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AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 158

THE C.A.M.S. 80 AMPHIBIAN (FRENCH)

An Observation Monoplane

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An Observation Monoplane

The C.A.M.S. 80 is a shipboard or observation patrol, light-bombing, long-range amphibian. (Figs. 1 and 2.) The construction is of high-resistance noncorrosive steel and light alloys, except for the wing covering. The water-cooled engine is of 650 hp.

Hull.- The hull (fig.3) is of high-resistance light alloys (duralumin and noncorrosive "védal"). The fittings are of rustproof steel. The carefully streamlined hull with two-step bottom is remarkably seaworthy, a result of systematic tests and long experience in hull construction. Its transverse structure consists of angle-iron frames, the inside height of which permits of easy circulation. The longitudinal structure consists of seven keelsons which form the widest portion of the hull, and of angle-iron stringers. The covering is of riveted védal sheet of varying thickness in different places (bottom, sides, and top).

Landing gear.- The landing gear is retractable and of the same type as that of the C.A.M.S. 37 A. It comprises two halves each consisting of:

1. An oblique of steel tubes, the two arms of which are hinged halfway up the side of the hull, and which carries a standard 1000 x 225 mm wheel at its apex.

2. A second nearly vertical V, the arms of which are attached to the lower surface of the wing near its root. The apex of this V is connected with that of the first V by an oleopneumatic strut of 140 mm stroke, which is nearly vertical in the landing position.

A retracting screw, applied at the top of the strut, folds the whole structure upon alighting, the plane of symmetry changing from the vertical to a nearly horizontal position parallel to the wing. The tail skid has an oleopneumatic shock absorber inside the hull.

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*Data furnished by the manufacturers.

Wing.- The medium thick monoplane wing of large aspect ratio consists of:

I. A central rectangular portion with parallel spars attached to the top of the hull, each of its ends carrying:

a) On the upper wing surface, the parallel wire bracing of the engine bearer;

b) On the lower wing surface, the wires transmitting the stresses of the upper wires to the bottom of the sides of the hull, and the inverted V-struts and the struts carrying the single-step lateral floats.

II. Two lateral triangular cantilever portions with converging spars, the trailing edge of which has two ailerons of large aspect ratio mounted on ball bearings. (Figs. 4 and 5.)

The wing structure consists of: high-resistance steel spars with sheet flanges, of four parts riveted together, and sheet-steel webs stiffened by vertical-section uprights riveted to the flanges and to the web; vedal ribs with open-section flanges, vertical members and diagonal cross-bracing.

The spars are connected by compression struts of the same construction as themselves, and a double cross-bracing.

The leading edge is constructed of channel uprights with the vedal rib riveted to the crimped edges of the steel spar flanges (fig. 6) and is stiffened by false rib caps. The trailing edge is stiffened by steel wires; the covering is fabric.

The fuel tanks are located in the wing between the front and rear spars, symmetrically with respect to the hull axis and near to it. They have dump valves and S.E.M.A.P.E. protection.

Tail surfaces.- The stabilizer and fin have high-resistance steel spars and duralumin ribs. The elevator and rudder are of autogenously welded steel tubes and mounted on ball bearings. The trailing edges of both control surfaces have balancing flaps.

Power plant.- The 650 hp water-cooled engine drives a tractor metal propeller. It is carried by two streamlined N struts connected at their base and forming a dihedral, the lower edge of which is fixed to the wing spars and coincides with the hull axis.

The engine bearer, of high-resistance light alloys, consists of two longerons, the ends of which are connected by box spars. The stiffening is by cross struts at the front and rear.

The stationary position of the power plant is insured by parallel brace wires attached to the ends of the rectangular portion of the wing. They are kept taut by the action of a Messier oleopneumatic shock absorber, by which they are connected to the end spars of the engine bearer. Excellent lateral rigidity of the bearer is thus achieved.

The tank of the automatic fire extinguisher, located between the two water tanks which supply the two frontal water radiators (fig. 7) in flight, is mounted at the front and inside of the engine housing. The two radiators mounted on the two front V struts of the engine bearer have a minimum drag and weight. One of their distinctive features is the possibility of filling them at the bottom.

