

AT Farnborough this year, the Royal Swedish Air Force paid tribute to Marconi Radar, to whom it presented a plaque commemorating a remarkable achievement — the continuous operation of the digital data handling system installed by Marconi in 1963, with no store failure in all those years!

In the early 60s, it was obvious that the time available from the initial detection of a possible air threat to the deployment of appropriate counter-measures was desperately limited. The problem for Sweden was particularly acute owing to its geographical position.

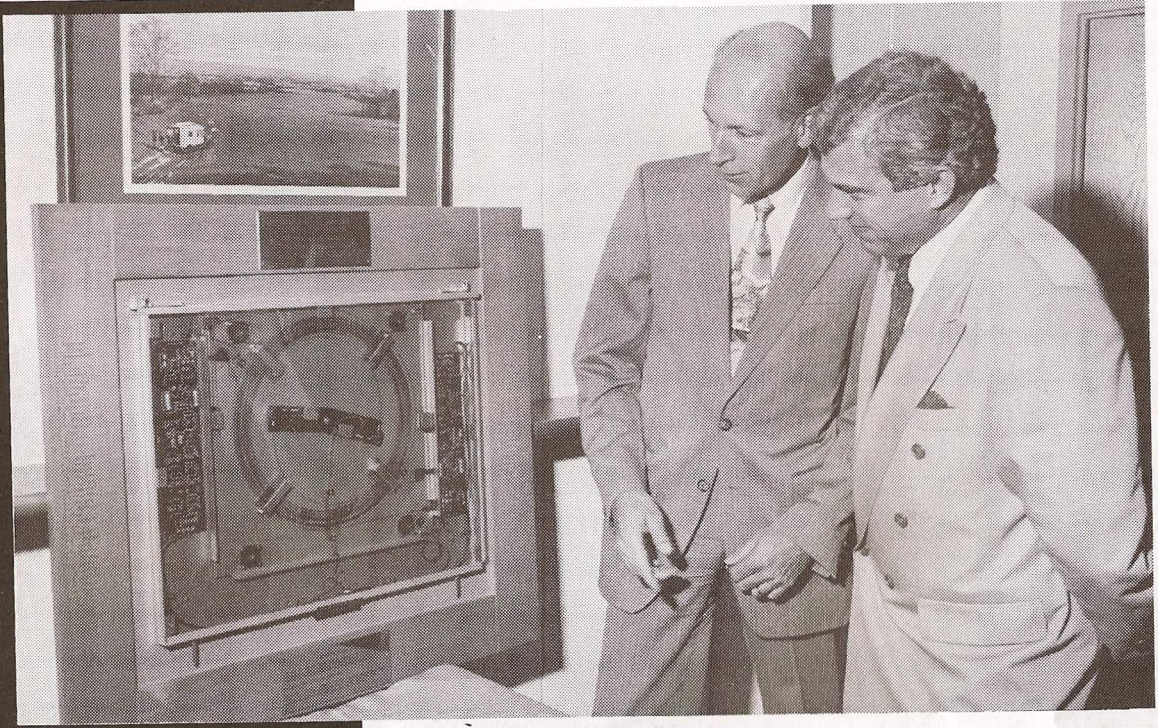
The Royal Swedish Air Force Board, recognising that the answer was the full or partial automation of tasks that were then carried out manually, turned to Marconi, who, in a project known as FUR HAT, set about applying high-speed data processing techniques to the new generation of control centres.

The resulting system, which was the most advanced of its kind in the world, is still operational. It acquires information on all aircraft from a number of long-range surveillance radars, other centres and reporting posts. It is also continuously updated with meteorological information and data regarding the status of all defence resources.

Operators responsible for the different defence functions are automatically presented with up-to-date data relevant to their particular tasks, thus speeding the deployment of defence measures, whether they be the scrambling and guidance of interceptor aircraft, the selecting and passing of acquisition data to ground-to-air missile and gunnery sites or liaison with the Civil Defence forces.

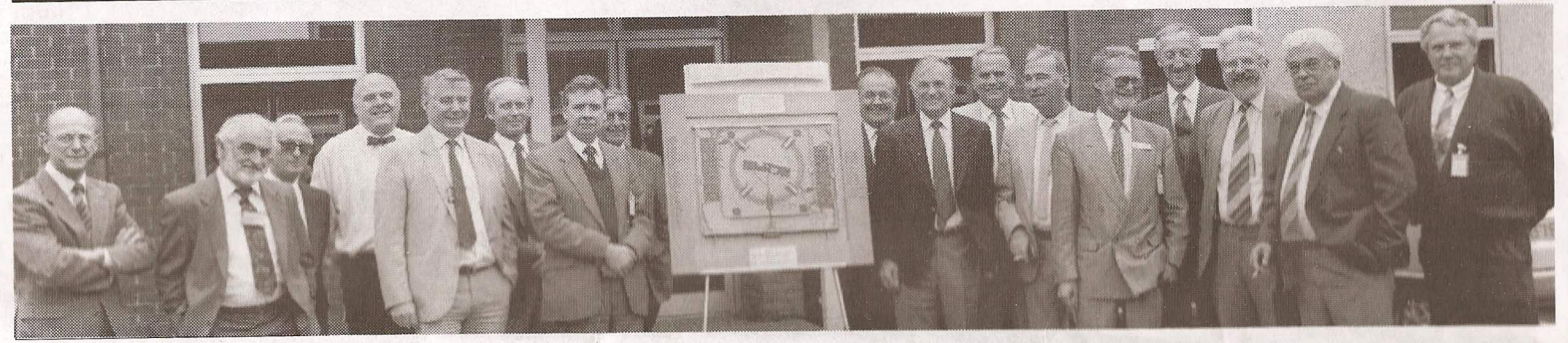
The guidance of the interceptor aircraft to its target is assisted by the use of Marconi-designed computers, which continually recalculate the appropriate intercept path and route out instructions to the aircraft via a ground-to-air data link. Similarly, instructions to bring the surface-to-air missile tracking radar on to the correct bearing and elevation are

