AERODYNAMIC APPRAISAL OF THE

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The fine article on the Fauvel AV-36 presented to American soaring enthusiasts in the May-June issue of SOARING by Andre Dumestre represents many hours of translating, condensing, and correlating the many short articles and letters sent from France by the designer, Charles Fauvel.

This information also was made available to this writer with a request for an aerodynamic appraisal of this unorthodox and fascinating design.

Due to lack of detail in some of the writings and difficulties of translation, it was not always possible to determine which information was theoretical, and which was the result of experimental measurements.

(Fauvel has since written that ALL data referred to in this article as "probably theoretical" is a result of flight tests.— ED.)

Since the answers to some of the most interesting questions concerning this design are dependent upon flight determination, it is hoped that more details of the flight tests and flight test methods will be forthcoming.

Before considering the performance, the unusual configuration prompts several questions in the realm of stability and control, namely:

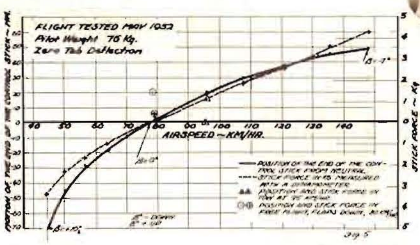
1. Does the low damping in pitch lead to unfavorable response to pitching disturbances?
2. Does the low static directional stability inherent in such a design lead to lateral-directional oscillations (Dutch roll)?
3. With a safe margin of static longitudinal stability does the longitudinal control power provide trimming to the high lift coefficients necessary in a sailplane?
4. What are the stalling, spinning and spin recovery characteristics?

The French flight tests revealed a damping of pitching disturbances in one oscillation with controls either fixed or free. It was further reported that no lateral-directional oscillations were noted. The static directional stability was estimated by this writer to be about 45% of that of a conventional sailplane such as the Olympia. The low dihedral, airspeed and relative mass of the Fauvel are in its favor in this respect.

The curves of figure 5 of Dumestre's article indicate that the static longitudinal stability has wisely been maintained at a higher value than many conventional sailplanes possess.

The high slope through the trim point is reassuring and the behavior is seen to be typical of a high wing location in that the rate of control deflection for trim increases for the lower airspeeds and decreases at the high.

The motion and stick force gradients maintain good values even at the highest airspeeds. The labeled points near the curves lead to the questions as to whether the curves themselves are theoretical or test data.

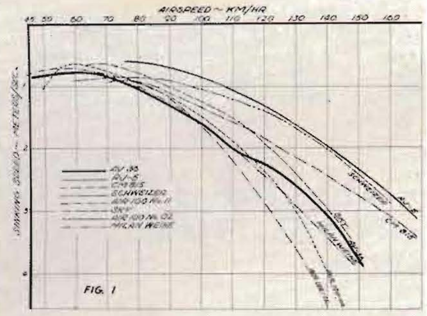


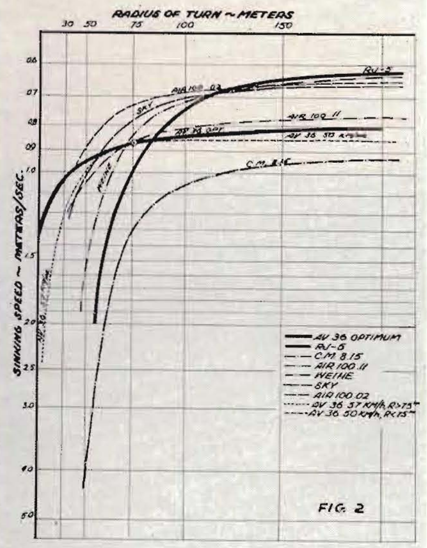
If they should be theoretical then the single points for the case of flaps up on tow and flaps down in free flight respectively are insufficient to provide flight substantiation of the stability of the design.

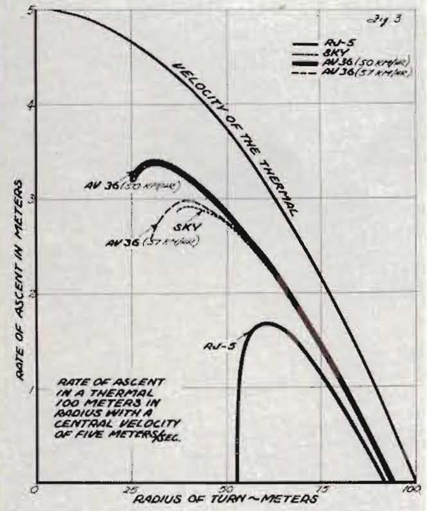
On the other hand the curves may be made up from flight test data with the two additional points thrown in as additional information. It is hoped that such is the case.

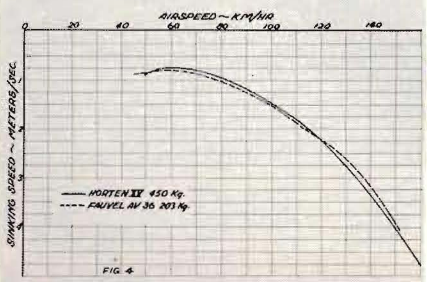
The wing loading is given as 2.96 pounds per square foot and the minimum speed flaps up is given in both tabular form and on performance curves as 28 mph. This combination gives a maximum trimmed airplane lift coefficient of 1.48 at a Reynolds number of one million.

This strains one's credulity slightly since section lift coefficients of plain airfoils at this Reynolds number rarely attain such a value and the up deflection of the trimming flap would









These are the graphs referred to in Andre Dumestre's article which appeared in the May-June issue of SOARING.