The oil tank, with filter and radiator at the bottom, is also located in the engine (fig. 8), its drag and weight being likewise very small. This part also contains the generator, of which only the blade projects from the rear of the carefully streamlined engine housing.

Equipment

From bow to stern, the hull is divided into the following compartments connected by doors.

1. Front cockpit.- Located between the bow and pilot's compartment, it comprises:

a) The T.O.7 ring mount with a wind-compensating device and a twin machine gun;

b) The projecting glass window which affords perfect vertical visibility to the bomber-observer;

c) On the deck, a drift indicator, compass, sight, pistol, and flare boxes;

d) In the cockpit, on the port side, an inclinometer, instrument board, lever and wheel controls, G.P.U. bomb gear (attached to the lower surface of the central rectangular portion of the wing), controls of Michelin bomb gear, rheostats, cartridge packets, parachute and belt, anchor, etc.

2. Pilot's compartment.- Of the closed cabin type and of very large dimensions. Glass framing affords excellent forward, lateral and downward visibility, the last being achieved by roller curtains. The chief pilot's seat is comfortably installed in the left forward corner of the compartment. The controls are rigidly connected with those for the second pilot seated beside him. They are balanced. The seat of the second pilot is slightly higher than that of the first, so that he has a better forward visibility and can see the instrument board and the compass in front of the chief pilot.

Safety is achieved by parachutes, belts, hand extinguishers in the cockpit and automatic extinguishers for the engine, and by an automatic fire-alarm system on the instrument board of the chief pilot.

3. Photographer's compartment.- This is lighted by portholes and comprises chiefly: a water-tight trapdoor at the left of the hull bottom, a camera support, seat, table, fire extinguisher, etc.

4. Radio cabinet.- It is located under the wing and permits sending and receiving during flight and on the water. It operates on the current supplied in flight by the generator and stored in a 24-volt 40-ampere storage battery. In addition to a complete wireless installation, the cabin contains a switchboard, telescopic mast, antenna reel, etc.

5. Rear gunner's cockpit.- This has a wide field of fire and comprises a T.O.9 ring mount with wind-compensating device and a slide rail with twin machine guns. The ammunition is placed within easy reach of the gunner, who is also supplied with a rheostat, transmitter, parachute, and belt.

6. Stern compartment.- This contains water navigation equipment such as a drag anchor, log line, boat hook, tow lines, etc.

Miscellaneous Equipment

The electrical installation is complete and includes:

1. Regulation lights, ceiling lights, trouble lights, plugs, rheostats for the heating of clothes, arms, etc.;

2. Running lights;

3. Signalling alighting searchlights;

4. Telephone for communication between the front and rear gunners' cockpits, the pilot's compartment, etc.

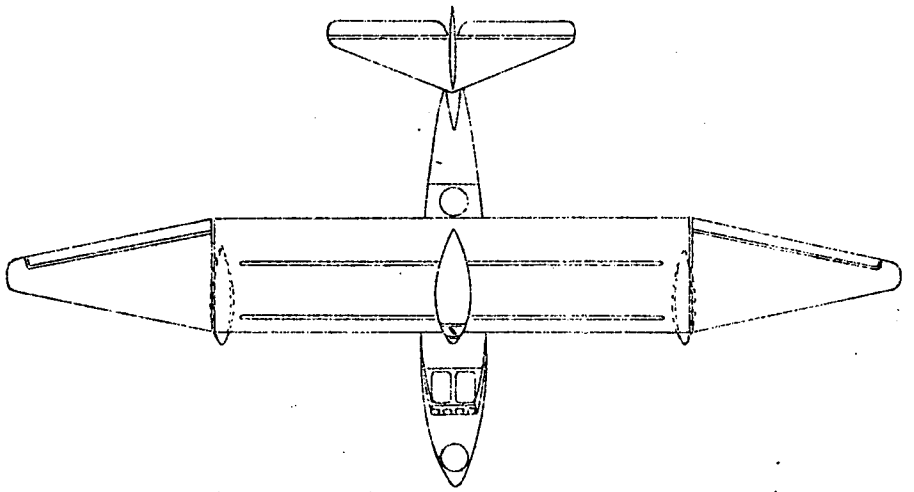
Characteristics

Span	24.6	m	80.71	ft.
Length	12.95	"	42.49	"
Height	5.1	"	16.73	"
Wing area	62.4	m^2	671.67	sq.ft.
Weight empty	2775	kg	6117.82	lb.
Fuel and oil	700	"	1543.23	"
Crew and military load	650	"	1433.00	"
Total weight	4125	"	9094.05	"
Wing loading	63.7	kg/m^2	13.05	lb./sq.ft.
Power "	6.1	kg/hp	13.26	lb./hp

