

Concepts of Redundancy for "All-weather" Landing

BY R. W. HOWARD

Elliott Brothers (London) Limited

SUMMARY

The paper states certain overall requirements for safety in all-weather landing and examines five basic systems which are being considered by various organisations in the world. The author considers that the simplest of these systems, employing single automatic controls with conventional panel instrument and director displays for pilot monitoring, is not acceptable for full all-weather touchdown, and at best such systems will achieve weather limits determined by go-around capability. The paper concludes that full all-weather systems for operation to RVRs of 50 yards and less must employ as the prime guidance and control means, failure-survival ground guidance equipment and failure-survival airborne automatic controls. Special purpose instrument situation information is also desirable for pilot monitoring. Means for achieving a failure-survival or "fail-operative" characteristics in automatic equipment is described, in relation to the equipment designed for the Vickers VC.10. In addition a reliability analysis is made of this system and the levels of M.T.B.F. for each category of equipment, ground and airborne, are derived.

General results are given of a cost comparison of systems employing single and failure-survival automatic controls as the prime landing system and present indications are that failure-survival automatic systems offer a reasonably economical solution to the "all-weather" landing problem.