive.

A proposal to amend the air traffic rules to clarify the distinction between "clearance" and "instructions" is being considered by the FAA.

The rules at present provide for the use of the two terms, but there has been a misunderstanding on the part of a few pilots concerning the difference between the two. The proposed rule makes the distinction clearer by pointing out that the clearance is in the nature of an agreement between the pilot and controller with regard to a particular course the pilot is to fly. The instruction, on the other hand, requires immediate and mandatory action by the pilot.

The controller would have the final authority in determining that the traffic situation, in the interest of safety, does not permit discussion of alternative action. The pilot may request an alternative action only after he has complied with the terms of the instruction.

The Agency is publishing the amendment to Sections 60.19, Air Traffic Control Instructions, and 60.60, Definitions, in the form of a proposal so that all pilots would be informed of the obligatory nature of an air traffic control instruction and have an opportunity to submit comments concerning it.

Lee F. Seirp, representative of Tactair brought this auto pilot training aid to use in his demonstration.

The Lear Life System simulator which was used at the Paris Air Show was brought by Pete J. Semper for his presentation. Buck Winston, FAA instructor, left, and Jim Gammon, Chief General Maintenance Section, watch as Semper demonstrates the simulator to the class.

The L-2 auto pilot simulator, which was built at the Aeronautical Center, was demonstrated by Charles L. Huston of Motorola. Observing are left to right Pat Baretta and Martin Casey, FAA instructors and students who attended the course.

Jim Gammon; R. S. Anderson, General Aviation Supply - Mitchell distributor; Bill Pearce of Mitchell; and Pat Baretta check the components of the Mitchell auto pilot for the class.

FIRST FAA INSTRUMENT COURSE HELD

Industry joined with General Maintenance Section of the Aircraft Branch in the first FAA course in Modern Aircraft Instruments and Automatic Flight Controls when the new GM-5 test and study guide were presented January 25-February 5 for 11 students.

Manufacturers of atuomatic pilots covered in the course were invited to send technical representatives to explain the products made for general aviation aircraft.

Instructors who prepared the text taught the areas not covered by representatives from Tactair, Mitchell, Lear and Motorola. Unable to attend the first session were representatives from Collins, and Sperry.

Students expressed the opinion that the course was vital at this time, and that its inclusion in the Aeronautical Center's program was a great time saver.

"To visit all the plants of the makers of the various auto pilots and other modern instruments to get the same information would take months," one student said.

Students in the first class were: Lawrence N. Bass, aero design evaluation engineer, FW-241, Fort Worth; James E. Christopher, deputy branch chief of general maintenance branch, KC-257, Kansas City.

Henry G. D'Estout, airworthiness inspector, LA-257, Oakland, Calif.; Jules Descrescenzo, airworthiness inspector, Ny-257, Teterboro, N.J.; Roger L. Fancey, airworthiness inspector, FW-257, Midland, Texas.

William D. Ford, deputy chief, general maintenance branch, LA-257, Los Angeles; H. A. Hart, aero engineer, FS-120, Washington, D.C.; Quay Lyle, general maintenance inspector, FW-257, Little Rock.

Joseph J. Manning, repair station specialists, KC-257, Detroit; H. Tavetian, repair station specialists, NY-257, LaGuardia field, New York; and John N. Temte, chief, air carrier maintenance section, AG-262, Aeronautical Center.

Second class in the new course will be held March 7-March 18, L. E. Shedenhelm, chief of the aircraft branch, said.

REGION 4 EMPLOYEE RECEIVES AWARD

Like a Christmas bonus, a suggestion award certificate with check attached, was presented to Harold Hazlett by ANF Branch Chief C. W. Mueller, during Christmas week, on behalf of the Region 4 Maintenance Engineering Branch.

Mr. Hazlett, a student in C. E. Class 141, was granted the award by his Region's Incentive Awards Committee for a suggestion on rapid rewind of repeater cartridges for transcribed weather broadcast equipment.

Others of us may well note that Mr. Hazlett had been in FFA only a very short time when he turned in the suggestion. He entered on duty last June, and started C. E. School on October 19.

CORRECTION—BEACON OMITS NAME

In a news item showing the new organization of ANF Branch, the position title and name of the Branch Technical Assistant was inadvertently omitted. Dan L. Fritz, formerly of Region 5, was selected to fill the Technical Assistant spot last fall when Leon Daugherty transferred to the Washington Training Division.

A 1953 aerial, looking southeastward over the old Center, shows little to indicate occupancy. The wartime Reconnaisance Training Base was also used for a Veteran's Hospital service and as a rental housing community.

An aerial photo taken late in 1959 presents in striking fashion the pride of Oklahoma City, a new home for the FAA's Aeronautical Center.

FAA'S CINDERELLA CENTER STORY

The wand of a fairy godmother must surely have touched upon the struggling enterprise on the west side of Will Rogers field that day in 1956 when the dream of a few civic leaders became reality—the breath of a new life for the Aeronautical Center. Truly a Cinderella story was the transition from the old accoutrements of a dedicated service to the princely trappings of a new realm with an inspiring and expanding mission. The story is still unfolding.

The timing was perfect or the story might never have happened for the nucleus of the new Center was barely constructed when the CAA became the care of the new Federal Aviation Agency on January 1, 1959. The setting was perfect, the need for expansion was imperative and the road ahead was well laid out.

Looking backward to freshen our viewpoint we note the milestones as they pass in review.

In the physical sense the old Center could hardly be recognized for what it was, except for the hangars on the flight line. Its laboratories, classrooms, offices, and storage areas were intermingled with wartime barracks made over into apartment dwellings. The suburban airport community boasted a school, a theater, a drug store, a church—a city-operated isolated attachment 7 miles southwest surrounded by wheat fields.

Fire was a hazard and the CAA fire station stood helpfully by. One by one, as slow expansion required, the CAA Center took the wooden barracks and storage sheds of the Air Reconnaisance Training Base, making them over into usable working space. Creaking floors, low ceilings, leaky roofs, and drafty windows were the rule Classrooms and offices were stifling in summer and often cold in winter despite the best efforts to heat and air-condition them.

But it was what went on inside that had real meaning. Scattered about the whole area was the work of Project Materials Division—warehousing and modifying electronic equipment. Along the hangar line were the classrooms and laboratories of Aviation Safety and Flight Inspection. Electronics Facilities Training was across the road on the West, and the wing-ed Headquarters building was centered in the area alongside the similarly fashioned Airways Operations Training building.

It was the standardization of CAA flight inspection aircraft that drew the lion's share of attention through the years starting in 1950.

Disheveled as it may appear by contrast the old Headquarters building served its purpose well.

The striking facade of the new Headquarters building is the trademark of a modern-day Aeronautical Center.

Old hangars with cramped service and storage areas have been replaced.

Inside one of the spacious Center hangars FAA aircraft undergo standardization in a new environment.

As a must-do project, realized for years previously, the thorough overhaul of engines and airframe and the standardization of cockpit and electronics measuring equipment played a major role in providing safe-to-fly airways. Other areas of work expanded too, declined with the economy wave in 1953, only to leap ahead in 1955 and continue to grow at a half-mad pace ever since.

As a next and much recent milestone the centralizing of all Agency warehousing at the Oklahoma City Center has become a major function. Incorporated now into the Bureau of Facilities and Materiel's "Depot" it takes in not only the warehousing but also the modification of electronic equipment and all aircraft standardization functions.

The Agency School combines all training functions conducted at the Center including the needs of the Bureaus of Flight Standards, Air Traffic Management, and Facilities and Materiel.

Newest major function to be located at the Center is the FAA's Aeromedical Research Project.

And so the Cinderella story goes on. The dream of its pioneers continues in a reality most simply expressed in its name, the FAA's Aeronautical Center.

From here were administered the scattered functions of the old Project Material Division.

This gigantic warehouse gives logistic support to the Bureau of Facilities' "Depot."

Low-ceilinged, pine-floored classrooms, difficult to heat and ventilate, were the rule in former years.

Modern classrooms now offer comfort and convenience, adding much to training effectiveness.

J. Howard DeCelles seated in the center, with other members of the class and their instructors.

FAA FLIGHT VETERAN IN CENTER MANAGEMENT COURSE

Taking the 26th "Management for Supervisors" course at the Aeronautical Center is a thirty-year veteran of flying.

J. Howard DeCelles ,chief of flight inspection for the Federal Aviation Agency, Region Two, headquartered in Fort Worth, Texas, is one of 13 in the class. The forty-hour course is conducted primarily for Air Navigation Facilities maintenance supervisors, but three spaces are allotted to Flight Standards personnel, and one to Air Traffic Management.

DeCelles is in charge of nearly 2-million miles of flying through 11 states, Mexico, and most of Central America.

The 60-year-old pilot started as a stunt pilot at county fairs back in the 'twenties.

It was during an attempt to set up a new world's endurance record in December, 1928, that DeCelles met and became fast friends with American humorist and native Oklahoman, Will Rogers. The endurance flight took place during the opening of Tulsa's new lighted airport. Since he had no radio, DeCelles carried a revolver to signal ground crews of any emergency so the field lights could be turned on. After 19 hours, six minutes and 51 seconds in the air, the little plane landed. DeCelles had beat the old record by more than two hours. Will Rogers was waiting to congratulate him. This led to a long friendship and DeCelles became Will's Number Two pilot.

During the years he met and became fast friends with Charles Lindbergh and Art Goebel, the first man to fly the Pacific.

For seven years, he flew the first international air mail between San Antonio and Mexico.

For the past 22 years, DeCelles has been with the CAA and the FAA. One of his most memorable tasks took place in January, 1953. He made a series of flights into minus-69 degree weather. Those flights established an air route for American fighters to England.

J. Howard DeCelles, who can look back over 12-thousand hours of flying, offered this comment about the Management Course at the Center, "This is the finest thing that has happened to me in my 22 years with the Agency."

Others in the class with DeCelles are: Ben Baker and Jack L. Catrett, Stanley Jedlicka, Jerry L. James and Robert L. Stewart, junior, from Region 3; James W. Fulton, Ira Harpring from Region 1; Robert W. Logan and Raleigh A. Stegall from Region 4; Loren H. Fisher from Region 5; George Quintal from Region 2 and Willard O. Bethel from the Aeronautical Center. Instructors in the course are Bill Werner, Herbert Richardson, Clair Monroe and Don Brooksher.

ANF DIRECTED STUDY OFFERS BROCHURE ON TUNNEL DIODE

In line with the original plan of DS-441, Semiconductors and Transistor Circuits, special articles on new developments in the field of semiconductors and solid-state physics will be prepared by the General Systems Unit of the Directed Study Section, and mailed to students who have completed Group I (first two assignments) of the course.

Two articles, written by Vincent Luciani, of the General Systems Unit, are currently being printed. The first, consisting of 27 pages and illustrations, covers the basic operating principles of the *tunnel* diode and includes some of its applications. This first supplementary information was mailed about January 15.

The second article, consisting of approximately 14 pages and illustrations, will cover the basic operating principles of the *sener diode* and some of its applications.

Subsequent articles will include *Masers, parametric amplifiers, junction diode amplifiers, voltage-variable semiconductor capacitors,* and others.

All supplementary literature will be three-hole punched, and an attractive cover will be provided so that the student can keep all of the articles in a notebook.

It is felt that these articles will tend to keep the student of semiconductors abreast with the rapid advances of the solid-state art.

As of January 1, there were 314 students enrolled in the Transistors course, DS-441. According to Unit Chief Dick Hudgins, activity is increasing rapidly. Many of the home laboratory kits have been distributed and experiment exercises are being sumbitted daily.

Assignments have been stream-lined to assist students in progressing rapidly. Examination questions are problem or multiple-choice type in all assignments.

BEACON NOTES

On January 19th, ATC Instructor Mike Ollis gave a short talk to flight personnel of the 1707th Air Transport Wing in the base theater at Tinker Air Force Base. This is a training group specializing in advanced instruction of air transport pilots for the Air Force.

Subject material of the talk consisted of ATC procedures in high density air traffic areas, enroute and terminal, during instrument conditions. Special emphasis was placed on those areas of procedure which most frequently cause misunderstanding between aircraft commanders and controllers. The ensuing question and answer session, and conversations, were believed to be mutually beneficial.