Performance

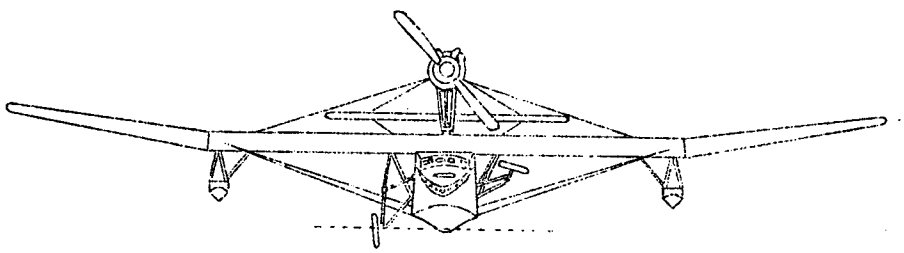
Maximum speed at sea level	208 km/h	129.24 mi./hr.
Theoretical ceiling	6500 m	21325 ft.
Climb to 1500 m (4920 ft.)	10 min.	
Range	1300 km	807.78 mi.
Static test coefficient	7.5	

Translation by W. L. Koporinde.
National Advisory Committee
for Aeronautics.



Span 24.60 m (80.71 ft.) Height 5.10 m (16.73 ft.)

Length 12.95 m (42.49 ft.) Wing area 62.40 m^2 (671.67 sq.ft.)



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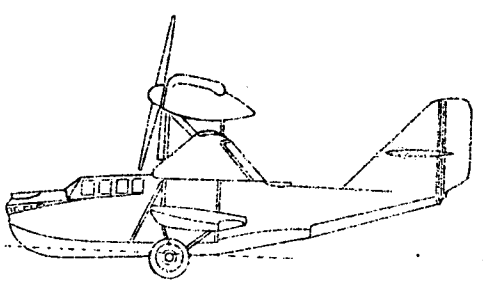

Fig.1 General arrangement drawings of the C.A.M.S. 80 amphibian airplane.

