European Aviation Safety Agency

COMMENT RESPONSE DOCUMENT (CRD)
TO NOTICE OF PROPOSED AMENDMENT (NPA) 2009-03

**for amending the Executive Director Decision No. 2003/10/RM of 24 October 2003
on certification specifications, including airworthiness codes and acceptable means
of compliance, for European Technical Standard Orders («CS-ETSO»)**

"Update to European Technical Standard Order ETSO-C119b"

<u>Explanatory Note</u>

I. General

1. The purpose of the Notice of Proposed Amendment (NPA) 2009-03, dated 12 March 2009 was to propose an amendment to Decision No. 2003/10/RM of the Executive Director of the European Aviation Safety Agency of 24 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for European Technical Standard Order (CS-ETSO). The NPA proposed amended an existing ETSO specification. The ETSO is technically similar to the existing Federal Aviation Administration (FAA) Technical Standard Order (TSO).

II. Consultation

2. The draft Executive Director Decision amending Decision No. 2003/10/RM was published on the web site (http://www.easa.europa.eu) on 13 March 2009.

    By the closing date of 24 April 2009, the European Aviation Safety Agency ("the Agency") had received 11 comments from 8 National Aviation Authorities, professional organisations and private companies.

III. Publication of the CRD

3. All comments received have been acknowledged and incorporated into this Comment Response Document (CRD) with the responses of the Agency.

4. In responding to comments, a standard terminology has been applied to attest the Agency's acceptance of the comment. This terminology is as follows:

    *   **Accepted** – The comment is agreed by the Agency and any proposed amendment is wholly transferred to the revised text.
    *   **Partially Accepted** – Either the comment is only agreed in part by the Agency, or the comment is agreed by the Agency but any proposed amendment is partially transferred to the revised text.
    *   **Noted** – The comment is acknowledged by the Agency but no change to the existing text is considered necessary.
    *   **Not Accepted** - The comment or proposed amendment is not shared by the Agency

    The resulting text highlights the changes as compared to the current rule.

5. The Executive Director Decision will be issued at least two months after the publication of this CRD to allow for any possible reactions of stakeholders regarding possible misunderstandings of the comments received and answers provided.

6. Such reactions should be received by the Agency not later than 28 September 2009 and should be submitted using the Comment-Response Tool at http://hub.easa.europa.eu/crt.

IV. CRD table of comments, responses and resulting text

(General Comments)	-

comment	*2* comment by: *EUROCONTROL - Mode S & ACAS Programme*
	EUROCONTROL concurs with no comment
response	*Noted*
	The Agency appreciates your support.

comment	*9* comment by: *Luftfahrt-Bundesamt*
	The LBA has no comments.
response	*Noted*
	The Agency appreciates your support.

comment	*10* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*
	The Swedish Transport Agency, Civil Aviation Department has no comments to the proposed amendments, and we support the NPA 2009-03.
response	*Noted*
	The Agency appreciates your support.

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comment	*1* comment by: *CAA-NL*
	We support this NPA
response	*Noted*
	The Agency appreciates your support.

B. DRAFT DECISION - ETSO-C119c	p. 8-9

comment	*5* comment by: *Garmin International*
	Section 3.1.4 requires EUROCAE ED-80 (RTCA DO-254) design assurance for "a complex custom micro-coded component" if the article includes such a component. Yet, there is no definition within the proposed ETSO-C119c that defines what components are considered "complex custom micro-coded components". FAA AC 20-152 paragraph 1.a defines complex custom micro-coded components as follows: "
	These complex custom micro-coded components include application specific integrated circuits (ASIC), programmable logic devices (PLD), field

programmable gate arrays (FPGA), or similar electronic components used in the design of aircraft systems and equipment.
"

Without such a definition within the ETSO, other types of components like graphic coprocessors and microprocessors could be considered as requiring ED-80 without reasonable capability for industry to perform ED-80 design assurance given the intellectual property issues associated with such commercial-off-the-shelf components.

