

ELECTRONICS

Pilots "Talked Down"

Regardless of weather, radar is able to "see" the plane as it approaches the landing field, and the operator sends complete instructions for landing.

See Front Cover

► WHEN "SOUPY" weather makes landing airplanes a dangerous operation, ground radar stations can give the pilot orders that bring him down on an airport runway safely.

Demonstrating its ground controlled approach system to aviation writers at Banana River Naval Air Station in Florida, the Navy showed how pilots can be "talked down" when low visibility makes landing hazardous. A close-up of sensitive radar equipment that records the position of planes above an airport, permitting operators of the equipment to "see" clearly, regardless of weather, and to systematize and control their landing approaches is shown on the front cover of this SCIENCE NEWS LETTER.

Radar at the edge of the landing field follows the plane's maneuvers as a pilot approaches the landing field. Able to

"see" the plane as it appears clearly on the radar screen through the thickest fog, the radar operator sends the pilot complete instructions that bring his plane down on the runway to a perfect landing.

Ground controlled approach—GCA to Army and Navy flyers—was developed during the war and first sent into the field by the Armed Forces about November, 1944. Since then, the Navy says that simpler, more reliable and more easily operated equipment has been produced.

On the ground, the GCA installation includes two complete radar sets, six radio transmitters and six receivers. The whole unit is mounted in a trailer behind a four-ton truck.

On the plane, no special equipment is required as the communicating is done via ordinary radio transmitters and receivers. All the pilot has to do, Navy

GCA enthusiasts emphasize, is to fly according to the directions given him.

In addition to "talking down" the pilot from the ground, the control system protects him from collisions with radar warnings of any other aircraft in the vicinity.

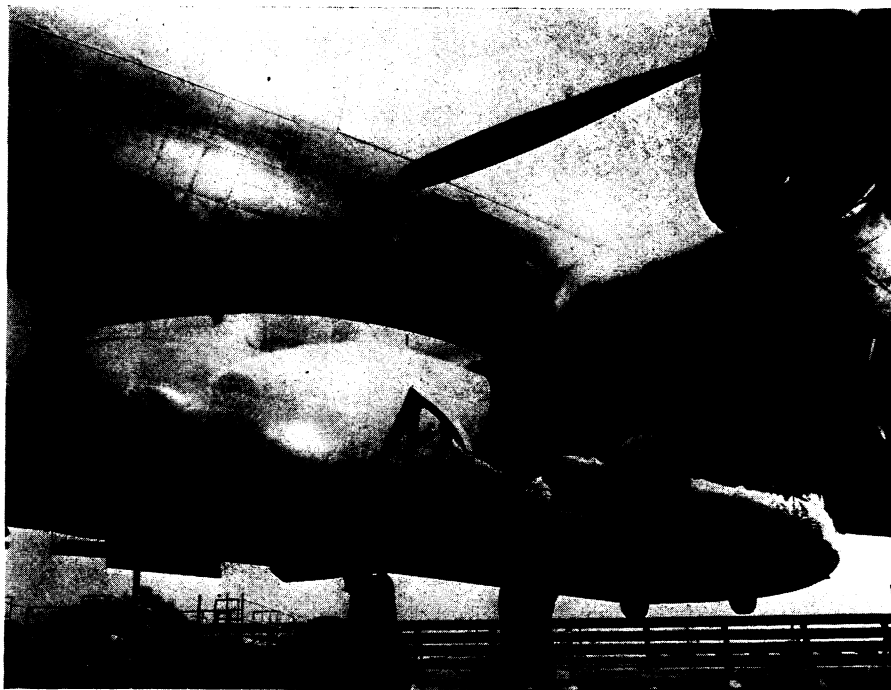
Original GCA specifications called for equipment that would bring the airplane safely down to 150 feet above the airport, but it can do better than that. The elevation beam used is accurate to six feet, while the azimuth beam is correct within 20 feet.

With his safety hinging on the orders received from the ground, the pilot has to understand clearly his orders. Strict and precise language is used by the pilot and the ground station, including such familiar air terms as "ROGER" for "Your message is received and understood," and "WILCO" for "Your message is received, understood and will be complied with."

To guide a pilot in, the orders are "Steer . . ." followed by "right" or "left" and a magnetic heading, while altitudes are simply sent as "Fly at . . . feet." With radar eyes to follow the plane, the ground station needs only these simple directions to bring a pilot down safely under "ceiling zero."

Basic GCA equipment was developed at the government-directed and supported radiation laboratory on the campus of the Massachusetts Institute of Technology, and this type of installation has been widely tested by the Navy, Army and the Civil Aeronautics Administration.

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HEAVY LOAD—With a loaded Speedpak firmly attached to its fuselage, a Lockheed Constellation is given final check by a mechanic prior to flight. Water-tight sealing on the joint between the Speedpak and the Constellation fuselage prevents seepage of moisture in flight. A waterproof tarpaulin gives additional protection for the baggage compartment.

AERONAUTICS

Four-Ton Cargo Container For 1,500-Mile Flights

► SLEEK, streamlined all-metal cargo containers, that fit snugly to the undersides of the bodies of giant Constellation airliners and hold four tons of baggage each, have been developed and tested by the Lockheed Aircraft Corporation, builders of the Constellation. The detachable container, called a Speedpak, can be attached to the belly of the fuselage in two minutes, or removed in the same brief time.

The giant transport, with the loaded Speedpak attached, can be used for flights up to 1,500 miles. Its speed is decreased by only about 10 miles an hour. The plane's flight characteristics are not impaired. An important feature of the Speedpak is the ease with which ground