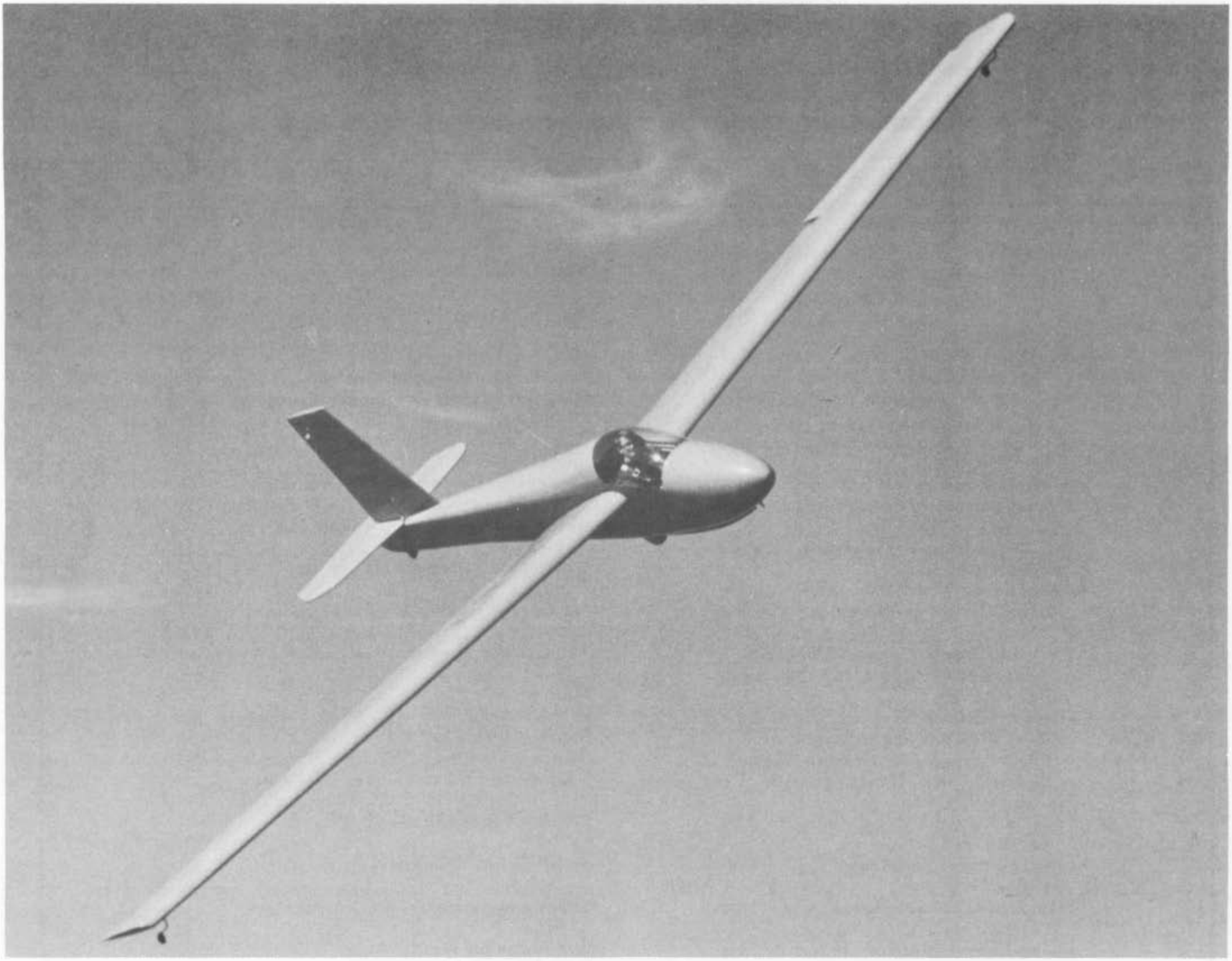
