



European Union Aviation Safety Agency  
**Comment-Response Document (CRD) 2021-07**

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RELATED TO NPA 2021-07 — RELATED ED DECISION 2022/018/R

RMT.0457

6.9.2022



## 1. Individual comments (and responses)

In responding to the comments, the following terminology is applied to attest EASA's position:

- (a) **Accepted** — EASA agrees with the comment and any proposed change is incorporated into the text.
- (b) **Partially accepted** — EASA either partially agrees with the comment or agrees with it but the proposed change is partially incorporated into the text.
- (c) **Noted** — EASA acknowledges the comment, but no change to the text is considered necessary.
- (d) **Not accepted** — EASA does not agree with the comment or proposed change.

<b>(General Comments)</b>	-
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comment	2	comment by: <i>LBA</i>
	LBA has no comments	
response	Thank you for your contribution. Your comment is noted.	

comment	4	comment by: <i>Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)</i>
	Thank you for the opportunity to comment on NPA 2021-07 Regular update of CS-ETSO. Please be advised that there are no comments from the Swedish Transport Agency.	
response	Thank you for your contribution. Your comment is noted.	

comment	69	comment by: <i>THALES AVS</i>
	Thales fully support harmonization effort with FAA TSOs. Thales welcome new ETSO-2C521 relying on Euroace ED-273 which will be the first industry standard worldwide dedicated to EFB applications, capturing the state of the art and defining MOPS for future and innovative applications. ETSO-2C521 together with ED-273 will allow streamlining of operational approvals by taking credit of the ETSO to alleviate the compliance demonstration effort against AIR OPS rules.	
response	Thank you for your contribution. Your comment is noted.	

comment	84	comment by: <i>Boeing</i>
	June 30, 2021 B-H020-REG-21-MT-26	
	<b>Subject: Comments to EASA NPA 2021-07 "Regular update of CS-ETSO"</b>	
	<u>To Whom It May Concern:</u>	



The Boeing Company appreciates the opportunity to review and provide comments on the subject NPA 2021-07 “Regular update of CS-ETSO.” We have reviewed the document and identified a number of areas where we recommend changes to improve clarity. The enclosed comments contain the details of our concerns and suggested revisions.

In addition, we would call out that Boeing has sought clarity on the issue of the technical validity of the ATD head center of gravity sliding motion criterion with the FAA draft TSO C127c. Boeing acknowledges with the inclusion of the 10ms criterion in this proposed ETSO update, but welcomes further engagement with other regulatory authorities on this topic.

Again, we thank you for the opportunity to provide input. Please note that comments are provided on behalf of The Boeing Company. We request that employee names are not published in any public document.

Please direct any comments or questions to Stephen Blunk of this office at (314) 313-2316 or email [stephen.blunk@boeing.com](mailto:stephen.blunk@boeing.com).

response Thank you for your contribution. Your comment is noted.

**1. About this NPA**

p. 4

comment 59 comment by: *Civil Aviation Authority the Netherlands*

The Netherlands has no comments on this NPA 2021-07, Regular update of CS-ETSO.

response Thank you for your contribution. Your comment is noted.

**2.3. How we want to achieve it - overview of the proposals | CS-ETSO SUBPART A — GENERAL (pp. 5–6/125)**

p. 5

comment 26 comment by: *DGAC France*

CS-ETSO SUBPART A — GENERAL  
Section 2

About the second paragraph, why CS-27 small rotorcraft are not concerned by the applicability of this new standard ?

response Thank you for our contribution. Your comment is noted. Indeed, the Section 2 of the NPA material is overly restricting the applicability of ASTM standard to CS-23. This section 2 of the NPA is just an introduction text. CS-ETSO subpart A section 2.4 does not prescribe the use of mentioned standards. It is up to the ETSO applicant to anticipate for the intended installation context of the ETSO article and select the appropriate standard for assignments of development assurance level(s).



