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Left, Sperry attitude director, with roller-blind attitude display and crossed-wire director. Prominent warning flags are incorporated. Centre, Sperry vertical reference unit with the VGL2 gyro package. Right, Standard Telephones and Cables STR-40 radio altimeter being tested in a clean-assembly area

type of work. All units meet British and American CARs, and are
designed to be easily interchanged without recalibration; they
can be mounted "solid." Sperry provide at least three-quarters of the basic instrument displays and their sensing gyros.
The attitude system includes three vertical reference units, two attitude directors and their display amplifiers, two rate-gyros and one yaw rate-gyro, all with their associated mounting trays. Captain, first officer and the flight director system have separate attitude information sources; and a discriminator detects when the attitude directors or vertical reference units are giving conflicting signals.
Each v.r.u. provides pitch and roll signals for an autopilot, flight director, basic attitude displays and weather radar. VGL.2 vertical gyros drive repeaters through synchros and an amplifier: pitch-bank erection minimizes turn errors. Comparator modules are included in the v.r.u., with pick-offs in the two attitude directors and the third v.r.u., which feeds the flight director.
The attitude director replaces the artificial horizon and provides command signals through crossed wires in front of the roller blind attitude display. Each unit receives separate attitude signals, but director information comes from a common computer. Warning flags for attitude and for localizer and glide-path signal strength are incorporated. Associated display amplifiers, housed in ATR cases, contain transistorized amplifiers and mixing networks and the flag-operating circuits. A plug-in module allows the display to be matched to different types of aircraft.
Each rate-gyro unit, which is a main signal source for one of the autopilots, contains three rate-gyros mounted on a tilting frame. In normal use the frame is locked by solenoid, but the rocking freedom is used for testing the autopilot during maintenance. The solenoid is switched off and the frame rotated by motor to produce a series of roll, pitch and yaw signals. Transistorized buffer amplifiers and side-slip pendula are incorporated. The yaw rate-gyro serves the yaw damper and governs pitch-bank erection in the third vertical gyro, the other two being served by the two rate-gyro units. Mounting trays for the rate and vertical gyros have been so designed that, once the trays have been aligned with each other and with the aircraft datum, individual units can be accurately replaced without requiring fresh alignment.
Sperry also provide the remotely operated airspeed indicators, VSIs and Machmeters. The ASI is of the helical scale type and each instrument is operated from both air-data computers. There are warning flags for signal conflict and power failure. Finally. Sperry contribute the twin CL.ll Rotorace gyro-magnetic com-passes and their mounting trays.

Standard Telephones and Cables Design, manufacture and siting of most of the aerials on the Trident, provision of HF communi-cations radio, intercom distribution and amplifier and the three radio altimeters has been an STC responsibility.
Three STR-40 frequency-modulated radio altimeters, transis-torized except for the transmitter output valve, are fitted from the outset in the Trident, but in the early duplex autoflare system one will work with each of the two autopilots and the third will serve

the flight director and PVD system. The STR-40 has a single indi-cating range, from 0 to 500ft. and a height accuracy of ±3ft or ± 3 per cent, whichever is the greater. Datum height setting will have an accuracy of ±lft. Operating frequency is 4,200-4,400 Mc/s with swept band of lOOMc/s and a modulation frequency of 300c/s. Each altimeter has two horn aerials with an in-flight test circuit by which a preset height response can be fed into the system. The main unit is sealed and filled with inert gas at 6-71b/sq in. The altimeter is assembled in clinically clean, dust-free conditions and is rigorously tested before sealing.
SA10 transistorized audio distribution equipment and SA11 loudspeaker amplifier provide intercommunication between crew, cabin staff and groundcrews. The HF radio is the 100-channel. 100W STR-18-C/1 with a fully suppressed HF notch aerial in the dorsal fairing. STC also provided four VHF communications aerials, three localizer, two glide-path and two marker-beacon aerials. There are also three L-band elements for DMET and ATC systems.

Triplex Safety Glass This company's factory at King's Norton, Birmingham, makes the electrically anti-iced windows for the flight deck. The centre window (rectangular), main ahead panes (parallelogram) and direct-vision panels (roughly triangular) are all built up from an outer layer of gold-film glass, a thick layer of vinyl, a thick slab of heat-treated glass bearing pressurization loads, and an inner membrane of vinyl covered by a splinter-protection sheet of glass. The outermost (gold-film) layer is electrically con-ducting, and the current intensity is governed by grading the films in order to achieve uniform power dissipation. The small "eyebrow" roof windows are double-curvature assemblies likewise with gold-film heating. Control of the system is effected by a Plessey unit with an input signal from a Triplex sensing element. All panels have to meet severe bird-strike requirements.

Rotax air control valve TypeM.6021,
described in the text on page 45