It is recommended that ETSO-C119c use the definition of "complex custom micro-coded component" from FAA AC 20-152 paragraph 1.a to maintain harmonization with existing certification authority guidance and eliminate confusion as to which components require ED-80 design assurance.

response	*Not accepted*

Although we consider that the requested definition may be beneficial. Custom micro-coded components are explicitly stated in paragraph 3.1.4, and an example of custom micro-coded components, is giving in ED-80 paragraph 1.2:

"*The guidance in this document is applicable, but not limited to, the following hardware items:*

1. Line Replaceable Units (LRUs).

2. Circuit Board Assemblies.

3. Custom micro-coded components, such as Application Specific Integrated

Circuits (ASICs) and Programmable Logic Devices (PLDs), including any associated macro functions.

4. Integrated technology components, such as hybrids and multi-chip modules.

5. Commercial-Off-The-Shelf (COTS) components."

The Agency therefore does not consider it necessary to reproduce the definition in all documents that refer to ED-80.

However, it should be noted that Agency will be preparing to publish equivalent guidance material, which is harmonised with the FAA position.

comment	*6* comment by: *Garmin International*

Section 3.2.1 defines the failure classification for ETSO-C119c equipment at the appliance level. Failure classification is inherently driven by aircraft level requirements that are inappropriate to automatically assign to an appliance without due consideration for the factors of the particular aircraft installation that may mitigate the failures and thereby the associated design assurance requirements.

For example, if a manufacturer designs a particular ETSO-C119c appliance as a secondary system rather than a primary system, the failure classification may not be hazardous/severe-major as proposed in section 3.2.1. That might mean the particular appliance cannot meet the needs of every aircraft installation, but failure classification is only one of a myriad of decisions that should influence a manufacturer's design choices.

Recommend removing section 3.2.1 entirely. Alternatively, it is recommended that section 3.2.1 be modified to indicate that the failure is for a primary system at the aircraft level and that other mitigating factors may result in a reduction in failure classification and design assurance level.

response | *Not accepted*

The comment may be valid for other systems, which allow a failure assessment based purely on the failure affects to that aircraft. However, the specific TCAS function foresees an interaction between two aircraft and the failure classification takes into account this specific scenario. We are not anticipating that a further mitigation on one aircraft will allow the downgrading of the failure classification, which considers the interaction of two systems.

Furthermore the failure classification is independent from the specific system architecture. The architecture may allow the selected software or hardware design assurance level to be reduced, but the associated failure level will not be directly affected by that mitigation.

comment | *12*   comment by: *Honeywell*

(section 3.1.4, page 9) - Equipment that was not originally developed according to ED-80/DO-254 should not be required to conform to this standard when upgraded to Change 7.1. See section 3.g of FAA TSO-C119c (page 2).

(Appendix 1, page 14) - the "Changes to TSIM" section is not needed and should be removed from this ETSO.

(Appendix 2, section 2, page 15) - the definition of bit 69 should match the definition that was approved for Change 1 to RTCA/DO-300.

(appendix 2, section 9, page 17) - the title for Test 4, currently written as "Passive to Active Abnormal Conditions", should be written as "Active to Passive Abnormal Conditions" as it was in the original document.

response | *Partially accepted*

Section 3.1.4, page 9: Partially Accepted: The specific FAA TSO section deals with equipment, developed before ED-80/DO-254 was available and does not distinguish between equipment developed before the TSO was issued and those developed after the date of amending the TSO. For clarification the text as provided in the TSO will be adopted to keep harmonisation as close as possible. It should however be noted that ED-80 is addressing the mitigation for previous developed hardware.

Appendix 1, page 14: Accepted: Text Deleted

Appendix 2, section 2, page 15: Not Accepted: In order to ensure harmonisation with the FAA TSO the definition of Bit 69 will not be changed at this time. After EUROCAE and RTCA published Change 1 to ED-143 and Change 1 to DO-300 respectively, we plan to revise the ETSO to delete the appendices and invoke the Change 1 of the referenced documents. At that time we will consider further the appropriateness of changing the definition of Bit 69.