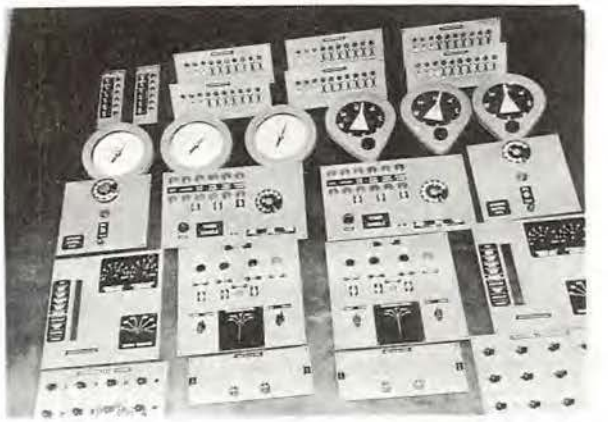
The Air Force is the largest single user of the air traffic control services. Since teamwork plays such an important part of these services, the relationship between control personnel and flying personnel is considered extremely important.

Most footprints in the sands of time were made by work shoes.

MEMORABLE PICTURE GRACES LOBBY OF NEW ANF BUILDING

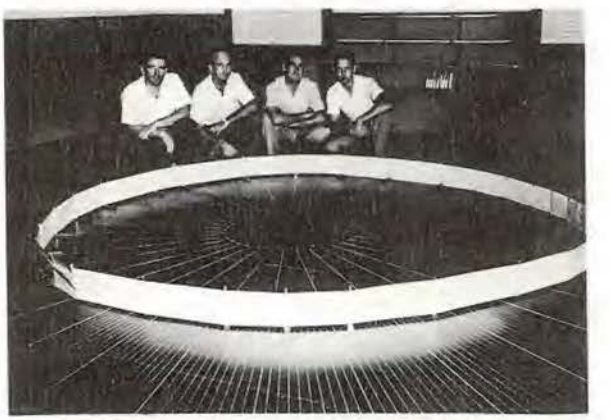
A large picture on the Wright Memorial at Kitty Hawk, No. Carolina, birthplace of aviation, adds an appropriate touch to the lobby of the new ANF No. 2 building, thanks to the thoughtfulness of student Matthew B. Cartwright.

The Region 2 technician, stationed at Elizabeth, No. Carolina, upon returning home asked a friend, John Otto, to hand the picture to Branch Chief C. W. Mueller when he arrived at Oklahoma City.



Mockups built for first ATC trainer.

L to R H. J. Barnett, James Elkins, George Crowley, and Toby Green.



L to R at Azimuth Calculator, J. Chester Shimp, H. J. Barnett, Elwyn Rowe, and William Deason.

FLIGHT INSPECTION AND DO IT YOURSELF

This is the story of a man's idea and how it became the standard for flight checking equipment installed in CAA and Air Force planes.

H. J. Barnett, now Chief, Contract Supervision and Materiels Section of the Flight Inspection Branch at the Center, has always been a "do-it-yourself-er." Way back in 1932 Barnett built his own airplanes, using Model "A" engines for power. He learned to fly in one; had no problem with that until CAA inspectors began looking for unlicensed aircraft. Barnett played hide and seek with the inspectors for a time, then gave up and sold out.

This insatiable curiosity about airplanes and how they go stayed with this man; was in his thoughts all through the war years. During that time Barnett was with the U.S. Army Air Corps as aircraft engine specialist assigned on detached service to the RAF. He helped assemble captured German jet aircraft in France, getting in on the ground floor of jet development.

In January, 1947 Barnett came with the Civil Aeronautics Administration and was assigned to Flight Inspection Division as one of the three initial employees. One of the first jobs was to modify aircraft for use as Flight Inspection training planes . . . Barnett, with the help of Engineer S. J. Brodnan and one other man . . . completely modified the interior of the aircraft that was to become N-70—the prototype for all CAA standardized Flight Inspection aircraft. He and his crew designed and fabricated radio racks, recorder panels, and training tables. They worked from rough drawings prepared by Brodnan and made the needed electronics installation.

The Air Force became interested in the N-70; requested it be flown to Dayton Air Force Base so AF engineers could copy the installation. This was in 1949. The net result . . . Air Force Project 440 in which a number of aircraft were equipped at Tinker AFB for Flight Inspection work.

It was that same year — 1949 — that CAA Flight Inspection determined that old N-70 would be the pattern for all CAA standardized Flight Inspection craft and that such standardization of aircraft would be done at the Aeronautical Center. Barnett, working with Brodnan and an engineer assigned out of Washington, designed mechanical features of radio control heads; adapted lighted control panels for use in all radio and interphone controls. These, incidentally, were the first lighted panels in FAA aircraft. The Aircraft Standardization Division was established under the direction of William Matthews to carry out modification of such aircraft.

After the DC-3 standardization, Barnett started fabrication of an installation to fit the Beechcraft. It would have to carry out the same inspection functions as the DC-3, except on a smaller scale. The biggest headache was getting the installation and console into a sufficiently compact unit to fit into the space in a Beechcraft. The console installation was made in all Flight Inspection Beechcraft and the consoles, with small modification, were shipped to many foreign countries for use there.

But—this wasn't enough for Barnett and the others. Air Traffic Control School needed training labs. A very small budget, not at all unusual, meant the mock-ups would have to be built, rather than bought. These training labs were the beginning of the present extensive Air Traffic Control school at the center. Needed next—portable ATC training consoles. Using the original lab as a model, Barnett and James Elkins of Facilities, working in spare moments, designed and built three complete trainers. These consisted of simulators for ATC Center, Airport Control Tower, Communications Center, Airport runways and Instructors' monitor. One unit, by the way, went to Indonesia. Another unit was used at an ATC conference in Montreal to demonstrate training problems.

Then came the design and construction of the Azimuth Calculator Plate for use in the Data Processing Center. The one being used wasn't capable of handling the work load.

Barnett got the steel plate, hand-fitted the joints to form an area of 400 inches. A theodolite was used to lay out accurately all azimuth radio lines—lines that were ground into the plate by hand. To show the amount of work, this came to 13 and a half miles of line work. That calculator was later used as a pattern for many azimuth calculator instllations by the AACS, Data Processing Centers around the world.

Just two years ago Barnett designed a machine to install wire in vinyl tubing for aircraft interconnect cables. For this savings in manhours he received an Employee Incentive Award.

Gene Taylor views his one-hundredth confirmation card from LA35G/P on Jan Mayen Island in the North Atlantic.

Shown above are Paul Porter, Lt. Col. Stephen Stone, and Hermann Bretsch, all of the Emergency Readiness Division of the Office of Plans and Requirements, Washington.

Mr. Bretsch, Chief of the Division, Mr. Porter, and Lt. Col. Stone, visited the Center in January to brief representatives of various offices on the Agency's Emergency Operations Plan and its implications with respect to the Aeronautical Center.

Shown with the team are F. M. Lanter, Director, and William H. Bond, Emergency Operations and Training Officer at the Aeronautical Center.

FMD HAM ATTAINS DXCC

Mr. Hubbard E. Gene) Taylor, Jr., has just received his one-hundredth confirmation card for having worked one-hundred foreign countries with his Radio Amateur Station, W5IYU.

Gene is employed in the FMD Electronics Branch and is recognized by his friends as a dedicated "Ham." He possesses an Extra Class Amateur License which further indicates his skill and knowledge in his hobby.

The designation DXCC implies long distance radio communications, DX, and the one-hundred countries portion, CC, arises from Century Club.

In order to bring to your attention one of the problems in obtaining this award you might pause a moment and just see how many countries you can name. Interesting isn't it? To further complicate the matter you must have a confirmation card, QSL card in Ham terminology, from each country contacted.

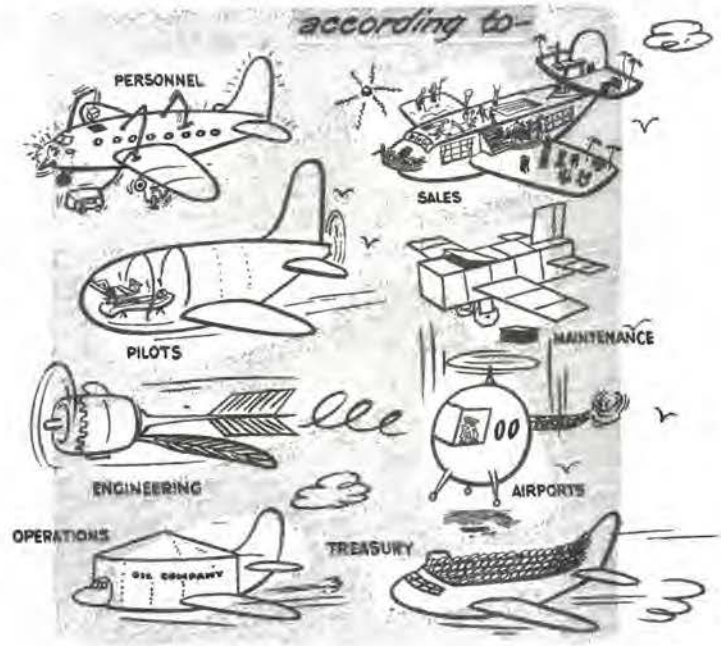
Gene has accomplished this feat on Single Sideband, and has submitted his cards to CQ Magazine for a Certificate of Membership in their SSB 100 Country Club. At the date of this writing, only about 110 Radio Amateurs have won this award. Then, too, he intends to submit his confirmation cards to the American Radio Relay League for membership in DXCC. This membership will not be nearly as exclusive as the SSB 100 Country Club because several different modes of transmission may be used to work the necessary 100 countries. Still, only some 1800 Hams have attained this honor on phone.

Gene's rig is a home-built linear amplifier, using two 6146's driven by a Central Electronics 10B Sideband Exciter. He uses a home-built Clapp VFO and an HQ-129-X receiver with a Model A Slicer. His antenna is a Hornet tri-bander hung 50 feet in the air.

The input on this rig is 100 watts and Gene has had good success working into his beam antenna. When asked if he had much difficulty competing with higher powered rigs, he indicated he was in the market for components suitable for a full kilowatt of power. Should his success in DX increase proportionally, we expect to hear he has worked 200 countries in the not too distant future.

Some of the exotic places Gene has visited from his "Ham Shack' 'are Sarawak in Borneo, Nepal, Burma, Russia, Uganda, Southern Rhodesia, Italian Somaliland, British Somaliland, Antarctica and Texas.

HOW AN AIRPLANE SHOULD BE DESIGNED



This is probably old stuff to a great many but it bears repeating. It typifies the job design engineers have when they set out to plan a new aircraft. If the separate departments had their wish this is what would happen.

Avro News

JET GEMS

For Whom the Belts Hold:

Lockheed redesigned the Electra seats five times—yet the pilots need extra cushions or an occasional change of position to relieve cramped legs. Douglas and Convair spent over three years designing seats for the DC-8 and the 880. Sometimes the airline chooses an alternate seat manufacturer. Hardman furnishes the seats for American Airlines and TECO the seats for TWO Boeing 707's. Wonder when Detroit will get wise and stop cramping the public in their iron chariots?

Sneaky Competition:

Pilot on Boeing 707 PA system: "Ladies and Gentlemen. in a few minutes you will see the most beautiful sight in the world on the right side of our airplane—we are passing a DC-8 which left Los Angeles 10 minutes ahead of us."

Insurance:

A British Insurance Company paper states that four out of every 100 DC6/7 aircraft built have been written off as total losses. The Viscount loss pattern has been five per cent until recently. In the past 18 months one Viscount has been lost on an average of every six weeks. Three Brittania's were lost in development and training. Two Locheed Electra's were lost in operation and two Boeing 707's in training. One Comet 4 has been lost and three have required expensive repairs. A takeoff or landing accident with the big turbojets could mean $1 million written off in underwing jet engine pods alone. The losses are said to be "within public tolerance" but the pitch is for higher rates because of the higher replacement cost of jet parts and materials. The interesting questions—will the turbojets do better than the turboprops and will they better the piston aircraft record? The Boeing 707's now have carried their two millionth passenger and have reached 10 hr. per day utilization—which is quite encouraging.

Fingernails & Coffee?