<b>2.3. How we want to achieve it - overview of the proposals   CS-ETSO SUBPART B — LIST OF ETSOs (pp. 6–12/125)</b>	p. 8
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comment	1	comment by: <i>FOCA Switzerland</i>
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response	There is no comment 1. FOCA Switzerland did not comment in Section 2.3	
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<b>2.3. How we want to achieve it - overview of the proposals   CS-ETSO SUBPART B — LIST OF ETSOs (pp. 6–12/125)</b>	p. 8
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comment	39	comment by: <i>Garmin International</i>
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**Table 2: Page 10:**

In the "Corresponding FAA TSO" column, TSO-C139a A1 is listed. The 'A1' appears incorrectly. TSO-C139a was released as shown on 25 February 2014, but there is no 'A1' in the title of that TSO. Remove the A1 from this entry in Table 2.

response	Thank you for your contribution. Your comment is noted. The reference used (TSO-C139 a A1) is part of chapter 2 of the NPA and does not affect the update of the document .	
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<b>3.1. Draft certification specifications (draft EASA decision)   SUBPART A — GENERAL &amp; SUBPART B — LIST OF ETSOs (Index 1 &amp; Index 2) (pp. 14–25/125)</b>	p. 14
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comment	27	comment by: <i>DGAC France</i>
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Page 15

2. STANDARDS TO MEET TECHNICAL CONDITIONS

2.4 Failure condition classification and development assurance

"[...]or ASTM Document F3061M-17, 'Standard Specification for Systems and Equipment in Small Aircraft', dated November 2017[...]"

We recommend to clearly state that ASTM Doc F3061M-17 should only be used for CS-23 airplanes (and CS-27 small rotorcraft?)

response	Thank you for your contribution. Your comment is not accepted. <ul style="list-style-type: none"> <li>- Within CS-ETSO, EASA is defining the requirements for an ETSO article.</li> <li>- Certification Specification(s) and AMCs may evolve independently.</li> <li>- Lastly, the reference to the ASTM is preceded by 'Depending on the intended aircraft installation' which is considered sufficiently clear.</li> </ul>	
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<b>ETSO-C55a A1 Fuel and Oil Quantity Instruments</b>	p. 26
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comment	33	comment by: <i>FAA</i>
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	· ETSO-C55a – Fuel and Oil Quantity Instruments – Page: 26	
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**Sufficiently Harmonized? Yes**

o Veronica Gardner – “There are no significant technical changes. However, the updates have been made for use of the latest revision of SAE AS405D. In doing so, EASA will be adding “A1” to their revision number. The FAA TSO-C55a has not been updated as of yet. This will cause a difference in the harmonization of marking between ETSO’s and FAA TSO’s.”

response Thank you for your contribution. Your comment is noted.

**ETSO-C63f Airborne Weather Radar Equipment**

p. 32

comment 34 comment by: FAA

· ETSO-C63f – Airborne Weather Radar Equipment – Page: 32

**Sufficiently Harmonized? Yes**

o Moin Abulhosn – “I agree with the ETSO C-63f.”

response Thank you for your contribution. Your comment is noted.

comment 40 comment by: Garmin International

**ETSO C63f Section 3.2.1 - Page 33:**

For the first failure condition given, FAA TSO-C63f includes 'or missed detection of the function' in addition to 'unannounced malfunction'. ETSO-C63f only includes 'unannounced malfunction'. Add the 'or missed detection' wording to the first failure condition's paragraph, representing the functions from paragraph 3.1.1(2) or 3.1.1(4).

response Thank you for your contribution. Your comment is accepted. The text has been amended.

comment 41 comment by: Garmin International

**ETSO C63f Section 3.2.2 (3) - Page 34:**

The ETSO References DO-213A, while the TSO references DO-213A, Change 1. ETSO Reference from 17 March 2016, TSO Reference from 21 June 2018. ETSO reference is out of date with respect to TSO reference. Update the ETSO Reference to RTCA DO-213A, Change 1, dated 21 June 2018.

