AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

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No. 37

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# THE FRANÇOIS VILLIERS MARINE PURSUIT AIRPLANE



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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

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# THE FRANCOIS VILLIERS MARINE PURSUIT AIRPLANE.*

This airplane was designed to meet the conditions of the Saint Raphael contest imposed by the French Navy. It is intermediate between a seaplane and an airplane. It has all the aerodynamic qualities of the latter (speed, ceiling, maneuverability) required for a pursuit airplane. It can also alight on the water, like a seaplane, its fuselage having the shape of a seaplane hull. A special device enables the lifting of the landing gear when alighting on the water, so as to eliminate the risk of upsetting at the moment of striking the water. Lateral stability on the water is obtained by means of two small floats under the tips of the lower wings.

The Villiers is of the sesquiplane type. The lower wings join the fuselage a little above the water line. The upper wing has two long narrow unbalanced ailerons. This wing is joined to the fuselage by a cabane consisting of four oblique struts. Each half-cell is braced by a pair of V struts with diagonal brace wires. The structure is wood covered with fabric.

The fuselage is carefully streamlined on the bottom. It is covered with plywood and is divided into water-tight compart-

*From a circular published by the Villiers Company, supplemented from an article by Serryer in "Les Ailes," November 25, 1926.

ments. The pilot's seat is behind the wings, both lateral and vertical visibility being very good. The gunner's cockpit is behind the pilot's and is equipped with two Lewis machine guns on a balanced turret. The airplane is also equipped with two Vickers machine guns firing through the propeller. The airplane is heated and lighted by electricity.

The horizontal empennage consists of a fixed stabilizer, which rests on top of the fuselage, and a two-part balanced elevator. The vertical empennage consists of a triangular fin and an unbalanced rudder. These parts are braced by cables.

The power plant consists of a 450 HP. Lorraine-Dietrich engine and a two-bladed tractor propeller. The engine bed is made of duralumin. It consists of two box girders held in place and strengthened by six bulkheads assembled by gussets (Fig. 2). The engine is water-cooled by means of a Lamblin radiator attached to the leading edge of the lower wings. The fuel is delivered by two A.M. pumps.

The landing gear consists of two lateral V struts supporting a horizontal, streamlined, rigidly braced axle, with sandow shock absorbers. The rudder is protected by a small tail skid. It can be supplemented by a brake for short-distance landings.

This airplane passed its marine acceptance tests at Saint Raphael, February 10, 1925. It then participated in the Saint Raphael contest. By way of indication, the following are the marks given by the board of judges.

1. Alighting and mooring facility.- Remarkably successful. The marks have not yet been communicated.

2. Taxying and take-off.- The airplane obtained the mark 20 on 20.

3. Qualities of flight.- Very good lateral and vertical visibility.

| | |
|---|---|
| Good forward visibility | 14 |
| Maneuverability | 19 |
| Group flight | 19 |
| Speed range: max. 212 km/h (131.73 M.P.H.) min. 82 " ( 50.95 " ) | 17 |

Very good combat qualities, very manageable; holds very well in the turns; very good visibility in combat, excepting upward in front.

4. Performances.- Maximum horizontal speed 212 km/h (131.73 M.P.H.), mark 18. Minimum horizontal speed 90 km/h (55.92 M.P.H.).

5. Marine qualities.- In floating at rest for six hours, it took in less than 20 liters (5.3 gallons) of water.

As a result of the above performances, the Villiers Marine Airplane was awarded the prize of the contest, and an order was given by the French Navy for 30 airplanes of the same type.

## Characteristics

| | | |
|---|---|---|
| Wing area | 40.0 m² | (430.56 sq.ft.) |
| Length of airplane | 9.3 m | (30.51 ft.) |
| Height of upper wing above ground | 3.76 m | (12.34 " ) |
| Span of upper wing | 13.00 " | (42.65 " ) |
| " " lower " | 7.2 " | (23.62 " ) |
| Chord of upper wing | 2.5 " | ( 8.20 " ) |
| " " lower " | 1.1 " | ( 3.61 " ) |
| Span of horizontal empennage | 4.0 " | (13.12 " ) |
| Chord of horizontal empennage | 1.9 " | ( 6.23 " ) |
| Area of horizontal empennage | 4.5 m² | (48.44 sq.ft.) |
| Weight empty | 1256 kg | ( 2769 lb.) |
| Useful load | 650 " | ( 1433 " ) |
| Full " | 1906 " | ( 4202 " ) |
| Wing loading | 47.5 kg/m² | ( 9.73 lb./sq.ft.) |
| Power " | 4.235 kg/HP. | ( 9.21 lb./HP.) |

Climb to 6000 m (19,685 ft.) with Navy pilot, 28 min. 49 sec.

Translation by Dwight M. Miner,
National Advisory Committee
for Aeronautics.

