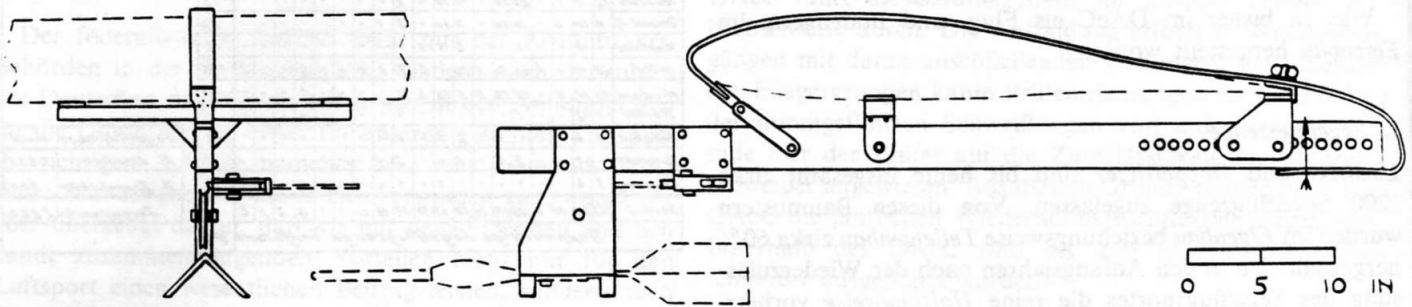


A Wing-Mounted Trailing Static Carrier

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Presented at the 8th OSTIV Congress, Cologne, Germany, June 1960



G. A. OF CARRIER

Introduction

The A.S.I. (Air Speed Indicator) pressure error, or position error, is most conveniently determined on gliders by means of a trailing static. The trailing static is a light bomb comprising static tube, ballast weight, and stabilising fins, suspended on a hollow cable far enough below the aircraft for the influence of the latter's pressure field to be negligible.

In use, the trailing static is lowered during the climb on aerotow, and after use must be either hauled up again or dropped. While techniques for dropping exist, the likelihood of the trailing static being damaged when striking the ground is very high; it is therefore considered preferable to be able to raise the instrument out of harm's way and to land with it still attached to the glider.

The carrier described below is one means by which the latter may be achieved, and was developed for B.G.A. No. 3. Test Group, Dunstable.

Description of Carrier

The carrier, illustrated in fig. 1, consists essentially of a beam strapped to the glider wing, carrying a steady bracket against which the trailing static is held by means of tension in its supporting cable.

The beam is of wood, 3" x 1" x 6 ft. long. It is held against the wing under surface at the spar (front spar if there are two) through a pressure plate, and at the trailing edge by a bracket. The pressure plate is a 2 ft. spanwise beam which can rock slightly in a forward-aft sense to suit the wing surface angle, and the rear bracket position on the (main) beam is adjustable to suit the wing chord; both pressure plate and rear bracket are suitably padded with sorbo rubber. The beam is retained in position by means of a strap secured at its front end by a pair of links and which passes over the wing and over the rear bracket, being secured to the latter by a small metal plate and a pair of wing nuts. The strap used was a piece of machine belting, but this is unduly stiff and is not recommended; parachute or cockpit harness material would be better.

The steady bracket which actually carries the trailing static is bolted to the nose of the beam, and carries a vertical pulley on a spanwise axis. A second L-shaped bracket is bolted a few inches further aft, and contains a horizontal pulley and fibre fairlead. This second bracket, as an assembly, is handed, but can be used for the opposite hand by reversing it on the beam, reversing the fairlead and transferring the pulley pivot to a second position.

Installation

The carrier is mounted on the wing about 1 meter from the fuselage side, in such a position as to clear the canopy and the

airbrakes, and located at a rib station. The latter is important as the strap tension, which can be 100 lbs., has to be reacted by a compression load in the wing in a chordwise direction. The spare length of the strap can be secured under the beam with locking wire. It is advisable to use felt padding between the strap and the wing surface in order to protect the latter.

The cable from the trailing static is passed over the vertical pulley, aft to the horizontal pulley, and off the latter via the fairlead and thence through the canopy direct-vision aperture (or one specially cut) into the cockpit. A jamming cleat is mounted on a suitable bracket to maintain the tension and to hold the cable off the edge of the aperture. The end of the cable is finally secured in the glider in some convenient manner.

Flight Experience

The carrier was first flown with ballast instead of a trailing static, to check that there were no ill-effects on the flying qualities, that it did not oscillate or vibrate unduly, that raising and lowering could be accomplished and that the cable when extended remained clear of the tailplane even at maximum speeds (100 Knots or so), the latter being checked by observation from the tug — this, of course, took place after the glider had cast off. The behaviour was satisfactory in all respects.

Four P. E. (Position Error) flights have since been made, all without difficulty except that on one occasion lateral swing developed while the cable was being hauled in, and the trailing static lightly struck the fuselage. It is believed that this can be avoided by taking care not to allow the aircraft to roll or yaw during the raising process (this is not quite so easy as it sounds) and to pull the cable in smoothly—it can be pulled only a foot or so at a time—and without hurrying.

In the latter connection it must be remembered that the cockpit becomes rather full, and it is vital that the cable is laid (dumped might be a more accurate description) in such a way as not to foul the airbrake and trim controls or, of course, to impede stick movement.

With a 50 ft. (15 m) cable, raising takes about 500 ft. (150 m) to 700 ft. (200 m) of altitude, and should be commenced at not less than 2,000 ft. (600 m) in case a swing has to be allowed to damp out and in order to allow ample time for planning the approach.

It was found to be immaterial whether the cable, when in the extended position, remained in the jamming cleat or whether it just rested on top of the bracket carrying it. This would be expected, as the cable used consisted of a $\frac{3}{8}$ inches diameter rubber tube containing a loose 10 cwt. steel wire rope core — the jamming cleat nips the rubber against the steel but still leaves an airspace and so allows pressure to be transmitted.