

ROUND THE STANDS . . .

it is now possible to extend this facility to the weather radar by using twin standard E.190 indicator and transmitter/receivers and scanner M.2269. This is a modified version of the M.2210 scanner in which the electronic components of the stabilization servo-amplifier are duplicated and mounted in a separate junction box M.2233. Duplicate synchros are fitted to operate the twin indicators.

Further emphasis on reliability is given by **Decca Radar** who claim a system availability of over 99.8 per cent with the prototype of a new and complex radar display system, a performance which has been sustained over the whole period of the prototype trials, which already exceeds 10,000hr. This advance in reliability for such systems has been made possible by a breakthrough in the engineering of transistor circuits. Decca engineers have developed a new technique based on environment stabilization whereby all circuits and transistors are maintained at a constant internal temperature to within $\frac{1}{4}^{\circ}\text{C}$ and at controlled humidity. Liquid cooling provided by an integral refrigeration unit and heat exchanger is combined with a mechanical design in which excellent thermal insulation is achieved. Ambient temperature variations between 0°C and 45°C , with relative humidity ranging from 10 per cent to 90 per cent have been successfully handled. During the 10,000hr trials mains voltage varied by ± 15 per cent, but stability was such that display error was consistently less than 0.2 per cent overall and less than 0.08 per cent for short-term measurements.

This new engineering concept makes possible the reliable employment of transistors in electronic equipment where very high standards of performance and circuit stability are required. In the engineering of typical data handling and display systems for civil and military operations rooms, and in naval vessels, it provides a reduction in power consumption by a factor of approximately eight. Of even greater importance is the very high reliability with minimum servicing attention which can now be achieved, even where great complexity and elaboration must be introduced to meet exacting operational requirements.

Following successful operation of their prototype equipment, Decca have developed production equipment and are now completing units for early delivery in a military project.

Two new Decca meteorological radars are also on show. The Type 43 is a sophisticated 3cm radar with a narrow vertical beam-width designed to display vertical structure as well as giving a PPI presentation of precipitation echoes. The Type 44 is a 750kW, 10cm weather radar specially designed for the detection of precipitation at long ranges under all conditions, and particularly for the penetration of cyclones and heavy rain areas.

A recent development by the **General Electric Co** is a digital data transmission system for air traffic control applications, consisting of a ground-to-ground digital data link and an airborne digital-to-analogue converter unit.

Of particular interest in the ground link is the use of three standard land lines to achieve high information rates of up to 3,600 bauds.

The equipment as designed and built uses three such telephone circuits in parallel, each being fed by 18 message channels (50 baud) of standard G.E.C. Telephone Works VFT equipment. For each circuit the VFT equipment comprises a 20 channel assembly on a standard 7ft 6in rack, one channel being used for a start signal and one as a standby spare, in addition to the 18 information channels. Thus the message rate for the three circuit system as built is 2,850 bauds, but various modifications can readily be incorporated to meet other message rates. For example, a single VFT circuit can be used where a signal frequency of 900 to 1,000 bauds suffices. Alternatively simple extensions of the design would permit the use of 24 channel VFT equipments on a 9ft rack with a correspondingly higher rate of 3,600 bauds. Even higher transmission rates are possible by increasing the bit rate in the individual channels.

After conversion in the airborne data link unit from digital to analogue form the instructions to the aircraft can either be displayed on suitable instruments or coupled into the autopilot. Both

ground and airborne units are fully transistorized and are designed for high reliability.

Redifon are showing their aircraft accident data recorder which records on magnetic tape, and via transducers, important information for post-flight analysis. Two versions are available. One provides a long duration record and the other, using a continuous loop, provides a progressive 15min record. The latter version is housed in an ejectable container which incorporates the necessary radio aids to recovery on land or sea. Also shown is the Redifax, a facsimile equipment suitable for weather map transmission and reception. Other items shown include a VHF 1kW ground transmitter for ground/air long-range VHF communication and the latest RADIC analogue digital computer which is intended for educational research applications and provides visual demonstrations of solutions both on a c.r.t. and on a co-ordinate plotter.

