THE AIRCRAFT

This design tries to improve upon previous models by reducing the wing loading or order to improve manoeuvrability and by reducing fuselage frontal and wetted area in order to reduce drag. A long tailplane moment-arm and a light fuselage of low pitching inertia combine to improve recovery from the pitching oscillations which sometimes result after a tight turn; power stalling is unlikely with the high power-to-weight ratio used. Excellent manoeuvrability is ensured by the use of fairly large aerodynamically balanced control surfaces, tested in one of our wind-tunnels for a maximum deflection to be maintained up to 60 ft./sec. A very low dihedral angle is avoided to allow smooth "hands-off" flight for short periods even at maximum speed.

Specification

Power 2.5-3.5 c.c. (FOX 15).

All-up weight - - -	34 ozs.
Wing area - - -	380 sq. ins.
Wing span - - - -	45 ins.
Wing section - -	N.A.C.A. 0012
Wing incidence - - -	+2°
C. of G. position -	35% back from L.E.
Dihedral - - - - -	+7°
Tailplane span - - -	23 ins.
Tailplane area - -	110 sq. ins.
Tailplane incidence - - -	0°
Tailplane moment-arm -	21 ins.

Structural Design

Wing: Two-spar construction with full depth $\frac{1}{16}$ in. sheet webbing on the mainspar. Laminated semi-circular tips for lightness and appearance. Solid T.E. to avoid buckling near to the root. Total weight is $5\frac{1}{2}$ ozs. including clear dope, fuel-proofer and heavyweight tissue.

Fuselage: From previous experience it seems that the most severe impacts result from poor range and/or piloting. These consist of straight dives causing a straight compressive shock along the fuselage with a splitting tendency due to the radio-gear driving forwards, or spiral dives with a nearly simultaneous impact of wing-tip and nose leading to torsion and compressive buckling of the weakened fuselage sides at the cut-out under the wing root.

To counteract splitting the nose is reinforced with $\frac{1}{32}$ in. plywood doublers inside the $\frac{3}{32}$ in. sheet balsa sides; tie-bars of hardwood and the wing dowels prevent failure in tension, of glue joints between these sides and the plywood formers, as will often occur under these circumstances.

External balsa stiffeners reduce the danger of buckling of the fuselage sides beneath the wing and the wing dowels and gussets assist here to form an interlocking structure.

The rear fuselage is very light with only small section longrons and soft sheet, as shock loads are small because the tail-unit is quite light.

A normal $\frac{1}{8}$ in. sheet fin is employed and is swept for appearance. An externally stiffened tailplane seating is used.

A two-wheel knock-off undercarriage is employed, and the nose is reinforced with fibreglass and block balsa. The engine is mounted upon a breakable paxolin plate, attached to $\frac{3}{8}$ in. square hardwood bearers. A 2 oz. "clunk" tank is used and the fuel level can be examined by means of a Perspex clear-view panel.

Radio Installation

Batteries and accumulators are connected to a socket assembly on a ply plate to which the "Mighty-midget" servo is attached and which is removable as a unit. The receiver has a five-pin free plug which leads through a hole in the fuselage side and engages a socket in the motor plate through a second hole. Plywood reinforcement is used here and this arrangement avoids slide switches. (VERY IMPORTANT). A separate transistor servo amplifier mounted on a B7G base is plugged into the socket assembly, allowing interchangeability with other models.

Difficulties so far reveal that the plywood doubling should be extended to the wing T.E., otherwise the structure seems sound.

This model needs further flight testing to overcome motor trouble and to allow me to gain piloting experience. However, the accessibility and performance appear very promising and the model was very simple and enjoyable to build although the construction is not as simple as "Gasser", for example.