US Airlines had 85 turbojets and 228 turboprops at the end of 1959. They are scheduled to get 155 more turbojets and 39 more turboprops in 1960!

Foggy

Receiving flu shot from Nurse Helen Pacific, are Truong Van Hung of Saigon, Vietnam, and Kang Mok Rhee of Seoul, Korea

CENTER EMPLOYEES GET FLU SHOTS

The spread of the Asian flu—"Q" flu, as it sometimes is called, from the West Coast east across the nation brought the order this January to immunize FAA employees against this spreading and virulent type of influenza. A one-shot vaccine, effective against four strains of the influenza virus, was ordered and, at the last tally, shots had been given to approximately sixteen-hundred employees and students.

Colonel Clough of the Tinker Air Force Base Hospital was the medical officer under whose orders the vaccine was administered. The Center's RN, Mrs. Helen Pacific and J. D. Garner, a bio-physicist from the Civil Air Medical Research Institute, put the needle to the employees.

Others who pitched in to clean syringes, needles, help with the sterilization in the autoclaves and see that the immunization proceeded in orderly fashion, were: Mrs. Joyce Simms, Frank Falwell, Louis Mason, Bill Reid, Grace Upshaw, Linda Allen and Ben Tankersley.

George Hudson receives plaque as the Outstanding Manager of the Quarter.

CENTER PRESENTS AWARDS

At the time George B. Hudson was named outstanding manager and received the Employees' Association Award, 16 cash awards were made for suggestions adopted at the Aeronautical Center. Cash and a certificate presented by Center director Fred Lanter went to Charles Biberstine, Roy N. Pickett, Margaret Hood, Ernest Thompson, Noble Gregg, Bill Lambrecht, Maurine Peaden, Jack Brown, Cledith Philpot, Donald Lowery, Wesley Chesnut, Mitchell Tucker, Sidney Blarlock, James Caughran, Robert Burnett, June Grayson.

Buck Winston received 200 dollars for sustained superior performance.

Hudson's outstanding manager award came as a result of his devotion to duty, his great interest in civic affairs, and his effective use of surplus materials, resulting in savings of several hundred thousand dollars to the Aircraft Standardization and Maintenance Division.

Everyone can give pleasure in some manner; some can do it by entering a room, others by leaving.

MEET RAYFORD ORREN

Pictured above is Rayford H. Orren, Supervisory Supply Specialist with the Aircraft Standardization and Maintenance Division. His responsibilities consist of the supervision and management of personnel engaged in the issuance of literally thousands of aircraft parts. This activity is carried on by employees in two hangar stockrooms, three bulk storage warehouses and the section office in Hangar Nine.

Ray works directly with the Chiefs of four branches, the Equipment Specialists and the Technical Assistant to the Division Chief in projecting future supply needs and in adjusting supply facilities to the work programs. He also has liaison with contractors on such matters as contract overhaul of accessories and components, fabrication of equipment and supply of materials.

Ray's background with FAA explains the thorough understanding and efficiency he applies in the management and supervision of the large number of supply personnel and the thousands of supply items that are his responsibility. He started work with CAA in Procurement at the Ft. Worth Regional Office in August 1940; transferred to Houston a year later in charge of supply at the Standardization Center. The War Training Service headquarters was located in Houston and Ray became district supervisor of that organization in 1942.

Ray entered the Navy in March 1944 soon after CAA discontinued WTS. (We are sure he did a good job for the Navy in disbursing officers in the "California Occupation Forces" even though his modest comment explaining his career in the Navy is, "The Navy was scraping bottom of barrel for men.") Ray was discharged in March of 1946 and joined CAA in Oklahoma City. At that time the Aeronautical Center personnel totaled about six and Ray became the third president of the Center Employees Association. He was instrumental in organizing the Aeronautical Center Credit Union and served on first credit committee. (Ray recalls in 1941 and 1942 the employees in Houston dreamed and talked of the day when the CAA would have a Center such as this one at Oklahoma City, but its size and scope have exceeded their wildest imagination.)

Orren is a real handy man around the house. He is adept in furniture building and seems to have the magic touch for repairing electrical appliances.

He is a very enthusiastic sports fan. When asked about his favorite sport, he remarked, "The one I like best is the one in season." He plays an occasional game of golf with his young son, Ray Jr.; was successful in coaching YMCA Little League baseball for four years, winning two penants. Ray Jr. shares in that sport and plays in the pitcher's box and infield positions.

Mrs. Orren is the Home Economics teacher at U.S. Grant. Ray affectionately says, "Frances is the brains in the family. She graduated from college at the age of 18—about the same age I graduated from high school." Frances enjoys reading and sewing at home; however, she lets nothing keep her from enjoying activities with Orren and Ray Jr.

ANF INSTRUCTORS MOVE UP

That an instructor assignment at the Center's Air Navigation Facilities Branch often serves as a springboard to higher positions in FAA has been amply demonstrated by recent transfers. More than 100 successful careers in FAA have been built in great measure upon experience and technical knowledge gained at the ANF Branch.

The ANF Training Bulletin reports five such transfers in the past six weeks:

Art Rogers, an instructor in Communications Equipment School, transferred December 27, to the Technical Training Branch, in Washington. Art joined ANF Branch at the Center in 1956 from Region 3.

Also from the Communications Equipment School, *Walter Wasierski* transferred to a Washington Office position in Flight Inspection. He is on duty for a time, however, at Los Angeles in the medium altitude flight inspection group. Walt came to the Center in 1958 from Region 3.

Ken Persson, who served at ANF Branch first as a Directed Study instructor and recently in the ILS/VOR School, reported January 25 as Training Officer in the Region 1 Manpower and Training Office. He had previously served in Region 5.

Johnny Maceda, a VOR instructor and supervisor, reported February 8 in Washington for a two-year tour of duty at the U.S. Mission, in Madrid, Spain, as an electronic engineer. Johnny came to the Branch in 1956 from a position at Washington National Airport.

Bert Rayner, a Radar instructor, was selected recently as Emergency Training instructor in Region 4. He came to the Center from that Region in 1958.

Walter D. Berklund, a Radar instructor and supervisor, transferred January 29, 1960 to Honolulu, Hawaii. Walt came to the Center June 30, 1957, from Region 5, to join the ASR/PAR Unit.

PERSONNEL-LY SPEAKING

A year or so ago I talked to the Aero-Maids one evening about the history of the Civil Service System. A drier subject I can't imagine, but they were kind and said they enjoyed the talk.

Actually, as governmental activities go, the beginnings of the Civil Service Employment system in our government has quite a lot of drama about it. Most of us associate the passing the Civil Service Act with the assassination of President James A. Garfield. Garfield was killed by a disappointed office seeker. We seem to assume that on that spot and at that time someone dreamed up the Civil Service System . . . Congress passed a law and that was it. Well, it really wasn't quite that simple.

The work leading up to the passing of the Civil Service Act had begun more than 50 years before it actually became law in 1883. The Civil Service system in the state of New York is older than the federal system itself.

We've all heard of the "spoils" system. Andrew Jackson, on being elected President in 1828, was quite frank in declaring his policy: "To the victor belongs the spoils," and he was quite convinced his policy was right. After all, government clerks kept in office too long became quite lazy and arrogant and no longer served the public faithfully. It became accepted that with each change of the administration there would be practically a 100 percent turnover in all federal jobs.

By the 1850's when a new president took office the government just plain stopped for from two to 3 months while all the old employees were swept from office and replaced by patrons of the new administration. Lincoln complained many times that office seekers and their antics took more of his time than any presidential duty.

In the 1850's the Civil Service League was organized to advocate the adoption of a merit system by both the national government and the states. This organization is still in existence and has been one of the really important influences toward sound programs in improving the government's personnel system.

The first Civil Service Law was passed by Congress in 1871, but there was little steam behind it. In 1875 there was more discussion, but no money was appropriated for conducting the examinations. As a result . . . the late 1870s saw the spoils system continuing full blast.

It's too bad that the American public has to be jolted so hard to get them interested in such things as better government, but we're built that way. President Garfield's assassination made Americans realize something had to be done and the Pendleton Act, passed a year and a half later still forms the basis for our entire Civil Service Employment System.

The present system needs improvements, but the basic concepts contained in the 1883 Pendleton Act have stood the test of time. Interestingly enough, so many laws and amendments to those laws now are in existence that both houses of Congress and the Civil Service Commission are working on a "recodification" of the laws about employment in government. This means that within the next year or so the scores of laws will be organized, indexed, and duplication cut out, forming a new law that will cover all matters about government employment. In a way . . . it will be sort of sad to see the original Civil Service Act go, though the new law will be much easier to work with.

W. M. Jackson, AC-90

BROTHERHOOD WEEK

February 21st through February 28th has been designated as the time to observe National Brotherhood Week. This year the Federal Aviation Agency and the Aeronautical Center are cooperating with other Federal agencies, civic and state groups, and the National Conference of Christians and Jews in observance of this week.

Brotherhood Week highlights the challenge to men and women everywhere to make our country's pioneer pledge "One Nation under God—indivisible—with liberty and justice for all" live throughout the entire year and not for just seven days.

This week, however, is a time when every community can re-assess those moral and spiritual values which we consider the foundation of our democratic society.

In this near-space-age, when missiles could cross continents in minutes, when man-made objects can circle the space above the earth in a little more than an hour's time, there can be found no greater need to allay the anachronism of "fear of things foreign." We're not alluding to alien subjects, but to those around us who may be of a different color, creed, or way of life. Those, to many of us, are "foreigners." In this barrier-less world we must not permit our attitudes, our interests, and our tolerance of fellow men to create barriers. And —if there is any truth in the old saying that "familiarity breeds contempt," then in this small world we must let our thinking grow . . . expand our principles and moral values. People must be considered as units . . . as individuals . . . and not grouped into good or bad areas. There is nothing that is completely black or white in the moral and spiritual world. All thinking, all emotion, all spiritual living . . . these are seen in varying shades of gray. All of us must recognize the prejudices and weaknesses in others as well as in ourselvs and not pre-judge.

We in the Aeronautical Center are members of a force that is vital to the promotion of a common brotherhood around the world—aviation. The jet age has brought the mystical, far-away place into our own back yards. Strange and distant ways of life, philosophies, and objectives are brought together daily in a common world-wide form.

The National Conference of Christians and Jews has developed a brotherhood creed—not specifically for Brotherhood Week — but for every day of the year.

The creed opens with this thought . . . "We believe in the brotherhood of man under the Fatherhood of God. We believe that the fabric of America is strong and unique because the threads of many races and creeds are woven into it. We believe in unity without uniformity. We believe that a man's God-given rights should not be violated because of his race, religion, or national origin."

The closing lines of the creed express the hope all of us have . . . "We believe that we can make this a better country for our children to inherit only if you and I strive unceasingly to stamp out prejudice, bigotry and discrimination."

Let us all at the Center remember that we are all brothers and, even though brothers sometimes quarrel, we are members of one family. Let us think strongly on unity and non-prejudice this month . . . and all year.

ASSOCIATION MEMBERSHIP DRIVE

The Aeronautical Center Employees' Association is conducting its annual membership drive this month. The fee for one full year is only one dollar.

Here's a run-down of what you get for that one dollar. The Board of Directors tries within its abilities to operate the Association in the best interest of all employees of the Center.

The Association pays the expenses incurred in publishing this magazine, The Beacon, on a monthly basis.

The Association also sponsors these activities:

All athletic activities at the center, such as bowling (there are three leagues) softball, golf, and other events.

There are many recreational and social groups, such as:

The Amateur Radio Club, Square Dance Club, Choral-Aires, Air Scouts, Stamp and Coin Club, Chess Club, Sportsman Club (hunting and fishing), the Center Blood Bank.

The Association tries to benefit all employees. This cannot be done if you don't join —if you don't express your views to your elected representative. This is your Association. With your help and your interest we can grow in stature with the Center. It's up to you!

TRAINING CORNER

Working and going to college may not be easy but it can be done. Here's proof positive. Our hat'soff to Jack Wichels, Chief of Long Range Radar Unit of ANF, who will march "proudly" down the aisle at OCU next June to pick up his BA Degree. Majoring in Physics Jack has completed all requirements and is only waiting till June because that's the next graduation exercise.

Typical of the drive he displayed during the past three an done-half years, Jack surprised his faculty advisor by signing up for more schooling because now that he has the degree he can concentrate on subjects he wants to know more about or feels will help him in his work.

