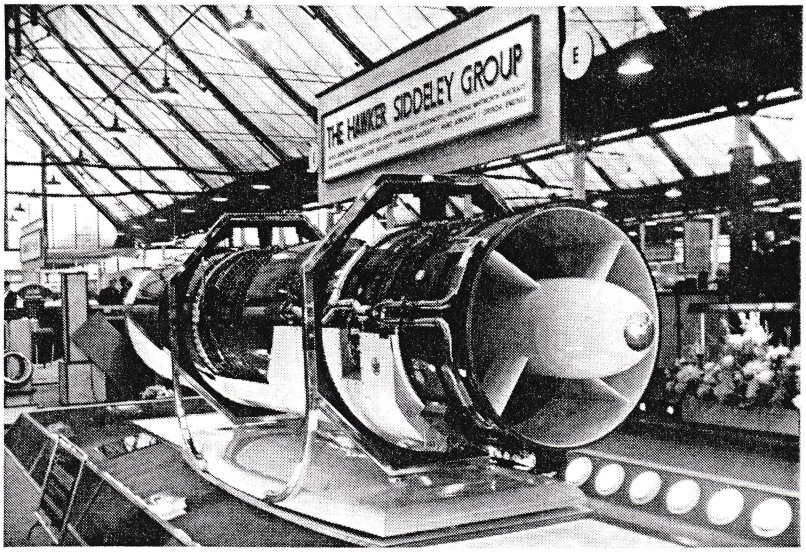
IROQUOIS AT FARNBOROUGH



Orenda Engines' mighty supersonic "steel - and - titanium" Iroquois dwarfed the ample Hawker Siddeley Group stand — alas, Security rendered it a mainly symbolic exhibit since no more than a hint of its interior was permissible.

It is a massive thing, with its integral "close-coupled" afterburner, measuring some four feet in diameter and pacing about twenty-five along its length. It thus has much the same frontal area as its rival, the DH Gyron, and is about the same length as the latter with its afterburner.

The light-coloured shield pop-riveted along the lower part of the engine is a windguard for the fuel system. It appears that in the Avro Arrow installation the usual transverse firewalls are not practicable because, in supersonic flight, the fixed air intake can swallow more air than the engine itself can ingest. This surplus air is extracted by ejector nozzles to prevent high spillage drag at the intake and the resultant internal gale would make it impossible to operate fire-extinguishers successfully — hence the shield for the accessories, inside which methyl-bromide can be effectively released.

The Iroquois has a two-spool compressor, to give flexibility of control, with an air bleed on the diffuser delivery for intake de-icing. The pressure ratio is rather higher than that of the Gyron, being about 8. The small diameter annular combustion chamber, which appears to have an internal fuel delivery gallery, is of novel high-velocity design.

The HP and LP turbines are independent, each operating its own compressor. The after-burner is fed by 32 closely-spaced fuel injectors. Various enigmatic executive efforts to indicate performance without falling foul of Security suggest a thrust of about 22,000 lb. for a weight of less than 5,000 lb. both without the afterburner — an air mass flow of 330 lb./sec. has been unofficially mentioned.—*J.H.S.*

electric starter, battery, generator and hand starter.

Made up as a rectangular tricycle cart for the Royal Navy the Palouste starter weighs 1,800 lb. and measures 119 in. long, by 49 in. wide, 37.5 in. high and for a fuel consumption of 330 lb./hr. it has a maximum air delivery of 2.71 lb./sec. at a pressure ratio of 3.88.

The slick air-transportable unit is 150 in. long, has a maximum diameter of approximately 25 in. and weighs 440 kg. The little tricycle undercarriage retracts, after removal and stowage of the main wheels, and, with all openings covered, it is lifted by standard bomb hoist gear. Access to the engine is by sliding the front part of the body forward.

Another innovation was the Artouste 510 APU, with a Palouste air-bleed compressor casing, a larger mass-flow "boiler" assembly and a shaft drive through a two-stage gearbox. Performance: zero shp *and* 2.5 lb./sec. at 3.72 pressure ratio and 315 lb./hr. fuel consumption; 190 shp *and* 1.4 lb./sec. at 4.0 pressure ratio for 340 lb./hr. As an APU for large airplanes the engine is made up in a pod, which can be either internally or externally mounted. The main shaft is coupled to an alternator, LP air is supplied from the air-bleed combustion chamber and there are accessory drives for a HP pneumatic, vacuum and hydraulic pumps. The length of the pod, which incorporates both engine induced-flow and alternator fan-cooling, is 73.5 in; diameter 24 in. and weight 400 lb.

Bristol Power: In addition to the traditional display of Bristol Aero-Engine's highly-polished and exquisitely-sectioned show engines on the stand, the company participated in the Flying Display in a forward-looking manner. The first prototype Britannia, G-ALBO, offered samples of both the long-range 300 series, with the Proteus 755 and the 1960 high-speed 430 with the Orion; while the company's Canberra simulated that civil enigma, the Curtiss-Wright/Bristol Zephyr.

The engines were, in fact, 13,000 lb. s.t. Olympus 104's derated to 10,000 lb. and fitted with noise-reducing nozzles. The Bristol "silencer" has eight internal triangular projections which convert the propulsive nozzle into deep corrugations and give the jetpipe an octagonal form of increased diameter. The triangular projections are of nickel alloy sheet stiffened by welded tubes. The jetpipe skin is cut away at the base of each triangle to admit cooling air from within the shroud, which is extended aft of the nozzle. The device would appear to be still in the "cut-and-try" stage.

Silently displayed, because of Security, was the Bristol BRJ-801 18 in. diameter ramjet alongside the 15.75 in. diameter Thor. It is obviously a more advanced as well as more powerful, engine and is slightly less simple than its predecessor. It could be intended for use in a dual-power airplane or in a large long-range missile — M3 *plus* in either case one would say.

de Havilland's Rocket: The Spectre throttleable airplane rocket, which runs on kerosene and HTP, was shown by The de Havilland Engine Company.

The rocket displayed was actually a mock-up of an early version; there are now five announced — the variable-thrust D.Sp.1, 3 and 5 and the D.Sp.2 and 4 constant-power models suitable for ATO or missiles. For a maximum thrust that is certainly over 8,000 lb., the Spectre, which is completely self-contained, has a diameter of 26.5 in. and length of 56.5 in. Its unfamiliar form is composed of a cylindrical central casing for reaction chamber and nozzle, to the front of which a gearbox is bolted. Annular ribs at the forward end of the casing show where the