Gripens, to reduce development time and programme costs. British Aerospace, for instance, manufactured the initial sets of composite wings for the prototypes. Saab later assumed responsibility for producing the wings, fin, foreplanes and items such as landing gear doors.
Sweden also took the decision to import ejection seats for the Gripen. In the past Saab had manufactured and installed its own ejection seats. It was decided that collaboration with Martin-Baker to produce a lightweight version of the company's MklO seat, the S10LS, would save money and valuable development resources.
The same programme rationalisation has been applied to the supply of nose and main landing-gear assemblies. AP Precision Hy-draulics was selected to manufacture these components, including the drag stays, door and retract actuators, up locks, door locks and landing-gear system components.

SMOOTH PROGRESS

Development of the Gripen's Ericsson PS-05/A multimode pulse-Doppler radar has been progressing smoothly, with the air-to-surface role already proved. Work for most of this year has centred on proving the interception mode. Flight testing of the PS-05 started in 1987 in a Viggen, although the radar has been under development in association with Ferranti since the early 1980s. The radar test programme is ex-pected to run for a further two years.
The Gripen radar has a lkW output, twice that of the JA37 Viggen's PS-46/A. The PS-05 is only half the weight and takes up 60% of the space needed by the earlier PS-46/A, however.
The X-band PS-05 is capable of operating in high-, low- and medium-pulse repetition frequencies (PRFs), enabling the Gripen to fulfil its three missions. In the air-to-surface mode, low PRF is selected, allowing track-while-scan and high-resolution ground mapping. Navigation and terrain avoidance are also available for this role.
For medium and high PRFs, the radar is optimised for the Gripen's pre-eminent air-to-air role. For this, the PS-05 offers target acquisition at long range, search and multi-target track-while-scan capability.

upper sides oi the,engine air intakes. The aircraft will be capable of 9g manoeuvres. The Gripen's GEC Lear Astronics triple-redundant digital fly-by-wire flight control system uses a Saab Combitech aircraft motion sensor and throttle actuator subsys-tem. The main flight control surfaces use Moog hydraulic servo actuators. Should the fly-by-wire system fail completely there is a single-channel analog backup system.

MATCHING VIGGEN

Composites, component miniaturisation and engine technology have enabled Saab to keep the Gripen's weight down to half that of the Viggen and yet still carry the same payload. In the past 15 years, engine im-provements have resulted in 30% fewer components and substantially reduced fuel consumption. About 30% of the Gripen's structure is composite, yielding an overall weight saving of some 25%. The Swedes have also saved weight by using a higher hydraulic pressure requiring a, smaller fluid volume and reduced pipe dimensions. Likely battle scenarios dictated that the Gripen would have to operate from dis-

persed sites as part ot Sweden's Bas (Base) 90 concept which uses 800m-long by 17m-wide sections of motorway. The Swedish philosophy is to minimise the effect of an enemy attack on aircraft necessarily located near the front line by dispersing them on stretches of road in time ofwar.
To operate from such short stretches of road the Gripen has been designed to fly carrier-type landings and has a low landing speed. The Gripen has no thrust reverser . and has to rely to a large extent on its airbrakes. The high-sink-rate undercarriage and nosewheel braking help reduce the landing run.
Within the Bas system, aircraft would need to be turned around within lOmin by a team of five Air Force conscripts with the minimum of equipment. To help achieve this objective the Gripen has its own auxiliary power unit and automatic test equipment. The latter has been developed by FFV Aerotech, one of the four members of the JAS consortium.
JAS Industry Group has taken a prag-matic approach to the supply of compo-nents for prototype and production

Tests revealed a compressor resonance problem in the RMJ2 engine earlier this year

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