

of the chief items is a new attack on the Flight Log aimed at still further reducing the need for pilot manipulation. The computer for this new display produces rectangular co-ordinate information from the Decca signals in binary digit form. The chart itself carries binary code markings which are searched by an optical system, the output of which is continuously compared with that from the computer and error signals are derived to drive the chart and pen to the correct positions. The display is thus a self-setting one. Other developments include transistorization and miniaturization of the airline Mk 10 set, automatic monitoring of the autopilot using Decca derived information on a selected track, a position transfer system to give automatic position reporting over a digital-coded data link and, of course, further expansion and refinement of the Decca system.

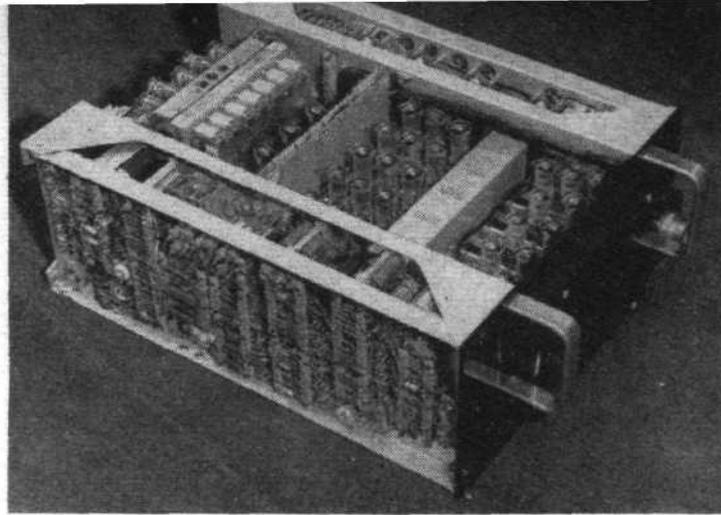
In addition to the B.E.A. Viscounts, operational flight work with the systems now includes a number of B.O.A.C. Comet 4s carrying on the work started in their DC-7C aircraft and it is understood that PanAm will be fitting a Boeing 707 later this year and that K.L.M. will be continuing their assessment, too. There can be no doubt about the vigours of these activities.

Marconi's Wireless Telegraph Company, associated as in past Shows with their Australian and Canadian associates, **Amalgamated Wireless (Australasia)** and **Canadian Marconi Company**, had a representative selection of the equipment they produce in a very broad coverage of the air radio field. Their exhibits ranged from the high-powered, combined S- and L-band radar S.247, the nodding height-finder S.244 and the 50 cm S.264 types which were demonstrated last year in an operations room simulation and this year in scale model form, to the tiny and widely acclaimed AD.712 A.D.F. The S.264 radar has evolved from the 50 cm radar which has been at work at London Airport for some years now and the first S.264 is now in service at Jersey Airport. These equipments will be remembered for their highly stable displays, effective M.T.I. and ability to see through rain.

Pilots have welcomed the AD.712 in the warmest terms and it is now virtually established as standard equipment in all British transport aeroplanes of recent introduction and will be on B.O.A.C.'s Boeing 707s.

Chief interest in the Marconi display must, however, go to the civil transport Doppler navigators which they were showing. There were two, the AD.2300 developed in the U.K., and the CMA-621 developed by the Canadian firm. Both are continuous-wave frequency modulated radars and both were shown with associated computer devices to process the basic Doppler groundspeed and drift information into more readily assimilable navigation form for the flight-deck. The Doppler navigation art being a young one in the civil airline business, there is no settled agreement yet on what a computer may do. A number of the bigger carriers have been carrying out equipment and system trials in the last year or more to establish their real needs and those of the A.T.C. environment in which they fly. Marconi are therefore offering two main types of computer each in its way complete, but each based on slightly different operational philosophies. Both computers provide for feed-out to the flight indicator system or autopilot, and it was an interesting development in itself and a sidelight on present day tendencies that an optional pictorial (chart type) display is offered. The one shown was built by **Kelvin Hughes**. The AD.2300 has already done hundreds of hours flight assessment in one of B.O.A.C.'s Britannia 102s ranging over the whole of their Far Eastern and African route system with very fine results and it is understood that it will now go into some of their Comet 4 aircraft for the final stage of evaluation.