To give a more complete picture—Jack attended San Francisco Junior College for a time and also took some courses at Heald's Engineering College in San Francisco. Later in the Navy he spent approximately eleven months attending Radio Materiel School at Treasure Island. This earlier training when evaluated at OCU gave him 64 semester hours on which to build and three and one-half years and quite a bit of midnight oil and sweat later he had completed the other 60 hours he needed to fulfill a longtime desire.

He reports that the heaviest schedule carried enroute was 10 semester hours involving four nights a week. He is quick to say that this may have been a little rougher on his wife (two children) than on him. But she was solidly behind him all the way. And yes it gets a bit expensive.

Jack is reluctant to advise anyone else who has similar goals but even tho the grind is barely over he says—"I'd do it again."

No . . . they are not men from outer space . . . It's John Moore and Jess Helms. The two are repairing the Cletrac Tractor used as a snowplow during the recent winter weather. Personnel of AC-132, Aircraft Maintenance Branch, improvised a bulldozer type blade; slipped it on front of the tractor. The blade was used to move the snow off the ramp and parking area used by the Center's aircraft.

The tractor is equipped with an air compressor and a generator. It can be used as the source of power for rivet guns and other air-driven attachments. The tractor, which has rubber tracks to prevent marring the hangar floor and concrete ramps, can be operated up to 20 miles an hour.

In 1907, horsedrawn vehicles in New York City's midtown traffic averaged 11.5 miles an hour. Today, automobiles on those same streets average 6 miles per hour.

Carl Drumeller, Technical Assistant, Flight Inspection Branch, supervises Mufit Baskaya and Sukru Kaya Baysal of Turkey as they talk to the folks at home

HAM RADIO LINKS STUDENTS AND HOME

Distance means little to students attending classes at the Aeronautical Center in Oklahoma City. Those students may be from areas halfway around the globe. But, within a matter of minutes, they learn how things are in their own backyards. How?

It's done through the medium of ham radio. At the center is located the largest radio club in Oklahoma. W5PAA is licensed to the Aeronautical Center Amateur Radio Club; has some 250 members qualified to talk to other "hams" around the world.

During the month of January ninety operators signed in at W5PAA, an average of three a day. Many brought guests with them—guests who wanted to talk to the folks at home. Over eighty percent of the operation during the month was by students at the Cener. Many have regular schedules with amateur stations in their own communities. And—it seems that while the "boss" is at the Center attending classes, he likes to keep a close tab on how his subordinates are running his sector at home.

There's lots of power at W5PAA. It is equipped with a Collins KWS-1 transmitter, a Collins 75A-4 receiver, a beam antenna . . . and a host of accessory items. To the casual reader, these are just names and numbers, but to the radio amateur it means the superlative—the absolute in communications gear. Purchased by the club at a cost of nearly 5-thousand dollars, this makes up a station that can serve as a valuable "back-up" for Center communications in case wire services are interrupted.

The lapsed-time meter on the transmitter indicates 100.5 hours for January. And the log shows contact with such exotic places as Germany, Canada, the Galapagos Islands, Samoa, Midway Island and our new state of Hawaii.

No! Home isn't far away as long as W5PAA can reach it in seconds.

Standing: Robert Beals, Clarence Supplee, Francis Keen, Art Douthit, Clyde Daniels, William Jones, James Gammon John Paul Jones and Hank Malone. Seated: Thomas Dye, John Temte, Guy Arnold, Pat Baretta, Gloria Wolfe, Eric Arnholt, and Clifford Dodson.

CENTER CONDUCTS TRAINING AIDS SEMINAR

A 20-hour Training Aids Seminar—the first of its kind to be held at the Aeronautical Center—was held during the first week of January for personnel of the Flight Operations and Airworthiness Division.

Sixteen supervisors and instructors took the course conducted by E. H. Malone and R. M. Beals of the Instructor Training and Educational Consultant Services Staff.

THE FAMILY FALLOUT SHELTER

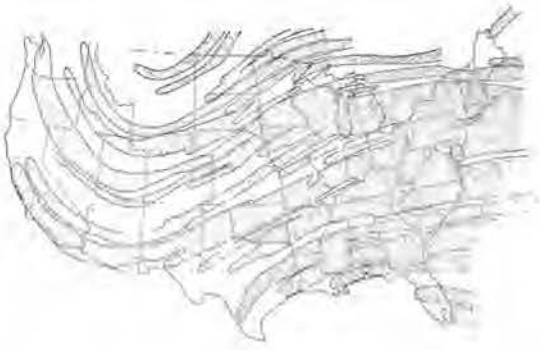
What are your plans for the protection of your family during a period of natural emergency? Should we be attacked today would you as a federal employee be free to assist your agency in carrying out its emergency commitments, or would your effectiveness be compromised by a sense of duty to your family?

This question is deserving of priority consideration by you because the answer will largely determine your availability to contribute your services during an emergency.

Thermonuclear weapons present two major hazards which we must consider. *First*, the tremendous blast and heat from these weapons will completely destroy everything within a 3 to 4-mile radius from the point of detonation. For the most part blast shelters are ineffective in a target area. Evacuation presents the most practical means of surviving blast and thermal effects. The *second* hazard is radioactive fallout. If we are outside the zone of major blast damage it is this hazard that must receive most of our attention. Fallout consists of some 200 different radio-active elements formed as by-products of the nuclear detonation.

Fallout areas at 1 hour after detonation.

The fallout particles resemble dust particles and will be blown considerable distances by wind currents eventually settling to the ground over large areas. During their active life they will emit *ALPHA, GAMMA* and *BETA* particles capable of causing tremendous numbers of casualties among personnel on whom they may settle. This radiation can neither be seen nor felt but it can be detected. Most important to us, however, is the decay rate associated with fallout. *It will decrease to less than 1% of its original intensity within 48 hours of its creation.* If we take shelter when fallout is detected and remain sheltered for the critical 48-hour period casualties from fallout will be negligible.



Fallout areas at 24 hours after detonation.

Governmental activities that will be required to function during the emergency will provide shelters for employees who will be on duty. The Federal Government has established a shelter program for all other personnel which is predicated on the concept of *family shelters.*

Under this concept each family group must prepare their homes for shelter against fallout during the critical 48-hour period. Families must stock sufficient food and water in their shelters for survival during the period. Home shelters may be constructed with a minimum of expense and will represent the sole means of survival from radioactive fallout. It is impossible to evacuate any area with assurance that the fallout hazard will be eliminated.

The Office of Civil Defense Mobilization has recently prepared a pamphlet entitled, "The Family Fallout Shelter."

The Emergency Operations Planning and Training Officer, AC-2, has secured a limited number of these pamphlets for distribution to Aeronautical Center employees.

W. H. Bond

OKLAHOMA HULA TEACHER

Madelyn Phillips demonstrates Hula.

The Park Department of Oklahoma City announced recently that for those acquainted with the basic hula, an advanced course would be offered, including dances and chants in both English and Hawaiian. The instructor will be Madelyn Phillips, wife of R. W. Phillips, AC-520.

The course will also include instruction in the making of flower leis, and an explanation of dress characteristic of the hula. Dances using the various hula implements will also be taught in a parallel course.

Mrs. Phillips studied the hula during a three year stint in the Islands in company with her husband. She decided to avail herself of the opportunity to learn the dance, anticipating something in the nature of an Arthur Murray course. One begun, she found the course to be more than just one simple dance to learn. The hula, tied in as it is, with the religion and life of the Islands, is not something to be leaped into and out of. As Mrs. Phillips says—

"The hula is a proud dance. It tells a story. Every movement, every expression, has a meaning. It is not the bump and grind of the burlesque stage, but, rather, a story told with the hands and eyes.

There are two main divisions of the hula. The Olapa, or ancient, is the native style, with drums and percussion instruments as accompaniment, and chants for the vocal sound.

The hapa-haole (half Hawaiian, half you name it) version of the hula is what most tourists see and remember.

There are some places in Hawaii, regretably becoming fewer, where the ancient hula is still taught. Madelyn Phillips learned the hula at one of these. Her teacher, Nona Davilla, was one of the finest instructors the hula has ever known. Mrs. Davilla, herself, was tutored by the dancer considered to be the greatest the Islands have ever produced; Helen Desha Beamer. From her teacher Mrs. Phillips learned the use of various implements in the hula. Among these were the ipu, or gourd, used in a fashion similar to a drum. Another was the iliili. These were ancient castanets, and the time was kept by the clapping of two water worn lava stones held in either hand. The puili—split bamboo, is slapped against an arm, or hand, to establish the tempo. Most spectacular of the implements is the uliuli, or feathered gourd. These are similar to maracas, but the associated movements are much more violent. Last of the implements is the kalaau. These are nothing more or less than two sticks which are used as rhythmic accompaniment to the dance and chant.

The hula and the mele, the song poem of the hula, were a combination haunting and beautiful. They told of the great gods of the Islands. Kane, the chief god, . . . Lono, the dweller of far places, . . . Ku and Kupulupulu.

They told the stories of nature. The whirling winds of the Pali . . . the rain advancing in columns . . . the swift running waves of the surf man . . . the heavenly glow of the rainbow.

There were stories of the name places. Haena, home of Lohiau, beloved of Pele . . . Hilo, Waimea, Kona. Of Haleakala, house of the Sun . . . Halemaumau, the Fire Pit—Home of Pele the Thunderer, Goddess of all the Volcanoes.

They sang of love with eyes alight and lips smiling. They spoke of love with eyes downcast and tear streaked faces, the Thunder rising in flaming majesty to destroy a girl and the man forbidden her. There is a time for singing and a time for sighing. A time for loving, and a time for crying. A time for living, and a time for dying. Never did a dance say so much.

This, in essence, is the hula. Old as time; Young as tomorrow.

BEACON NOTES

What's going on at the Aeronautical Center these days? . . . Well, other than the Flu, there's bowling.

The Bowlarena Bunch starts it each week on Tuesday night at 8:45 and the 66 Bowl and Capitol Sports Center leagues carry it on at 6:15 on Wednesdays, and then it's talked about till next Tuesday rolls around and here we go again.

There's fuel for a family feud on the Tuesday night League—Maxine McBride holds high score for women (with a 193) and is a member of the first place "Alley Cats," while husband Morris "Sandy" McBride is a member of the last place "Eight-Ballers." Nancy Heare holds high series for women in this league with a 477, and Walt Allen and Chick Longman hold high scores for the men with 221 and 576 respectively. Members of the first place "Alley Cats" are Don Van Hooser, Chick Longman, Maxine McBride, and Peg and Roy Johnson. Sharing last place with Sandy McBride are Nancy Heare, Calvin Rutherford, and Edith and Will Gresham.

In the Southside league, the "Satellites" are in first place, with Leo Maldonado, Alice Watkins, Bob Walling, A. W. Parker holding forth, with one vacancy to be filled. Hoping there is "nothing in a name" are the last place "Gophers"—J. Green, Al Brewer, Peggy Baker, Helen Green and James Wear. Oleta Miller holds the high single for women, 188, and Norma Wrinkle holds high series with a 486. Kenny Baker is hogging high single and high series with a 224 and a 608. Al Krag recently won a Triplicate Award by bowling three identical games in one night!

The Northside #1 league which bowls at 66 Bowl on Wednesdays has the Spotters leading the league, and the Spotters are Bernie and Margaret Stilwell, Ed and Lorenia Brewer, and Bob Brown. Margaret Stilwell holds high single game (219) and Mary Schur holds high series with 508. Phil Wilcox has a 237 and a 617, to hog high spots for the men. The "Jatos" are not only in last place, but are losing a member. Faye Crane, and her husband Howard who is president of the league, are transferring to Los Angeles. Other members of the Jatos are Bill Pfrehm, Jane Fanning, Garry Costar and George Downs.

Plans are already beginning to take shape for having two large leagues (16 teams each) next year, with one league bowling southside and one northside.

Recently it was learned that the daughter of Cliff Slack, AC-520's Planning Supervisor, was one of 49 students at Northwest Classen High School to achieve the goal of straight A's. This remarkable achievement is even more astounding when you realize that only 49 students in a school of 2,160 students were able to attain this goal. Karen Slack was one of eleven sophomores who made straight A's and we certainly know that this makes Cliff very happy. Congratulations to you Karen and also to you Cliff.

