

AIRCRAFT CIRCULARS
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 80

C.A.M.S. 54 G.R. TRANSATLANTIC SEAPLANE (FRENCH)

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C.A.M.S. 54 G.R. TRANSATLANTIC SEAPLANE* (FRENCH).

The C.A.M.S. 54 G.R. seaplane was built for the purpose of crossing the Atlantic from Europe to America by way of the Azores. The flight tests of this seaplane were made the end of March, 1928 (Figs. 1, 2, and 3).

The hull of the C.A.M.S. 54 has two steps and a pronounced V bottom, the sharpness and curvature of which increases towards the bow.

The hull structure is made up of longitudinal and transverse members, the latter of oak. The transverse frames and bulkheads are braced longitudinally by stringers either of single or double T section depending upon whether they are used for the maintenance of shape or the fastening of planking.

At the points of great stress false secondary frames are spaced between the main frames and reinforce the bottom by strengthening the longitudinals.

The divisions between the various compartments are composed of reinforced bulkheads. The bulkhead at the forward step is in the plane of the rear lower wing spars. To this bulkhead are fastened the fittings of the wing roots and the supporting struts. Transverse steel bands strengthen the bulkhead at the point of

*Prepared by Paris Office, N.A.C.A.

attachment of the struts. The bulkhead corresponding to the forward spars of the lower wing is built up in the same fashion.

The covering of the sides of the hull is of double planking up to the water line (one thickness of plywood and one of teak). The sides of the upper part of the hull and the deck are covered with plywood except for the rear of the hull forming the fixed fin and carrying the tail surfaces, which is of moulded tulip wood and birch. The hull is armored in the plane of the propeller.

Beginning at the box, the hull is divided up into the following compartments:

1. Hold for carrying supplies.
2. Enclosed pilot's compartment (two pilots side by side).
3. Navigator's station and radio.
4. Tank compartment.
5. Berth and lavatory.

The wings, of equal span, have box spars with spruce flanges and webs of two thicknesses of spruce glued together. The ribs are of double T section having webs of plywood with lightening holes. The struts and diagonals are of poplar or spruce.

The upper wing is in three pieces, a center section and two outboard sections. In the center section are placed the oil tanks and attached to its lower surface are the Lamblin water and oil radiators.

The lower wing is composed of the two wing roots mentioned above and two outboard sections, each of which carries the wing tip float attached to the spars by two vertical and two oblique struts.

The inboard ends of the wings (next to the center section or wing roots) are composed of two strengthened ribs connected together by plywood nailed to their flanges. The outer ends of the wing tips are of poplar. The interior structure includes spruce box cross members and suitable wiring.

Both upper and lower wings have ailerons operated by double control wires. The upper and lower ailerons are connected by streamline wires.

The engine beds are composed of two bearers made up of layers of spruce which are glued and wrapped, connected by four caissons, of which the two main ones in the plane of the wing spars receive the struts, and two little caissons at the ends.

Two pairs of tubes forming the legs and two anti-thrust tubes connect the engine bed to the hull. In the front and rear wings cross tubes give rigidity to the structure. The center section of the upper wing is connected to the engine mount by four oblique struts. All the tubes supporting the engines are streamlined.

The power plant consists of two of the new series 500 HP. geared Hispano Suiza V type engines arranged in tandem. These two engines are enclosed in a streamlined cowling composed of

rings attached to the engine bed and longitudinal stringers of light metal to which are fixed the quickly detachable cowling. Thanks to several large openings on the sides and bottom of the cowling, it is easy to inspect the interior of the power egg and the engines (magneto side). A hatch in the hull and steps placed on the struts facilitate access of the mechanic to the engines.

Engine starting is by means of a starting motor aided by the fuel injector.

The stabilizer of cloth-covered wood has attached to it balanced elevators of steel tubing. The control is through two horns placed very near the longitudinal axis of the seaplane so that the control cables can be placed within the fixed fin of the hull.

