

with eight RB.162s—is due to fly later this year. The great increase in power afforded by the TF-106 propulsion engine may be put to good use for non-VTOL Mirages, possibly as an alternative to the IIIV. It is an open secret that the Mirage IIIT<sub>2</sub> is a projected STOL two-seater, heavier and having a higher performance than any Atar-powered III.

The 50 **Mirage IVA** twin-engined bombers are coming through the works, fuselages being on the line at Argenteuil and wings being by Sud-Aviation at St Nazaire. Aircraft 03 spent a day at Le Bourget last week, complete with bomb.

For years **Saab** have had the happy knack of producing the right aircraft at the right time; but they freely admit that they have learned by a number of mistakes and that they have gained a great deal from friendly and constructive relations with companies in Britain and the USA (the G.Q. ejection-seat parachute system has just been adopted for the Draken). Saab's planning has always been facilitated by the company having a single aircraft customer, the Royal Swedish Air Force, with a relatively restricted field of operations. Now the development emphasis is firmly centred on the "System 37" and the **J37 Viggen** aircraft (*Flight International*, December 27, 1962).

The J37 involves an even greater degree of co-operation between customer and suppliers than before. The whole weapon system is being planned as an integral project, complete with ground-support and check-out equipment, training devices, including simulators, operational features and airframe. The Swedish Air Board has formed System Group 37 and the suppliers have formed the Central Preparation Group, System 37, the latter with several permanent members and access to industrial computers. The American PERT management system has been applied to co-ordinate development. While the Robot 304 missile is planned for naval attack, an entirely new air-to-ground weapon is being developed for System 37, as well as guns, bombs and rockets.

Companies involved include AGA (aircraft attitude instruments and radio), Arenco (air data computer and instruments), L. M.

Ericsson (radar), Philips (navigation equipment), Saab (airframe, digital compute and missile), Svenska Flygmotor (engine, pictured on p. 913), Svenska Radio Aktiebolaget (electronics) and Standard Radio Telefonie (operations control system). Saab is prime contractor and is also developing the digital computer—using numerous Fairchild microcircuits—which will deal in the air with automatic navigation, fire control and weapon calculations, including radar sighting, autopilot, fuel monitoring and integration with the STRIL 60 ground environment control. To cope with this task the computer has an 8,000-word, rapid-access memory and a speed of about 100,000 additions per second. Input-output adapters include digital/analogue converters and there is spare capacity for any subsequent elaborations.

While System 37 gets under way, the J35 Draken and the new **Saab 105** are also being actively developed. The 105 prototype, already publicised extensively, is due to make its first flight next month. It has been a private venture so far, but Saab are confident that, if performance is satisfactory, the RSAF will place an order for 100 to 130 aircraft to replace Vampire Trainers, and, in part, Safirs, as pilot-training aircraft. The present training syllabus is 80hr on Safirs, then 150-180hr on Vampires and thence to a Draken OCU, with a good deal of time on the Curtiss-Wright simulators. In future it could be 20hr on Safir, a second stage on the 105 and thence direct to the Draken.

The variants of the **Draken** are themselves noteworthy, because the type is rarely seen outside Sweden. There are two basic airframes, the J35A and D. The J35A has the SFA RM6B 200-series Avon with SFA 65/66 afterburner and short tailcone. The J35B has a long tailcone and 66 afterburner. The J35C is a two-seater pilot trainer with A engine and limited electronics. The A and B have Lear autopilot and bomb, rocket, gun and Rb324 Sidewinder armament. At first L. M. Ericsson made a plain interception radar under C.S.F. licence for the few A models, most of which are now used as operational trainers (it has search, lock-on, ranging and break-away modes, without mapping), and the S6 fire control for radar and infra-red use is fitted. Then Ericsson made their own, more advanced, radar for the J35B and a better fire-control was fitted. Production of J35A, B and C has now ended.

The J35D has the RM6C 300-series Avon, giving 25 per cent more thrust than the 200-series RM6B and having the Flygmotor type 67 afterburner and long tailcone. There is increased internal tankage and provision for two underwing or two centreline external tanks, as well as the usual range of weapons. Ericsson provide the PS-03 radar to go with an S7 fire control and Saab FH5 autopilot. The J35E has a camera nose, limited 35D electronics, but the same equipment. Both are in production and in service.

Saab regard the latest version, the J35F, now being tested and due in service two or three years hence, as their first real effort in systems engineering—and a highly successful one at that. It will have the Ericsson PS-01 radar, S7B fire control and FH5 autopilot, and it will be the first to carry the Rb327 (radar "de luxe") and Rb328 (infra-red "regular") Hughes Falcon missiles.

Ericsson state that the 35A electronics system is equivalent to that of the Russian Mig-21, but they cannot reveal any operational features of their later radars. The model displayed on their stand is made up from production-line items of the PS-03 with a mock-up aerial, a feature being three-axis aerial orientation, under control of the master reference gyro, in contrast with the usual two-axis freedom. The nose-mounted electronics package, from which the "hard-mounted" aerial can be swung away—and flexible waveguide disconnected—consists of canned modules which can be extracted with a simple key after detachment of spring-loaded retaining bars.



GAM Dassault have co-operated closely with Rolls-Royce in developing the Mirage IIIV, and in the picture above a lift-intake model of the big Mach 2 VISTOL strike fighter is seen in the 7ft by 5ft transonic tunnel at Hucknall. With it are M Fromantel (left), GAMD chief aerodynamicist, and Mr Conrad Bee of Hucknall's aerodynamics department. Both Dassault and Sud-Aviation have IIIV models on view (right)