response Thank you for your contribution. Your comment is accepted. The text has been amended.

comment 42 comment by: Garmin International

**ETSO C63f Section 4.2 - Page 34:**

	For the marking, ETSO States 'include the equipment class, as defined in Table 1' while the TSO states 'Mark each article according to Equipment Class(es) from Table 1'. TSO explicitly allows for multiple classes. Change ETSO wording to state 'class(es)' allowing for multiple classes.
response	Thank you for your contribution. Your comment is accepted. The text has been amended taking into consideration your comment.
comment	44 <span style="float: right;">comment by: <i>Garmin International</i></span>  <b>ETSO-C119e Appendix 1 - Page 42:</b>  In the footer, [Amdt ETSO/17] is not present. If the change from ED-221 to ED-221A is made, it is suggested to also update the footer to include this Amendment. Add [Amdt ETSO/17] to the footer.
response	Thank you for your contribution. Your comment is accepted. The footer will be included.

**ETSO-C96c Anticollision Light Systems**

p. 35

comment	28 <span style="float: right;">comment by: <i>DGAC France</i></span>  §3.2.2 Note : AS8017D does not reflect the impact of updates to Certification Specifications published after 15 August 2017, such as CS-23 Amendment 5.  Did EASA assess if consistency is maintained between F3234/F3234M-17 (CS-23) guidance and AS8017?  Same question for CS 27.1401
response	Thank you for your contribution. Your comment is noted. As F3234/F3234M-17 refers for the performance to AS8017 and AS8037 they are self-consistent.

**Appendix 1 to ETSO-C96C ANTICOLLISION LIGHT SYSTEMS**

p. 37

comment	35 <span style="float: right;">comment by: <i>FAA</i></span>  · ETSO-C96c – Anticollision light system – Page: 37 <b>Sufficiently Harmonized? Yes</b> o Michael Johnson – “The ETSO-C96c looks okay. Although, I would like to see Appendix 1 changes incorporated in the next SAE Aerospace Standard update to AS8017. (Yellow)”
response	Thank you for your contribution. Your comment is noted.

**ETSO-C119e Airborne Collision Avoidance System II (ACAS II) Version 7.1 with Hybrid Surveillance**

p. 40



comment	61	comment by: <i>Airbus Helicopters</i>
	<p>General:</p> <p>Correlate ETSO-C119e release with AMC 20-15 “Airworthiness Certification Considerations for the Airborne Collision Avoidance System (ACAS II) with optional Hybrid Surveillance” update</p> <p>Section 3.1.2</p> <p>Latest CS ETSO Amendment 16 section 2.1 “Environmental standards” address ED-14G / DO-160G Change 1 dated January 2015. ED-14G Change 1/DO-160G Change 1 <b>has been published to remove</b> all User Guides previously included in ED-14G/DO-160G. ED-234/DO-357 replaces the User Guides previously included in ED-14G/DO-160G.</p>	
response	Thank you for your contribution. Your comment is noted.	

**Appendix 1 to ETSO-C119e - Traffic Alert and Collision Avoidance System II (TCAS II)  
Version 7.1 Amendment to the EUROCAE ED-143 Change 2 Requirements**

p. 42

comment	43	comment by: <i>Garmin International</i>
	<p><b>ETSO-C119e Appendix 1 - Page 42:</b></p> <p>In the last paragraph of the changed text, the ETSO references ED-221. This should be ED-221A. ED-221A is the updated, newly referenced version of the document. Replace ED-221 with ED-221A.</p>	
response	Thank you for your contribution. Your comment is accepted the document is been updated accordingly.	

**Appendix 2 to ETSO-C119e - Traffic Alert and Collision Avoidance System II (TCAS II)  
Version 7.1 Hybrid Surveillance Amendment to the EUROCAE ED 221 Requirements**

p. 43

comment	45	comment by: <i>Garmin International</i>
	<p><b>ETSO-C119e Appendix 2 - Page 43:</b></p> <p>The title references ED-221 instead of ED-221A. ED-221A is the updated, newly referenced version of the document. Replace ED-221 with ED-221A.</p>	
response	Thank you for your contribution. Your comment is accepted the document has been updated accordingly.	