The fixed fin is of fabric-covered wood and of trapezoidal shape. It is attached to the main longitudinal hull member and the sternpost and to the spars of the stabilizer. It is braced by wires running from its upper end and attached by lugs to the outer ends of the stabilizer spars. The balanced rudder of steel tubing is hinged to the sternpost.

There are two sets of controls for the seaplane, the principal pilot's seat being on the port side. All control wires are in duplicate with different points of attachment.

The eight fuel tanks are arranged on each side of the hull leaving a central passage clear. Their center of gravity is in

the same plane as that of the seaplane and their total capacity is 4960 liters (1310 gallons).

The oil tanks (one for each engine) are in the center line of the center section, of which they follow the curve. Their total capacity is 290 liters (76 gallons).

Access to the hold in the hull is rendered easy by opening the partition separating it from the pilot's cabin. In addition, there is a hatch allowing access to the hold from the deck.

The enclosed pilot's cabin, well lighted by windows and wind shields, allows access to the interior of the hull. For this purpose, two sliding panels are placed above the seats. Behind the pilot's cabin is placed the wireless set and radio direction-finding apparatus with its frame. Here is also the starting motor driving the wireless alternator. On the opposite side of the hull and in the same compartment is a chart table containing space for maps in a recess.

The tank compartment is reached after opening a well sealed door designed to prevent the dissemination of fuel vapor. There is a central passage between the eight tanks and then another door giving access to the berth and lavatory.

Aft of this and as far as the sternpost, the hull is empty; access to this part is through a hatch with a sliding cover on the deck aft of the rear propeller.

The interior lighting includes instrument lights in the pilot's cabin, two ceiling lights in the radio and navigation

cabin, and a trouble light with extension. There is a central ceiling light in the tank compartment and one in the rear compartment. The external lighting includes the regulation position lights.

The radio installation permits sending and receiving in flight and on the surface. Current is furnished by a generator driven by the starting motor with a battery in addition.

The antenna for use in flight consists of a wire with a bob which passes through the bottom of the hull by a water-tight hole which is closed after use. The antenna for use on the surface consists of a tubular mast normally kept in the hull but which can be erected on the upper wing and carries a four-loop aerial.

Attached are the characteristics of the C.A.M.S. 54, both with normal load and also with fuel load giving a radius of 4300 km (2672 mi.).

This seaplane can also be equipped with two "Jupiter" geared engines instead of Hispano-Suiza.

(Signed) John Jay Ide.

Characteristics of C.A.M.S. 54 G.R. Seaplane

Two 500 HP. Hispano-Suiza engines

Span	20.40 m	66.90 ft.
Length	14.84 "	48.69 "
Height	5.224 m	17.13 "
Weight empty	4290 kg	9457.76 lb.
Useful load	2800 "	6173.00 "
Total weight	7090 "	15630.76 "
Wing area	113 m ²	1216.32 sq.ft.
Wing loading	62.74 kg/m ²	12.85 lb./sq.ft.
Power "	7.09 kg/HP	15.42 lb./HP.
Maximum speed at sea level	220 k.p.h.	136.70 M.P.H.
Alighting speed	110 "	68.35 "
Climb to 2000 m (6560 ft.)		14 min.
Ceiling	4400 m	14436 ft.
Radius	2500 km	1553 mi.
Load factor		5

Following are the Performances with Maximum Load

Weight empty	4290 kg	9457.76 lb.
Useful load	4110 "	9061.00 "
Total weight	8400 "	18518.76 "
Wing loading	74.33 kg/m ²	15.22 lb./sq.ft.
Power "	8.4 kg/HP	18.27 lb./HP.

Performances with Maximum Load (Cont.)

