B.L.E.U. Demonstration - October, 1958

Brief for News Reel Companies

In spite of the improvements made in bad weather flying aids in recent years, a very serious limitation is imposed upon the operation of civil aircraft today by low cloud base and restricted visibility. With the advent of newer types of aircraft with higher landing speeds and possibly poorer downward fields of view from the cockpit, the problem will become even more acute unless new techniques can be employed.

The modern civil airliner carries equipment which, when used in conjunction with ground based radio beam systems, enables approaches to be made down to a height of about 150 feet above ground level, the automatic pilot being used to fly the aircraft. From this height, the pilot must depend upon visual approach and landing aids, e.g. Calvert approach lights, approach angle indicators, etc., for the completion of the landing. The height down to which the automatic approach can be made is limited mainly by the inadequacy of the existing radio guidance systems to define the correct flight path of the aircraft with sufficient accuracy.

The work of the Blind Landing Experimental Unit is mainly concerned towards eliminating the final visual phase of the landing.

New radio guidance systems have been developed which provide the necessary accuracy to enable aircraft to be landed under complete automatic control. Using these new guidance systems in conjunction with a modified automatic pilot and an automatic airspeed control, over 2,000 fully automatic landings have been made.

The automatic landing system is preceded by an automatic approach, the pilot also engaging the automatic airspeed control. Once this has been done, he selects one further switch to initiate the automatic landing. His sole function then is to monitor the control and flight path of the aircraft on his instruments. The various switching sequences, e.g. changing from one radio guidance system to another, are carried out completely automatically. Once the aircraft has touched down on the runway, the pilot disengages the automatic controls and steers the aircraft using director information presented to him on his instruments.

Flight Demonstration of Automatic Landing

1. Using normal navigational aids and/or airfield radar control, the pilot positions the aircraft using the automatic pilot at a suitable point for the start of an automatic approach. He sets the magnetic heading of the runway on his beam compass and engages the first part of the automatic approach equipment. The aircraft is flown by the automatic pilot onto the extended centreline of the runway, the guidance information in azimuth being derived from a radio beam and the height being kept constant by a barometric height control.

2. When the aircraft reaches a second radio beam, the glide path beam, the second part of the automatic approach equipment is selected by the pilot and the aircraft is then flown by the automatic pilot down the descent path defined by the glide path beam. (As the Varsity, unlike the Canberra, has only partial airspeed control, the pilot adjusts the throttles at this point to maintain a constant airspeed throughout the automatic approach).

3. When the aircraft is established on the correct descent path, the pilot selects "automatic landing" and thereafter he merely monitors the control and flight path of the aircraft on his instruments. The automatic approach proceeds down to a height of about 300 feet.

/4

4. On reaching this height, the automatic landing system is brought into operation by means of an automatic switch. Thereafter the various parts of the landing equipment are switched in at predetermined points by means of this switch.

5. At a height of about 50 feet, the automatic airspeed control slowly closes the throttles to reduce the airspeed for touchdown.

6. At a height of about 20 feet, the automatic pilot removes any drift the aircraft may have due to crosswind so that there is no side load of the undercarriage at touchdown.

7. When the aircraft touches down the pilot disengages the automatic controls and steers the aircraft using director information presented to him on his instruments.

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