CONCERNING AN IMPROVEMENT OF THE 63-618 AIRFOIL

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(Note: translation from the German provided by Bruce Carmichael.)

The NACA 63-618 airfoil is used in many modern sailplanes. This study demonstrates that the characteristics of this section can be significantly improved by a slight change in the nose shape.

Figure 1 presents calculated velocity distributions for the original and for the modified section. The original section exhibits a sharp peak in velocity at the nose on the upper surface at lift coefficients of 1.265 and at 1.594. The modified section is seen to retain a velocity distribution free from peak at a lift coefficient of 1.265 and to have a greatly reduced velocity peak at a lift coefficient of 1.594. From this one can expect retention of laminar flow to higher lift coefficients and thus a wider low drag bucket, and also an improvement in maximum lift coefficient.

The leading edge of an airfoil of chord length 46.65 inches using the original NACA 63-618 airfoil is shown in figure 2. Also shown is the modified nose shape which produced the improved velocity distributions mentioned above.

Both the original and the modified profile were tested in the two-dimensional low turbulence windtunnel of the Aerodynamic Institute at the Technical College at Stuttgart, Germany. The results are presented in figure 3. The lift-drag polars remain virtually unchanged in the high speed flight regime, (lift coeff. equal to .3±.1). In slow or circling flight the modified section is clearly superior to the original section. The maximum lift coefficient of the modified section is 1.4 compared to a value of 1.3 for the original section. In addition, the flat-topped lift curve signifying a gentle stall break is retained. The maximum section L/D is also improved.

The boundary layer transistion locations on the upper and lower surface at a Reynolds number 1.9 million are also shown in figure 3. The auxiliary scale on the absissa gives the values. The higher Reynolds number of these tests is typical of between thermal flight while the lower Reynolds number is typical of circling flight. Although the data is not shown, the pitching moments of the airfoil were not altered by the change in nose shape.

The alteration as shown in figure 2 is sufficiently small, and the benefits sufficiently large that it would appear worthwhile to alter existing sailplanes, This fairing could be done with Microballoons and resin.

Figure 2 (half scale).

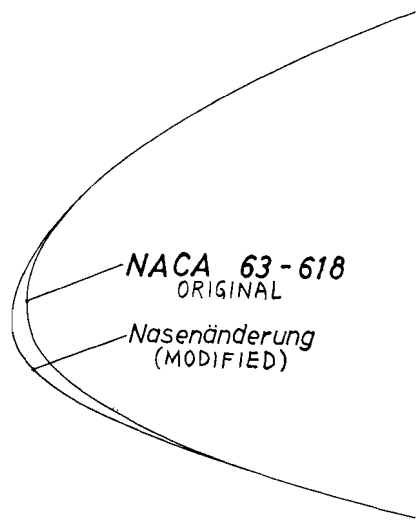

Figure 3.

Reference: F. X. Wortmann and D. Althaus, "Measurement of Three Wingsections of the Ka-6 Sailplane," paper presented at the 1960 OSTIV Congress. Printed in condensed form, in German, in the Oct., 1961, issue of the Swiss *Aero Review*, with a special supplement in the Dec., 1961, issue giving a full-scale reproduction of nine Ka-6 wing nose stations from which Ka-6 owners could modify their wings.

ANOTHER PHOTO CONTEST

As for 1961, $200 has been contributed to SSA for the purpose of conducting another contest for photos of sailplanes in flight. The new contest will run until October 1, 1962. Prize money will be awarded as follows: $100, $50, $25 and five awards of $5 each. Any person may enter in the contest any photo of a sailplane in flight not previously submitted or used in *Soaring* magazine or a soaring calendar. If the entrant did not take the photograph, he must submit a release from the photographer. All entries must be 8" x 10" black and white glossy prints marked "contest" and becomes the property of SSA. None will be returned.

Entries will be judged by four members of the SSA Publications Committee. Weight in judging will be given to sailplanes currently flying in order to promote modern, up-to-date soaring. Send photos to SSA, Box 66071, Los Angeles 66, Calif.