

AERO'S READY TO GO —

ARE YOU?

PROP WASH

OCTOBER 1962

SENSOR SIMULATION

For the past several months the activities of our Relief Model Department have been something of a mystery to most people at Aero. Shortly after the Open House at the new Van Kirk Plant, the department equipment and an enlarged staff entered the new building and dropped out of sight.

Behind the locked doors, our conventional relief map products continued to grow and interesting new subjects are also emerging.

Ever since the department started during the war, a certain amount of relief model work has been done for military training aids of various types. It is an increase in the volume of work of this type which was a significant factor in the expansion of the department and their relocation into the larger quarters. Let's take a look at some of their current activities.

RADAR SIMULATION EXPANDED

Substantial changes have taken place in radar simulation techniques since the days when Aero produced the nine by thirty-six feet rubber map models for the ultrasonic trainers. A description of two types of input materials will give us a picture of current operations.

THE F-105-D SIMULATOR SYSTEM

This realistically simulates ground mapping radar at all operational altitudes from low level to 100,000 feet. The F-105-D is an all



Three F-105-D aircraft headed for a training mission.

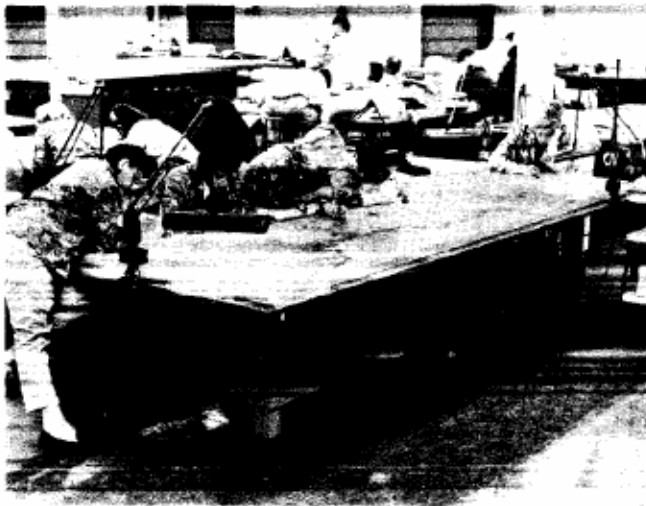
weather fighter-bomber built by Republic. The aircraft is designed to provide tactical air support to ground forces. It can approach the target area at 1,400 miles per hour, slow down to 250 MPH and attack ground targets at tree top level and then zoom on to the next target area. The aircraft is equipped for in-flight refueling and a complex electronic data acquisition and navigational system which can be programmed for round trip missions where the pilot will never see the ground.

Map input information is provided by a relief map and a planar map, each five by eleven feet at a scale of 1:400,000 giving coverage of an area of a quarter million square miles. The ground scanning radar is simulated with a relief device, consisting of a planar and relief map illuminated by a high intensity light source and scanned by a closed circuit TV camera. The three dimensional relief map is constructed of epoxy-fiber glass. The planar map is a flat map on which planes of elevation are represented by gray-shade reflective values.

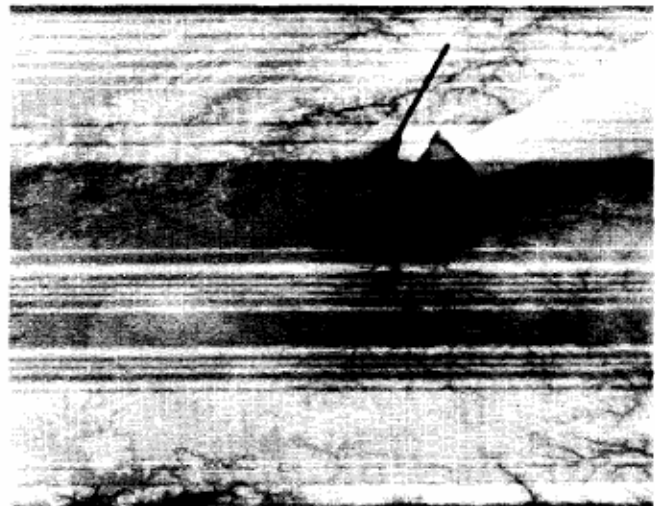
The F-105-D system also utilizes plotting system maps in the form of color slides at three different map scales. These slides are used to score the student pilot's accuracy and ability through the use of reference images.

THE T-10 SIMULATOR SYSTEM

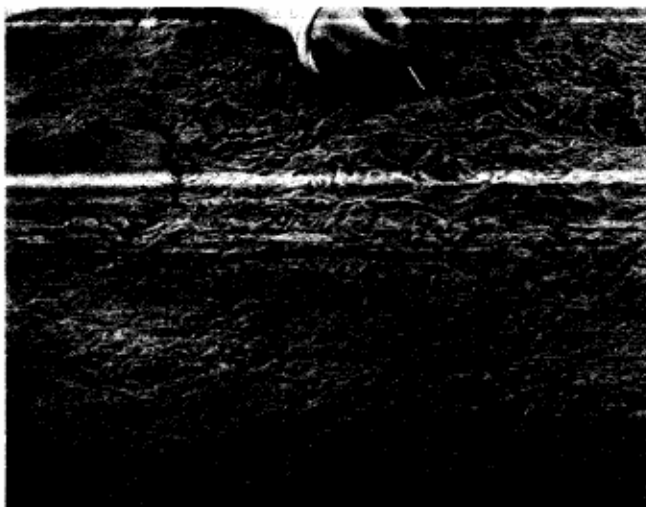
This system, designed by the Marquardt Corporation-Pomona Division, is used to simulate B-52 tactical missions. Aero is doing the compilation and cartography of the information which is to appear on the simulator plates. The increased range of aircraft and low altitude pattern requirements have produced the need for this system. Aero's part in this program to date has been the production of manuscripts for 24 geographic areas totalling more than two million square miles. In each area ground elevations are shown by nineteen color gray shade hypsometry. The cartographic materials generated by Aero will go to Technicolor Corporation to become a finished product in the form of color plates. Eighteen of our cartographic personnel are on temporary assignment to Technicolor's Burbank, California plant.



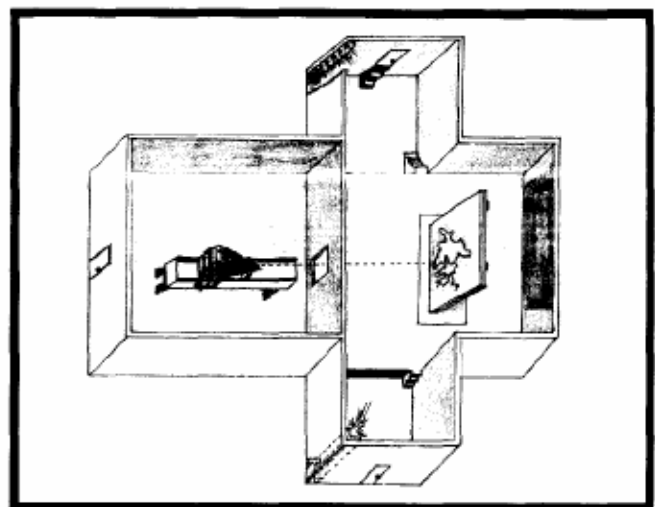
Painting gray shade reflection values on a F-105-D planar model.



Note the amount of fine detail involved in this planar map.



Here is an example of the relief model used in the F-105-D trainer. A TV camera simulates the position and attitude of the aircraft.



Artist's sketch of the copy camera installation currently being constructed at the Van Kirk Street plant.

A partial requirement of the T-10 task, due to the dimensional tolerances required, was the maintaining of material and work area temperatures of 74° plus or minus 2° and a humidity control of 50% plus or minus 5%. A temperature and humidity control system was installed in the compilation area of the VanKirk Street building and is a valuable addition to Aero capability to produce map information to fine tolerances.

To improve the photographic facility available to the Sensor Data Division a high precision copy camera installation is underway at the VanKirk plant. This camera will be used to produce reproductions of map and target information for the various simulation programs. The aim of this camera system is to produce extremely high dimensional

accuracy. Errors in image size will be in the order of .00003 inches per inch or five ten thousands in a fifteen inch image.

The installation consists of a modified Klimsch process camera. Modifications involve a special back to permit precision positioning of thirty inch glass plates, a lens focusing device which positions the lens system to one ten thousandths of an inch, and vibration free support for the camera and easel system. A special lighting system will provide constant level of illumination over the hugh easel so that image density can be controlled to plus or minus .01.

The entire system is to be installed on a slab of reinforced concrete twenty two by forty feet in area and eighteen inches thick.

The slab will rest on a bed of eighteen inches (100 tons!) of sand to isolate the system from external vibrations.

NEW AREAS FOR MODELS

Aero is preparing now for activities in the earth-moon-earth flight simulation programs and have created a number of models related to this program. The Prop Wash cover features a lunar hemisphere produced at a scale of approximately 1:40,000,000. Lunar modelling at larger scale is exemplified by the 1:100,000 model of Hell Crater. This crater about twenty miles in diameter and two miles deep appears as a pin head sized dot within another crater in the lower left quadrant of the cover photograph. The crater was modelled in epoxy and lightly colored to give an idea of suspected moon tones. As is the case with most photographs of three dimensional models, the model is much more realistic and valuable as a study tool than the two dimensional photograph would indicate.

The department is currently working on a lunar relief section four by four feet rendered at a scale of 1:250,000 with a two to one vertical exaggeration. This model will portray the crater Copernicus and the minor craters in the vicinity. This is the large crater on the left of the cover photo.