FUR HAT IS A BIG TOPPER



ABOVE: Lennart Kallqvist, technical director and head of FMV F Systems Department, with the plaque that he presented to David Overton, right. Also shown is a print of the painting depicting the 1935 radar experiment at Weedon, which Marconi Radar presented to the Swedes.

BELOW: Many of the engineers who were involved in the FUR HAT project are still very much at work in Marconi Radar. The picture shows some, but not all of them, together with visitors from Sweden, gathered round the presentation plaque.



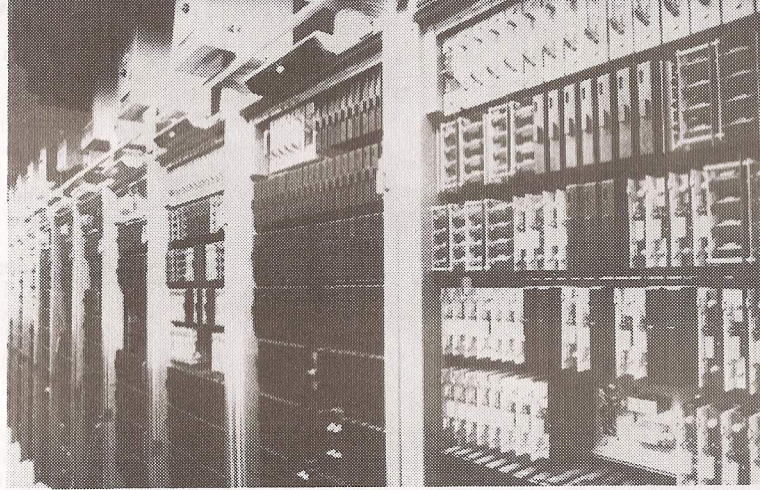
to-air data link. Similarly, instructions to bring the surface-to-air missile tracking radar on to the correct bearing and elevation are passed automatically to the missile site.

Instantaneous

By means of this instantaneous correlation, presentation and transfer of information, not only are the air defence controllers relieved of all routine tasks and left free to make decisions on which the defence of the country depends but also every vital second is saved, thus enabling the defence armament to be used with maximum efficiency.

The main aircraft track data store, whose 29-year non-stop performance is commemorated in the presentation plaque, consists of 72 synchronised delay lines, each made from a 30 ft coil of wire. Each line stores 1,500 bits of data for 3ms, and this is recirculated. Hence the store is 72 x 1,500 bits and occupies 12 cabinets of equipment. Even though one small chip could now easily replace this capacity, the facilities were so far in advance of their time in the 60s that they are, even now, comparable with present-day systems.

The system was designed with a considerable redundancy and is able to continue in operational service under a variety of fault conditions — faults can be located,



One of the rows of racks in the radar office containing the data handling and computer equipment.

repaired and equipment brought back on-line without the system's having to close down.

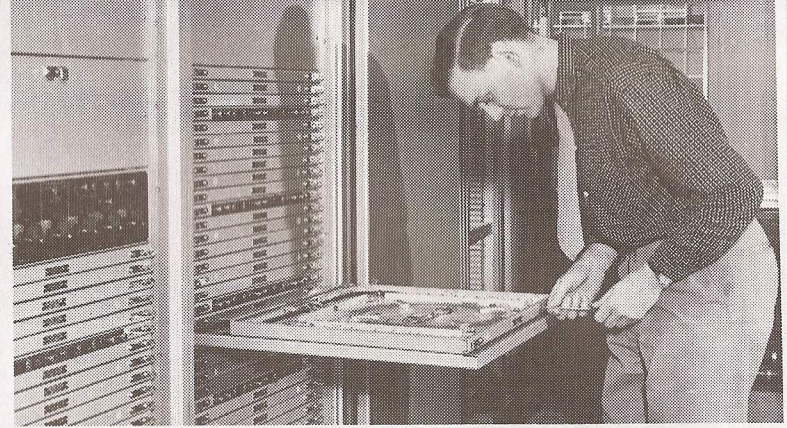
FUR HAT was acknowledged to be a major project even in the days when massive projects abounded.

For more than two years, about 60 Marconi engineers were employed in Sweden on the installation and commissioning of the display and associated systems, which were housed in a four-storey building *inside* a mountain.