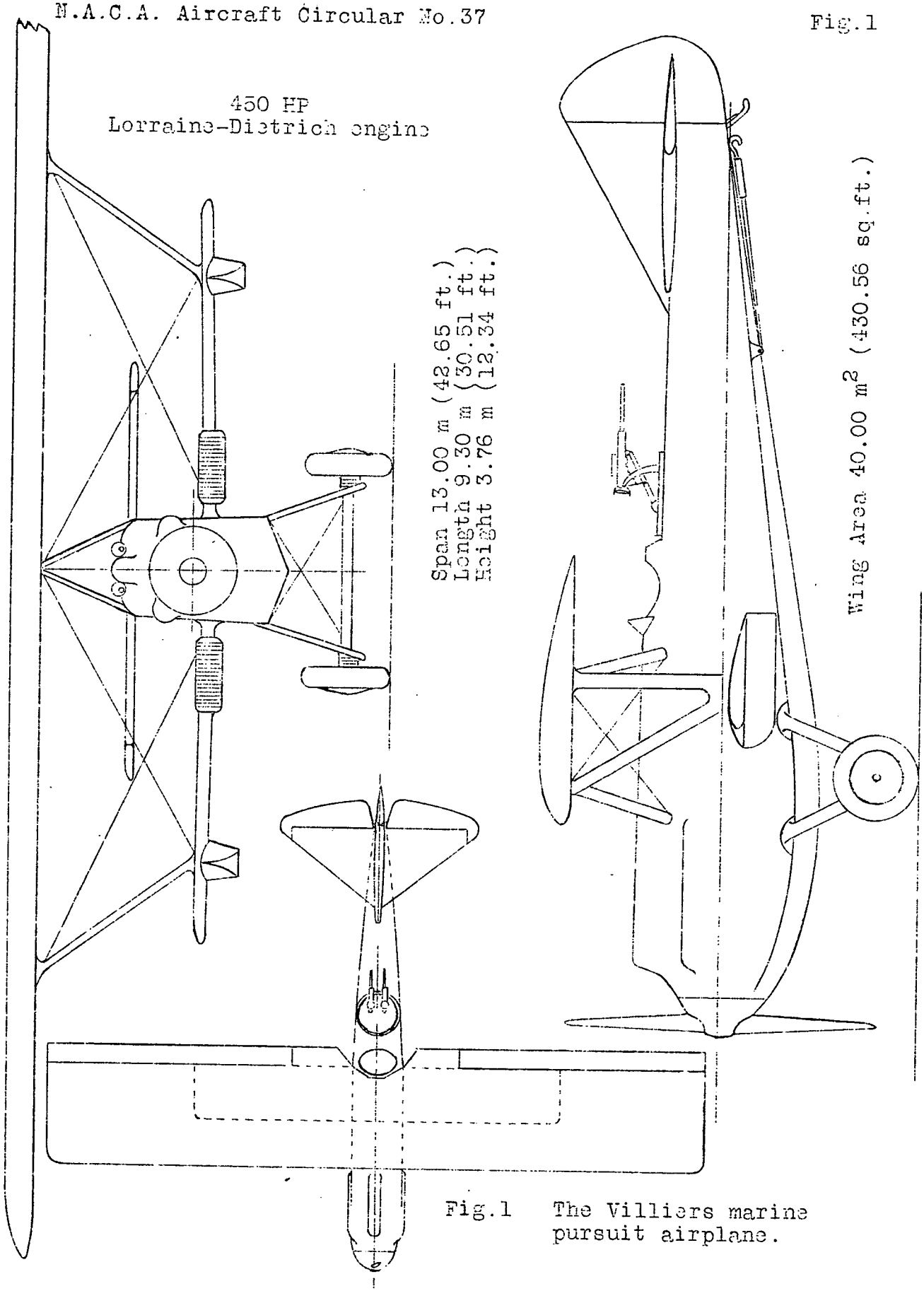
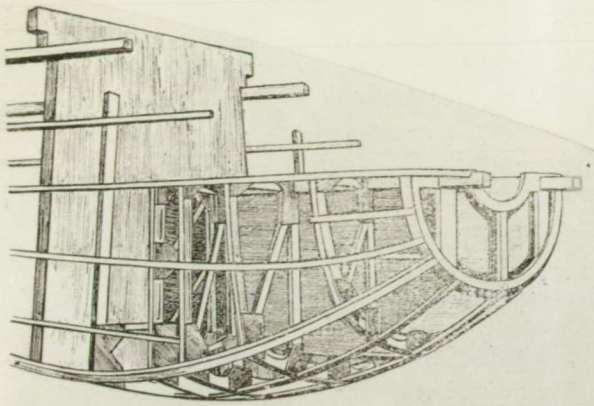
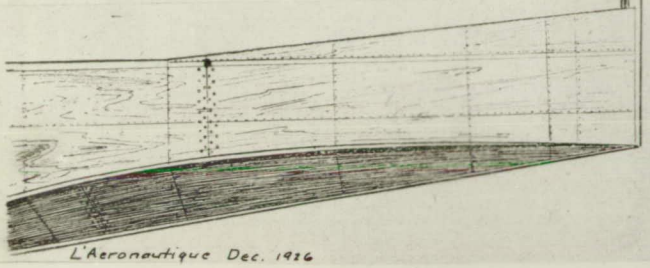



Fig.1 The Villiers marine pursuit airplane.





L'Aeronautique Dec. 1926

Figs.2 & 3 Engine bed and rear end of fuselage of Villiers 2 pursuit marine airplane.

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Fig.4

Fig.5

Fig.6