

contact printing, one and one-half diameter enlarging, mosaic construction and line map construction.

The Mobile Photographic Laboratory is an entirely self-contained unit having its own electrical power supply, water storage tanks, refrigeration units, heating unit for cold weather, cooling system for hot weather, and space for the operators to sleep when necessary.

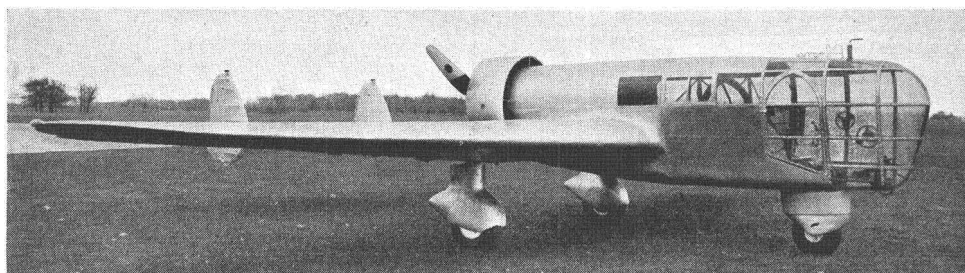
### AIRCRAFT AND NAVIGATING EQUIPMENT

In the United States a large part of the air photography has been done with conventional commercial and military aircraft.

In addition to the above the Fairchild Model "71" and Model "82" planes are equipped especially for air photography. The Model "71" has been in use for a number of years.

The Fairchild "82" is designed to accommodate the largest multiple lens cameras or the usual single lens cameras. A very complete set of instruments on a special panel is provided for the photographer from which he can tell at a glance whether the cameras are working satisfactorily and whether the pilot is flying the airplane in the most satisfactory manner. This instrument panel, furthermore, contains switches and rheostats for controlling and regulating the operation of the camera. All the electrical wiring and vacuum or pressure tubing are built into the walls of the airplane and into the floor. Outlets, in the form of floor sockets, close to the point where the wires connect to the camera, are provided. Thus, there are no loose wires to be tripped over, and the photographer can move completely around his camera without being obstructed by wires or tubes.

This photographic airplane has a range of over 700 miles (1100 km.), a cruising speed of 140 m.p.h. (240 km.p.h.), a single engine of 550 H.P., an absolute ceiling of 25,000 feet (9,050 m.) and a service ceiling of 21,000 feet (7,600 m.). The gross weight of the airplane, complete with a photographic load and personnel, is 5,862 lbs. (2,650 kg.). Inasmuch as the airplane is licensed for a gross weight of 6,325 lbs. (2,870 kg.), it is possible to carry extra tanks of gasoline, thereby increasing the range of the airplane.



Abrams' Plane

The Abrams Aircraft Corporation of Lansing, Michigan, has recently completed the first model of a plane especially designed for air photography which differs radically from conventional types. The first model is now undergoing service tests.

The following features of special importance in air photography have been included in the design: forward and downward visibility, rapid climbing ability, high cruising speed, stability, long cruising radius, supercharged motor, and oxygen supply for the crew when working at high altitudes.

The plane is of the pusher type with motor in the rear and seating arrangement forward to improve the visibility for the pilot. It is equipped with outriggers or booms connecting the tail and control surfaces, and with three wheel landing gear with oil and spring hydraulic shock absorbers. The rear wheels are equipped with brakes and the front wheel is steerable.

The gondola is of welded steel covered with a stressed aluminum covering. The wings are full cantilever of monospar steel tube construction, with balance type ailerons and special flaps which are partially lowered in the take-off to increase the lifting capacity and fully lowered in landing to reduce speed.

Stick and rudder controls are available for both the pilot and cameraman, and can be separately or simultaneously operated by either. A full set of instruments and engine controls are within sight and reach of both pilot and cameraman.

A special mapping porthole with a special camera mount is provided for in the floor of the gondola and the arrangement is such that pictures can be taken straight down through this opening, the aperture being hermetically sealed when the camera is in place. Supercharging of the cabin is provided for by sealing in the safety glass which, besides serving as windows, also serves as the outside covering of the gondola.

The detailed specifications of the initial model of the new plane as furnished by the manufacturer are as follows:

#### AREAS

Wings	191.00 square feet	(17.75 sq. m.)
Ailerons	18.40 square feet	(1.71 sq. m.)
Flaps	12.74 square feet	(1.12 sq. m.)
Stabilizers	20.70 square feet	(1.92 sq. m.)
Elevators	9.80 square feet	(0.91 sq. m.)
Fin	7.66 square feet	(0.71 sq. m.)
Rudder	6.86 square feet	(0.64 sq. m.)

#### WEIGHTS

Gross	3,200 pounds	(1,450 kg.)
Empty	1,790 pounds	(810 kg.)
Useful	1,410 pounds	(640 kg.)
Equipment	50 pounds	(23 kg.)
Gas and Oil	800 pounds	(360 kg.)
Crew	380 pounds	(172 kg.)

#### PERFORMANCE

Maximum Speed (sea level)	185 miles per hour	(300 km.)
Maximum Speed (10,000 feet)	200 miles per hour	(320 km.)
Cruising Speed	165 miles per hour	(265 km.)
Landing Speed	66 miles per hour	(107 km.)
Rate of Climb	1,800 feet per minute	(550 m.)
Service Ceiling	21,000 feet	(6,400 m.)
Cruising Range	1,400 miles	(2,300 km.)

#### POWER PLANT

Engine Wright R975-E 330 H.P. at 2,100 r.p.m.

### FAIRCHILD SOLAR NAVIGATOR<sup>1</sup>

*Leon T. Eliel*

As photogrammetry has been approaching closer and closer to an exact science during the last several years, it has become increasingly apparent that the ultimate quality of the work is dependent upon good flying. Ragged flying

<sup>1</sup> From an article by the author in the October-November-December, 1937 issue of PHOTOGRAMMETRIC ENGINEERING.