

# THE ELFE

By ALEX DAWYDOFF

A sailplane with a thin laminar flow wing was started in 1946-47 by the sailplane firm of Husch, Stein am Rhein, Switzerland, under the technical direction of Dr. W. Pfenninger, now connected with Northrop Aircraft Corp. On February 11, 1948 the first trial flights of the prototype, Elfe II, began. Unfortunately an accident soon demolished the aircraft. However, the radical design of the sailplane was not connected with this in any way.

Despite its short life Elfe II proved beyond doubt that it was fully up to the expectations of its designer and the buiders. At 75km/hr (approximately 47 mph) the sinking speed was 0.5m/sec (1.62 ft./sec.) and the glide angle was 1:40. At high speed reduction of glide angle and increase of sinking speed was very slight.

Based on these tests it is obvious that this configuration offers considerable improvement in sailplane design.

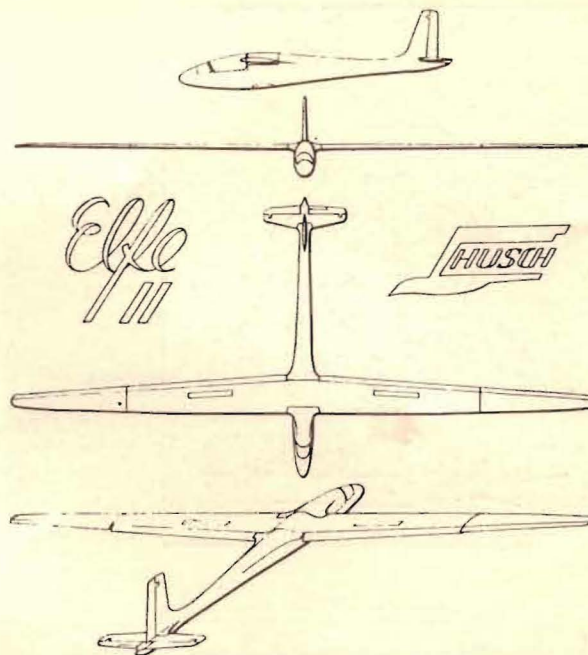
In reconstruction, therefore, the aerodynamic form was not changed much. The span was increased from 15.4 meters (50 ft. 7 in.) to 16 meters (52 ft.), the wing area from 11.7 sq.m. (124.9 sq. ft.) to 12 sq.m. (128.18 sq. ft.), the aspect ratio from 20.3 to 21.4. The shape of the fuselage was somewhat altered with the slim boom-like rear section (shown in photograph) abandoned in favor of a thicker one (illustrated in the three-view drawings). All control surfaces were dampened by mass balance.

The laminar flow section of the three-piece wing was especially developed for the Elfe II, the inboard section having a 13.3 per cent thickness and the outboard section 10.5 per cent thickness, the camber at the mean line being equal to 3 per cent.

Special attention was paid to stability under instrument conditions.

Narrow hinged surfaces at the trailing edge of wings serve as flaps and ailerons. Test flights proved the effectiveness of the flap by considerably extending the sailplane's speed range, especially under high speed regime.

The full cantilever wing was built in three sections in order to save weight of metal wing fittings, notorious-



The modification of the "Elfe" now under construction

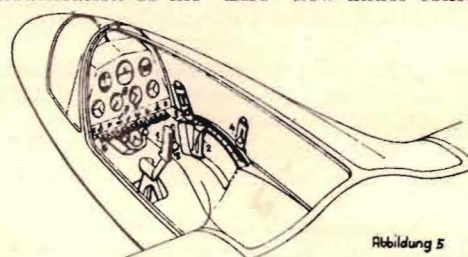


Abbildung 5

ly heavy on the two-piece wing. Otherwise the construction is normal with wide main box spar and wooden ribs. The entire wing structure is covered with diagonal plywood to the rear flap and aileron spar. Flaps and ailerons are fabric covered. Spoilers and dive brakes complete the wing equipment.

The fuselage is of semi-monococque structure covered with diagonal plywood. It is equipped with a retractable landing wheel which has a mechanical brake interconnected with spoilers.

Other specifications are: Weight empty, 308 lbs.; gross weight, 528 lbs.; wing loading, 4 lbs./sq.ft.; V/Max., 168 mph; stalling speed, 35 mph (approx).



The original "Elfe" laminar-flow sailplane