In January, Civil Service Week received official recognition from Oklahoma City's mayor, James Norick. January 16th marked the 77th anniversary of the Civil Service act of 1883, under which more than 27-thousand government workers are employed in the greater Oklahoma City area alone.

Looking, on as Mayor Norick designated the week of January 17-23 as the anniversary period, were Earl Wiseman, director of internal revenue in Oklahoma City; Fred Lanter, director of the FAA Aeronautical Center; Henry Friend, postmaster of Oklahoma City, and Doctor Oren Skouge, of the Veterans Administration.

ARE YOU A FRIENDSHIP AMBASSADOR?

Frank E. Tuckett

Recently I read with interest, the article titled "Harry Morgan's Friendship Ambassadors" in the February 1960 issue of Readers Digest. Did you read it? If you haven't, I would recommend that you do. I am certain that if each and everyone of us had the interest in our foreign students and visitors that Harry Morgan has, the many grossly malignant ideas of America would soon disappear.

Here in Oklahoma City we have an opportunity to do what Harry Morgan felt compelled to do. We have hundreds of International "Ambassadors" attending schools at the Aeronautical Center and representing countries from every corner of the world. Fortunately, thanks to a wonderfully planned program by our International Liaison Officer, Darwin Maurer, the people of Oklahoma City have the opportunity to meet these men, to bring them into their homes, to show them the real American way of living, and happily, I have learned that the citizens of Oklahoma City are making the most of this opportunity.

I have heard it said that these International participants spend too much time on social activities and not enough time on their studies. Some say that this is an enormous waste of our Government's money. I wonder if that is so! Do we want these people to return home with the thoughts and images of America that Nural Kahn from Pakistan had before Harry Morgan's tour of the real America? Do we want them to have the twisted and distorted picture of America that so often is obtained from our movies and our newspapers? Isn't this an important phase of their training while here in the United States? I certainly feel it is. If we overlook this opportunity to show our foreign friends what America really is like, we can have no one, and I mean no one but ourselves to blame if the cancer of communism spreads into their countries. But equally important, we are depriving ourselves of a wealth of knowledge; knowledge which cannot be obtained from text books or newspapers.

While each of us cannot be a personal guide like Harry Morgan, we can certainly give of our time, our hospitality and our good fortune to demonstrate how Americans really feel and act. We too, can profit from these acts of friendship. As Harry Morgan said "For generations the Statue of Liberty in New York Harbor has been inviting the world to send its tired, its poor, its huddled masses. Today they're sending us their brilliant, their gifted, their leaders-to-be. It takes so little from an individual, a group, a community to show these, too, at first hand what American freedom is."

I am not directing this story to the personnel of the Aeronautical Center or to the citizens of Oklahoma City alone, but to each and every American Citizen. The students trained here at the Aeronautical Center leave Oklahoma City to go to many FAA facilities throughout the United States. This is our opportunity to show them all of America. The people of Oklahoma City have done a magnificent job of showing them the warmth an dhospitality of America here in Oklahoma, but you and I know that these International participants want to learn first hand about life in other parts of the United States. Therefore, it is ever so important that regardless of where we live and regardless of who we are, we should avail ourselves of this opportunity to show the greatness of America, the heart of America, the American home and the American way of life.

I have had the good fortune of working with many of these students. I know how Harry Morgan felt when he learned of Nural Kahn, Dorio Mutti and Jose Aruego's views of America. These are not, in the least, unusual. Because these people only know what they see in American made movies or what they read in their newspapers. The only way for them to see the true picture of America is for us to show it to them. To permit them to participate in church and community affairs, to feel a part of our everyday living and to learn first-hand that America is not made up of "smugly complacent, shallowly religious, politically naive, lovers of gadgets and luxury and frenzied pursuers of the fast buck" type of people, but people whose ideals are founded around a happy family life and an ever growing desire to share this happiness with people all over the world.

I hope that everyone takes the opportunity to read this article in the Readers' Digest and that we will aid Harry Morgan's one-man campaign by purchasing shares in his "Ambassadors for Friendship" program. And let's not feel that the purchasing of these shares is enough, let's make the most of every opportunity that arises to show our foreign friends the real America. Let us all be "Ambassadors of Friendship."

MARCH 1960

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Editor's Note: "Wiretap" is a weekly (most generally) news sheet typed up by one of the Aeronautical Center girls, containing news of employees, Association functions, items for sale or trade, a frequent joke, an occasional editorial, and other bits of information deemed of interest to and by the employees. The following was sent to her through the mail, and is shared as our "Valentine" for 1960.

.....

Here's to "Miss Wiretap",
Who brightens our day,

She relates all the news
In a cheerful way:

Variables for sale,
Rent or trade,

Drapes that are
Guaranteed not to fade;

Farms to live on,
Cars to drive,

Pools to swim in,
How to dive;

How to play bridge
With a Poker hand;

How to build castles
Out of sand.

You carry our thanks
To faithful pals,

Notice of gaieties
Planned by Aero Gals,

Quirps and funnies and
Gripes and woes;

Also the "Onion Column"
Down below.

... TO LET YOU KNOW
WE THINK YOU'RE FINE
YOU'LL ALWAYS BE
OUR VALENTINE.

AIR TRAFFIC CONTROL BRANCH GRADUATES

TE - 160

Lester L. Barnard	Atlanta Center
James J. Chepey	Pittsburgh Center
Freddie A. DeWitt	Ft. Worth Center
John W. Ellis	Memphis Center
William D. Elwell	Miami Center
Jess W. Farr, Jr.	Atlanta Center
Edward J. Fedako	Pittsburgh Center
Malcolm L. Fowler	Atlanta Center
Gill M. Garrett	Jacksonville Center
James H. Grady	Atlanta Center
William L. Green, Jr.	Atlanta Center
Christopher J. Hayes, Jr.	Atlanta Center
Hurschel L. Haynie	Ft. Worth Center
Robert L. Hopkins	San Antonio Center
Frederick J. Huber	San Antonio Center
Robert E. Jones	El Paso Center
Roger S. Myers	Atlanta Center
Joseph C. Robinson	El Paso Center
Frank A. Russell	Pittsburgh Center
Jimmy L. Utley	Atlanta Center
Herbert W. Weber, Jr.	Atlanta Center

TE - 161

Charles J. Carmody	Chicago Center
Donald L. Doolittle	Chicago Center
Edward A. Friz	Chicago Center
Richard V. Haines	Chicago Center
Shirley H. Hieatt	Norfolk Center
Richard Huff	Chicago Center
John J. Jorgensen	Chicago Center
Walter O. Kittelson	Chicago Center
Eric H. Larson	Chicago Center
Kenneth H. McKelvey	Norfolk Center
Ernest L. Miscik	Chicago Center
Richard C. Miserski	Chicago Center
Harvey A. Powell	Norfolk Center
Frederick E. Ridley	Chicago Center
Michael R. Spinler	Chicago Center
Hubert M. Teater	Chicago Center
Joseph T. Wartolec	Chicago Center
Melvin L. Zerwas	Chicago Center

TE - 162

Robert E. Botkin	Jacksonville Center
Herbert F. Cadle	Memphis Center
Glenn M. Cantner	Atlanta Center
Franklin O. Christiansen	Memphis Center
James M. Coker	New Orleans Center
Joseph H. Collier	San Antonio Center
Albert B. Craig	Ft. Worth Center
James S. Crawford	Memphis Center
James E. Edwards	Atlanta Center
Edwood F. Fisher	Memphis Center
Dennis D. Graham	Ft. Worth Center
James D. Haggard	Memphis Center
Larry D. Hanna	Ft. Worth Center
Thomas R. Hays	Jacksonville Center
Harold T. Janney	Ft. Worth Center
William J. King, Jr.	Atlanta Center
Robert O. Krauss	San Antonio Center
John R. Lindstrom	Jacksonville Center
Donald W. Lucky	Ft. Worth Center
Everett A. Malloy	San Antonio Center
Howard E. Rice	Memphis Center
Gary E. Sibbald	Ft. Worth Center
Raymond E. Smith	Jacksonville Center
Bryant H. Spiller	New Orleans Center
James G. Walters	Atlanta Center
Ralph W. Wilson	Atlanta Center

TE-163

Webster S. Ambush	Washington Center
John E. Angel	Minneapolis Center
John G. Blake	Pittsburgh Center
John T. Bowers, III	Washington Center
Nicholas Centopani	Norfolk Center
Robert J. Daly	Minneapolis Center
Robert L. Fazon	Washington Center
Carl P. Fields	Norfolk Center
William E. Flagg	Norfolk Center
Gerald E. Fricke	Minneapolis Center
Edwin S. Hammer	Minneapolis Center
Marvin R. Johnson	Chicago Center
Gerald L. Larson	Minneapolis Center
Walter J. Laumeyer	Minneapolis Center
Lewis E. McKay, Jr.	Washington Center
John B. Murphy, Jr.	Norfolk Center
Lawrence B. Oakey	Minneapolis Center
Peter Onieu	Minneapolis Center
Charles A. Purcell	Memphis Center
Duane A. Rosendale	Norfolk Center
Charles E. Schreivert	Pittsburgh Center
Lewis B. Smith	Minneapolis Center
Donald M. Taylor	Washington Center

TE - 164

Bernard A. Arseneau	Boston Center
Bruce E. Ayer, Jr.	Cleveland Center
Russell J. Bredenkamp	Indianapolis Center
Donald C. Coe	Indianapolis Center
John F. Conley	Norfolk Center
Sherrill E. Hampton	Indianapolis Center
Kenneth J. Hoffman	Indianapolis Center
Jerold L. Landis	Indianapolis Center
Charles K. McCoy	Indianapolis Center
Albert I. McDonald	Indianapolis Center
John W. Miller	Indianapolis Center
Dallas R. Pember	Cleveland Center
Charles L. Plunkett, Jr.	Norfolk Center
John W. Ritmiller	Washington Center
Robley E. Sawyer	Norfolk Center
Rex R. Slye	Indianapolis Center
John W. Swiatek, Jr.	Boston Center
John Z. Toth	Cleveland Center
Henry R. Trauner	Indianapolis Center
William H. Wheeler	El Paso Center

TE - 165

Edward J. Buerlen	Los Angeles Center
Charles A. Chamberlain, III	Los Angeles Center
John J. Fitzpatrick	Los Angeles Center
John F. Fullmer	Los Angeles Center
Robert B. Gaskins	Los Angeles Center
William O. Hoskinson	Los Angeles Center
Eugene L. Zornock	Los Angeles Center
Myron L. Martin	Los Angeles Center
Kenneth C. Patterson	Los Angeles Center
Joe O. Riddle	Los Angeles Center
Buster W. Trammel	Los Angeles Center
Jack D. Waldo	Los Angeles Center
Don J. Weir	Los Angeles Center
William R. Young	Los Angeles Center

TE - 166

Floyd W. Adams	New Orleans Center
Robert E. Allen	Ft. Worth Center
Ernest Babb	Jacksonville Center
Phillip O. Baron	Jacksonville Center
Robert C. Bateman	Ft. Worth Center
John L. Bush	Atlanta Center
Warren J. Falgout	Ft. Worth Center
Arthur E. Foster	New Orleans Center
James W. Hodges	San Antonio Center
John R. Jones	Memphis Center
Darrell E. Keels	Ft. Worth Center
James D. Leonard	San Antonio Center
James E. McCallum	Ft. Worth Center
John H. Mitchell	Memphis Center
William A. Mikell	Jacksonville Center
Jack B. Pannock, Jr.	Ft. Worth Center
Douglas M. Salo	New Orleans Center
Franklin D. Smith	Atlanta Center
Lewis H. Soles	Jacksonville Center
Harlan A. Starnes	San Antonio Center
Donald L. Stoddard	Ft. Worth Center
Jerry L. Tyer	Ft. Worth Center
Robert H. Warren	Atlanta Center
James L. Washburn	Atlanta Center
Vernon K. Yingling	Atlanta Center

ELECTRO-MECHANICS CLASS 11 (TELETYPE PHASE) - JAN. 8 - JAN. 29, 1960

NAME	REG.	STATION	NAME	REG.	STATION
Berube, Robert H.	1	Portland, Maine	Oellien, Charles A.	4	Daggett, Calif.
Massey, John E.	2	Atlanta, Ga.			