It was recalled recently that the entrances to the tunnels leading into the mountain were camouflaged

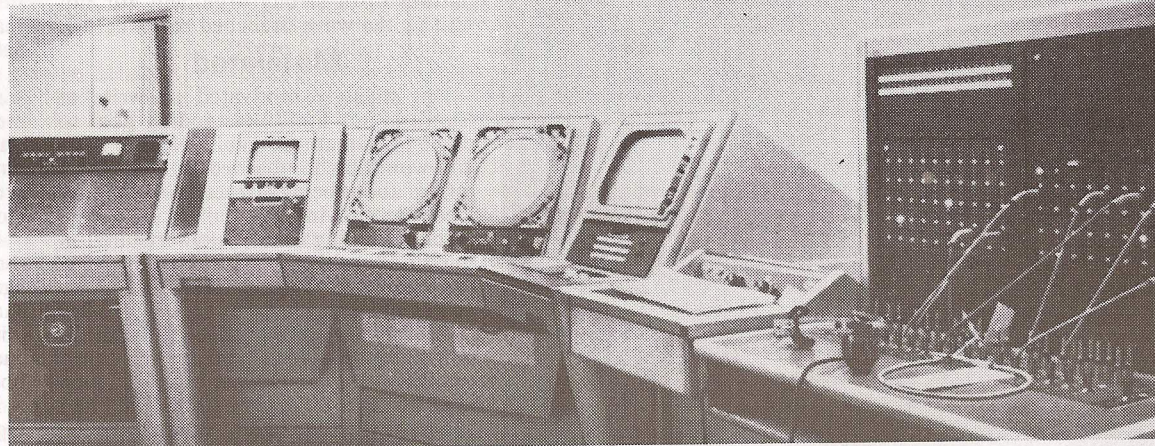
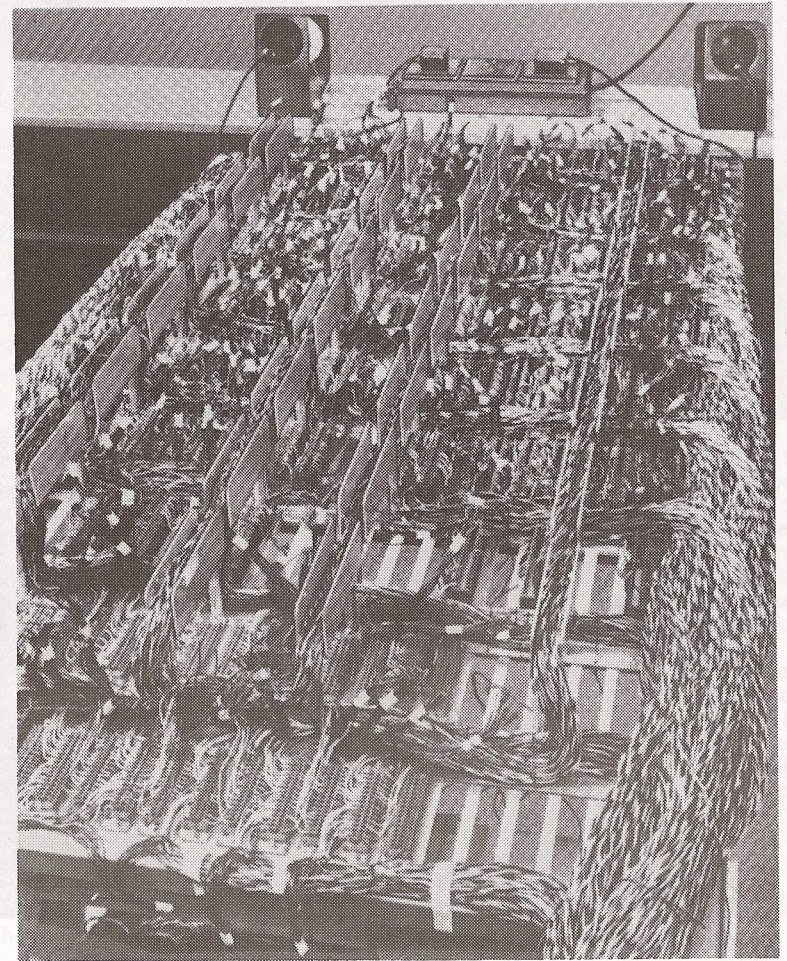
by 'trees' somewhat ingeniously made from wooden poles and netting. One day, one of the engineers tied a big red apple onto one of them. The Swedes were not amused and asked that it be removed. The next day, the core hung there forlornly.

The plaque, which marks the Swedes' appreciation of the system that is serving them so well, has been made from a spare store unit and was flown in the new Swedish Gripen fighter aircraft to Farnborough for the presentation ceremony.



ABOVE: An archive picture showing a store acoustic line being tested at Baddow.

BELOW: Part of the complex wiring seen during the assembly of the racks of the high-speed data processing equipment.



On the left is Marconi's fault detection and indication equipment, used for monitoring the correct operation of the computer complex. Any of the data displays can be switched in to the standard displays in the monitoring room. Each console throughout the system was designed for the particular requirement of the operator.