FLIGHT SYSTEM SURVEY

Where Are We Now?

THE decision of the ICAO Council to standardize DMET as a supplement to VOR was recorded in *Flight* last week. We stated then that Britain, France, Canada, Denmark, India, Australia and South Africa had voted against the standard, but after going to press we learned that the last four countries had in fact abstained. It was perhaps inevitable that the American proposal should be adopted but it is significant that it was only by extreme exertion and, their opponents claim, by intense economic and political pressure that the Americans were successful. Equally intense opposition from Decca has caused such bitterness on both sides that any compromise, such as the standardization of Dectra, is unlikely in future. Yet the Americans are still actively investigating Decca for helicopters—one of the many anomalies of the situation.

Successive ICAO discussions over past years make remarkable reading and it is worth noting that, even in the final Council meeting, delegates admitted that they were confused by intense bombardments of technical and other information and the ability or inability of VOR/DMET to fulfil the requirements was still a major issue a matter of minutes before the vote itself was taken. It seems clear that few nations can actually convince themselves that either VOR/DMET or Decca can really provide the navigation system which will be required for the critical air traffic control problems three years ahead. All they can hope is that DMET will form a useful prop in the chain of "building blocks" which the Americans claim will at some time in the future form the ultimate system.

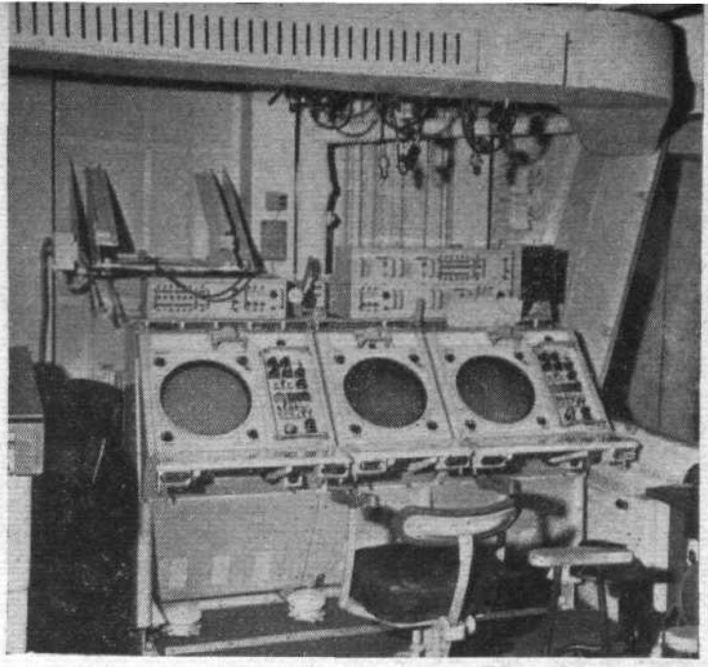
But now the standard has been fixed, and only the dissent of a majority of the 74 member nations, stated within six months, can reverse the decision. VOR/DMET is protected until 1975.

Britain has stoutly and unequivocally supported Decca and opposed DMET (but not VOR) during the past year and stated at the recent Eumed meeting that it would not implement DMET. Unless Britain climbs down, therefore, it must file a formal reservation and set up a DMET-less zone across some of the world's major air routes. How long can such a situation continue and what results might it have?

Continued support and use of Decca on British airways might be embarrassing and annoying but will allow Decca to bring into service the improvements which must absolutely establish its ascendency over VOR/DMET. Nevertheless it appears that only successfully maintained patent laws and the almost inevitable opposition of the powerful American business aircraft operators can prevent the Americans developing and internationally proposing a new hyperbolic aid if VOR/DMET proves dangerously inadequate, as Britain maintains it will.

For the immediate future in short range navigation we can foresee neither complete uniformity nor complete peace. The years to come may see air traffic in turmoil and in danger. It should not be forgotten that the ultimate stakes in this process are not national prestige or lucrative contracts but the tempers and the custom—and the very lives—of passengers. C. M. L.

Lord Douglas of Kirtleside, chairman of BEA, at the controls of a Tu-114 at Moscow. The instrumentation is described at right



The command staff position in the upper operations room of the carrier defence system using the type 984 radar in HMS "Hermes." The system was produced by Pye. Both hand and foot-operated controls are fitted to the consoles and an electronic "tote board" is used in the main plotting centre

Tu-114 Flight Instruments

THE picture on the left shows Lord Douglas of Kirtleside, chairman of BEA, seated at the controls of a Tu-114 in Russia. The principal instruments are visible in some detail and show the simplicity of the main panel with its black crackle finish. The centre panels, the edge of which can be seen on the right of the picture, span the stairway leading down into the navigator's compartment in the nose. They contain indicators and switches presumably related to engine operation, but no conventional throttle levers.

Sizeable welded ducting leads demisting air to all the cockpit windows and the panel immediately ahead of the pilot is additionally heated by a transparent electric element either applied to or imbedded in the glass and apparently provided with a thermostatic control. A windscreen wiper blade is visible on the left of this panel. The triangular window immediately aft can be pulled in and slid back for direct vision. Rubber-bladed ventilator fans are positioned near the pilots. The pale-coloured control wheel has a rotatable control concentrically mounted and probably serving nosewheel steering.

The instruments themselves appear well arranged in the pilot's line of sight beneath a high-set glare shield. From left to right, the top row includes an a.s.i. reading on a linear scale from 0 to 1,100km/hr, but having two needles overlapped in the picture. Next is a two-pointer altimeter on which the short needle indicates against an inner scale of thousands from 0 to 20,000m and the long needle against the outer scale from 0 to 1,000m. A window between the 400 and 600m marks shows barometric pressure in millimeters and the related setting knob is on the lower left edge of the dial. Third from left is a conventional ILS meter with blue and yellow sectors marked and to the right of it is a radio-magnetic indicator labelled as serving No 1 ADF. This dial has a rotating bearing card and lubber line at the 12 o'clock position. A needle, and "tramline" marker presumably associated with it, provide ADF bearing information and there are additional scales in degrees round the rim of the dial. A further black indicator reaches across the whole dial but has only a few single-degree lines at each end. It can be seen to be obscuring "06" and part of "24".

The lower row of dials includes, from left to right, a radio altimeter with two indication scales, an angle of attack indicator reading from +12° to −4° and a conventional electric artificial horizon with degrees of climb and dive marked on the skyplate. The height of the fixed aircraft silhouette is adjustable and an "off" warning flag is showing. Behind Lord Douglas' right hand is a large dial which very probably is another artificial horizon. It was noted earlier that the Il-18 has two horizons, one fully free in roll and the other of lesser freedom. One is standby to the other and operated by a separate supply. The v.s.i. is logarithmic and indicates in metres/sec, the maximum being 30m/sec (5,900ft/min). Next door is a plain ADF dial labelled as serving No 2 ADF. Below are a turn and slip indicator marked for banks up to 45° calibrated at 500km/hr; and to the right is a dial giving tailplane incidence angle from 0° to −4.5°. This one-way-only deflection was noted in our external description of the Tu-114 at Paris (*Flight* for August 21, last year). Outlined in white are two dials individually showing deflection of left and right flaps from 0° to 45°. Of the various warning lights on the panel, the one near the r.m.i. is the marker beacon indicator.