812 FLIGHT, 26 June 1953

FRENCH

ORIGINALITY . . .

(Right) S.E. 5000-01 Baroudeur.
The aircraft is seen in its final
form, but the trolley lacks the
"follow-through" nose cradle.
(Below) the Potez 75.

munk and Beaver and the adaptor of the Vampire Trainer, the fuselage of which was transplanted to the Sea Venom. The Baroudeur is a relatively conventional swept-wing mono-plane, save that the wing is placed rather high. The cockpit, which is pressurized against a possible intercepter role, is well forward and a sloping pointed nose gives a downward view of 17 deg. There is heavy armour and an ejector seat. The wing is very thin—less than 10 per cent—so that all equipment and fuel have to be carried in the fuselage. There is provision for underwing loads of bombs, guided missiles, or drop tanks and also a scheme for forward-projecting tip-tanks. Thirty-millimetre cannon are mounted in the bottom of the fuselage.
All controls are operated through Jacotet hydraulic boosters, with two-speed electric motors for trimming. This arrangement gives an electrically-operated reserve power system if the hydraulics fail, and also a "last ditch" manual control, since the Jacotet jack locks solid as a strut if pressure fails. The tailplane is power-operated and is likely to be used as the main pitch-control, with the narrow-chord elevators for trim only.
Structural design is based on simplicity for large-scale manu-facture and the prototypes have been made on production jigs. The fuselage is broken down into small panels complete with extruded stiffeners, part frames, and plumbing. The wing and tail have the skin panels made as units with their stiffeners for assembly to the spar-rib structure. The wing is made in two parts bolted to fittings mounted on the main fuselage frames. Instead of the torsion-box structure to which one has become accustomed there is a single beam for bending loads at about 45 per cent chord, with light front and rear false spars for aileron, flap and slat loads, which also form, with the skin and ribs, the torsion-bearing structure. Instead of the multiple-bolt root joint —as on the Sabre—there are only four bolted fittings. The top main spar has a horizontal bolt, so that, by using a mild steel assembly pin, it makes a hinge for assembly in the field without special equipment while the lower boom and false-spar bolts are being fitted. This feature is typical of the thoughtfulness with which Jakimiuk has designed for simple maintenance as well as easy fabrication.
The ailerons are of the pressure-balanced type, despite hydraulic boosters, and there is a tab on the port one. Because of the thin-ness of the wing the hinge bearings and operating joints protrude through the skin, but wind-tunnel tests suggest that they will he within the boundary layer. The flaps, which extend between the ailerons and fuselage, are of the slotted extension type, ingeniously pivoted at the root to form plain split flaps. The reason for this is that the triangular trailing-edge root fairings form the air brakes. These are hinged at their middles so that they are aerodynamically balanced and, since they lie almost on the thrust line, they should cause very little change of pitching moment.

The S.N.E.C.M.A. Atar axial is very neatly installed on trun-nions in the rear part of the fuselage. The tail and rear fuselage are removed as a unit, there being a four-bolt attachment with

quick-release connections for the controls, electrics and hydraulics The wing-root intakes have notable efficiency up to high subsonic Mach numbers. The two ducts turn in ahead of the main wing-spar and join in a single trunk to the compressor eye. The boundary-layer bleed air enters the fuselage for accessory cooling and is exhausted round the jet-pipe by induction. The neat shape of the air ducts, set high in the fuselage, leaves an unusuallv "solid" volume for the fuselage fuel tanks.
The greatest interest in the Baroudeur, however, lies in its alighting gear and take-off trolley. There are two main skids (or skis) on the "corners" of the fuselage and one under the tail. They are, of course, retractable, and are magnesium-alloy casting with replaceable steel shoes heat-insulated from the magnesium by a layer of plastic. In the D.H. tradition, rubber blocks are used for shock-absorbing; one set works in torsion for springing, with compression rubbers fore and aft to replace tyre resilience. The running and shock-absorbing properties of this alighting gear have been tested on a full-scale mock-up which was dropped shot off a ramp and, finally, launched at over 100 m.p.h. from the take-off trolley. The designer is confident about its effectiveness and says that even on the rough flints of Istres shoe-life is com-parable with that of tyres, while on grass it is greater. The friction of the skids permits landings of a few hundred yards on almost any surface that is roughly level.
The take-off trolley, which looks simple enough, took a year of careful design to evolve. It has a steel-tube frame and a tricycle undercarriage with large-diameter medium-pressure (35 Ib/sq in) tyres. The twin front wheels are free to castor for ground handling, while the main wheels have differential brakes operated from the rudder pedals. Two or four rockets are used for take-off, according to load and terrain, with two always in reserve. On test the trolley has been accelerated to 140 m.p.h. and films prove that it will run true, with or without load, on surprisingly rough ground. The cumbersomeness on the ground of the Ax 234A and Me 163 were their weakest features; but the Baroudeur it is claimed, can be mounted on its trolley in little more than a minute. A keel runs along the fuselage, right up under the nose The Jeep towing the trolley uses its power take-off to winch the aircraft up on to the trolley over spiral rollers that automatically centre the keel. Side-pads steady the aircraft at the rear, and front support holds the nose, while it is locked on to the trolley by a bomb slip.
At take-off, the pilot opens the throttle and fires the rockets; when take-off speed is reached a warning lamp lights and he releases the bomb slip. He then increases incidence, the fron support following the nose as it rises, and then he flies off. The trolley brakes are automatically applied and arresting tines lowered into the ground stop the trolley in less than a hundred yards. These tines are double-ended and are mounted at thei mid point on a spring-loaded pivot so that, should one encounter a stone, it will turn over and present its other end instead of break-ing. S.N.C.A.S.E. claim that full-load take-offs can be made in less than 1,000 yards—even less at intercepter weight.
Data on the Baroudeur is, naturally, still very much restricted. The designer claims that the equipped weight is about 1,000 kg less than that of the Mystere and between 1,500 kg and 2,000 kg less than that of the Sabre. All-up weights vary widely between the intercepter role with cannon and limited fuel at about five tons, the attack version with full internal tanks and rockets, and the ferry or escort mission with under-wing and tip tanks. The span is 32ft ioin, length 44ft 3m, height 10ft (on skids) or n ft ioin (on trolley), skid track 4ft 4m, fin sweep 55 deg, and tailplane sweep 42 deg.
The resuscitated Potez company is showing the Potez 75, which is a ground-attack two-seater intended for "Home Guard" aviation. Because it is to be flown by week-end pilots it has been

(Left) S.E. 24)0; (below) S.E. 2415.