Appendix 2, section 9, page 17: Accepted: Text amended

<table>
<tr><td>resulting text</td><td>

3.1.4 - Electronic Hardware Qualification

If the article includes a complex custom micro-coded component, the component must be developed according to EUROCAE ED-80 Design Assurance Guidance for Airborne Electronic Hardware, dated April 2000. Those articles containing hardware upgraded from an original product developed before EUROCAE ED-80 (RTCA DO-254) was published (April 2000), need only apply the requirements in EUROCAE ED-80(RTCA/DO-254) to the changed hardware and all hardware affected by the change.

</td></tr>
</table>

B. DRAFT DECISION - ETSO-C119c - Appendix 1   p. 10-14

comment	*7* comment by: *Garmin International*

Appendix 1 specifies modifications to EUROCAE ED-143 Minimum Operational Performance Standards. The Appendix 1 modifications are supposed to be identical to the proposed RTCA/DO-185B Change 1 presently undergoing Final Review and Comment (FRAC) until April 21, 2009.

It is recommended that the final ETSO-C119c include the identical text to the final RTCA/DO-185B Change 1 to maintain harmonization.

response	*Noted*

The modification to ED-143 as detailed in Appendix 1 are consistent with those of Change 1 to DO-185B and are the same as those in FAA TSO-C119c

comment	*11* comment by: *FAA*

Contained in Appendix 1 is a change to the TSIM data set in the TCAS test suite. That specified change has been incorporated by FAA contractors into the test suite. Because the test suite is a delivered item to an applicant, no action is required on their part related to the specified TSIM change. The FAA deleted the TSIM change from the corresponding appendix in TSO-C119c before it was approved. Since no action is required on the part of an applicant and to maintain harmonization of the TSO and ETSO documents, the TSIM change should be deleted from the NPA.

response	*Accepted*

The Changes to the TSIM will be deleted from the ETSO

resulting text	

~~**Changes to TSIM**~~

~~Modify the following programs that are compiled into the TSIM simulation program or that provide input data to that program as follows:~~

~~**Trans7.dat**~~
~~[Corrective_Climb, Yes -> No]~~
~~Base_Number = 2.1.11.2~~
~~Trigger = Composite_RA_Evaluated_Event~~
~~Output = Corrective_Climb_Evaluated_Event~~

~~!Climb_RA_Weakened;   T T . T~~

```
Climb_Goal = 0;                              F   T   .   T
Descend_Goal = 0;                            .   T   .   .
Own_Tracked_Alt_Rate > Climb_Goal;      T   .   .   .
Own_Tracked_Alt_Rate > 0 - HYSTERCOR;   .   T   .   T
Own_Tracked_Alt_Rate <= HYSTERCOR;      .   T   .   .
!Not_Meeting_Descend_Goal;               .   .   T   .
Descend_Goal < HUGE;                     .   .   .   T
*** The row above and new column is added by Hui Men (JHU/APL)
2008.12.12 IP-15
 …

[Corrective_Descend, Yes -> No]
Base_Number = 2.1.11.3
Trigger = Corrective_Climb_Evaluated_Event
Output = Corrective_Descend_Evaluated_Event

*** Begin:  Hui Men (JHU/APL) 2007.08.27 CP116

!Descend_RA_Weakened;                        T   T   .   T   T
Descend_Goal = 0;                            F   T   .   T   T
Climb_Goal = 0;                              .   T   .   .   .
Own_Tracked_Alt_Rate < Descend_Goal;    T   .   .   .   .
Own_Tracked_Alt_Rate < HYSTERCOR;        .   T   .   T   T
Own_Tracked_Alt_Rate >= 0 - HYSTERCOR;  .   T   .   .   .
!Not_Meeting_Climb_Goal;                 .   .   T   .   .
!Extreme_Alt_Check;                      .   .   .   T   .
Multiple_Threats;                        .   .   .   F   .
*** End:  Hui Men (JHU/APL) 2007.08.27 CP116
Climb_Goal > 0 - HUGE;                   .   .   .   .   T
*** The above row and new column is added by Hui Men (JHU/APL)
2008.12.12 IP-15

 S7.c
Line 946

&& g_disp_else->de_strong == 0) // added by Hui Men (JHU/APL) on
2008.12.12 for IP-15

Line 961
&& g_disp_else->cl_strong == 0
     // added by Hui Men (JHU/APL) on 2008.12.12 for IP-15
```

