No. 171

THE S.P.C.A. 30 M.4 MILITARY AIRPLANE (FRENCH)
A Multiplace Low-Wing Monoplane

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THE S.P.C.A. 30 M.4 MILITARY AIRPLANE (FRENCH)*
A Multiplace Low-Wing Monoplane

The S.P.C.A. 30 M.4 multiplace of the Société Prov-
encale de Constructions Aéronautiques, was designed to
carry four men and meet all the requirements of the 1928
program. (Figs. 1, 2, and 3.) As a fighter, it is in-
tended for observation and for accompanying bombardment
squadrons. Its equipment also enables it to serve as a
day or night bomber. In all situations, its defense is
assured with the maximum efficacy. The arrangement of its
three firing stations leaves no field uncovered, the down-
ward firing field being increased by the narrowness of the
fuselages. Its all-metal construction enables it to en-
dure all kinds of weather. Since it is composed of ele-
ments easily demountable and interchangeable, repairs can
be readily made. This airplane can be converted into a
three-engine ambulance airplane with a detachable cabin
under the fuselage. (Fig. 4.)

The wing is of the cantilever type, made in three
separately demountable parts, namely, a central portion
of uniform section supporting the cabin, fuselages, engine
bearers, and landing gear (fig. 5); and two lateral por-
tions, each joined to the central portion by four bolts.
The two wing spars are lattice girders of uniform height
in the central portion, but tapering uniformly in the lat-
eral portions. Each spar flange consists of two continu-
ous semicylindrical duralumin plates and a U riveted to-
gether so as to form an almost circular cross section.
(Figs. 6 and 7.) These flanges taper uniformly in the
lateral wing portions so as to form elongated cones. The
spar webs are formed by lattices of box cross section.
The wing covering is supported directly by the ribs, which
likewise take the form of lattice girders. The triangular
bracing in the planes of the upper and lower spar
flanges is rigid, the bracing members being extruded in
the form of omega. The ailerons are hinged to auxiliary
lattice spars.

*From data furnished by the manufacturers and from L'Aéro-
nautique, August, 1932, pp. 238-239.
The wing covering is entirely of metal, consisting of corrugated sheets 0.35 mm (0.014 in.) thick reinforced internally by section metal. Some of the covering panels are attached by screws permitting their quick removal and easy inspection of the interior of the wing and of the supports of the controls.

The two fuselages are attached to the central portion of the wing by four bolts each. The framework of each fuselage consists of two triangularly braced girders joined at intervals by transverse frames. (Fig. 8.) The covering is smooth sheet metal 0.5 mm (0.02 in.) thick. The floor and ceiling are reinforced by stringers throughout their whole length. Each fuselage carries a ring machine-gun mount 1,0,7. A central corridor connects the machine-gun station with the engine compartment and with the central cabin.

The central cabin is prolonged by a balcony projecting about 13 feet in front of the wing and has a structure similar to that of the fuselages. It has a continuous floor interrupted by a trapdoor for access and the requisite openings for navigation and for the operation of the observer. The cabin is divided lengthwise into two compartments by a partition with a connecting door. The forward compartment is for the chief observer and contains all the requisite instruments for navigation, observation, and bombardment, together with a ring machine-gun mount. The after compartment contains the two tandem pilot stations with dual control supported by two raised girders. Each station can be disconnected by the pilot of the other station. The flight controls are rigid and are mounted on ball bearings. The frame for supporting the bomb rack is in the bottom of the after compartment between the spars of the central part of the wing. This frame can also serve as a camera support in photographic missions.

The horizontal stabilizer has the same structure as the wing. It connects the two fuselages, with an overhang at each end. The elevator is mounted on ball bearings. The vertical empennage comprises a fin and a rudder at the tail of each fuselage. The structure is the same as that of the horizontal empennage.

The landing gear is composed of two independent symmetrical parts, each having a special steel axle, a tube of variable thickness attached by a ball-and-socket joint to the lower flange of the front spar of the central part
of the wing under the side of the cabin. An oblique fore-and-aft steel strut is attached to the lower flange of the rear wing spar under the center of each fuselage. A vertical strut provided with a Messier oleopneumatic shock absorber is attached to the lower flange of the front spar under the center of the engine bearer. The lower ends of these three members are joined so as to form a trihedral. At the apex of this trihedral and constituting the end of the axle, there is a spindle which carries a wheel 1,300 by 275 mm (51.2 by 10.8 in.). Each fuselage carries a swivelling tail skid provided with a Messier oleopneumatic shock absorber.

The S.P.C.A. 30 M.4 is equipped with two 650 hp Lorraine 18 Kd engines, mounted as shown in Figure 9, or two 650 hp Hispano-Suiza 12 Nbr engines. Two protected drop fuel tanks of L2R alloy are located in the central part of the wing, one on each side of the cabin. The fuel system makes it possible to supply each engine from either or both tanks.

The Lorraine engines have radiators of the frontal honeycomb type, while the Hispano-Suiza engines have retractable plate-type radiators located in the leading edge of the wing.

CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span</td>
<td>(about) 26.50 m</td>
</tr>
<tr>
<td>Maximum chord of wing</td>
<td>4.91 &quot;</td>
</tr>
<tr>
<td>Chord at tip of wing</td>
<td>3.30 &quot;</td>
</tr>
<tr>
<td>Length</td>
<td>(about) 17.00 &quot;</td>
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<tr>
<td>Height</td>
<td>4.10 &quot;</td>
</tr>
<tr>
<td>Track</td>
<td>5.85 &quot;</td>
</tr>
<tr>
<td>Wing area</td>
<td>100 m²</td>
</tr>
</tbody>
</table>

Engines:
Two 650 to 720 hp Lorraine Kd, or
Two 650 to 725 hp Hispano-Suiza 12 Nbr
Total weight | 6,500 kg | 14,330 lb.
Wing loading | 65 kg/m² | 13.3 lb./sq.ft.
Power loading | 5 kg/hp | 10.87 lb./hp

**PERFORMANCE**

Maximum speed at sea level | 255 km/h | 158.4 mi./hr.
Landing speed | 90 " | 55.9 "
Ceiling | 7,500 m | 24,600 ft.
Climb to 2,000 m (6,560 ft.) in 6 min.
Climb to 5,000 " (16,400 ") " 20 " 30 sec.

Translation by Dwight M. Miner,
National Advisory Committee
for Aeronautics.
N.A.C.A. Aircraft Circular No. 171

Fig. 1 General arrangement drawings of the S.P.C.A. 30 M4 airplane

Span 26.50 m (86.94 ft.)
Length 17.00 " (55.77 ")
Height 4.10 " (13.45 ")

Wing area 100 m² (1076.39 sq.ft.)
Two 650 hp engines.
S.P.C.A. 30 M4 multiplace fighter with two 650 hp Lorraine 18 Kd engines
Fig. 4 II.A.C.A. Aircraft Circular No. 171

Airplane with cabin

Airplane without cabin

Cabin removed for transportation by tractor

Fig. 4 Conversion of 30 M4 for use as an ambulance airplane
Fig. 5 Central portion of wing, seen from the front, with leading edge removed.

Fig. 6 Spar of central part of wing, seen from within.

Fig. 7 Wing and rib structure.

Fig. 8 Fuselage structure.

Fig. 9 Bearer for 650 hp Lorraine 18 Kd engine. Attached to central part of wing by four bolts.