
Subject: TCAS 7.1 Upgrade

Introduction

TCAS 7.1 is a safety enhancement for TCAS II products that has been mandated by the European Aviation Safety Agency (EASA). This product is being installed on all international aircraft.

Upgrades to B747-400 aircraft will begin in November with ship 6311. An EP-19 will be placed in the aircraft logbook to inform crews regarding the installation of this system.

Background

Version 7.1 makes three primary changes to the operation of the TCAS II computer.

First, there are logic enhancements that determine when TCAS will issue a reversal RA; the TCAS computer may change a "CLIMB" RA into a "DESCEND" RA or vice versa.

Second, a "LEVEL OFF" RA aural alert has been added.

Third, a change has been made as to how TCAS handles a "DESCEND" RA when at low altitudes.

Reversal Logic Enhancements

TCAS 7.1 improves reversal logic. Two new mechanisms ensure that reversal RAs are triggered when necessary:

- (1) The first feature monitors RA compliance. When it detects that an aircraft is not responding correctly to an RA, a reversal RA is commanded for aircraft closer than 100 feet vertically.
- (2) The second improvement adds a prediction of vertical separation at the closest point of approach, based on current vertical speeds, to detect the need for a reversal RA.

LEVEL OFF Aural Alert

The current “ADJUST VERTICAL SPEED, ADJUST” RA directs pilots to reduce vertical speed to 2000, 1000, 500, or 0 fpm. If a pilot increases vertical speed instead of reducing it, the situation could become worse.

With TCAS 7.1, a single aural “LEVEL OFF” RA that recommends a reduction in vertical rate to 0 fpm, replaces the multiple “ADJUST VERTICAL SPEED, ADJUST” RAs.

Low Level DESCEND RAs

Prior to TCAS 7.1, an aircraft that was descending in compliance with a DESCEND RA must reduce its vertical speed in response to an “ADJUST VERTICAL SPEED, ADJUST” RA at 1,000 feet AGL.

With the TCAS 7.1 modification, a “DESCEND” RA is changed to “MONITOR VERTICAL SPEED” and vertical speed command is issued to prevent a climb.

Conclusion

The Volume 2 will be updated during the next revision cycle.

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