The basic manuscript Aero produced for the modelling section was derived from Air Force Lunar charts. With the aide of photography and cartographic skills, a model has been produced from a flat map giving a clearer understanding of what a portion of the moon's surface might look like. The model will be displayed at a major convention next year.

Aero is currently awaiting a request for proposal from North American Aviation on the Apollo project. This Apollo project represents a total mission simulator to which Aero hopes to contribute the model inputs. We may produce relief globes of the earth and moon twelve and three feet in diameter respectively. Simulated approach sections for both Earth and Moon, approximately fifteen by forty feet and simulated landing areas fifteen feet square on both bodies will also be required. Another part of our contribution to this project may be the supplying, in film strip form, the necessary window views for mid-course operations between Earth and Moon.

The Gemini project, even though it differs somewhat in scope, presents simulation effects done in much the same manner as



Hell Crater Model. The crater would cover the Philadelphia area from Chester to Willow Grove, Norristown to the Jersey Turnpike.

the Apollo project. The Gemini project is a two man mission, with or without the possibility of landing on the moon - Apollo, a three or four man mission with a moon landing. Both projects present a new field in which the Sensor Data Division can apply its highly developed engineering, cartographic, photographic and artistic skills.

COMMERCIAL MODELS

In the commercial wall map area, 2nd Editions of the Relief Maps of North America and Europe are ready for release.

The major changes in the North America map are due to population shifts to be reflected in revised symbols and type faces for cities which have had significant changes.

Changes in the Europe map are mainly political - the Saar now shown as a part of West Germany, Cyprus no longer a United Kingdom possession, and Stalin and Molotov disappear from the names of Russian cities.

Aero has made another entry into the commercial plastic forming field with 5,500 dealer display plaques for the Jacobson Power Tool Company.

FOR NEW ENGLAND TOURISTS

Visitors to the Hubbardton, Vermont Battlefield site can now trace the events of this important skirmish on an animated terrain model which Aero completed and delivered this summer. As visitors listen to a four minute commentary, a second tape channel actuates controls for about four hundred light bulbs which portray 68 bits of animation, about five times as many as we have included on previous models.



Joe Donnelly of the Maintenance Department checking the pouring of concrete for camera room foundation. The Maintenance men have worked long and hard on these building modifications.

The action portrayed took place on July 7, 1777 when lead elements of Burgoyne's forces caught up to the rear guard of General Joseph St. Clair's Continental Army fleeing from Ticondaroga. Although the Continentals were forced to withdraw after one and three quarter hours of fiercest fighting, they did so leaving



The Battle of Hubbardton centered upon this cabin and the surrounding area. During the short but fierce fighting, both sides suffered almost twenty percent casualties.

the pursuing forces with heavy casualties, no supplies, and insufficient ammunition. The action is credited with being the first vigorous resistance to Burgoyne's advance toward New York and provided time for the Continentals to reorganize for the Battle of Bennington and the crushing defeat of Burgoyne at Saratoga.

F L A S H ! as Prop Wash goes to press-
Aero awarded contract for F-105D Trainer-
Simulator map sets in amount of \$ 1,446,683,
largest single contract for simulator input
materials ever awarded.

AERO-TRONICS

In the early part of this year, Aero management reviewed our activities in the language training device field. The product line we handled last year was not gaining consumer acceptance due to lack of expandability and product design.

The decision was made to design and place in production at Aero an entirely new product to meet the growing educational market for portable language training devices for classroom use.

Operating on a crash program, this new product was designed and a prototype unit was constructed and delivered to a trade show in April, seven weeks after receiving management approval for the new program. During the following nine weeks a manufacturing facility was created and staffed at the Van Kirk Street plant and quantity production was underway. The new product has been an immediate success. At the recent National Audio-Visual Association convention, more than forty units were sold on the spot with additional orders following by mail.

The evolution from a basic idea to quantity production within this short period of time is a truly dramatic achievement and the personnel of the Industrial Electronics Division deserve high praise for their accomplishments.

WHY LANGUAGE TRAINING DEVICES ?

The learning laboratory concept, utilizing the presentation of information via tape decks, records and visual aids, has been practiced on a large scale primarily at the university level for perhaps the past decade. The extension into the high school and grade school level has been progressing rapidly the last few years. Educators now believe that the number of units in use will double during the current school year. A fixed installation language laboratory is a costly item, with prices running from \$4,000 to \$15,000. Aero's portable unit, with 10 student positions, and provision for expansion to 30 positions, costs \$985.00.

The central unit consists of a tape deck for use in presenting audio material to

New Product Name

New Improved Product

New Production Capability



Aero-Tronic unit in a typical classroom situation. Ease of operation and rugged transistorized printed circuit construction are features which appeal to educators. The compact electronic components are located in the upper deck of the unit, leaving the balance for the storage of accessory equipment. Shown in this staged photograph are part time secretary Lois Liptak and Peter Jensen, Katherine Brown, Joe Mullen and Judith Ludwig, high school students working with us this summer.

students and for recording their learning progress. The instructor through the use of conveniently arranged controls can address or monitor selected individuals or the entire group as desired. The high fidelity earphones have built into them an Aero produced transistorized amplifier. The economical expansion of the unit is achieved by the expansion of plug in connections and the purchase of additional head sets. Provision has also been made for a slide projector to be attached to the central unit and actuated by programmed signals superimposed on the audio tapes. Such programmed tapes are producable with the basic unit.

OTHER ACTIVITIES POSSIBLE

Although the department activities are currently devoted exclusively to the Aero-Tronic units, we now have, for the first time, a capability to produce electronic devices on a production quantity basis and



By dipping a printed circuit assembly in this pot of molten solder, Cass Pendergast completes 98 solder connections in one operation.



Annamay Hamilton (r) and Rose Pollacco (l) wiring power supplies. Some of the printed circuit units are visible on the right side of the work area. Both girls have husbands at Aero, George Hamilton, now on a field assignment, and Bob Pollacco, a member of our Topographic Department.



Ann Gruber cabling wiring in the foreground, while Mary Gallagher in the background is inspecting completed subassemblies.



Wireman Bernie Allen (l) and production technician Peter Jasin wiring up a final assembly and checking it out.

it is certain that over a period of time we will see other Aero products forthcoming from this new unit of the Aero organization.

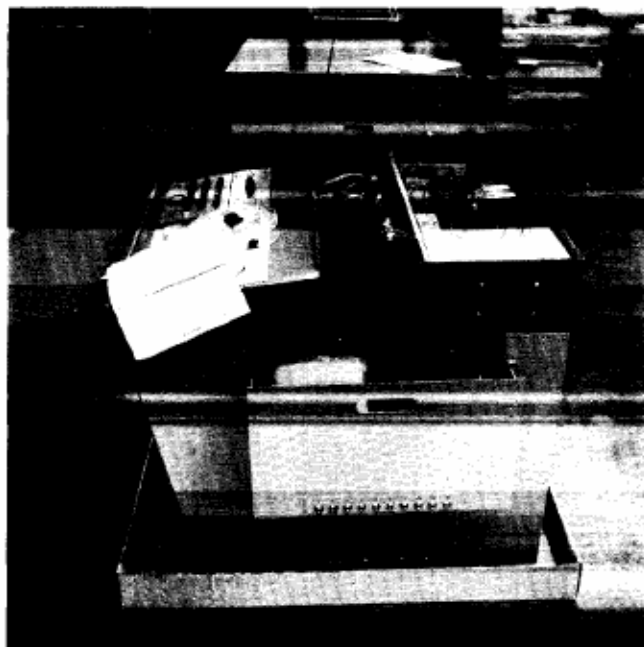
The marketing of the Aero-Tronic equipment is handled by the Product Sales Division under the direction of Charlie Houghton. Charlie reports that forty authorized Audio-Visual dealers have already been appointed, and by the end of the year our nationwide distribution network should be complete. These dealers are served by a total of six manufacturers representatives located in the major marketing areas.

Personnel connected with Aero-Tronics engineering and production who do not appear

in the photo story are Chief Production Engineer Norm Wunsch, Ray Thomas, Production Control; and wireman Don Ball. Ray Alexander, an engineering technician formerly with our mechanical engineering and photogrammetric departments deserves special mention for his fine efforts during the hectic days of new design and prototype building. Ray is currently receiving special training at a Monroe-Litton facility in connection with another new Aero product.

Aero-Tronics activities fall in the Industrial Electronics Division of Aero, under John O'Hara, who has contagious enthusiasm when discussing the potential of the Aero-Tronics equipment. The other major effort

of the division involves the Automated Coordinatograph. We will have a story in our next issue covering the important changes and improvements which have been made recently in this device.



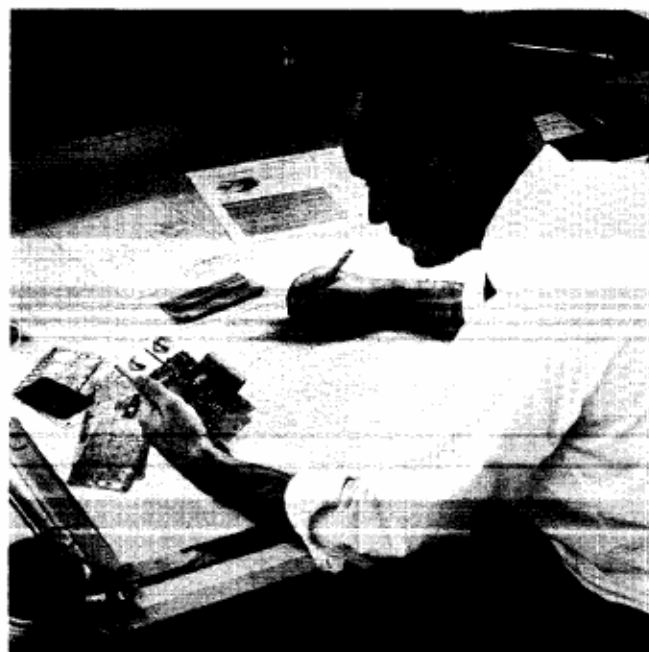
Two units ready to be shipped. The near 30 student unit is destined for Howard Brown, a Pheonix, Arizona dealer and the 10 student unit in the background is enroute to the D.T. Davis Company in Louisville, Kentucky.



