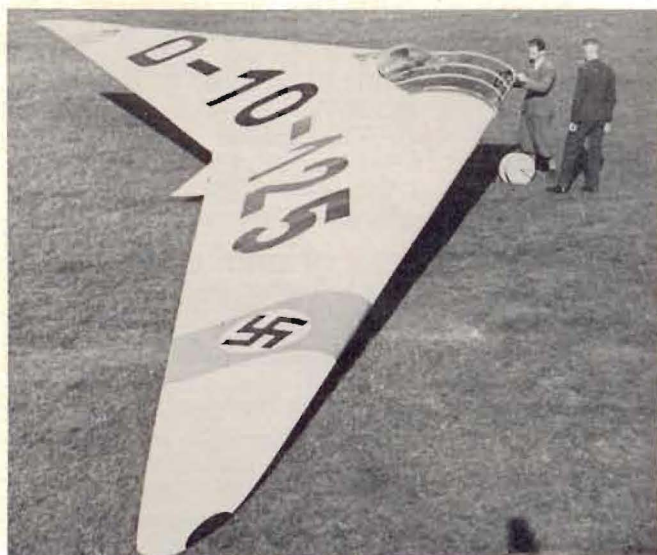


INTERESTING GLIDERS

by PETER M. BOWERS



The Horten I sailplane. Note bubble for pilot's head.

Tailless gliders, generally referred to as "Flying Wings" in recent years, have been around in one form or another for just about as long as there have been gliders, so they can hardly be called a novelty from the standpoint of being something new. However, in spite of the venerable age of the basic design, it is still a rare bird numerically. Until the advent of the Postwar II Fauvel in France and Al Backstrom's "Plank" in this country, practically all of the earlier "wings" were one-shot experimental.

Almost without exception, the tailless designs up to World War II, like the 1937 Horten I illustrated here, achieved longitudinal stability through wing sweepback and a considerable amount of "Wash-out" or decreased angle of incidence at the wingtips. Directional control was achieved on some designs by vertical control surfaces installed at the tip, but the Hortens and other late models used "Elevons," hinged surfaces near the wingtips that served the combined function of elevators and ailerons.

Boosters of the all-wing designs were loud in their praise of the inherent advantages of their pets—reduced drag and structural weight through elimination of the conventional fuselage and tail surfaces, but these features didn't pay off to the degree that was expected. The advantages were largely offset by some inherent disadvantages. Because of the very short moment arm involved,

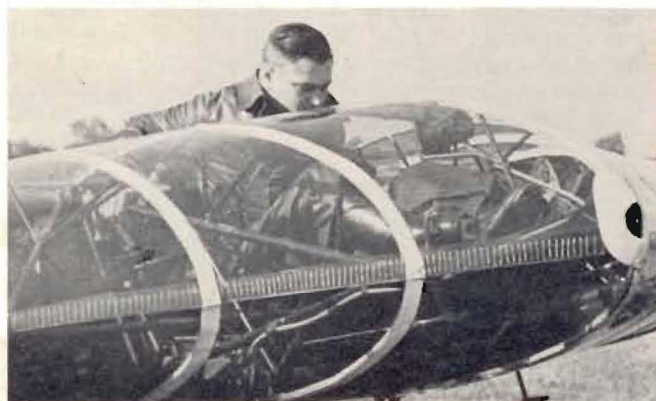
longitudinal control was often quite marginal, as was directional control when using elevons that could not be deflected too far because of drag considerations. To gain full advantage of the wing's overall cleanliness, the pilot was forced to lie prone in some of the cleaner Hortens, which did not simplify his control and visibility problems. Other wings that overcame this objection put the pilot in a conventional upright position and sacrificed performance to the weight, drag, and surface intersection problems of the more conventional designs. One other built-in disadvantage beset the swept-back wings—the need for high angle-of-attack attitudes during the low-speed take-off and landing conditions put both wingtips on the ground if a relatively high landing gear was not used, so an additional weight and structural penalty was incurred. This latter characteristic has

been licked in postwar wings like the Fauvel and the Plank, which feature straight chord-lines, but their other features, such as pods and vertical control surfaces, do much to defeat their advantages as flying wings.

Of all the prewar "wing" designs, the Hortens are by far the best known. Used mainly as research types in the late 1930's and early 1940's, some were developed into low-powered twin-engine airplanes. Several were brought to the United States after the War, and one Horten IV flown by Rudy Opitz put in a season of remarkable flights culminating in Diamond distances that were anything but joy rides.

The Horten I was of composite construction, with a steel-tube center section and wooden wings. Tandem-wheel landing gear was used, and the pilot's visibility was enhanced by a large plexiglass area around the semi-prone position cockpit. Span was 16.5 meters (56 feet), wing area was 32 square meters (366 sq. ft.), which gave an aspect ratio of 8.5. Best lift-to-drag ratio was 24:1 at a speed of 95 km/hr (59 mph).

One problem that beset the Horten was that of applying the standardized vertical tail surface markings that were mandatory on all aircraft in Hitler's Germany from 1933 to the end of the war. This was resolved by painting the swastika and its red background chordwise across the wingtips. The D-10-125 is a special marking adopted for German gliders about 1937. The D is the international registration letter for Germany (Deutschland), the 10 represents the gliding district in which the ship is registered, and the 125 is its number within that district. This was in 1938 or 1939, when this picture was taken. Wouldn't it be nice if our own land of plenty (of everything else) were divided into ten soaring districts, each with 125 ships?



Pilot of Horten I flies in bent-over position with only his head above the wing contour.