B. DRAFT DECISION - ETSO-C119c - Appendix 2   p. 15-17

comment | *3*   comment by: *Roland Mallwitz*

As currently written **Bit 69** will be set when the TCAS unit is Hybrid
Surveillance capable. However, it would be more beneficial if that bit is set,
when the installation is Hybrid surveillance operating, i.e. TCAS is Hybrid
Surveillance capable and the aircraft installation is providing correct own
position data with the appropriate quality. For monitoring it does not help to
know that the TCAS unit is capable, but it would be beneficial to know that the
aircraft installation is operating with Hybrid Surveillance.
     Although ICAO ASP has proposed a change to Annex 10 Vol IV reflecting
the current wording this proposal has not yet been distributed and will
certainly be changed prior to publication of a new amendment if EASA and
FAA/RTCA agree on the change proposed below:

Proposed resolution

2.2.11 Hybrid Surveillance Indication in the Data Link Capability Report

Note: The Data Link Capability Report format specified in EUROCAE ED-143, Volume I uses bit 69 to indicate whether the TCAS unit is hybrid surveillance capable. Bit 69=0 indicates 'hybrid surveillance not operational.' Bit 69=1 indicates 'hybrid surveillance fitted and operational'.

The hybrid surveillance algorithms require data concerning own aircraft, e.g. ADS-B position information. Hybrid surveillance is not operational unless all the required data are made available and provided to TCAS. Additionally, should flight crew have the capability to enable or disable hybrid surveillance, it is not operational when disabled.

There are five TCAS-related bits in the Data Link Capability Report (Bits 48 and 69-72). These five bits are set or cleared as appropriate by the TCAS unit and sent to the Mode S transponder for downlink to a Mode S ground sensor. Execution of the default EUROCAE ED-143 logic will clear bit 69, meaning that in order to set bit 69, an implementer must modify the TCAS logic so that bit 69 will be set to one when the logic is executed. For details, see EUROCAE ED-143 Volume II, "Interface: Data_Link_Capability_Report," and DO-185B Attachment A, "PROCESS Send_owndata_to_trans."

If hybrid surveillance is implemented in an EUROCAE ED-143 capable TCAS unit, then the implementer should ensure that other avionics provide to TCAS the data required by hybrid surveillance and TCAS sets bit 69=1 in the five bits sent to the transponder.

response	*Not accepted*
	In order to ensure harmonisation with the FAA TSO the definition of Bit 69 will not be changed at this time. After EUROCAE and RTCA published Change 1 to ED-143 and Change 1 to DO-300 respectively, we plan to revise the ETSO to delete the appendices and invoke the Change 1 of the referenced documents. At that time we will consider further the appropriateness of changing the definition of Bit 69.

comment	*8* comment by: *Garmin International*
	Appendix 2 specifies modifications to RTCA DO-300 Minimum Operational Performance Standards. The Appendix 2 modifications are supposed to be identical to the proposed RTCA/DO-300 Change 1 presently undergoing Final Review and Comment (FRAC) until April 21, 2009.
	It is recommended that the final ETSO-C119c include the identical text to the final RTCA/DO-300 Change 1 to maintain harmonization.
response	*Noted*
	The modification to DO-300 as detailed in Appendix 2 are consistent with those of Change 1 to DO-300 and are the same as those in FAA TSO-C119c.

resulting text	**Test 4 — Active to Passive ~~to Active~~ Abnormal Conditions**