ELECTRO-MECHANICS CLASS 12 (ELECTRICAL PHASE) - DEC. 28, 1959 TO JAN. 29, 1960

Anderson, J. L.	4	Fresno, Calif.	Penikvar, John J.	4	Great Falls, Mont.
Bolen, L. A., Sr.	2	Memphis, Tenn.	Rue, Robert R.	4	Dubois, Idaho
Buckley, Thomas R.	1	Pittsburgh, Pa.	Santorelli, John A.	1	Harrisburg, Pa.
Cook, George E.	6	Wake Island	Snyder, Roy W.	5	Nome, Alaska
Cosgrove, Dell E.	1	Louisville, Ky.	Veit, Max S.	AC	Okla. City, Okla.
Dulin, Bedford	2	Wichita Falls, Tex.	Wichita, James B.	3	Topeka, Kansas
Gabriel, Lloyd R.	3	Battle Creek, Mich.			

MAINTENANCE SUPERVISION CLASS 22 CONVENED DEC. 7 TO DEC. 11, 1959

Gordon, Douglas	AC	Okla. City, Okla.	Ogilvie, Rudal	3	Sioux Falls, S. D.
Foster, H. S.	2	Ft. Worth, Tex.	Ritter, John	5	Bethal, Alaska
Knudsen, D. W.	4	Marysville, Calif.	Ryan, Jesse L.	4	Los Angeles, Calif.
Melotte, K. J.	3	Peoria, Ill.	Welch, Gerald	AC	Okla. City, Okla.

MAINTENANCE SUPERVISION CLASS 23 CONVENED DEC. 14 TO DEC. 18, 1959

Cox, N. W.	2	Corpus Christi, Tex.	Pemberton, George	4	L. A., Calif.
Del Balzo, J. M.	1	Portland, Maine	Rafiti, R. L.	4	Salt Lake City, Utah
Dziowgo, E. X.	3	Grand Is., Neb.	Rowland, Ramsey	1	Pulaski, Va.
Forbes, Carter	4	Las Vegas, N.M.	Scovel, E. S.	1	Boston, Mass.
Guest, John	3	Kansas City, Mo.	Stanley, B. B.	2	Ft. Worth, Texas
Kimball, R. M.	1	Millinocket, Maine	Still, D. F.	2	El Paso, Texas
Lewis, H. W.	3	Evansville, Ind.	Taylor, Robert	3	Garden City, Kan.
Loverde, J. E.	3	Ft. Wayne, Ind.	Turner, M. B.	3	Cedar Rapids, Iowa

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 1

Ernst, Charles J.	AC	Okla. City, Okla.	Lockwood, C. F.	3	N. Platte, Nebr.
Gorby, Earl W.	ANF	Okla. City, Okla.	Travis, James A.	WB	Las Vegas, Nev.
Helland, Wayne M.	2	Jackson, Fla.	Williams, H. E.	2	Tuscaloosa, Ala.
Krueger, G. A.	WB	Joliet, Ill.			

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 2

Bliessner, F.C., Jr.	3	Sault Ste Marie, Mich.	Devol, L. N.	WB	Kingston, Jamaica
Carson, Robert G.	ANF	Okla. City, Okla.	Koski, N. E.	WB	Pendleton, Ore.
Cassidy, H. F.	1	Danville, Va.	Quick, V. H.	4	Rawlings, Wyo.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 90

NAME	REG.	STATION	NAME	REG.	STATION
Akers, C. A.	4	Elko, Nev.	Lee, C. W.	2	Huntsville, Ala.
Anderson, C. R.	5	Galena, Alaska	Lee, Walter	4	L. A., Calif.
Arledge, H. J.	2	Hurst, Texas	Logan, Paul	1	Horseheads, N.Y.
Ashenfelter, C.H.	2	Tulsa, Okla.	Lopez, J. A.	OIC	Managua, Nicaragua
Bakula, T. W.	3	Cedar Rapids, Ia.	Lynch, A. R.	AC	El Reno, Okla.
Bell, Wesley E.	4	Oakland, Calif.	Mahdik, G. W.	4	San Francisco, Calif.
Benson, R. R.	4	Malad City, Idaho	McNully, D. D.	2	McAlester, Okla.
Boatright, C.K., Jr.	1	Erlanger, Ky.	Mollard, R. G.	4	Pueblo, Colo.
Bodder, A. M., Jr.	1	Erlanger, Ky.	Myers, P. W.	AC	Okla. City, Okla.
Bolen, L.A., Sr.	2	Memphis, Tenn.	Newton, W.A.	4	San Jose, Calif.
Boroski, Stephen	1	Allentown, Pa.	Nutt, S. J.	3	Olathe, Kansas
Briscoe, R. F.	2	Slidell, La.	Olmstead, Thomas	1	Syracuse, N.Y.
Brubaker, Paul	5	Anchorage, Alaska	Olsen, C. K.	4	Klamath Falls, Ore.
Byrd, L. D.	Spec.	Tana, Alaska	O'Neil, H. B.	3	Danville, Ind.
Campbell, L. G.	2	Okla. City, Okla.	Painter, Joe R.	ANF	Okla. City, Okla.
Carter, J. D.	AC	Bethany, Okla.	Patterson, H. G.	4	Alameda, Calif.
Claycomb, G.L.	1	Valley Station, Ky.	Pebsworth, R. G.	AC	Okla. City, Okla.
Contreras, Arthur	2	San Antonio, Tex.	Phillips, LeMoyne A.	5	Cordova, Alaska
Crofford, R. B.	1	Elyria, Ohio	Pirtle, H. C.	AC	Norman, Okla.
Custer, D. R.	4	Oakland, Calif.	Primsen, John	3	Flint, Mich.
Davis, E. L.	2	Midland, Texas	Reed, D. E.	1	Columbus, Ohio
Edlin, R. H.	4	San Francisco, Calif.	Reina, J. A.	1	Pittsburgh, Pa.
Elmore, C.A.C., Jr.	2	Hialeah, Fla.	Rice, F. G.	AC	Okla. City, Okla.
Flores, Pedro	AC	Okla. City, Okla.	Ricker, F. H.	1	Worcester, Mass.
Fox, R. O.	4	Salt Lake City, Utah	Salahi, Abbas	3	Camby, Indiana
Fryer, M. B.	4	Ogden, Utah	Siders, R. L.	ATC	The Dalles, Ore.
Galbraith, John	2	Cotulla, Texas	Snapp, K. M.	4	Alamosa, Colo.
Good, W. L.	4-EST	Albuquerque, N.M.	Steinberg, G. D.	4	Salt Lake City, Utah
Goodwin, J. H.	2	Balboa, C. Z.	Tabor, W. E.	6	Wake Island
Harvey, Dudley	4	Seligman, Ariz.	Terrel, R. O.	4	Vancouver, Wash.
Hider, Raymond	3	Indianapolis, Ind.	Van Demark, H. D.	3	Indianapolis, Ind.
Hopper, Robert	2	Vero Beach, Fla.	Weaver, F. J.	4	Denver, Colo.
Horner, E. S., Jr.	2	Lafayette, La.	Westlund, A. E.	3	Lamonia, Iowa
Hughes, H. R.	AC	Norman, Okla.	Wetterer, E. W.	1	Charleston, W. Va.
Jackson, J. H.	2	Huntsville, Ala.	Whitmore, L. M.	4	Colo. Spgs., Colo.
Johnson, F. A.	3	Omaha, Nebr.	Wilkerson, W. F.	1	Beverley, Va.
Kimes, G. D., Jr.	1	Columbus, Ohio	Willmon, L. B.	2	Decatur, Ga.
Kohl, C. J.	4	Newark, Calif.	Woods, Otis L.	2-EST	Ft. Worth, Tex.
Kremin, N. W.	3	Minneapolis, Minn.	Wooldridge, G. H.	2	Austin, Texas
Kubo, Yoshimitsu	6	Wake Island	Wooley, Robert S.	2	Decatur, Ga.
LeClaire, Gerald F.	3	Flint, Mich.	Yong, Gus	6	Wake Island

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 100

NAME	REG.	STATION	NAME	REG.	STATION
Argueso, Eduardo	OIC	Spain	Lawrench, R. B.	2	Columbia, S. C.
Berry, Henry C.	2	Atlanta, Ga.	McKittrick, T.	3-EST	Kansas City, Mo.
Braeslin, W. W.	6	Honolulu, T.H.	Mulrooney, V.D.	4	Lakewood, Calif.
Clark, G. J.	AC	Okla. City, Okla.	Oumi, S. Y.	HO-EST	Honolulu, T. H.
Coffey, D. K.	4	Seattle, Wash.	Pollack, Ben H.	2	Miami, Fla.
Costa, F. W.	1	W. Islip, N.Y.	Seay, Lewis E.	1	Nantucket, Mass.
Feeley, W. J.	6	Kailua, Oahu, T.H.	Skolaut, E. W.	3	Topeka, Kansas
Gonzales, Francisco	OIC	Spain	Stockton, J. W.	4	Thermopolis, Wyo.
Harvey, J. T., Jr.	2	Hialeah, Fla.	Ulevog, T. S.	4	Pueblo, Colo.
Hegar, D. T.	2	Arlington, Tex.	Valentich, Frank	4	Oakland, Calif.
Hutchinson, R. A.	WO	Rochester, N.Y.	Warring, E. R.	3-EST	Kansas City, Mo.
Hutson, B. L.	3	N. Platte, Nebr.	Wensel, C. W.	4	Albuquerque, N.M.
Johnson, D. L.	4	Seattle, Wash.	Wilkinson, D. E.	2	Atlanta, Ga.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 201

Burrows, R. L.	3	Bismarck, N.Dak.	Joyce, John A.	4	Dallas, Ore.
Gibbs, Gail E.	2	Columbus, Miss.	Miller, Roy F.	WB	Denver, Colo.
Gilkison, Joe E.	4	Fresno, Calif.	Onagard, C. P.	3	Green Bay, Wisc.
Haley, George W.	2	Wichita Falls, Tex.	Reese, C. G.	4	Summit, Utah
Jedlicka, Stanley	3	Duluth, Minn.	Thompson, E. C.	1	Northfield, N. J.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 202

Bunn, Wm. E.	3	Emporia, Kans.	Magual, Joseph J.	1	Reading, Pa.
Chun, H.W.M.	6	Honolulu, Hawaii	Moore, B. C.	2	Pensacola, Fla.
Cox, R. W.	4	Winslow, Arizona	Snoddy, James E.	2	Terminal, Tex.
Gilkison, Joe D.	4	Fresno, Calif.	Townsend, H. A.	5	Anchorage, Alaska
Jones, Jas. D.	2	Houston, Tex.	VanHoosen, R. L.	3	Chicago, Ill.
Kirkpatrick, W.M.	3-EST	Kansas City, Mo.	Woehlke, H. E.	4	Glendale, Ariz.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 203

Carnahan, C. B.	WB	Salem, Ore.	Ralph, R. H.	1-EST	Jamaica, N.Y.
Duncan, Joel G.	2	Montgomery, Ala.	Reid, D. M.	3	Kansas City, Mo.
McGrath, R. P.	1	Simsbury, Conn.	Walker, C. H.	2	Pasadena, Tex.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 204

Desautels, E. J.	5-EST	Anchorage, Alaska	Nelson, F. N.	4	Akron, Colo.
Faur, Paul J.	1	New Rochelle, N.Y.	Taylor, D. A.	2	Okla. City, Okla.
Gordon, C. L.	4	Gila Bend, Ariz.	Williamson, J.R.	2	Asheville, N. Car.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 205

NAME	REG.	STATION	NAME	REG.	STATION
Adkins, Wm. E.	3	Joliet, Ill.	Kuriyama, Akiyoshi	6	Waianae, Oahu, T.H.
Carpenter, C. E.	3	Columbia, Mo.	Morton, James L.	ANF	Okla. City, Okla.
Hewitt, Robt. S.	3	Moline, Ill.	Rentfrow, Evan C.	5	Spenard, Alaska
Hunter, Dorris C.	3	Monroe, La.	Stanley, John T.	ANF	Okla. City, Okla.
Iversen, Robt. C.	4	Seattle, Wash.	Taylor, Donald A.	2	Norman, Okla.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 301

Boyd, Robert S.	3	Butler, Mo.	Jones, Robert E.	3	Des Moines, Iowa
Donahue, W. B.	3	Sioux Falls, S. D.	Kemmer, Frank R.	2	College Sta., Tex.
Grillo, Philip	1	Glens Falls, N.Y.	Paquette, Leo J.	3	N. Platte, Nebr.
Izumi, George Y.	6	Honolulu, Hawaii			

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 302

Goo, Harry W.	6	Honolulu, Hawaii	Rolands, Hugo	3	Wayne, Mich.
Hebbard, D. M.	4	Colo. Spgs., Colo.	Stevenson, L. E.	3	Taylor, Mich.
Kawagoe, Roy	6-EST	Wahiawa, Oahu, T.H.	Vance, Abe G.	4	Lyman, Wyo.
McMorrow, N. S.	WO	Rochester, N.Y.			