Shop Foreman Frank Lauth looking at the transistorized amplifier contained in one of the head set units. This feature promotes the economical expansion of the units. Frank incidentally was a Kelsh operator in the Photogrammetry Division prior to the formation of this new production department.



Dick Watson shown here check out a unit works with Chief Engineer Karl Sutphen and project engineer Charlie Mattern on the electronic design.



Bill Armstrong, a newcomer to Aero, will be handling electro-mechanical design for the division.

NEW AT AERO

During the past several months several notable additions have been made to our stable of specialized equipment.

Before we go into the aircraft and instruments, we should make a special mention of our new plant at VanKirk Street and pass along to our Maintenance Department a special commendation.

Those of you who attended the Open House already have an appreciation of what had been done to date. Since then, the large areas we saw have been further modified and the men under Ed Brown did, and are still doing a fine job. In addition to a general refurbishing, they have dropped ceilings, raised floors, installed special services of various types and generally converted a manufacturing plant into a fine cartographic and modelling center. Three cheers for Maintenance.

Our flight operations group recently acquired additional Aero Commanders, the third in May and the fourth in September. All four are now equipped with camera installations, an airborne magnetometer, Doppler navigator and long range fuel tanks.

On September 20, we received a 1963 model Cessna 320 Skynight, a turbocharged twin engine aircraft with a 30,000 ft. ceiling. Camera and magnetometer installations are now in progress.



Dick Boyle inserting a roller assembly in the Versimat film processor. The equipment receives the film, as it comes from the camera, in the dark room to the right. Time, temperature and chemical concentrations are handled automatically and dried film is delivered to the take up spool on the left ready for numbering.

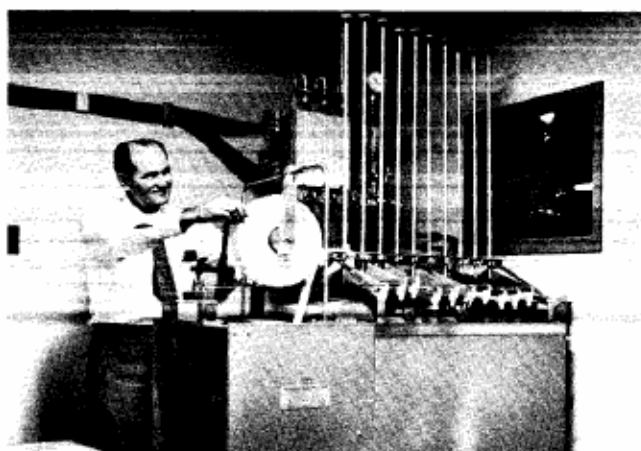
The Photographic Department has been acquiring automated photographic equipment and modernizing existing devices so that we may reduce the unit costs of our photographic processing and thus secure additional work not available at our current prices.

An Eastman Kodak Versimat now in operation develops, fixes, washes and dries a 200' roll of aerial film in 30 minutes. An E-K P4 Paper Processor turns out glossy prints ready to be trimmed at the rate of more than 150 per hour.

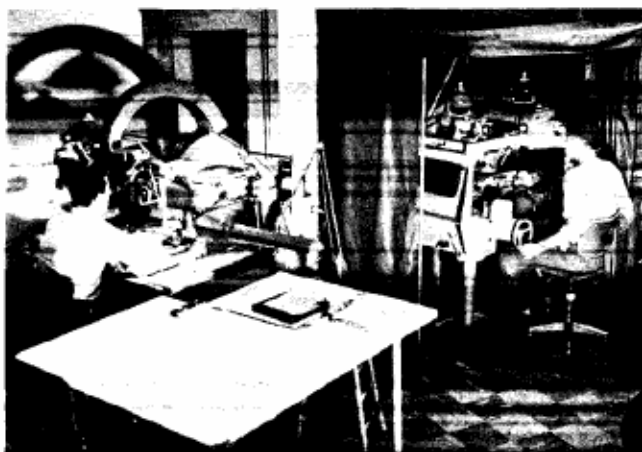
One of our SEG V Automatic Rectifying Projectors is being converted to an Automatic Rectifying and Dodging Projector through the inclusion of the features of the Log Etronic units. Aero has carried out the design and modification work within the Company, purchasing the LogEtronic mechanism from the manufacturer.

The A-9 Stereo plotter for super wide angle photogrammetric photography has been joined by two B-8 plotters. The Jordan project and the Alaskan monumentation project are examples of work which are being done on the A-9 and A-8's.

In Nigeria, Canadian Aero has been using a RC-9 Camera with an Infragon lens for small scale mapping. As an adjunct to the field control procedures, they are making use of their recently acquired Wild Horizon Camera and Staloscope. The Horizon Camera, just behind and above the RC-9, fires simultaneously with the mapping camera and provides



This equipment produces contact prints on roll paper. Fixed and washed prints pass through the partition to other automatic equipment which dries and ferrotypes the prints. Aero is currently trimming prints manually, however, an automatic print trimmer is also available.



Frank Sassa operating the new B-9 (left), and Ed Sztukowski on the A-9 to the right.

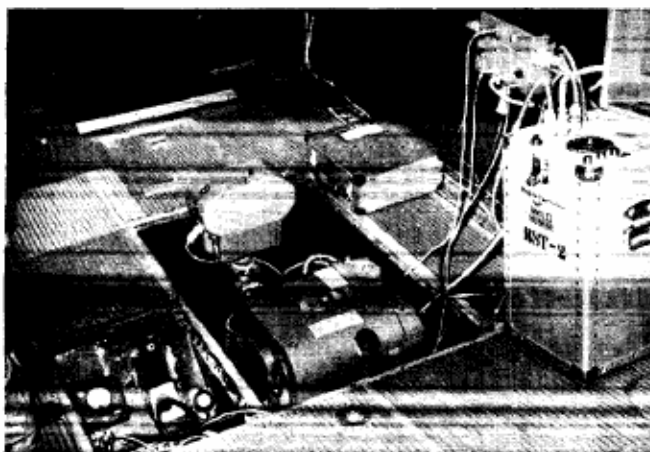
four photos of the earth-sky horizon. This data is useful in establishing the tip and tilt of the aerial camera for use in bridging techniques. The Statoscope is an instrument which records, with high accuracy, relative changes in the aircraft altitude. This information plus that obtained from Doppler will provide the photogrammetrist with fairly accurate information regarding the relative position and altitude of the camera when each of a series of bridging photographs were exposed. The system performed well in Nigeria and permitted a significant reduction in the amount of field control required.

The new equipment arrivals are a visible sign of the change in market conditions and advancing technology. New wide angle cameras such as the RC-9, permit obtaining photography at lower altitudes. Navigational systems are becoming more compact as well as complex. Factors such as these, coupled with a smaller market demand has tended to reduce our activities in certain types of work.

SWAN SONG FOR AN OLD EAGLE

A trend of this type recently led the company to reduce our heavy aircraft capability and one of the victims was N5017N. This B-17 joined the Aero ranks in September 1949. During the following twelve years, this aircraft has flown almost one million miles, sufficient to circle the globe more than 35 times. Crewed by such men as Charlie Stinchfield, Quentin Allen, Dwight Oehlerking, Ken Slack, Gordon Roser, Orville Quinn, Ed Irwin and Paul Dauphin, 5017N covered much of the Eastern World at 30,000 feet.

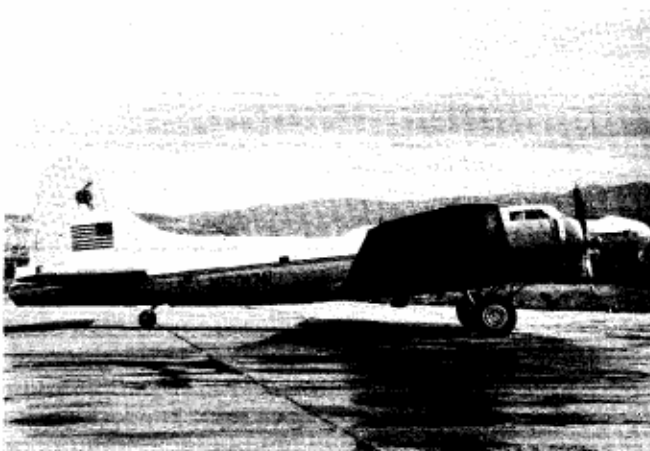
Flight crews associate the ship with Saudi Arabia, for much of the country was



Canadian Aero's DC-3 in Nigeria with Wild RC-9 camera, Horizon camera, and Statoscope.

mapped using this aircraft. Mechanics think of Beirut, Lebanon where engine changes were completed. A more complete roster of its work included Shoran controlled photography and visual photography in Iran, Laos, Libya, Viet Nam, Cambodia, Egypt, and Jordan. The Boeing Company Magazine in 1960 ran a feature story covering its exploits.