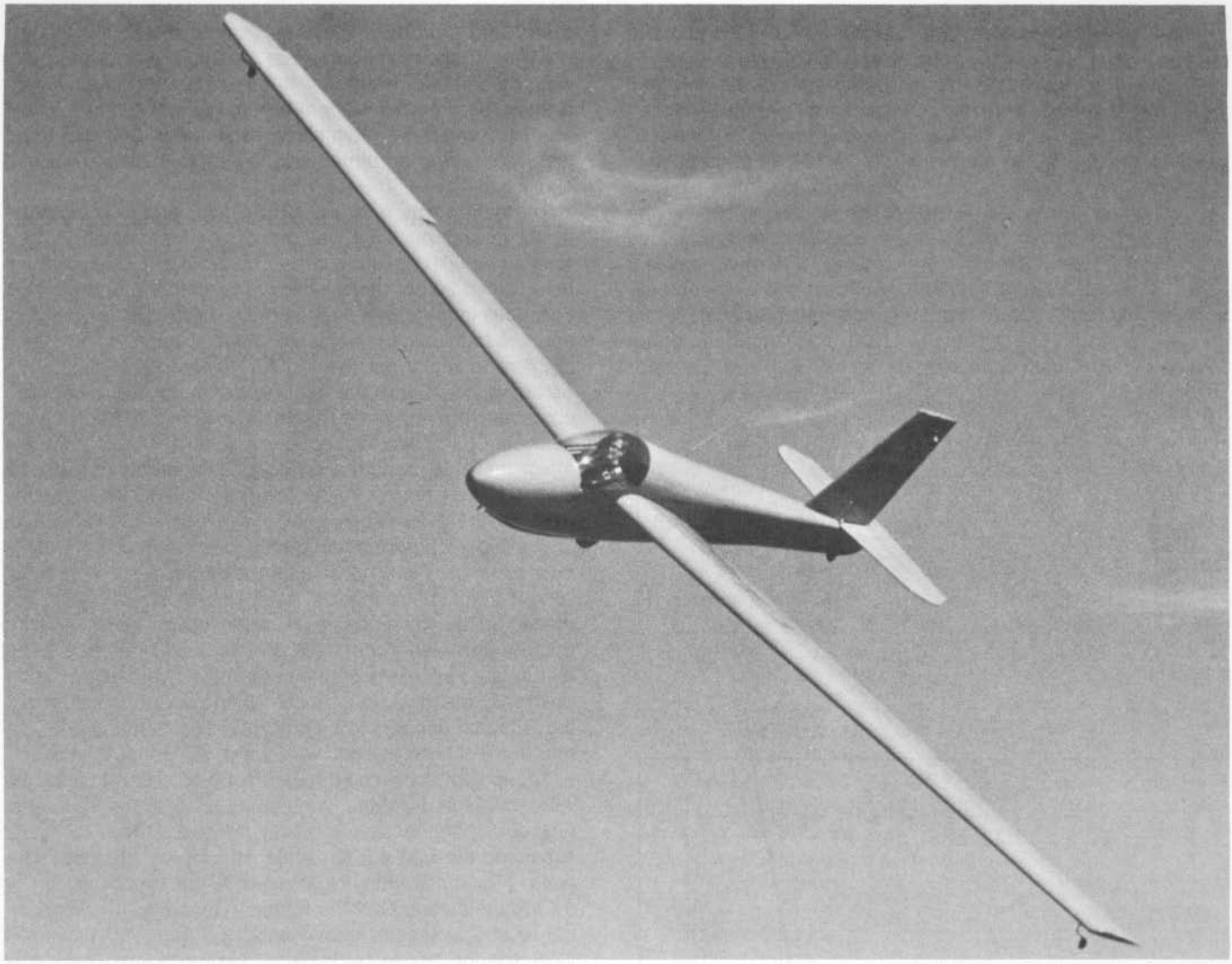