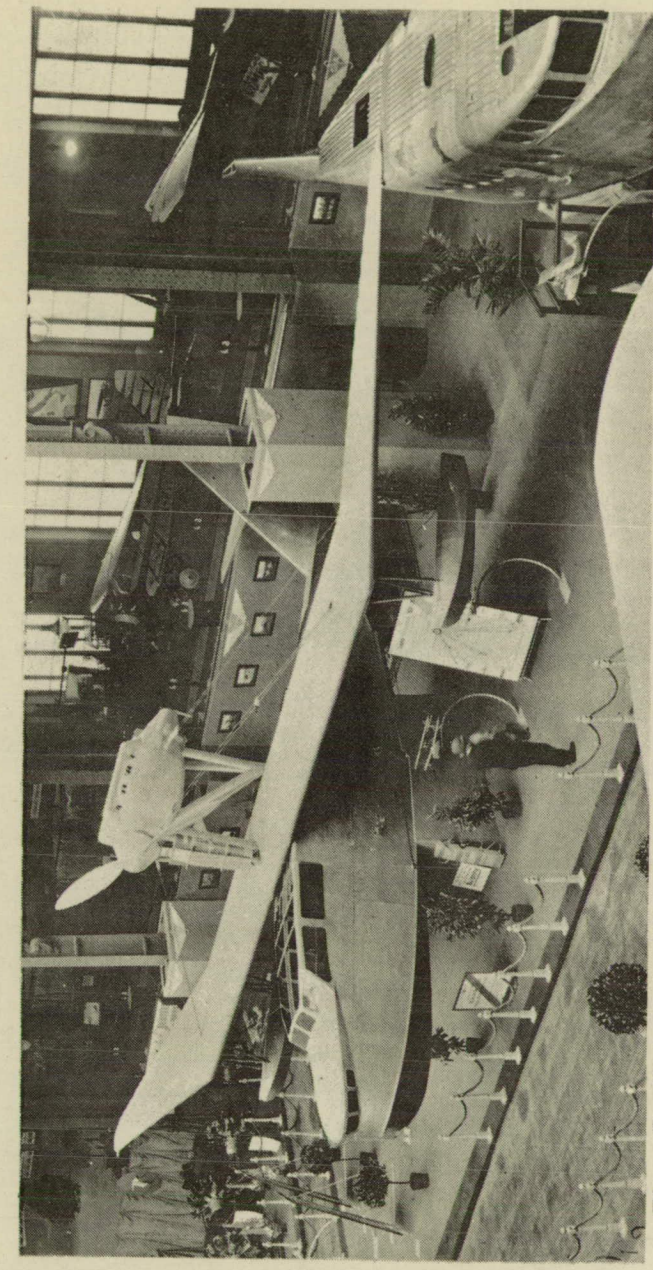

Fig. 2 C.A.M.S. 80 Observation airplane, (Amphibian gear not attached to fittings). The Lorraine "Orion" 675 hp engine is used.

Structure of the C.A.M.S. 80 airplane.

