

INSTRUMENT PLANNING

The New Service Blind-Flying Panel Described : Six Essential Instruments Correctly Grouped

By Wing Commander

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THE arrangement of certain specialised instruments on a panel mounted independently of the remainder is a custom which comes to us from the United States. The Pioneer Instrument Company's catalogues of about nine years ago illustrated several such arrangements, while more recent lists refer to the "recognised primary blind-flying instrument group" consisting of airspeed indicator, turn indicator and climb indicator.

The new Royal Air Force blind-flying panel, which has just been adopted and is described in this article, is very comprehensive and carries the following instruments: Airspeed indicator (Smith's Aircraft Instruments); Gyro Horizon (Sperry Gyroscope Company); climb indicator (Smith's Aircraft Instruments); Kollsman altimeter (Kelvin, Bottomley and Baird); Directional Gyro (Sperry Gyroscope Company); and a turn and bank indicator (Reid and Sigrist).

Even in transport aircraft which do not use a blind-flying panel a somewhat similar layout is adopted, and the two instruments most frequently scanned by the pilot occupy the centre of the dashboard. These are the Gyro Horizon and the Directional Gyro. Apart from these, the remaining four instruments might be laid out in various combinations depending upon the preference of a firm's chief draughtsman or test pilot. Some pilots might like to have a top row consisting of an altimeter, an Horizon, and a climb indicator—the three "rise and fall" instruments—together. The Artificial Horizon shows whether the machine is pitched so as to rise or fall in height; the climb indicator tells the rate at which height is being gained or lost; and the altimeter shows the amount, so that the pilot knows when to stop his climb or dive.

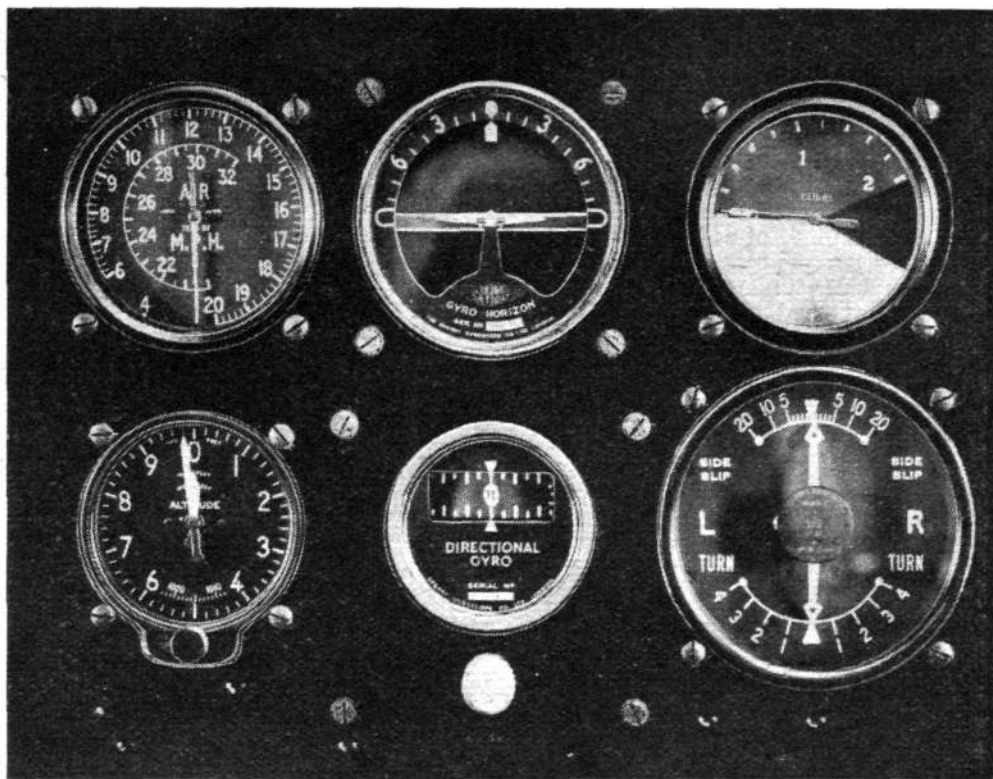
Once a complete set of instruments such as this has been used it is surprising how a pilot comes to rely upon their indications. In conditions of poor visibility, or at night, it is probable that the pilot will consult his instruments in a regular sequence.

Instruments in Action

During and after the take-off the pilot can watch the miniature aircraft on the artificial horizon rise above the line and note the readings on his vertical speed indicator so that he can obtain the best angle for any engine speed. At the same time, besides keeping the machine level, he must also see that the card of his Directional Gyro remains on zero setting.

During the first turn he will glance at the directional gyro as the card revolves, so as to know exactly when to stop the turn, and will also watch the turn indicator, which will tell him not only the rate at which he is turning, but whether or not his aeroplane is correctly banked for that rate. In straight flight the latter will give an instant indication of the slightest deviation, which would also be shown—and especially if there were an accumulation of small deviations in one direction—by the directional gyro.

And so on to the approach and landing, when a sensitive altimeter will be of very great use in the closing stages of a glide, provided that it has been adjusted to the barometric reading of the aerodrome of arrival. Without the help of a



How the instruments are arranged in the new panel. From left to right they can be seen as: (top) Airspeed indicator, Artificial Horizon and rate-of-climb indicator; (bottom) sensitive altimeter, Directional Gyro and turn and bank indicator. This particular rate-of-climb indicator is shortly to be replaced by an improved type. (R.A.F. Official: Crown Copyright Reserved.)

radio beam the slowest rate of descent can quite easily be determined from the readings of the rate-of-climb indicator; with a beam, direction is easily maintained without hunting, and a steady rate of descent will show that the average angle of the beam is being followed.

In fact, it is possible, with the aid of proper equipment, to make every manoeuvre with the same speed and certainty as in daylight and clear weather.

Little of which is likely to be new to the experienced transport or bomber pilot. Nevertheless, this brief outline of the particular uses of the various instruments making up the new panel not only indicates the real value of each, but also shows how a properly laid-out panel would inevitably reduce the amount of necessary concentration.

The panel itself consists of a plate of dural, in which the holes for the instruments as well as the fixing holes have been pressed out and are thus exactly to size. It is first anodised and then stove-enamelled a dull black—though it may be said that the matt-grey anodic finish is very much better looking than the black panel and does not reflect light or in any way trouble the eyes of the pilot. In order to smooth out engine and airscrew vibrations which might affect the accuracy of the three gyro instruments, the panel is supported on anti-vibration mountings consisting of a combination of a conical coil spring and a cylindrical rubber buffer. Like the panel, its attachment, together with all the small fittings which go with it, are also enamelled black; black anodising would probably prove an equally satisfactory and more convenient process. The mounting has been developed by Messrs. Meredith and Barnes, of the R.A.F.

When the panel is installed in the machine it is essential that its face should be truly vertical and its top edge truly horizontal, with the machine in flying position. Three of the instruments would give false readings unless this point was carefully attended to.

Dealing with the instruments in turn, the air speed indicator is of the type already in use in thousands of Service aircraft. It possesses no novel features, but, forming one of a combination of six instruments such as these, it may be used by the pilot instead of the rate-of-climb indicator whenever it is necessary to make the best air speed as compared with the best rate of climb or rate of descent. The Artificial Horizon