European Aviation Safety Agency

Deviation request #97 for an ETSO approval for CS-ETSO applicable to Low range radio altimeters (ETSO-2C87) & (ETSO-C87a) Consultation Paper

1. Introductory note

The hereby presented deviation request shall be subject to public consultation, in accordance with EASA Management Board Decision No 7-2004 products certification procedure dated 30 March 2004, Article 3 (2.) of which states:
"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

2. ETSO-2C87#2 & ETSO-C87a#1 – Low range radio altimeters

Clarification on the understanding of the term altitude range in EUROCAE/ED-30 paragraph 3.3

Introduction:
During ETSO compliance finding it was determined that the requirements on altitude range in EUROCAE/ED-30 paragraph 3.3 can be misinterpreted easily. Whereas the terms "height" and "electrical height output" are well defined in the document, the term altitude is not defined in the document. In addition the term altitude is used in an understanding which is different from the dictionary definition of altitude.

Current Requirement:

1. 4 DEFINITIONS

1.4.1 Height

The term height is defined for the purpose of this document as the vertical distance from the antenna system to the terrain. The alternative definition of height as the shortest distance to the ground may have to be accepted by the Radio Altimeter Designer and so declared.

NOTE: The electrical height outputs may be offset by a constant value representing the vertical distance between the antenna system and the terrain at touch-down.

3.3 ALTITUDE RANGE

3.3.1 Category A

This category will cover most of the applications.

Correct operation is required between -20ft and +2500ft over all types of terrain in the conditions indicated in other parts of this document.

3.3.2 Category B

It is recognized that the performance of some Ground Proximity Warning Systems is improved (giving more warning time) if the maximum operating range of the radio altimeter is increased.

For this reason a category is established in which the operation is required between 0 and 5000ft over all types of terrain in the conditions indicated in other parts of this document.

Industry:

ARINC formulates in ARINC 707:

The requirement stated above specifying operation to at least -20 feet (below ground level) does not imply any operational need for the Radio Altimeter to operate below the surface of the ground (such as in submarines, earth digging equipment or in coal mine trains) but is specified for the specific purpose of affording a means of checking the performance of the Radio Altimeter when the aircraft is on the ground, to accommodate the required touchdown accuracy specified in Section 3.7 [*equivalent to section 3.2 in EUROCAE/ED-30, note by EASA*] and in addition the variations in reading of a particular Radio Altimeter in a particular aircraft, under certain environmental temperature conditions (where the coax cable propagation speed may have been reduced from the normal), or where the aircraft antennas might have to be located ahead of the landing gear, the Radio Altimeter indicator may (or may not) read below ground level when the aircraft is parked even though the Radio Altimeter is properly calibrated for zero indication in the touchdown configuration under normal flight operating conditions.

EASA:

Understand the second sentence of EUROCAE/ED-30 paragraph 3.3.1 as follows (additional words are marked **bold**):

“Correct operation is required for **electrical height outputs** between -20ft and +2500ft over all types of terrain in the conditions indicated in other parts of this document.”

Understand the second sentence of EUROCAE/ED-30 paragraph 3.3.2 as follows (additional words are marked **bold**):

“Correct operation is required for **height** between 0ft and +5000ft over all types of terrain in the conditions indicated in other parts of this document.”

No deviation request by the applicant is necessary if this understanding of the requirements is used.