

NEW PERFORMANCE TEST METHOD

by C. A. MOELLER

With more and more new high-performance sailplanes being built of late, it is of paramount importance that new methods to measure the performance accurately and cheaply be developed. Only in this way can we evaluate and compare the relative merits of changes and new concepts.

As expressed by H. Marshall Claybourn, Sr., in the October, 1959, issue of *Soaring*, the classic flight test techniques have about reached their limit of usefulness when considered for L/D ratios above 35 to 1. Subsidence and lifting of local air masses can and do occur without detection, causing large inaccuracies in the data.

As the usual saw-tooth glides must of necessity be made in upper air in order to provide a number of points for each flight, it appears necessary to search for another site of "test" air where disturbances will be at a minimum. Early morning ground air will fill this requirement nicely, as vertical motion can hardly occur in the strong inversion provided no appreciable surface wind is blowing. This condition will persist for several hundred feet above the ground.

The next problem is how to measure performance in this shallow layer. I propose that a level coast from high speed will provide accurate deceleration data, from which a complete L/D curve can be computed. It is only necessary to record airspeed vs. time on a suitable recorder. The slope of the corrected curve gives deceleration at any airspeed, and total drag is directly pro-

portional to deceleration.

How long a runway would be required to make this recording? Fig. 1 is a curve of airspeed vs. total distance during a level coast. This was reconstructed from the preliminary L/D curve of the HP-8 as published in the October, 1959, issue of *Soaring*. As this curve was obtained before fillets and other improvements were added, it is conservative, and coast distances are somewhat greater than as depicted in fig. 1. Thus, starting at 120 mph, it will take about 12,000 feet to make the full recording. While this might be obtained at a dry lake bed, the record can be obtained in two parts at airports having moderately long runways.

A 1000 foot release would be sufficient for the high speed run. The pilot would dive to, say, 50 feet at the start of the course and maintain this altitude as the sailplane slowed down. Ground effect at one-span altitude would probably be negligible.

The problem of maintaining level flight can be implemented by the use of a vibrated altimeter and a sensitive variometer vented to a "good static source." (Anybody know where these can be bought?)

Fig. 2 depicts a typical corrected airspeed vs. time curve, showing the computation of the L/D at $V_{true} = 90$ ft./sec. where the L/D is 31.4/1.

The writer believes that a V-t recorder should be built and tested in a sailplane of known performance. Consistency of data will prove or disprove the merits of this method.

A suitable recorder would be similar to a barograph, having a drum

speed of about 120 seconds, 130 mph range, and an isolated capsule to minimize the static volume which must be balanced in the pitot line in order to equalize response. The mechanism would be temperature-compensated. A remote control would permit on-off command by the pilot.

It might also be feasible to use a motion picture camera trained on the calibrated airspeed and an adjacent sweep-hand timer. An electric camera would be best as the running time is not limited.

It is the author's hope that this may prompt someone to try the suggestions put forth here and prepare a paper on their experiences for publication in a future issue of *Soaring* magazine.

1962 SOARING CALENDARS

The 1962 SSA soaring calendars have gone to press and should be available for sale by the time this is read. The format is the same as that used for the 1960 calendar (not the 1961), namely one full 8½ x 11 inch page for each month with 12 different sailplane photos featured. The individual price has been reduced to 75 cents and there will be a special bulk rate for orders of 10 or more, to be announced later. Samples of the 1962 calendars are being mailed to each soaring club so that their members may see at first hand in advance what is being offered before they submit collective orders.

These calendars make desirable Christmas gifts for soaring friends and are an extra source of income for clubs who buy them for resale. They provide daily inspiration from your wall or help to promote soaring when displayed all year at your local airport. Look for the big ad in the November *Soaring*, SSA, Box 66071, Los Angeles 66, Calif.