Maximum speed at sea level	210 k.p.h.	130.49 M.P.H.
Alighting speed	115 "	71.46 "
Climb to 2000 m (6560 ft.)		50 min.
Ceiling	2300 m	7545 ft.
Radius	4300 km	2672 mi.
Load factor		4

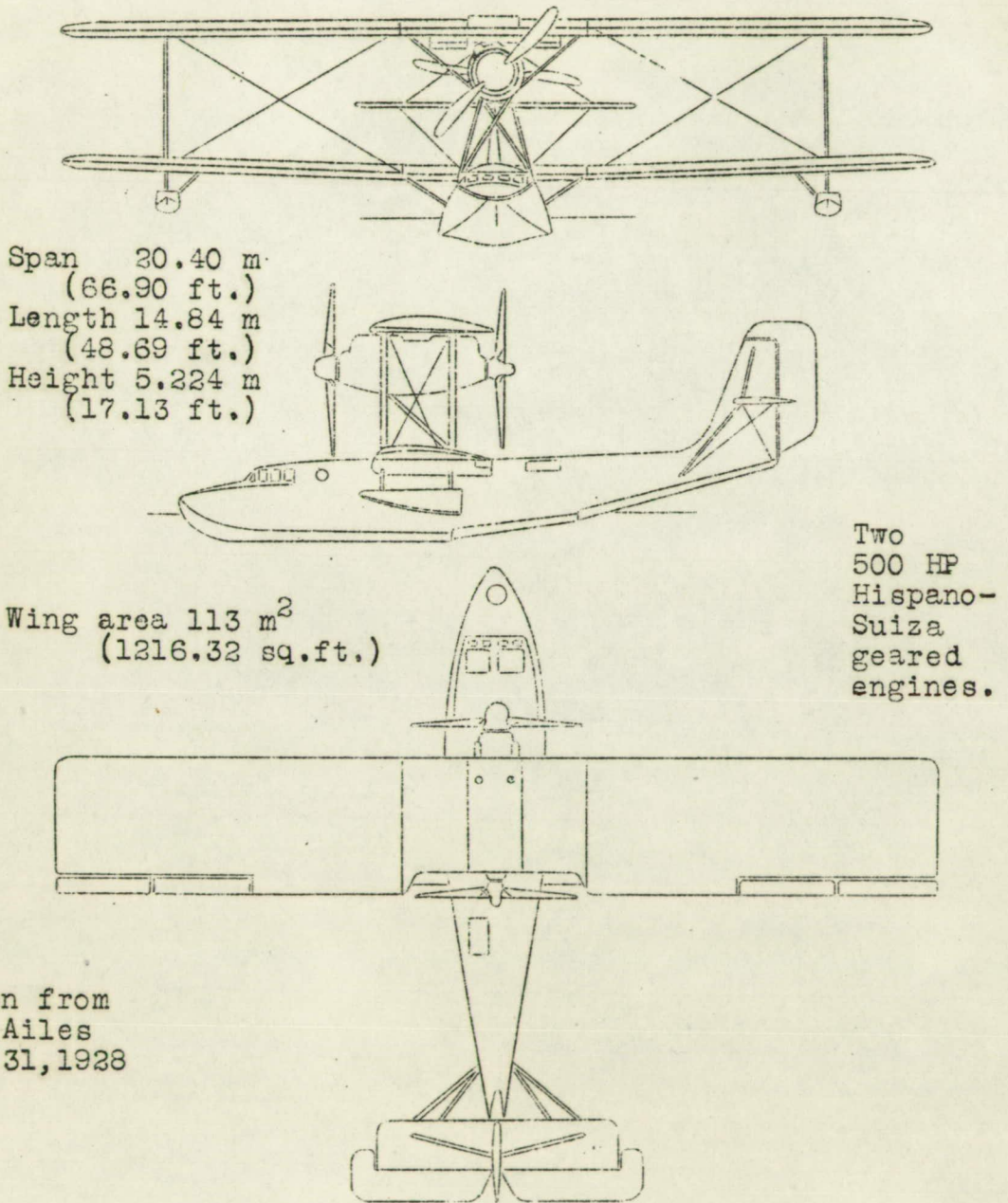


Fig.1 The C.A.M.S. 54 G.R. seaplane.



Figs. 2 & 3 Three-quarter views of the C.A.M.S. 54 G.R. seaplane with two 500 HP Hispano-Suiza eng.
6780 A.S.