Prior to Aero's purchase of it, 5017N was used to ferry fresh shrimp to East Coast markets. It was manufactured by Boeing too late to participate in WW II combat. The aircraft was sold this Summer to Chris D. Stoltzfus and Associates of Coatesville, Penna., who will use it for forestry dusting operations and for fighting forest fires.



Aero B-17 N5017N during its heyday as a mapping aircraft. During September and October of 1956, this aircraft flew forty four consecutive days obtaining photo coverage of 150,000 square miles of Arabia.

JORDAN OPERATIONS EXPAND

Bob Savidge, Bill Wieman, Wayne Estes and Basil Beline are working out of Amman on the field edite of 30,000 square miles of topo job along the East Bank of the Jordan River. They are being assisted by a staff of nine local personnel. This is one of the larger edite jobs we have engaged in and is certainly the most difficult in so far as field work is concerned. The actual edite is carried out by four teams using six vehicles with an assist from the Desert Patrol and nomadic Bedouins. Most of their work so far has been in the Northeast part of the country, black lava rock desert where the temperatures average 110° plus and they have as many as seven flat tires in one day. Bill Wieman and Wayne Estes have been working on this project for more than one year, first on the field survey control, and more recently on the field edite.

Other projects in Jordan are the city mapping of Jerusalem, highway mapping from the Gulf of Aqaba on the Red Sea to Saif on the Dead Sea, and a mosaic program for a UN sponsored redevelopment of a large area in central Jordan.

Ernie McLendon and Gordon Roser recently completed the Jerusalem flying with an Aero Apache.



Pilot Ernie McLendon, Photographer Gordon Roser, and Jordanian Security Officer boarding the Apache for photo flight over Jerusalem.

Ernie and Basil Beline are now using the Apache for the highway mapping photography.

Red Dupuy head of Aero's Field Survey Department will be leaving for Jordan in the not too distant future to make arrangements for securing field control for this area.



Desert Patrol soldier guiding an edite vehicle over rough but typical country.



More rough going!

PROPERTY WORK

In March 1962, Aero offices in Mayville, New York were opened for the purpose of preparing property maps for Chautauqua County. The year and a half project is scheduled for completion in mid 1963. To combat the shortage of building space in the town, we refurbished a one hundred plus year old barn and turned it into a cozy compilation and drafting facility. At the peak of the summer season project manager Jim Veign had a staff of twenty one people.

An interesting sidelight to this project involves the original ownership of the land.

This area at one time was claimed by the states of Pennsylvania, New York and Connecticut. Robert Morris, the Philadelphia financier, acquired the land by separate negotiation with the states and also with the various Indian tribes involved. After the Revolutionary War when Morris was in financial difficulties due to his generous support of the Continental cause, the Holland Land Company purchased three million acres, known as the Holland Purchase. This included the western section of New York. A Joseph Ellicott was engaged to survey the land about 1800 for subdivision. A true bearing North-South Meridian was desired on the Eastern edge of the tract.



Tax Mappers at Mayville; 1 to r 1st row: Ed Mifsud, Tony Monta, Denny Brown, Bob Borst, Bill Lantz; 2nd row; Betty Wetsel, Jeanne Wetsel, Marion Mawhir, Peggy Kraemer, Mary Borst, Barbara Seymour; 3rd row: Jack Schall, Sponse Limbaugh, Don Strobl, Bump Sprague, Phil Hodkin, and Dick Marks. Project Manager Jim Veign is behind the camera.

There was no transit in America at the time of sufficient accuracy to establish this 100 mile line. Ellicott's brother, a Philadelphia manufacturer successfully undertook the project of making a transit of the desired accuracy which was the most accurate survey instrument in America for some time. Some years later, Ellicott did the first survey of the District of Colombia.

TRI STATE PHOTO COVERAGE AVAILABLE

In June, Aero crews completed dual photo coverage of a 12,000 square mile area in New York, New Jersey and Connecticut for the Tri-State Transportation Study. At the same time Aero obtained 6,000 additional miles of photography covering the balance of New Jersey and Connecticut plus all of Rhode Island.

High altitude photography was obtained with an Aero B-17, each exposure being centered on the center point of the USGS quad maps of the area. They will be avail-

able at the scale and format of the quads and will serve as valuable adjunct to the topo maps, many of which are 10 to 25 years old. Large scale photography, obtained with light aircraft provides coverage at a scale of 1" = 1,500'. Photomaps, with street names and other land marks lettered in, have been prepared from the large scale photography and as you might imagine, the Topographic Drafting section was engulfed with a LeRoy lettering job this Summer.

Aero retained reproduction rights to the photography and Reprint Sales will be marketing the photography and maps to planners, engineers and other potential customers.



Gil Mallinckrodt and Lee Burton awaiting arrival of another Aero Commander returning to Galena. The airfield is about 20 feet below the level of the nearby river and is protected by a dyke.

Alaskan Geophysical work has received an impetus from Alaskan statehood status. At the end of WW II, the U.S. Geological Survey in collaboration with the U.S. Navy completed airborne magnetometer work in the coastal area west of the Colville River. A number of exploratory wells were drilled, some of which produced shows of gas and oil. Admittedly this was work done with an early model of the airborne magnetometer and at the time base maps were inadequate to provide good control for the data compilation, however, the general results were encouraging. The surface features and general geology of the area are also quite encouraging. The area north of the Brooks Range is a gigantic sedimentary basin of considerable depth.

With the achievement of statehood, the opening of the area to petroleum concessions is expected and the petroleum industry is showing considerable interest in the area. On the basis of this Aero is conducting a petroleum magnetometer survey on a speculation basis covering the area east of the Colville River between the Brooks Range and the Arctic Ocean with occasional lines running out to the pack ice. The flying was completed this Summer - 25,000 square miles with Doppler control and a line spacing of one mile. Three Aero Commanders were assigned to this and certain other areas. In spite of adverse conditions in the remote areas, they achieved excellent production, Lee Burton and Tom O'Rourke for instance turning out 1,687 miles of data in one day. The data is already being compiled and some sales have been consummated.

This is our first work in this portion of Alaska since Ernie McLendon and Ed Brown, Jr., carried out the horizon camera work there in 1956.

ALASKAN ACTIVITY

Aero crews have been hard at work ranging from the Gulf of Alaska on the three Aero Commanders equipped with n Twin Beech mounting an RC-8 and RC-9 flight bases at Anchorage, Fairbanks, K later two bases were marked by a potential sized gravel on the runway at Umiat, and Sea which boast a population of four.

Ken Slack is overall project manager. Wayne Campbell and Gill Stoll have been Tom O'Rourke, Ed Kuzman, and Don Hill has been flying as a photographer and pilot in top notch condition. Dean Turner has

Bob Black of Electronics did some geophysics tometer.

The various operations cover an area

Photogrammetric Engineering activities in Alaska this year can be traced directly to the fact that Alaska achieved statehood status. Much of the Alaskan territory consisted of Federal Government lands and with statehood status, the state government may select large areas of land which will be transferred to state ownership. Much of this land will ultimately be sold to private owners. As the state selects areas for such transfer, the U.S. Bureau of Land Management will provide survey control and monuments to divide the land into townships and sections.

The division of land into townships six miles square containing thirty-six sections of about 640 acres each derives from legislation of the Continental Congress in 1785. This prescribed the methods to be used in accounting for public lands until each time as they were transferred to private ownership. The use of local rectangular coordinate systems for the states was introduced in Ohio, the plan being expanded and perfected as our country grew and extended westward. The first large scale use of the current

T RECORD LEVEL

is season. Contract and speculative work Arctic Ocean on the North have involved s, cameras, and Doppler Radar and a operations have been carried out from Galena, and Umiat. Operations at the l runway at Galena and by grapefruit ween the Brooks Range and the Arctic

n operations. Lee Burton, Bud Thomae, aircraft through this difficult country. d the electronics chores. Gil Mallinckrodt and Paul Dauphin is keeping our aircraft the Wild cameras in an AT-11.

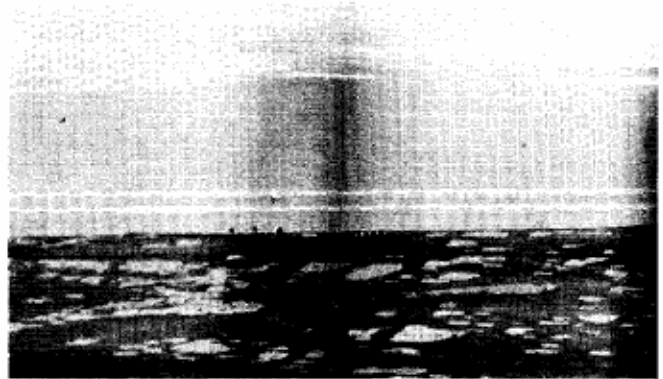
exploration with a boat mounted magne-

square miles.

system was in the development of the North-west Territory. Since property in the Philadelphia area was largely under private ownership when land management laws were enacted the square townships and sections are not familiar to most people in this area, however, most of us have read of settlers rushing into western lands under the various homestead acts which offered sections or fractions thereof to those first on the spot.

The survey method used to achieve the land subdivision has been modified over the years as new methods and procedures became available. The contracts currently underway for the Bureau of Land Management represent the first large scale use of photogrammetric bridging to establish township and section corners.

