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LOSS OF FUNCTIONALITY OF AIRCRAFT'S COLLISION AVOIDANCE SYSTEM (ACAS)**1 Introduction**

1.1 The following information was published in Eurocontrol's Safety Warning Message dated 4 May 2007. The purpose of this Circular is to bring to the attention of flight crew the issues associated with loss of functionality of an aircraft's collision avoidance system (ACAS).

2 Background

2.1 A mid-air collision occurred in Brazil on 29 September 2006, between a Boeing 737-800 and an Embraer Legacy 600 business jet. The investigation of this accident is ongoing.

2.2 However, preliminary findings suggest that a critical safety issue exists regarding the loss of functionality of an aircraft's collision avoidance system (comprising a transponder and ACAS) and associated cockpit warnings to flight crews.

3 Issue

3.1 For ACAS to provide flight crew with collision avoidance information, both the ACAS and the transponder units must be turned on. In addition, the transponder must not be selected to the STANDBY mode.

3.2 If the transponder is not turned on and is not responding to interrogations, the aircraft's ACAS cannot display information about potentially conflicting aircraft nearby nor can it provide instructions to the crew to resolve impending collision threats. Furthermore, the aircraft may be invisible to ACAS units of other aircraft in the vicinity. In addition, as the aircraft will not be tracked by ground-based secondary surveillance radars, it will be invisible to ATC.

3.3 In many aircraft types, the only notification the pilots are likely to receive regarding the loss of ACAS functionality is a small, static text message on the pilot's flight display that reads 'ACAS OFF' (or similar). In the event of an ACAS failure, the warning 'ACAS FAIL' would illuminate; the type of text message will vary depending on the reasons for the loss of function.

3.4 Static text message to indicate a loss of collision avoidance system functionality is not a reliable means to capture pilots' attention because these visual warnings can be easily overlooked if pilots' attention is directed elsewhere in the flight environment.

3.5 Until this problem is systematically addressed by the manufacturers and airworthiness authorities, pilots' attention is drawn to the lack of a conspicuous warning to indicate the loss of collision protection resulting from a compromise in functionality of either the transponder or ACAS unit.

4 Recommendations

4.1 All pilots who use transponders or transponder/ACAS units should ensure that they are familiar with the means currently used to indicate failure or lack of active functionality of these components.

4.2 The relevant displays/indicators should be routinely scanned during the flight to monitor continued operation of transponder and ACAS.

4.3 In a case when a failure message is detected, the crew should verify that the failure condition is still present if the second transponder is selected and then follow the appropriate trouble-shooting procedures. As necessary, further action should be taken to initiate engineering rectification action.

This Circular is issued for information, guidance and necessary action.