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 303

Berry, H. C.	2	Atlanta, Ga.	Wilcox, D. E.	5	Ft. Edgecombe, Nebr.
Hutchinson, R. A.	WO	Rochester, N.Y.			

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 304

Leabo, Don C.	3	Fargo, N. D.	Morris, E. S.	4-EST	Los Angeles, Calif.
Stevenson, C. H.	4	McChord AFB, Wash.			

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 401

Baumes, Geo. J.	1	Whitesboro, N.Y.	Parsons, J.A., Jr.	GSD	Falls Church, Va.
Chapman, Clifford	ANF	Okla. City, Okla.	Raymond, G. E.	4	L. A., Calif.
Cobb, Max E.	4	Sacramento, Calif.	Roseborough, R. W.	4	Medford, Ore.
Hurst, R. B.	ANF	Okla. City, Okla.	Schneider, R. B.	3-EST	Kansas City, Mo.
Johnson, C. T.	4	Sharp Park, Calif.	Stribling, D. R.	4	Denver, Colo.
Lewis, R. W.	3-EST	Kansas City, Mo.	Warren, H. V.	1	Brooklyn, N. Y.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 441

NAME	REG.	STATION	NAME	REG.	STATION
Foster, H. L.	3-EST	Honolulu, T.H.	Nelson, John M.	AC	Norman, Okla.

DECEMBER GRADUATES IN DIRECTED STUDY COURSE 901

Jones, Robert E.	3	Des Moines, Ia.

COMMUNICATIONS EQUIPMENT CLASS 144 CONVENED NOV. 30, 1959 TO MAR. 4, 1960

NAME	REG.	STATION	NAME	REG.	STATION
Becher, Thomas R.	3	Milwaukee, Wisc.	Guthrie, Donald C.	4	Spokane, Wash.
Bonde, Emmet R.	2	Atlanta, Ga.	Kocus, Melvin L.	3	Goodland, Kansas
Davis, Robert E.	2	Atlanta, Ga.	Long, James D.	5	Anchorage, Alaska
Duquette, Wilfred A.	1	Old Town, Maine	Lumsden, W. S.	4	Portland, Oregon
Esancy, David L.	1	Jamaica, N. Y.	Mayette, Richard E.	6	Honolulu, Hawaii
Fifer, Donald F.	4	Salinas, Calif.	Russell, Marvin L.	3	Philip, S. Dakota
Ford, Donald P.	2	El Paso, Texas	Salatino, Joseph S.	1	Niagara Falls, N.Y.
Fryer, Merlin B.	4	Salt Lake City, Utah	Schellenberg, H. K.	2	Charleston, S. C.
Hawkins, Philip C.	1	Youngstown, Ohio	Schoppe, C. A.	2	Lufkin, Texas
Hood, E. W., Jr.	2	Alma, Georgia	Schreier, A. E.	2	Augusta, Georgia
Howell, Melvin W.	4	L. A., Calif.	Slocum, W. E.	3	Bismark, N. Dak.
Huff, Gordon E.	4	Denver, Colo.	Tenny, F. A.	4	Toledo, Wash.
Johnson, R. H., Jr.	1	Richmond, Va.	Walker, Grant W.	4	Fairchild AFB, Wash.
Ker, George V.	1	Zanesville, Ohio	Wierschem, G. L.	4	San Diego, Calif.
Kirnig, Frank E.	4	Sheridan, Wyo.	Williams, Sonia V.	5	Anchorage, Alaska

COMMUNICATIONS EQUIPMENT CLASS 145 CONVENED DEC. 14, 1959 TO MAR. 18, 1960

Albert, Francis J.	2	Key West, Fla.	Ozdemir, Hasan	OIC	Ankara, Turkey
Benvenuti, A. B.	1	Atlantic City, N. J.	O'Riley, Richard	4	Tucumcari, N. M.
Clayton, Charles E.	2	Virgin Islands	Pelletier, R. E.	4	Marysville, Calif.
Dyba, Frederick E.	4	Helena, Montana	Robertson, W. E.	3	Kansas City, Mo.
Edlund, Gerald J.	3	Pierre, S. Dak.	Shelley, Robert A.	5	Anchorage, Alaska
Haley, George W.	2	Wichita Falls, Tex.	Skinner, John T.	2	San Antonio, Texas
Ivill, Stanley	2	Miami, Fla.	Smith, Paul R.	3	Topeka, Kansas
Jatiman	OIC	Indonesia	Smith, William	1	Louisville, Ky.
Johnson, D. M.	3	Topeka, Kansas	Tamanaha, Suetoshi	6	Honolulu, Hawaii
Karpins, Charles A.	4	Burley, Idaho	Ulbricht, Robert E.	4	San Diego, Calif.
Lord, William B.	4	Stockton, Calif.	Willemsaen, D. R.	4	L. A., Calif.
McNully, Denson D.	2	McAlester, Okla.	Zack, Donald E.	4	Great Falls, Mont.
Menke, Donald A.	3	Pierre, S. Dak.			

COMMUNICATIONS EQUIPMENT CLASS 146 CONVENED DEC. 28, 1959 TO APR. 1, 1960

Allred, Gary D.	4	Albuquerque, N. M.	Monroe, C. J., Jr.	3	St. Louis, Mo.
Bartholomew, D. F.	5	Anchorage, Alaska	Moore, Oley, Jr.	2	Monroe, La.
Bower, Robert H.	3	N. Platte, Neb.	Morrow, C. R.	1	Wright-Pat. AFB, O.
Campbell, P. H.	2	Jacksonville, Fla.	Norlem, James F.	3	N. Platte, Neb.
Cray, Lowell A.	4	Seattle, Wash.	Palermo, T. J.	2	Shreveport, La.
Dang, Chon M.	6	Honolulu, Hawaii	Phillips, R. L.	3	Scottsbluff, Neb.
DeBoer, R. A., Jr.	3	Sioux City, Iowa	Raith, Robert O.	3	St. Louis, Mo.
Dunlap, Clark G.	4	Oakland, Calif.	Raley, C. J., Jr.	4	Needles, Calif.
England, Cramer A.	2	Nashville, Tenn.	Tate, Thomas E.	4	Tonopah, Nevada
Gianakopoulos, J. K.	4	Burbank, Calif.	Thompson, F. E.	2	Pensacola, Fla.
Kaechele, Walter K.	4	San Diego, Calif.	Tidwell, C. L.	4	Truth or Conseq., N.M.
Lowrimore, R. H., Jr.	2	Valdosta, Ga.	Tribble, C. A.	1	Erie, Pa.
Manthey, F. E.	4	Spokane, Wash.	Wakefield, J. H.	4	Cheyenne, Wyo.
Marquez, Lae I.	4	Las Vegas, N. M.	Welchel, T. F.	2	Wilmington, N. C.
Miller, W. R.	5	Anchorage, Alaska	Wilson, K. E.	4	Denver, Colo.

RADAR CLASS 142 CONVENED DEC. 14, 1959 TO FEB. 26, 1960

NAME	REG.	STATION	NAME	REG.	STATION
Blacklund, Kurt E.	5	Anchorage, Alaska	LeBleu, Julien	2	Houston, Texas
Blount, James P.	1	London, Ohio	Lenox, James M.	2	Tulsa, Okla.
Bukowsky, Arnold S.	2	Shreveport, La.	McKee, D. J.	1	Idlewild, N.Y.
Cartier, Robert N.	1	Burlington, Vt.	Morris, R. L.	2	Charlotte, N. C.
Crane, Forest E.	4	March AFB, Calif.	Murphy, Paul F.	1	Otis AFB, Mass.
Earl, Harry D.	5	Anchorage, Alaska	Muse, Kermit M.	2	McComb, Miss.
Hankins, James C.	2	New Orleans, La.	O'Mara, R. J.	1	Fairborn, Ohio
Hatcher, Ross M.	2	El Paso, Texas	Oshiro, H. T.	6	Honolulu
Heuerts, S. M.	2	Atlanta, Ga.	Reilly, Grant A.	4	Los Angeles, Calif.
Jackson, Ronald	1	Otis AFB, Mass.	Roy, Stanley W.	2	Biggs AFB, Texas
James, Robert U.	4	Colo. Spgs., Colo.	Rhoades, John K.	3	Hutchinson, Kansas
Johnson, L. E.	2	College Stat., Tex.	Rohde, C. E.	4	Albuquerque, N.M.
Jones, Stanley F.	2	Montgomery, Ala.	Smith, Jack H.	2	Raleigh, N. C.
Knighten, W.W., Jr.	5	Anchorage, Alaska	Stevens, Albert T.	2	Memphis, Tenn.
LaGrassa, W. W.	4	Salt Lake City, Utah	Wendt, Walter D.	2	Midland, Texas

RADAR OPTION SPECIALTY CLASS 139 OPTION 2 CONVENED DEC. 7, TO DEC. 24, 1959

Bolzinger, H. M.	3	Wichita, Kansas	Cobb, Charles A.	5	Yakutat, Alaska
Bridges, H. L.	5	Anchorage, Alaska	Conroy, Robert J.	1	New York, N.Y.
Brigge, S. L.	3	Kansas City, Mo.	Katje, Gerald P.	3	Minneapolis, Minn.
Clark, Byron F.	4	Colo. Spgs., Colo.	Stobbe, F. D.	4	Colo. Spgs., Colo.
Cline, George V.	5	King Salmon, Alaska			

SPECIAL SCAN CONVERSION T1-440 CONVENED DEC. 7 TO DEC. 18, 1959

Brown, M. E.	2	Atlanta, Ga.	Mitchell, C. S.	2	Atlanta, Ga.
Cihla, Edward R.	1	Cleveland, Ohio	Neiner, Duane C.	4	Los Angeles, Calif.
Friss, E. W.	4	L. A., Calif.	Ridge, Lowell H.	4	Dallas, Oregon
Glowka, K. R.	2	San Antonio, Tex.	Scurlock, H. A.	1	Washington, D.C.
Isenhower, H. W.	4	Albuquerque, N.M.	Spencer, C. F.	2	San Antonio, Tex.
Jones, Cleo	2	San Antonio, Tex.	Steele, John L.	4	Oakland, Calif.
Landers, Harry E.	4	Albuquerque, N.M.	Wolff, Robert W.	3	Indianapolis, Ind.
Marko, William	3	Indianapolis, Ind.			

VOR CLASS 167 CONVENED NOV. 30, 1959 TO JAN. 22, 1960

NAME	REG.	STATION	NAME	REG.	STATION
Atsen, Gordon H.	3	Des Moines, Iowa	Neece, Louis T.	2	Fayetteville, N.C.
Chung, Raymond	6	Wake Island	Neuville, W. G.	2	El Paso, Texas
Daniel, Billy P.	2	Ft. Worth, Tex.	Pan, William	4	Oakland, Calif.
DeFord, E. L.	1	Norfolk, Va.	Pantilik, John F.	3	Chicago, Ill.
Edwards, W. R.	2	Memphis, Tenn.	Price, C. S., Jr.	2	Jackson, Miss.
Hendricks, W. C.	2	Daytona Beach, Fla.	Randall, D. C.	1	Portland, Maine
Hoyler, Ernest T.	1	Jamaica, N.Y.	Richardson, E. J.	4	Blythe, Calif.
Marderosian, Charles	4	L. A., Calif.	Turner, Walter B.	2	Charlotte, N. C.
Mills, James T.	4	Yakima, Wash.	Whitaker, A. K.	5	Anchorage, Alaska
Nash, Benjamin E. Navy		Argentia, N. F.			