Two contracts now underway involve about 7,500 square miles. Bureau personnel have provided and flagged field control in the area and obtained photos of the points which can be used to recover the locations on mapping photography. They have established mathe-



Partially obscured by the propellor shadow is Oliktok, an Eskimo town and radar station on the Arctic coast at the mouth of the Colville River, where the Aero Commander was further North than Iceland or Norway.

matically the coordinates of the corners of the townships and sections. Aero is flying photography to be used to bridge their control and to identify upon the photography reference points to township corners and alternate section corners along the township boundaries. Since the mapping photography will be used for bridging the flight crews must use more than ordinary care in planning each flight strip so that it covers adequate ground control for the bridging technique.

Bridging has been already completed on some of the areas using the A-7 plotter in our Philadelphia office. The office end of the work also involves unusual care. As the A-7 operator proceeds with the bridging operation and reaches a model containing one of the 1,000 points to be monumented, he must select three points surrounding the section corner. These must be points which a field survey crew can positively identify on the ground. The operator must consider local conditions effecting the selection of reference points such as ground slope, trafficability, and vegetative cover which might prevent the survey crew from reaching the spot, setting up their instruments, and clearing a line of sight to other reference points and monument positions.

The reference points selected are plotted upon a manuscript and after the instrumental bridging has been completed and adjusted statistically, the adjusted coordinates of the reference points will be determined. Aero will deliver data to the client in the form of plane table sheets upon which are plotted the section or township corner, the reference points to it, and appropriate azimuth and reference information. The government field crew will use this plot on a plane table in the field to locate and establish the monu-



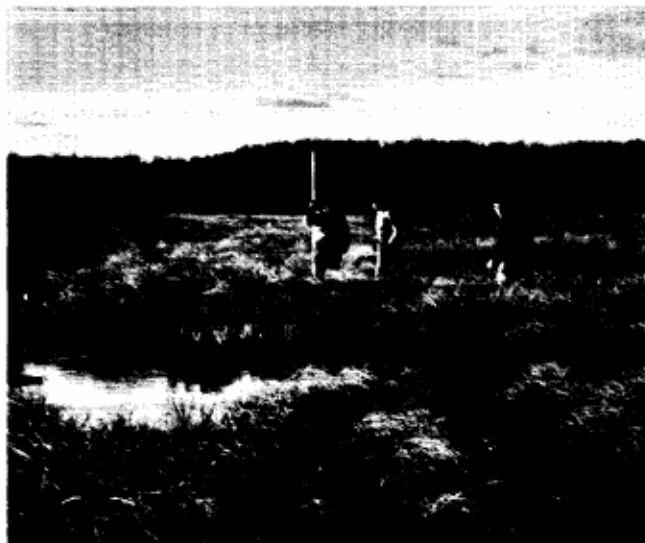
View of "gravel" runway at Umiat. Ed Brown took this photo in June when he was arranging to have the big ones removed. Even after it was smoothed out, there were still instances of bouncing stones denting the underside of the Commanders.



Delivered plane table sheets will be oriented on a plane table such as Red Dupuy is using in the picture, and the alidade used to sight from the reference point to the monument position by aligning it with the plotted points.

ments within five to eight feet of the true position.

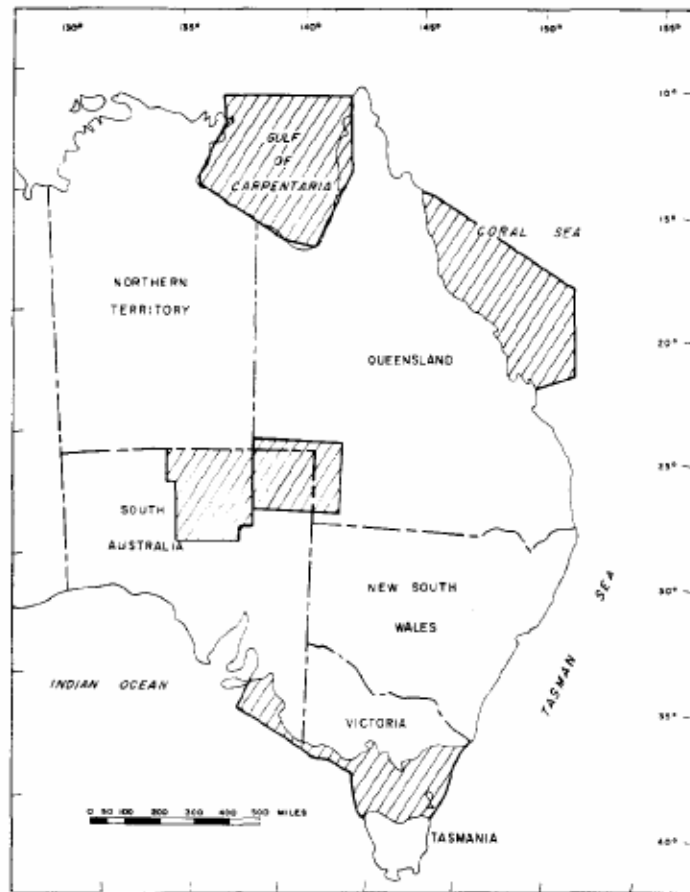
On the basis of the experience gained in the first area, a modified procedure will be used on the second area. Photography of the area is being obtained with the wide angle RC-9 camera, bridged, and a controlled mosaic prepared. Larger scale strip photography will then be obtained along the township boundaries. During the bridging of the small scale photography, points will be selected to be used to orient the large scale stereomodels from which the reference point and monument point coordinates can be scaled directly on the manuscript. This procedure reduces the time required and the cost of obtaining the photography, establishing the field control, and carrying out the bridging operation. On the second contract we will also indicate the positions of shorelines and buildings so that local land records for homestead sites can be corrected and up-dated.



This Alaskan country side is typical of that which will be traversed by government survey parties locating the monuments. Wherever possible, reference points will be chosen to avoid such areas where terrain makes travel difficult.



THE DC-3 DAKOTA, long known for its dependable, workhorse performance, is the survey aircraft for Aero Service Ltd.



MAJOR airborne magnetometer surveys in Australia, during past year include work in these shaded areas.

Aerial exploration investigates huge Australian tideland areas

EXPLORATION is flying ahead in Australia. For example, July saw the beginning of a 140,000-sq-mile airborne-magnetometer survey in the Gulf of Carpentaria. It's the largest aerial reconnaissance ever done Down Under.

Other major aeromagnetic surveys—in the Great Barrier Reef and the Bass Strait areas, as well as inland—bring the total nearly to 500,000 sq miles during the past 12 months.

These surveys are being performed by Aero Service Ltd., Sydney, a division of Litton Industries. The company is managed and staffed by Australians, with a small nucleus of technical personnel from the parent company. It has been engaged in petroleum exploration

on this continent for nearly 10 years.

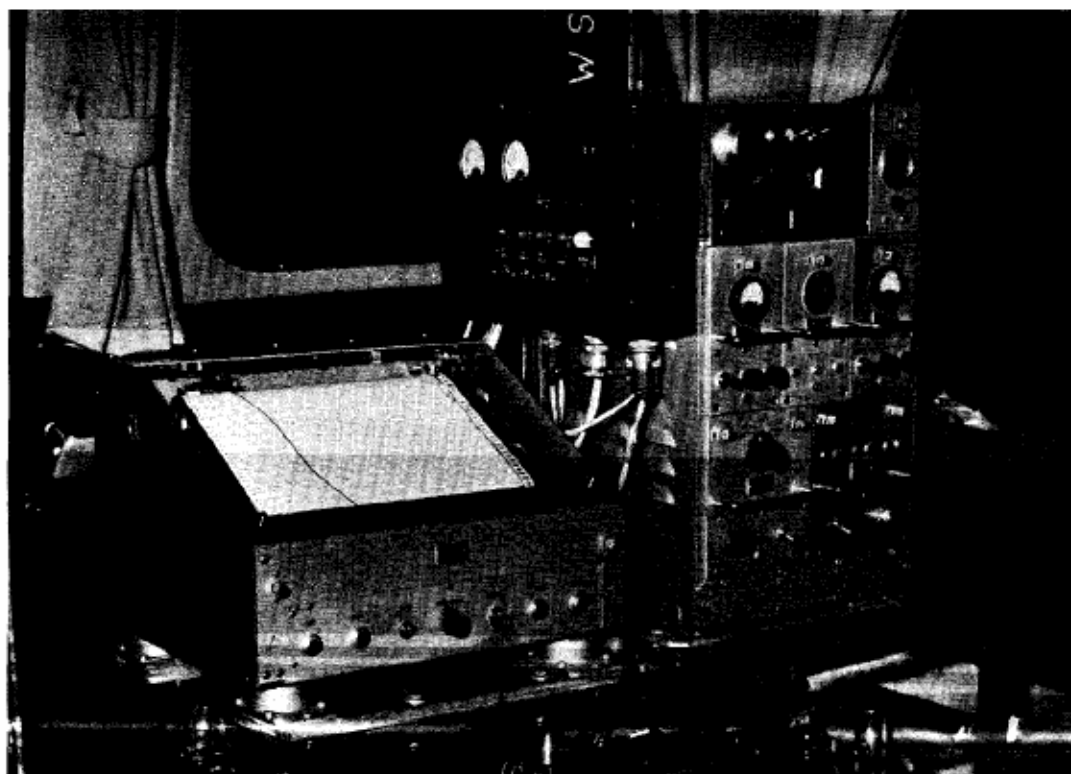
The Carpentaria survey is being performed for the Delhi Australian Petroleum Ltd.-Santos Ltd. group. The aeromagnetic reconnaissance of the Great Barrier Reef area was undertaken for Australian Oil & Gas Corp. Haematite Exploration Pty. Ltd., the B.H.P. subsidiary, was the client for the Bass Strait survey. The inland surveys were performed for Delhi.