A Flight Test Evaluation of the Schweizer 1-26E

by RICHARD H. JOHNSON



Some twenty-two years have passed since the first Schweizer 1-26 entered the American skies. In 1954 Clarence See entered the 21st U.S. Nationals with the prototype 1-26 and flew it to eighth place in the final standings in the Class I category. Production deliveries began in early 1955, for both kit and completed sailplanes, and continue uninterrupted through the present time.

The 1-26 was not intended to be a racing sailplane, but to fill a badly needed role for a safe, lightweight, low-cost sailplane, simple enough to be assembled from a kit by the homebuilder if so desired. It has served and continues to serve well for its intended purpose; it will likely continue to be marketed by Schweizer for many years to come.

Through the years, relatively minor changes have been incorporated into the original design. An optional aluminum-covered, swept, vertical tail fin was one of the early modifications, along with such things as a fiberglass fuselage nose fairing, a metal fuselage turtle deck, and all-metal aluminum covering for the aft portions of the wings. None of the above modifications apparently made any significant changes to the 1-26 performance polar, which was probably the factory's intention all along — to keep the one-design performance level unchanged.

Performance measurements with one of the earlier steel-tube-and-fabric fuselage models, SN100, were made during the 1969-70 winter by Alan Bikle, and reported in Reference (1). These test data indicated the best glide ratio for this particular sailplane to be 21.5:1 at 42 knots and its minimum sinking speed about 165 ft./min. at 32.5 knots.

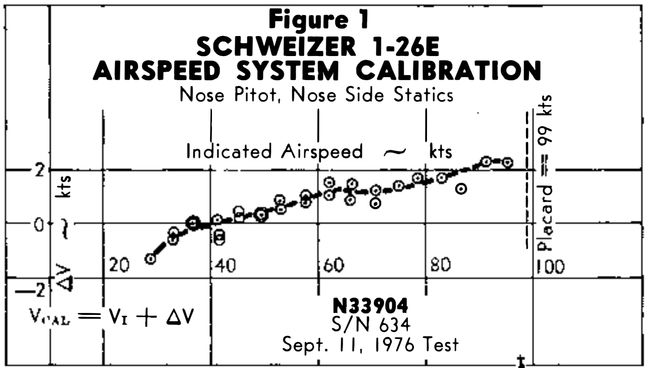
More recently the 1-26 modifications included top and bottom surface airbrakes, a lowered nose and instrument panel, and most recently, an all-aluminum semi-monocoque fuselage. This latest evolution of the 1-26 line is the "E" model. Is its performance polar still unchanged from that of the early models? That was a good question.

Southwest Soaring at Caddo Mills, Texas, had SN634, one of the newest "E" 's which they kindly offered for use in flight-test polar measurements. The only modification made to this 1-26E from its factory-delivered condition was to remove its wingtip wheels so that its lowest drag could be measured during the tests.

Four high tows were performed in smooth air. The first was to calibrate the 1-26E airspeed system, and the remaining three to measure the 1-26E sink rates when flying at various constant airspeeds.

Figure 1 shows the airspeed system calibration measured error data for the "E". The airspeed system pitot is in the fuselage nose air vent hole, and it appears to work well there. The airspeed system static vents are located on each side of the fuselage nose. The Figure 1 data shows that this location provides essentially no airspeed system errors over the 35-to-50 knot range. However, at higher airspeeds the error steadily increases, and reaches about +2.5 knots at the 99-knot redline airspeed.

The true calibrated airspeed is the sum of the indicated airspeed (after correcting for any error in the airspeed indicator itself) plus the correction ΔV shown in Figure 1. Since the measured correction ΔV for SN634 at its 99-knot placard dive speed is about + 2.5 knots, the true calibrated airspeed is 99 + 2.5 = 101.5 knots. The + sign of the airspeed correction values shown above 41 knots indicates the nose side static ports are sensing higher-than-ambient static pressures, and this in turn causes the airspeed indicator to read too low. The 2.5-knot error at 99 knots is not very large and is about one half the magnitude, and opposite in sign, to that measured recently with the Standard *Cirrus* and *Nimbus II* glass sailplanes at that airspeed.



