

NEW DEVELOPMENTS IN SELF-LAUNCHING SAILPLANES  
 SINGLE SEATER FLYING WING FAUVEL AV-451  
 WITH LAMINAR AIRFOIL WORTMANN FX-66H-159

by

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Presented at the XVth OSTIV Congress  
 Chateauroux, France, 1978

At one time, it was intended to build a single seater, self-launching sailplane of the type FAUVEL AV-48 Flying Wing, using the Wortmann FX-66H-159 airfoil with a wing of fiberglass construction. The airfoil, which was developed by Dr. Wortmann especially for use on unswept, untwisted flying wings, has given promising results in wind tunnel testing performed on a large model (1.97-m span, .60-m chord) at the St. Cyr Aerodynamic Laboratory, France.

A fire in the shop, where the aircraft was to be built, put a stop to the project which could not be pursued due to lack of funds.

Another version of this aircraft is actually under construction under the designation FAUVEL AV-451. It differs from the FAUVEL AV-48 in that it has an all-wood/plywood wing, although it also employs the Wortmann FX-66H-159 laminar airfoil.

The span is increased to 15-m and the wing area to 16.65-m<sup>2</sup>. Therefore, the aspect ratio is 13.5.

The wing has elevators in the center section and conventional differential ailerons on the outboard wing panels. Fins, with highly differential rudders, are mounted at each end of the wing center section in a manner similar to that of other Fauvel Flying Wings AV-45, AV-361, and AV-36.

The maximum relative thickness of the Wortmann airfoil is 15.9%. By comparison, the F2 airfoil of the AV-45 has a relative thickness of 17%.

The air brakes are Schempp-Hirth types.

The front fuselage streamlining has been improved over that of the AV-45 with the wheel drag reduced. Its cross sectional area is somewhat smaller than that of the majority of conventional sailplanes with retractable landing gears.

In spite of the modest wing aspect ratio, and counting on a carefully built wing, it is expected that the maximum gliding ratio will reach 30 with the engine stopped and

propeller folded. This gliding ratio is considered favorable for a self-launching sailplane with non-retractable engine located inside the fuselage.

It should be noted that the configuration of these unswept, untwisted Flying Wings favors maximum gliding ratio for the following reasons:

1. The small, short fuselage has a lower drag which varies little with angle of attack.
2. The absence of conventional horizontal empennage eliminates one important source of drag.

It should be noted, however, that the wing area of a Flying Wing is larger than that of a conventional aircraft because it includes the area normally devoted to the horizontal empennage.

In addition, for the configuration of the AV-36, AV-361, and AV-45, the location of the vertical surfaces at the outboard ends of the elevator is beneficial. These vertical surfaces are equally active above and below the wing and act as effective fences.

The power for the FAUVEL AV-451 is provided by a 28 KW (38 HP) Rotax engine made in Austria and certificated for self-launching sailplanes.

The self-launching sailplane FAUVEL AV-451 is expected to be ready for flight in the summer of 1978.