Airborne geophysical surveys, and indeed all types of petroleum exploration, are aided by a subsidy from the Australian Government. The Department of National Development of the Commonwealth of Australia has virtually doubled its allocation for subsidizing geophysi-

cal and drilling operations, to accelerate these activities on the continent.

Aero Service Ltd. uses specially modified DC-3 Dakotas as its survey aircraft. They carry a Gulf high-sensitivity magnetometer in a tail or "stinger" installation. The DC-3s are also equipped with precise radio altimeters and a Kearfott N-1 electronic compass system. The Kearfott compass helps to guide the Dakotas, especially in the Gulf of Carpentaria where flight lines are over water, with up to 400 miles between landfalls.

Flying of the Carpentaria area is moving ahead rapidly. The aircraft will be based at Weipa, Galbraith station, and Home Island as the survey progresses. The mag-



GENTLY curving record trace of a petroleum survey is seen in this photo of the airborne-magnetometer recorder gear in the DC-3.

netic data will be compiled and interpreted at the headquarters office at Ramsgate, Sydney.

In these offshore airborne-magnetometer surveys, the exploration company has found it useful to have a staff petroleum geophysicist, experienced in aeromagnetics, in the field with the survey crew. His day-to-day review of the data helped to determine the intensity of survey coverage in areas of particular interest, and to guide the survey pattern generally.

Historically, field interpretation in petroleum geophysics has been limited to the slower-moving crews working on land and sea. Preliminary field interpretations of the aeromagnetic data were found useful in defining and confirming the broad guidelines of the survey plan. Such reconnaissance helps to determine the best flight-line direction, thus increasing materially the value of the data.

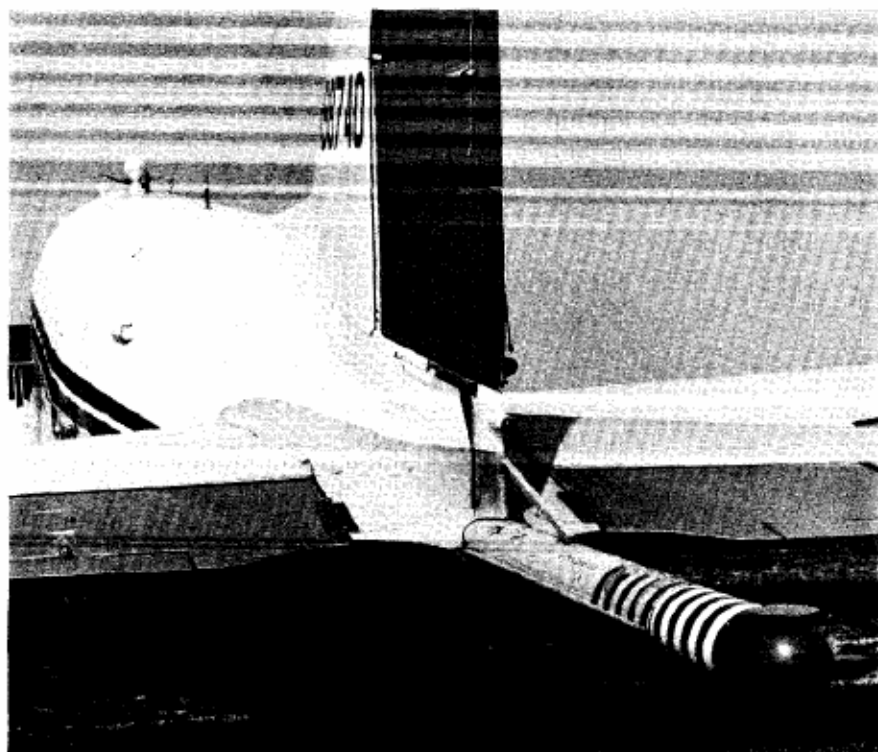
"Aerial exploration in Australia presents its own operational problems," says M. J. Lawrence, vice president and regional manager for Aero Service Ltd. "The continent is huge—nearly 3,000,000 sq miles. Its 10,000,000 population is concentrated mostly in cities or on the eastern seaboard. There are large

undeveloped areas with little or no transport or communication. Existing map coverage is often unreliable.

"Weather can also be rugged. In the Bass Straits survey, our Shoran masts were blown down by gale-

force winds of over 100 mph. Surveys in Central Australia are handicapped by dust storms, and a new survey, soon to begin over the Simpson Desert, will call for flying over almost featureless terrain."

End



GULF HIGH-SENSITIVITY airborne magnetometer is mounted in the tail of the Dakota aircraft in a "stinger" installation for the Australian surveys.



AERO AUSTRALIA BUSY WITH EXPLORATION

The preceding two page article reprinted from the August 27, 1962 issue of The Oil and Gas Journal gives an excellent picture of what our Aero friends in Australia have been doing recently.

Pilots Les Taylor and Gerry Heyen, mag operator Bob Welshe and engineer John Richmond deserve the credit for the recent airborne geophysical work.

Gerry Vardi and Gordon Phipps have just returned from extensive air photo work in Queensland and the Northern Territory.

Last November and December, Gerry Vardi pilot, Dave Lyus operator, and Gordon Phipps, ground support, were hard at work in the Simpson Desert of Central Australia where a 14,000 mile magnetometer survey was completed under project manager Dick Lambert. The main base was Oodnadatta, formerly the western terminus of the transcontinental railroad. The field work was conducted during the peak of the summer season when the temperatures were in the 100° plus range. The end of the Christmas Holidays was signaled by the worst dust storm in 57 years. It covered a 750 mile front and the dust rose to 18,000 feet. The project was completed fifteen days later.

Philadelphia Geologist Ron Hartman is stationed at Toowoomba for the interpretation



The last issue of Prop Wash pictured at 30'. Shoran tower perched on a mountain top. This shows the results of a wind storm which temporarily "demobilized" the station. The base of the tower is just visible in the center of the photograph, the other 30 feet being scattered around the slope and valley. The tent housing the equipment in the lower left was also a casualty.



Australian DC-3 at Weipa Mission during the Delhi magnetometer project over the Gulf of Carpentaria. Pictured (l to r) are Jeff Greer, Delhi Exploration Manager; Copilot Gerry Heyen; Les Williams, Bureau of Mineral Resources; pilot Les Taylor; Engineer John Richmond; Aero Geologist Ron Hartman; and Bob Welshe, magnetometer operator.

of airborne geophysical work. We understand Ron has continued his "luck" at the bridge table, taking first place in at least one local tournament. We suspect that this has been more pleasant than his Philadelphia area activity - membership on a township Sewer Authority in the throes of installing a new sewer system.

Grant Mervyn, Bud Thomae, Harry Hughes, Don Hill, Len Subick, Tom O'Rourke, Dick Butler, Jim Neals, Marcel Fouquet, Mike Reford, Don Davidson and Les Taylor were members of the Philadelphia - Ottawa - Ramsgate team which completed the Bass Straits Shoran controlled magnetometer survey the first of the year.

CHILE

It has now been more than a year since the project started which has become known as Proyecto Aerofotogrametrico OEA/Chile. All phases of the project are now well under-way and some have been completed.

The staff in Chile now numbers one hundred and ninety seven people, thirty seven from North America and one hundred sixty Chilenos. In addition one hundred and thirty people in North America have been involved with drafting, compilation, photographic and other phases of the work. The number of aerial photographs acquired by the six aircraft now totals more than twenty four thousand, ranging in scale from 1:10,000 to 1:50,000. The project which started as an operation to map 10 earthquake damaged cities has extended into geophysical exploration, land use and capability maps, and property maps.

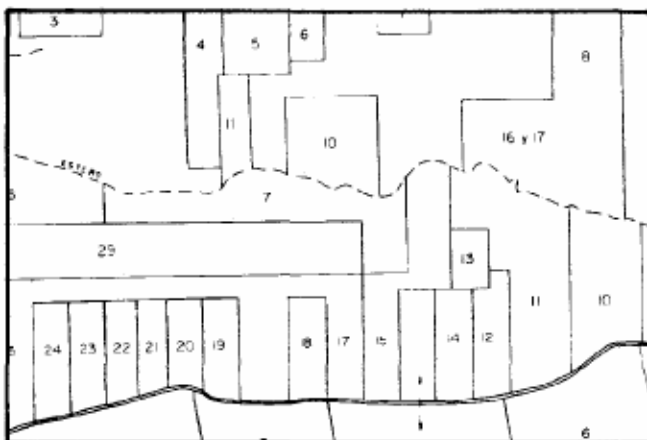
In addition to the six aircraft, 48 land vehicles, horses, launches and helicopters have been used on the mapping, land use and land capability studies covering an agricultural belt six hundred miles long. Field work is expected to be completed in August of next year with final delivery of maps and reports scheduled for December 31.

This project can be listed with Omaha and Chatanooga as having some kind of matrimonial magic. Charlie Curtis became the fifth man to be afflicted on this project, wedding Solange Bandet on July 1. Two more are scheduled.

The property mapping section has been forced, due to lack of adequate source material, to resort to extensive and intensive field edite work. Frank Yates' bevy of beautiful draftswomen will draft the properties on 471 mosaic sheets and overlays will show the current land use and the land capability.

Four Chileans have been selected by the United States Agency for International Development for training in the U.S. in connection with the Agricultural Tax Reform. They have been working closely with the Proyecto staff and will be visiting Aero Philadelphia in the near future.