The new PA.230 1kW HF linear transmitting amplifier designed for aeronautical, marine and civil administration services is the most recent addition to the **Plessey** range of telecommunications equipment. The most advanced electronic techniques have been employed in its design and in general it meets the requirements of D.E.F. 5,000 and I.S.C.T.C. specifications. A special feature is the use of silicon rectifiers in all units.

The amplifier comprises an RF unit, power unit and control unit. Provision is made for incorporating a drive or converter unit. The amplifier is continuously tunable over the frequency range 1.6Mc/s-27Mc/s and is capable of delivering a power output of 1kW (p.e.p.) into a 50 Ohm unbalanced line. Under continuous single-tone operation 1kW mean power is available.

The bandwidth of 12kc/s permits the operation of ON/OFF keying (A1) double side-band full carrier (A3), single side-band (A3A), independent side-band (A3B), frequency shift keying (F1) and four frequency duplex telegraphy (F6).

Comprehensive monitoring facilities are provided, including forward and reverse power monitors, which indicate the amplifier output power and allow the standing wave ratio on the output feeder to be determined. At present the equipment can be remotely controlled over land-lines on six preset frequencies. A multi-tone RC unit will shortly be available.

A new equipment, on display for the first time, is the **British Communications Corporation** VHF packset Type 40, which is stated to be the smallest and lightest of its class in the world. It is a fully transistorized set for single- or double-frequency simplex operation in the VHF bands. It contains a transmitter, high-grade single superhet receiver with crystal filter, re-chargeable battery and loudspeaker. Either a hand telephone or fist microphone may be used with press-to-talk facility. The frequency range of 30-174Mc/s is covered in four bands, a different version of the set being required for each band. Four preset channels are available and can be used for single or double frequency simplex operation. The transmitter has an output of 150mW. Power is obtained from a rechargeable DEAC 13V battery with a capacity of 450mW. A telescopic aerial forms an integral part of the equipment. This little man-pack measures 5in \times 2 $\frac{1}{2}$ in \times 7 $\frac{1}{2}$ in and weighs 2 $\frac{1}{2}$ lb with its battery.

As an advance on the present method of drawing the pilot's attention to system faults by flashing lights or illuminated labels, **Ferranti** has introduced a transistorized audio warning device which can provide immediate speech warning in the pilot's headset of faults monitored by the central warning system in the aircraft. This effectively reduces the pilot's visual work load.

The transistorized audio warning unit comprises a tape transport mechanism and selector switch driven by a governed d.c. motor with gear head. The selector switch continuously samples the input signalling wires so as to automatically connect the appropriate track to a playback amplifier. The bandwidth of each audio channel is 300c/s to 2.5kc/s.

Warning messages are recorded on a closed loop of magnetic tape 9in long and 1in wide and having 16 tracks, one for controlling the indexing of the tape and the remainder for messages. The message length can be of up to 3sec duration, although this can be extended if necessary. Priority messages can be given precedence and are repeated continuously until manually cancelled by the pilot.

The prototype audio warning unit is housed in a hermetically sealed cylindrical container 10in long and of 4 $\frac{1}{2}$ in diameter filled with inert gas as a protection against severe environmental conditions. Weight of the unit shown is 6lb, but length and weight of the production version will be halved.

General Precision Systems announce that a substantial contract has been placed by the Ministry of Aviation for their visual flight simulator attachment for addition to all types of flight simulators in service with the RAF. Known as Terravision, the attachment may be added to all makes and types of existing or planned flight simulators and presents a dynamic picture of an airfield during take-off and landing. It provides the pilot, whether he be of a high order of proficiency or a student, with all the visual cues which hitherto have not been available to him.

The Ministry of Aviation carried out an extensive evaluation before agreeing the technicalities of the specification for this contract, which is the first of its kind to be placed in Europe.

Below left, the airborne unit for the G.E.C. data link and, right, the Ferranti audio warning system with tape unit at the top