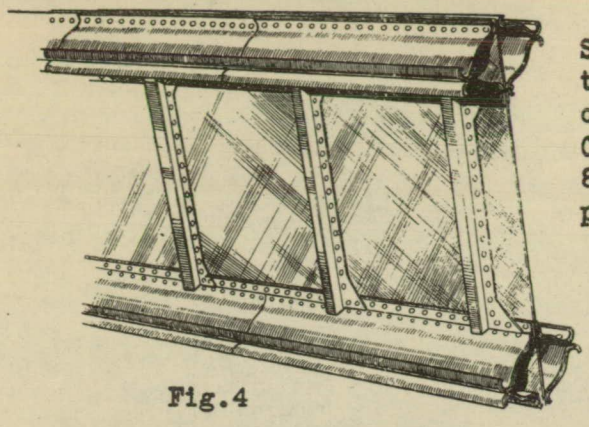

Fig.4

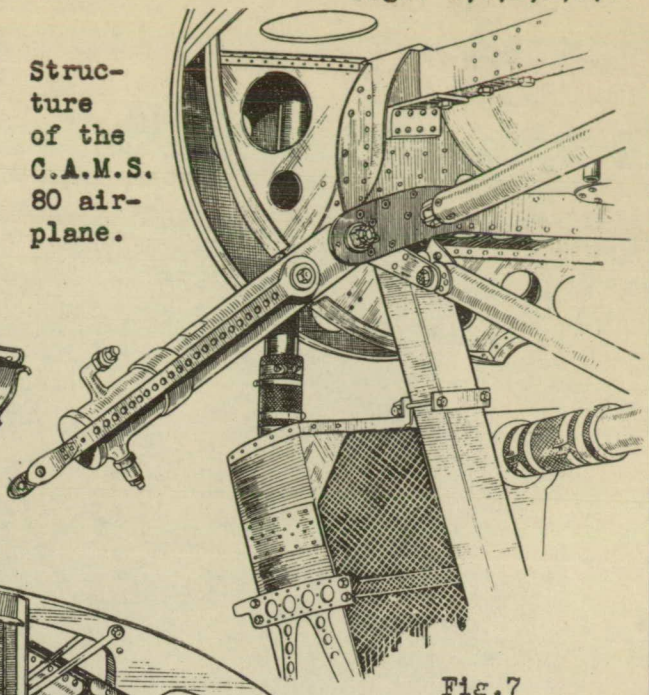

Fig.7

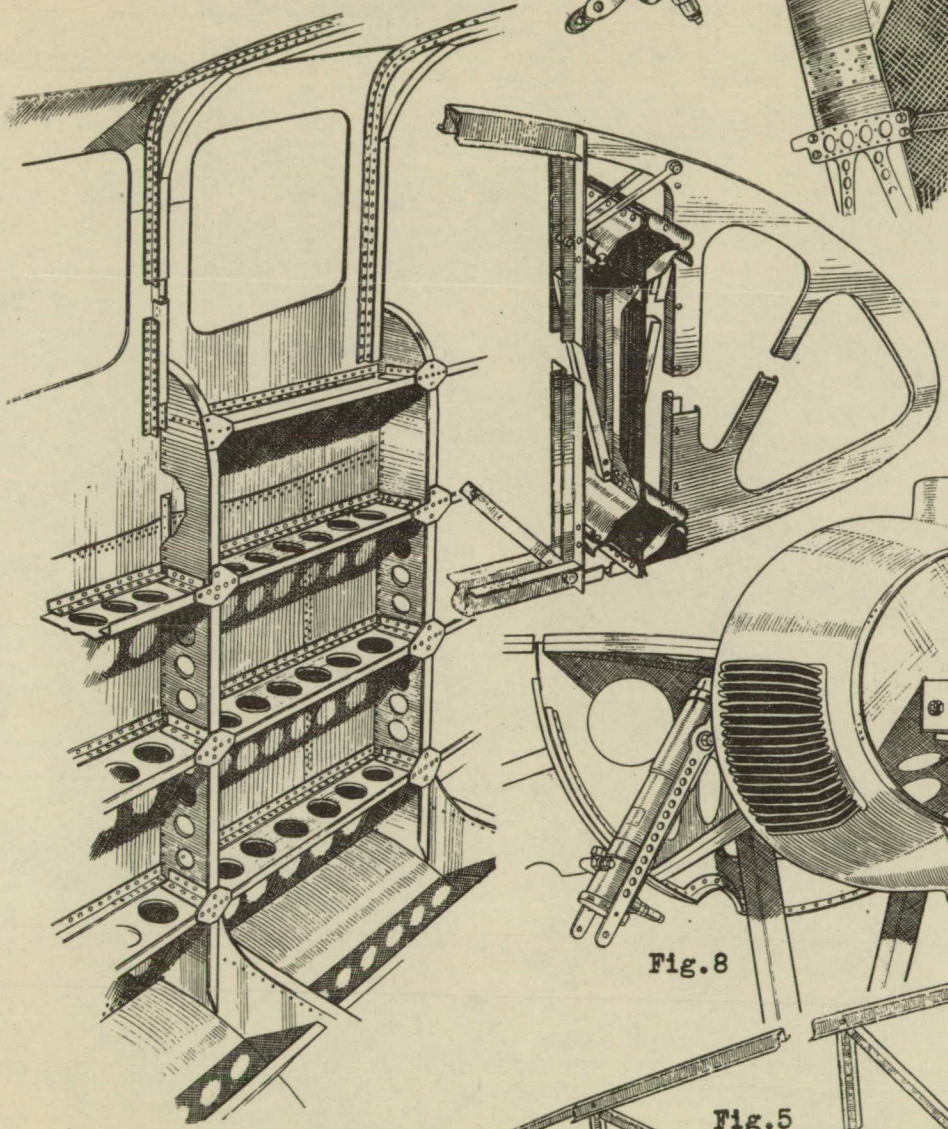

Fig.6

Fig.3

Fig.8

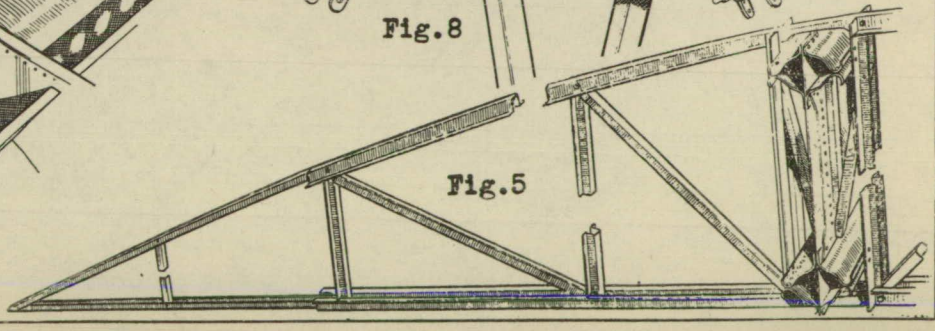

Fig.5

Taken from
L'Aéronautique, Dec. 1931