VOR CLASS 168 CONVENED DEC. 14, 1959 TO FEB. 5, 1960

Argueso, Eduardo	OIC	Spain	King, Norman S.	2	Childress, Texas
Barfield, W. D.	2	Miami, Fla.	Munroe, Thomas F.	1	Washington, D.C.
Belcher, Billy A.	1	Bowling Green, Ky.	Nhieu, Huynh Van	OIC	Saigon, Viet Nam
Crowley, Thomas D.	2	Memphis, Tenn.	Prieto, Jose M.	OIC	Spain
Curtis, Norman E.	4	Raton, N. Mex.	Rabon, James S.	2	Ashville, N. C.
Ennis, William O.	1	Hunting, W. Va.	Roderick, Wayne E.	4	Bellingham, Wash.
Gonzales, F. C.	OIC	Spain	Schmidt, Lester J.	3	Terre Haute, Ind.
Hall, Francis E.	5	Kenai, Alaska	Stoops, Donald V.	4	Albuquerque, N.M.
Hunnings, W. R.	1	Blackstone, Va.	Watson, Harry W.	4	Fallon, Nev.
Jimenez, Pedro	OIC	Spain	Wells, Bill J.	2	Nashville, Tenn.
Johnson, H. E.	4	Albuquerque, N.M.	Westlund, Arthur E.	3	Lemoni, Iowa
Jones, Irving L.	1	Richmond, Va.			

VOR CLASS 169 CONVENED DEC. 28, 1959 TO FEB. 19, 1960

Allison, Martin E.	2	Childress, Tex.	Iversen, Robert	4	Seattle, Wash.
Blattman, Daniel A.	4	Olympia, Wash.	Johnson, Philip E.	4	Cheyenne, Wash.
Davis, William L.	3	Fargo, N. Dak.	Keskinkilic, Hilmi	OIC	Turkey
Donnalley, R. F.	1	Long Island, N.Y.	McMakin, W. J.	1	Falmouth, Mass.
Dove, C. H., Jr.	2	Dallas, Tex.	Miley, R. E.	3	Ypsilanti, Mich.
Erustun, Ismet	OIC	Turkey	Otto, John W.	2	Elizabeth City, N.C.
Eskridge, J. R.	5	Anchorage, Alaska	Pan, William	4	Oakland, Calif.
Hill, W. J., Jr.	3	Cedar Rapids, Iowa	Preli, Alfredo	4	L. A., Calif.

ILS CLASS 164 CONVENED DEC. 14, 1959 TO JAN. 8, 1960

Bischoff, Dale H.	3	Minneapolis, Minn.	Mertz, V. E.	3	Russell, Kansas
Briscoe, R. F.	2	New Orleans, La.	Pickard, H. W.	4	Billings, Mont.
Campbell, D. E.	4	Oakland, Calif.	Pidek, John R.	3	Romulus, Mich.
Campen, L. K. M.	4	Yakima, Wash.	Schmitt, G. W.	4	Portland, Ore.
Coon, S. M.	1	Glen Falls, N.Y.	Tetz, Dahl W.	4	Reno, Nev.
Farner, James E.	2	Ft. Worth, Tex.	Van Hoosen, R. L.	3	Chicago, Ill.
Hefler, V. R.	2	Okla. City, Okla.			

ILS CLASS 165 CONVENED DEC. 28, 1959 TO JAN. 22, 1960

NAME	REG.	STATION	NAME	REG.	STATION
Abu-Lymoun, A. I.	OIC	Egypt	Lutes, Bobby J.	3	Chicago, Ill.
Bates, James L.	2	Meridian, Miss.	McCartney, T. R.	WO	Washington, D.C.
Beckett, Carl W.	3	Champaign, Ill.	Moskowitz, Philip	1	Philadelphia, Pa.
Bryant, James G.	2	Shreveport, La.	Plowman, H. J.	4	Denver, Colo.
Evans, H. A., Jr.	2	Tulsa, Okla.	Rivers, Marion D.	2	San Angelo, Tex.
Fujiwara, Tamotsu	4	L. A., Calif.	Schafer, C. F.	3	Quincy, Ill.
Gabel, Richard N.	AC	Okla. City, Okla.	Schroeder, Neil J.	3	Burlington, Iowa
Harpring, Ira	1	Dayton, Ohio	Vegh, Joseph	4	Colo. Spgs., Colo.
Hunt, Otis	2	Charleston, S.C.	Wanless, R. E.	4	Denver, Colo.
Johnson, E. J.	4	Fresno, Calif.	Zientarski, Bernard	1	Toledo, Ohio

ESTABLISHMENT CLASS 6 CONVENED DEC. 14, 1959 TO JAN. 8, 1960

Abercrombie, H.	1	New York, N.Y.	Mohr, A. E.	2	Ft. Worth, Tex.
Betz, Robert L.	4	L. A., Calif.	Moore, Ronald E.	4	L. A., Calif.
Brown, Robert A.	2	Ft. Worth, Tex.	Moyer, Thomas A.	4	L. A., Calif.
Codispoti, Bruno	1	New York, N.Y.	Myhre, R. E.	3	Kansas City, Mo.

DME AND TACAN CLASS 7 CONVENED DEC. 14, 1959 TO MAR. 1, 1960

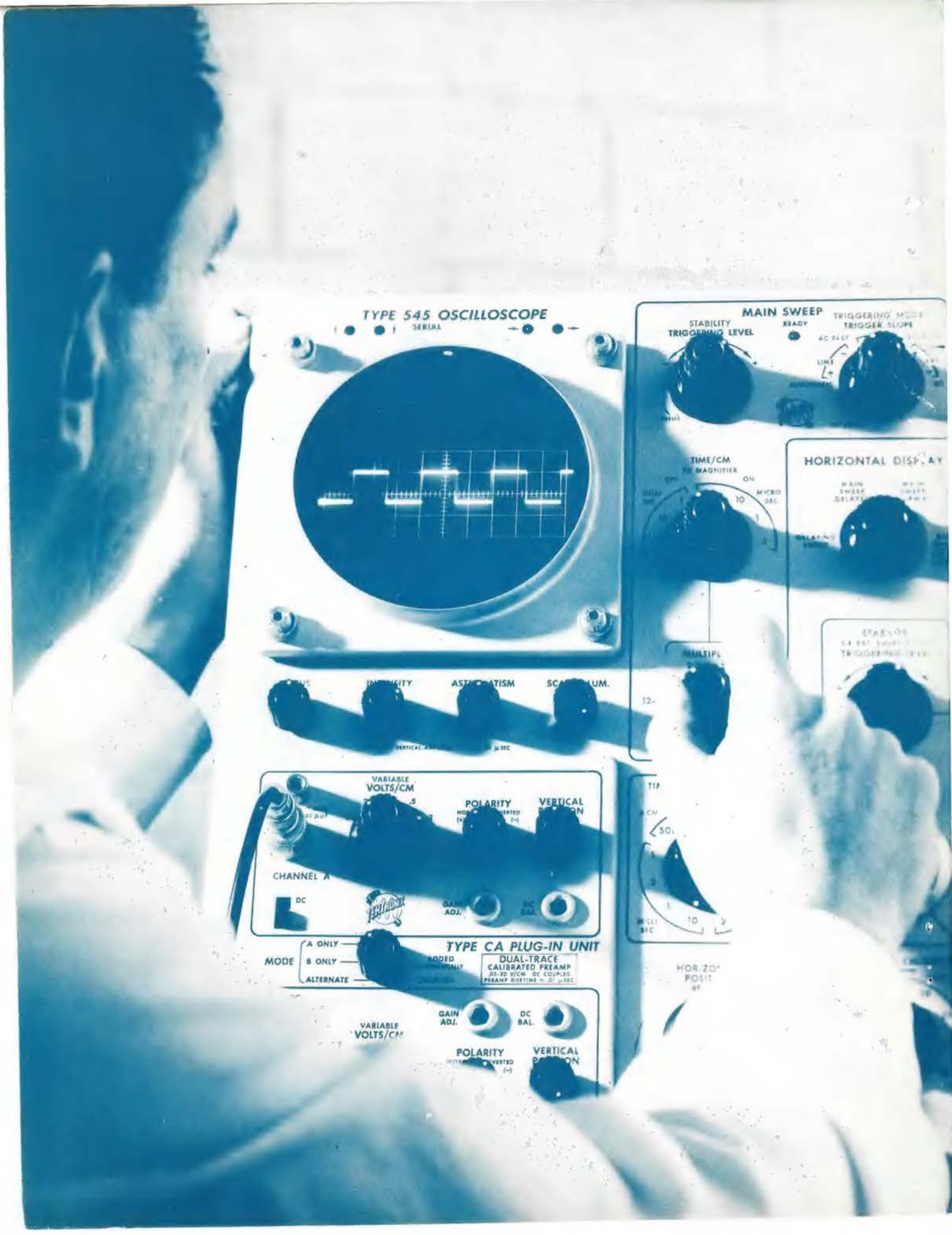
Graff, Jerry F.	3	Goshen, Ind.	Owens, Arthur E.	4	L. A., Calif.
Heathcot, Joe H.	3	Minneapolis, Minn.	Robbins, Carlisle H.	2	Charlotte, N.C.
Hutson, Bennie L.	3	N. Platte, Nebr.	Rosenow, Arnold W.	3	S. Bend, Ind.
Jackson, F. F., Jr.	1	Richmond, Va.	Ryan, Jesse L.	4	L. A., Calif.
James, Claud C.	4	L. A., Calif.	Scott, Delmar R.	2	New Orleans, La.
Landiak, Raymond	2	San Antonio, Tex.	Vogel, Alvin H.	1	Richmond, Va.
Melotte, K. J.	3	Peoria, Ill.	Vondracek, Paul C.	3	Topeka, Kansas
Nishijima, Kenji	4	L. A., Calif.	Walker, James W.	1	Gordonville, Va.

TACAN CLASS 17 CONVENED DEC. 14, 1959 TO MAR. 4, 1960

Clark, Kermit W.	4	Redwood City, Calif.	Poindexter, C. A.	2	Memphis, Tenn.
Goldman, J. A.	2	Jacksonville, Fla.	Ritter, John R.	5	Bethal, Alaska
Hanks, Leroy	2	Ft. Worth, Tex.	Ronald, J. L.	5	Anchorage, Alaska
Hansen, Duane A.	4	Salt Lake City, Utah	Ross, William A.	1	Pittsburgh, Pa.
Harr, Charles D.	2	San Antonio, Tex.	Templeman, D. L.	3	Kansas City, Mo.
McKay, D. W.	4	Butte, Montana	Weeks, Hugh S.	3	Green Bay, Wisc.
Maciariello, E. P.	1	New Castle, Del.	Wood, L. M.	4	Albuquerque, N.M.

ELECTRO-MECHANICS CLASS 11 (AIR CONDITIONING PHASE) - DEC. 21 - DEC. 31, 1959

Bottum, C. A.	3	Omaha, Nebr.	Oellien, C. A.	4	Daggett, Calif.
Bowers, George W.	1	Louisville, Ky.	Ouellette, L. R.	3	Duluth, Minn.
Boyd, Jimmy D.	AC	Okla. City, Okla.	Timmons, W. F.	1	Syracuse, N. Y.
Davis, Ralph L.	2	Tulsa, Okla.	Wicienciak, S. P.	3	Milwaukee, Wisc.
Massey, John E.	2	Atlanta, Ga.			


TYPE 545 OSCILLOSCOPE
SERIAL
MAIN SWEEP
STABILITY
TRIGGERING LEVEL
READY
TRIGGERING MODE
TRIGGER SLOPE
TIME/CM
MAGNIFIER
HORIZONTAL DISPLAY
INTENSITY
ASTIGMATISM
VARIABLE
VOLTS/CM
POLARITY
VERTICAL
CHANNEL A
DC
GAIN ADJ.
DC BAL.
TYPE CA PLUG-IN UNIT
MODE
A ONLY
B ONLY
ALTERNATE
DUAL-TRACE
CALIBRATED PREAMP
VARIABLE VOLTS/CM
GAIN ADJ.
DC BAL.
POLARITY
VERTICAL