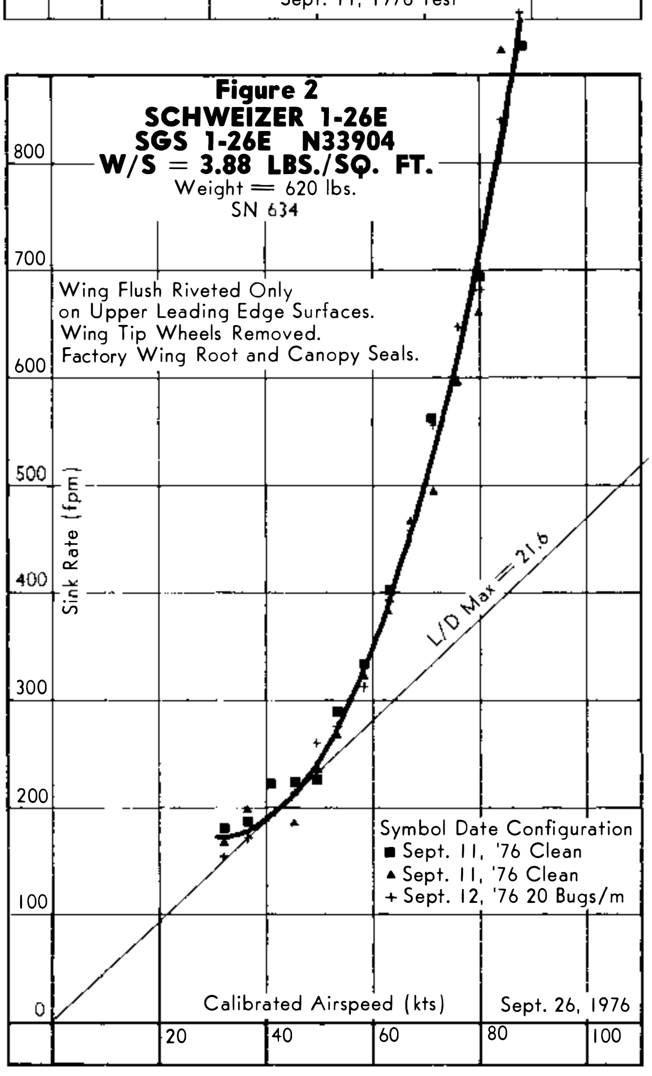


Figure 2 shows the sink rate versus airspeed polar that was determined from the three sink-rate measurement flights. The data points from the first two flights are shown as the Δ and the □ symbols, respectively, and these two test flights were performed with the entire sailplane washed and clean.

The data points from the third flight are shown by the + symbols, and this flight was made with wing leading edges roughened with small squares of .010-inch thick cloth duct tape placed 20 per meter span in the standard arrangement described in the earlier test reports. Surprisingly, or perhaps not, the addition of the leading-edge roughening "bugs" appears to make not the slightest difference in the 1-26's performance. Even the stall speed and flight handling characteristics appeared to remain unchanged. Because the addition of the leading edge roughening "bugs" did not affect the 1-26 performance polar measurably, it must be surmised that practically no low-drag laminar flow regions exist on the 1-26 wings.

The Figure 2 performance data indicate that the 1-26E's best glide ratio is 21.6 at about 43 knots, with or without "bugs." This performance level is almost precisely that measured by the Bikle team some seven years ago for SN100, an older model 1-26. In comparing the recent "E" test to Bikle's Reference (1) data, the curves appear to be practically identical up to about 75 knots. Above this speed the "E" data appears to be slightly better, perhaps because the "E" flight-test weight was about 40 pounds heavier.

Though not shown on the Figure 1 plot, sink-rate test data were measured all the way up to 97.5 knots calibrated airspeed, but the sink rates at airspeeds over 88 knots exceeded the 900 ft./min. scale limit for our standard data plots. (For those who might need it, the sinking speed at 97.5 knots measured 1200 ft./min.) Generally, it is impractical to use airspeeds above about 80 knots for optimized 1-26 soaring flights because of the associated high sink rates inherent at those high airspeeds.

It seems that Schweizer has been successful in its intended plan to maintain the entire 1-26 series at a common performance level, which is the basis for the 1-26 Association's one-design competitions. Except for its mediocre performance level by today's glass sailplane standards, little fault can be found with this latest "E" model. The cockpit is configured quite well, the pilot's visibility is good, and I do not know of a safer or easier flying sailplane. Actually, this fine sailplane appears to be the epitome of the proposed new CIVV Club Class definition general criteria as defined in the 1975 CIVV Sporting Code paragraph 8.9:

"The purpose of this Class is to encourage the production of gliders suitable for elementary flying, training, performance, and competition flying. Aircraft should be safe to fly and to land in ordinary fields. They should have a low stall speed, good handling, and effective airbrakes. The cockpit must have good all-round visibility with attention to proper crash protection. The pilot's seat and landing gear should provide good shock absorption. The aircraft should be easy to rig and to inspect."

Thanks go to A. C. Williams of Southwest Soaring for the use of the new 1-26E, to the Dallas Gliding Association for the tows, and to Bob Gibbons for the test data reduction.

REFERENCE
1. Bikle, Paul A. "Polars of Eight," *Soaring,* June 1970.