Philadelphia personnel currently assigned to this operation are Charlie Hodell, John Schmunk, Arnold Kreisman, Howard Bennett, Frank Yates, Gurbachan Dhillon, Lester Seglin, Charles Curtis and John Montanari.



These sections of property map sheets show the difficulties the property map section is having. The sheet above indicates property boundaries on the basis of property records. The sheet below shows property boundaries as they have been delineated on aerial photographs during field edite operations.



1 to r: Mr. and Mrs. Jorge Saldivar, Mr. Sergio Bascunan and Miss Mary Fernandez, Mr. and Mrs. Manuel Grez and Mr. and Mrs. Sergio Gonzales will be visiting us soon during their training in tax reform methods.

CANADIAN NEWS

October 11 is the red letter day for our Ottawa staff - when they move into their new 25,000 square feet of modern plant. We hope to have photographs of the occasion for our next issue.

In May of this year, our Canadian staff completed 10,000 square kilometers of topographic mapping in the area of Mekong River in Laos. Three Canadian Aero field men chopped through the Asian jungle, traversed Vientiane and Luang Prabang, and other areas in the news. This was part of a long term project sponsored by the Colombo plan and Canadian Aero received a large share of the mapping work.

The Ottawa geophysical unit has large contracts with the Canadian government for airborne magnetometer work in Quebec, Manitoba and Saskatchewan. During a four year period they are flying and compiling 565,000 miles of magnetometer work. They currently have staffs at work in all three provinces.

In Surinam, the Canso completed a successful season, turning in 17,000 miles of EM and magnetometer data. During the course of their stay, the crew introduced badminton and darts to the locals.

Fred Landry, Fred O'Flaherty, Malcolm Campbell, Pete Van Vliet, Harry Whale and project manager Murray Turner are still basking under the tropical sun in Nigeria. Lorne Shea and Jock Inglis have returned home. The flying was done in a DC-3 equipped with mag, Doppler, and RC-9 Infragon camera installation.

In Ghana we find Canadian Aero represented by surveyors Bob Forbrigger,



Local inhabitants constructed this bridge for a Canadian Aero survey party in Nigeria. Twelve feet high and containing not a single nail or bolt, it cost less than five pound sterling, but it did the job.



Portion of survey crew in the Lafiagi area of Nigeria. Canadian surveyors with the party are Campbell, Shea and McGovern.

Wilson Collins, Jean Tremblay, Bill Maher, Paul Kozak, Ted Nagy, and Harold Anderson who are working on 500 miles of transmission line and substation stakeout.

WEST VIRGINIA PROPERTY WORK INCREASES

Jacob Solliday is now located in Madison, West Virginia where Aero is carrying out property mapping for Monroe, Boone, Clay and Jackson counties. These four rural counties total about 35,000 parcels. The area is difficult to map due to terrain and vegetation.

The staff of this office is also doing an extension of the Pound River survey, which includes preparing legal descriptions for easement and condemnation proceedings. A new Bellville Corps of Engineers project will be performed at Madison.

With the completion of Nicholas County and those mentioned above, we will have prepared property maps covering seven counties of West Virginia.

EGYPTIAN GROUND WATER PROGRAM COMPLETED

In May, Aero's Egyptian staff completed final delivery of data for the 86,000 square mile ground water survey program. Aero crews entered Egypt the end of 1960.

The program, sponsored by the U. S. International Cooperation Administration was a four point approach to the problem of reclaiming arid areas of Egyptian Desert. Photo Photography was obtained covering 86,000 square miles and assembled into 1:100,000 controlled mosaics; an airborne reconnaissance magnetometer survey covering the same was used to determine the slope of the rock basement in an attempt to ascertain the source of water for existing oases; field survey control was obtained, using Zenith camera methods as well as conventional control methods, for the mosaicing program and also for more detailed work to follow; and a reconnaissance soils survey was conducted.

Ray Roberts, our soils scientist delineated the major soils area on each of more than 6,000 photographs and conducted field studies along each degree of longitude throughout the area.

Original plans had called for processing of the photography to be carried out by existing photographic units of the Egyptian Government. When this proved to be impossible due to the work load, it was necessary to set up and staff our own photographic facility in Cairo. A building was located which was in the final stages of construction and the first three floors were completed for our use. Project Manager Blaise Santianni, photographer Bob Plum, mosaicist Roy Carlin, photogrammetrist Ed Vollmer, George Gause and Tom Ford put their heads together and came up with what was needed. The building was completed to our specifications, including tile photographic tanks to handle the 24 by 30 inch mosaic sheets and water and power provided where needed.

An SEG V Rectifying projector, a 24x30 copy camera, vacuum frame printer, large drum type mosaic print dryer and the usual photographic equipment was installed and over fifty Egyptian personnel were hired and trained in their tasks. The lab was completed in August 1961 and the project completed nine months later. They prepared 50,000 contact prints and approximately 1,000 mosaic sheets.



New Photo Lab building in Cairo nearing completion.



Ed Vollmer and Bob Plum checking the new dark rooms.



Two of Ed Vollmer's Cairo staff working on a radial control laydown.

DAVIDSON COUNTY AT HALF WAY MARK

The end of August marked the first anniversary of our office in Nashville, Tennessee where splendid progress has been made on the property maps of Davidson County. This program started with an estimated 115,000 properties and it appears that when completed, we will have mapped about 150,000 land parcels. Land subdivision and home construction are going strong in the area and this always makes life interesting for property mappers!

A Kelsh plotter has been set up in the office and a number of small topomapping jobs have been obtained. Most recent ones are for the Nashville Housing Authority and the Planning Commission.

Aero old timers on the job include project manager Gene Gomolka, Roger Smith, in charge of production, Fred Scheliga, compilation supervisor, Gerry Wendling, assembly supervisor, Joe Kozacheck and final drafting supervisor. Forty one people from the Nashville area make up the balance of the staff and they have been doing a fine job.

Old pro Fred Scheliga presented the trophies at the banquet of the Bowling League commenting that "This is the only place I've ever seen where they pronounce my first name with two syllables, Fray'ed". The trophy winning team was Floyd Evans, Stan Clark, and Jerry Wendling.

BOWLING LEAGUE TWELVE TEAMS STRONG

Aero's keglers came back from vacations with renewed vigor this fall and have twelve teams in action for what promises to be a good season. The Sensors, captained by Harry Mount, are off to an early lead but will have rough sledding to maintain their undefeats record. Other teams, with their respective captains are: Accounting, Carl Retzback; Drafting, Joe Harold; Photo Lab, Gordon Roser; Airport, Walt Duemig; Geophysics, Richard DeLaurentis; R. M. Casting, Dave Sander; R. M. Finished, Dick Keeney; Shop, Ed Brady; R. M. Compilation, Tom Bottomley; Engineering, Joe Dawson; and Aero-Tronics, Frank Lauth.

League officers for the season are Carl Gehring, President; Jack Marsh, Vice President; Bob Woods, Secretary; Del Kohn, Treasurer; Joe Donnelly, American Bowling Congress Representative.

ASED PREPARING FOR SHIRAN EVALUATION

Aero's Systems Engineering Division is currently at work on evaluation program for Shiran, (S Band HIRAN) an airborne distance measuring tool proposed to replace HIRAN and SHORAN for geodetic distance measuring programs.

Blaise Santianni, a field veteran of many Shoran controlled mapping programs is project manager of the project which involves the planning and the execution of a test program to evaluate the new system. Working the Blaise on this project are Ev Rhoades, John Kratochwill and Bruce Jacobson. Field tests of the new system will be carried out in Arizona sometime next year.

Project Manager Neil Gebhardt, fresh from our Egyptian work, is enroute to Sumatra where he will direct field operations for a petroleum search using the airborne magnetometer and RC-9 Super Infragon camera. An Aero Commander crewed by pilot Al Holtzclaw, mag operator/photographer Don Hill, and mechanic Paul Dauphin are enroute. Steve Terry will be Geophysicist and Tom Ford will handle the Photo Lab and data operations.

Another Aero Commander is off for British Guiana to aid in the development of Surinam's western neighbor. Que Allen, mag operator and photographer Tom O'Rourke, mechanic Bob Coder and data/lab technician George Cummings will carry out the field work. Joe Mullen will be on hand at the start of the operations.

Dick Crosby, Bill Noone, Manuel Molins and Ira Shaw have completed the work on the Spanish Sahara mineral survey.

Niles Moss, Frank West, Clarence Vorwerk, Len Subick, Larry Colbert and Melecio DelaGarcia have spent many months recently down in Arizona on a test evaluation program. Shoran is being used to evaluate other navigational devices.

Aero is currently obtaining photo coverage of one half of the Virgin Islands, the remainder to be done in the next fiscal year. Joe Mullen and Fred Wachtel started the project



This Twin Pioneer is operated by the UN for geophysical exploration.

in an AT-11 from Philadelphia. When Al Holtzclaw and Milt Villiard completed their Chile work in another AT-11, they took over the flying. Wayne Campbell recently took over the left seat, releasing Al for the Sumatra project.

Since July our Flight Operations Department has been operating an A-26 on a flight test program for one of the large electronic manufacturing firms. Que Allen, Joe Mullen, George Miller, and Joe Yersak have flown for the client. Another strange aircraft to North Philadelphia Airport was the Twin Pioneer, a Scottish manufactured aircraft. Our Aircraft and Electronics Departments have been installing equipment in this aircraft which is operated by the United Nations Special Fund.