The Canadian set has an interesting feature which is believed to have been shown to be a desirable and useful refinement following the T.C.A. and PanAm flight trials with it. Basic to the design of the CMA-621 there is a land/sea switch to deal with the



Decca Navigator Mk 10 receiver engineered to Arinc form factors. The two side chassis hinge outwards for servicing

reduction in accuracy which can take place over certain sea states. A third setting has now been incorporated so that over smooth water the radar is converted from the conventional Janus four-beam system to a two-beam radiation, port and starboard of track, the aerial at the same time being given a fixed forward pitch to increase the energy in the radar loop. The C.M.C. Doppler is exhibited in association with their comprehensive computer type CMA-601. This is a transistorized unit and uses digital displays.

As their contribution to Autoland, **Murphy Radio** had on show the leader cable element of the B.L.E.U. automatic landing system. The purpose of the Murphy development is to provide the magnetic signals for the guidance and control of the final stage of the approach and landing rôle. It consisted of the ground generation and monitoring equipment and the airborne aerial and receiver units and control box.

A wide range of air surveillance and special purpose ground radars were brought to the exhibition by **Decca Radar**. The company's work on anti-precipitation techniques on their 10 cm scanning radars, which has been a feature of their earlier Shows, has undergone still further refinement and was demonstrated this year in their DASR.1 surveillance radar. This radar has undergone extensive operational proving at an airfield in this country and it is understood that the new and more precise circular polarization techniques which it embodies have reduced rain clutter to negligible levels. Perhaps the most impressive of this battery of radars was a 10 cm height-finding radar, the Decca HF.200, which also employs the company's circular polarization system to combat rain returns. The very large aerial structure was demonstrated performing to complex height-finding motion under the control of a simulator. In operational use, the HF.200 would move in response to controls from a plan radar azication display in order to give heights of selected targets. Decca claims high accuracy of measurement for this radar and it has several interesting operational features. Both slewing and nodding motions are governed by a hydraulic system giving linear vertical sweep, an ability to nod whilst slewing and a high information rate with smooth positive control. A means is provided for automatically limiting the excursion of the nod when the target is at long-range. This is done to avoid useless scanning in the higher elevation angles.

Another of the Decca radars which has seen substantial development since it was introduced three years ago is the 3 cm wind-finding radar, which was shown this year in its Mk 2 form. Increased performance has put up the slant range capability of the radar and the antenna can now be switched to broad-beam radiation in addition to the precise narrow-beam normal condition, to simplify the tracking of a target at the start of an ascent in high wind conditions. Another important addition is the facility to stop all the dials at the moment at which readings are required so that these can be read at leisure, and then automatically restored to the new position of the aerial. This radar and its Mk 1 predecessor has been adopted by twenty meteorological authorities throughout the world.

Although civil aircraft communications are not yet in the U.H.F. aeronautical band, another fine example of contemporary engineering was shown amongst the exhibits of the Plessey Company in the ARC-52 U.H.F. airborne transmitter/receiver equipment. This is a radiophone set having 1,750 channels and is in use by the R.A.F. and the Navy and by NATO air units. This was shown with its special test set which is so designed as to permit a fault-finding routine of the "tiered" kind.

The Comet 4 passenger cabin address was shown by **Trix Electrical**. This is a completely transistorized equipment and in the modern trend displaces the large central amplifier in favour of local amplifier units at the speakers. The speakers are of the column type and a music input is provided. The installation in

The Decca Navigator Flight Log computer, Type 930, engineered for enclosure in a half ATR case