Commander George H. Mullahy Jr., USN presented a certificate recently to Personnel Director Harry S. Vila in appreciation of the services of our Naval Reservists who were on active duty. Although the certificate was presented to Aero, the real appreciation of the services goes to Ed Maenner of the Photogrammetry Division who served as a Quartermaster First Class on the USS Blackwood, a destroyer escort, in the U.S. and Guantanamo, Dave Hessler of ASED, who flew a P2V with Patrol Squadron 933 from Willow Grove, as an electronics technician. Tom O'Rourke of Field Electronics almost made this elite group but the Navy couldn't wait for him to come back from the Australian bush, where he was working on the Bass Strait project.



Bill and Blanche Noone held their June wedding at Las Palmas, in the Canary Islands.

MADRID ACTIVITIES EXPAND

Activities of our Madrid office, which now boasts a staff of 33, have expanded into foreign areas. Currently they have two geological crews in the field and four men on the Spanish Sahara magnetometer survey. Bill Noone and Blanche Molanik, both of Philadelphia were married in Las Palmas during June. Ernie McLendon and Harry Sanders from Philadelphia flew an airborne magnetometer survey in Spain recently. Bill Des Laurier handled the data chores for the crew and Rev Hammons of GAI was geophysicist.

Ray Roberts, soils scientist who was working on the Egyptian project has been visiting the Madrid office after a vacation tour of Europe.

Emilio Herrero conducted ground resistivity work in Turkey in an attempt to map the course of an old underground river. The job was a success and led to further operations. The tangible evidence of success is Emilio's Well.

The DesLaurier family have moved into their new home in Madrid. While the contractors were digging the foundation, they discovered the ancient wall of the city, erected by the Moors in the Tenth Century.



MAGNETICS SURVEY TO SPUR VIRGINIA EXPLORATION

During early Summer, Lee Burton, Dick Brown, Paul McReynolds and Tom O'Rourke flew an Aero Commander on a petroleum magnetics survey in the southwestern part of Virginia. The \$35,000 survey was performed for the Virginia Department of Conservation and Economic Development who are making the compiled data available at nominal reproduction costs in order to stimulate further exploration in the state for oil and gas reserves. The data was made available in July and early reports are encouraging.

AERO GOLFERS HOLD TWO MATCHES

In September of 1960, Aero Service Corp. sponsored a golf match at Langhorne Country Club, for Aero employees. The match was such a success that it left an indelible desire in all involved that the matches be continued. As a result, the Relief Model Division set up an organization under the auspices of Del Kohn, Charles Snyder and Bill Munger. The organization has now grown into multi-department participation. At the end of 1961 a Calloway match was held between the 12 existing members. The enthusiasm being so great the organization now has matches with multi-department participation and has doubled its membership to 24.

The organization elected the following officers at the end of the August match: Gordon Roser of the Photographic Department, President; Charles Snyder, Secretary. Bill Thornton and Hal Strange, rules committee. Bill Munger and Charles Snyder, Treasurer and Prize Committee. The results of the partners match are as follows:

1st place - Bill Thornton - Joe Donnelly
Bob Plum - Hal Strange

2nd place - Joe Bergner - Tom Janus

3rd place - Gordon Roser - Carl Sydow

The hole in one award resulted in a tie between Del Kohn and Joe Bergner.

A second tournament held Sept 22 at Juniata Golf Course, a total handicap match resulted in the following:

1st place	Joe Bergner
2nd place	Bill Thornton
3rd place	Joe Donnelly



Director of Overseas Affiliates and Sales Harry Burchett, (l), Wally Beasley, and Dave Leeds (r) take a look at the South American map. Wally will be our regional manager for South America where he has been working on Aero projects since 1960. We will operate from Lima, Peru. Dave Leeds has been appointed assistant to Harry Burchett and will be active in the direction and coordination of our overseas activities.

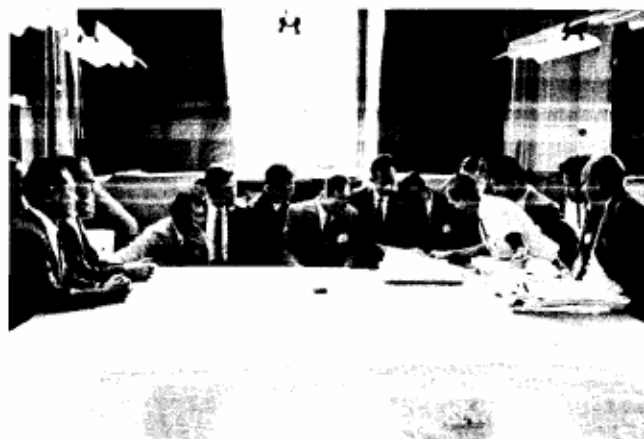


Bill Cadzow now represents Aero's Photogrammetric Engineering Division in the New England, New York and New Jersey areas. Bill took over part of the territory covered for some years by Tom Kirk, who will devote a good part of his time to the Photo/File and Sur/Fax sales effort.

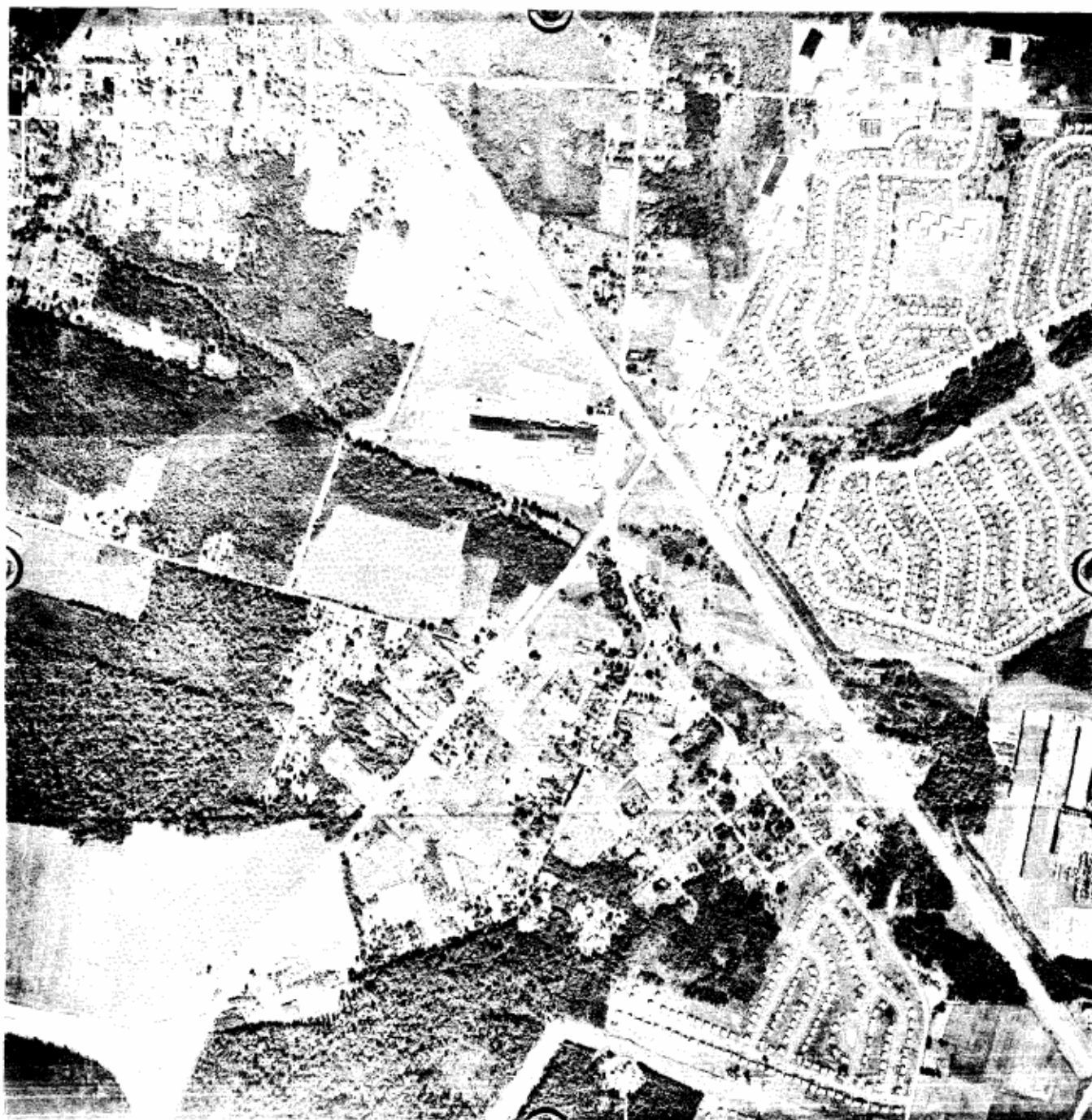


Photo by Thomas Walsh

John and Ruth Nathans were married early this Spring. John who started with Aero's Field Survey Department is currently manager, Northeastern U.S. Relief Map Sales.



Recent visitors to Aero included Indonesian electronic personnel receiving scatter wave communications training at a nearby Philco plant. Bill Lebens is explaining our indexing work.



This aerial photograph was taken with a new aerial camera, one which Aero Service will produce and market. It is a photographer's camera, featuring ease of operation- sturdy construction- and repairability, even by the photographer during flight.

A number of models will be available to meet different requirements, prices will start at about \$ 7,000.



OUR TORCH DRIVE DOLLARS ARE SERVING. ...

...TO SUPPORT 250 AGENCIES AND SERVICES

...SUCH AS THE ONE PICTURED ABOVE

...THE 1963 GOAL IS \$13,750,000

...AERO'S GOAL IS \$8,216

...GIVE A FAIR SHARE