**ETSO-C127c Rotorcraft, Transport Aeroplane, and Small Aeroplane Seating Systems**

p. 47

comment	20	comment by: <i>Airbus-Regulations-SRg</i>
	PDF-page 49/125, §4.1 - General	



	<p>Airbus Proposal: Delete also "subpart A" (replace the initial text completely).</p> <p>Rationale: "Subpart A" is already referenced inside the new text.</p>
response	Thank you for your contribution. Your comment is not accepted. The referenced paragraph and related text are part of a standardized template used for all ETSOs.
comment	<p>29 <span style="float: right;">comment by: DGAC France</span></p> <p>1 Applicability (3) Seat Orientation (a) &amp; (b) :</p> <p>Considering aircraft longitudinal axis has a direction, shouldn't item (a) state "of 18° left or right relative to ..." and item (b) state between 162° and 198° relative to the ..."?</p>
response	Thank you for your contribution. Your comment is not accepted. Within the definition of the angles given, we have not considered a direction for the longitudinal axis and used most common nomenclature in such context. We would prefer to keep the same definition as FAA TSO to avoid misinterpretations as well as for harmonization purpose.
comment	<p>90 <span style="float: right;">comment by: Safran Seats</span></p> <p>Section 4.2(d) Side Facing (SF) and Oblique Facing (OF) seat orientations are missing from the description</p>
response	Thank you for your contribution. Thank you for highlighting the missing cases. Text updated accordingly.

**Appendix 1 to ETSO-C127c - MPS For Rotorcraft, Transport Aeroplane, and Small Aeroplane Seating Systems**

p. 52

comment	<p>19 <span style="float: right;">comment by: Rayk Hey</span></p> <ul style="list-style-type: none"> <li>• Quote from page 54 of NPA 2021-07: <ul style="list-style-type: none"> <li>○ On page 7, for Type A-T, Type C seats (all the aircraft categories detailed in 1(1)c of this ETSO), replace subsection 3.3.1 by Table 5 of Appendix 1 of this ETSO.</li> </ul> </li> <li>• Discussion: <ul style="list-style-type: none"> <li>○ Chapter 3.3.1 of AS8049C provide guidance on the quality of all materials used within a seat design. NPA 2021-07 replaces this chapter by the guidance from ARP6337. ARP6337 however has been drafted to address composite materials. Consequently with NPA 2021-07 guidance originally intended for composite materials is made applicable for all materials. While the introduction of ARP6337</li> </ul> </li> </ul>
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	<p>is supported, the original wording from AS8049C should remain applicable for all other material.</p> <ul style="list-style-type: none"> <li>• Proposed new wording for NPA 2021-07:             <ul style="list-style-type: none"> <li>○ On page 7, for Type A-T, Type C seats (all the aircraft categories detailed in 1(1)c of this ETSO), replace subsection 3.3.1 by: Materials shall be of a quality that experience or tests have demonstrated to be suitable for use in aircraft seats. For composite materials apply Table 5 of Appendix 1 of this ETSO.</li> </ul> </li> </ul>
response	<p>Thank you for your contribution. Your comment is partially accepted. The document has been reviewed to reflect your input.</p>
comment	<p>21 <span style="float: right;">comment by: <i>Airbus-Regulations-SRg</i></span></p> <p>PDF-page 52/125, Appendix 1, table 1, AS8049C section 3, change description for page 6.</p> <p>Airbus comment: The shown subsection number “3.2.1” in front of the new wording shall be 3.2.15.</p> <p>Rationale: The shown subsection number “3.2.1” (new wording) is not correct (typo assumed).</p>
response	<p>Thank you for your contribution. Your comment is accepted. The text has been reviewed accordingly.</p>
comment	<p>22 <span style="float: right;">comment by: <i>Airbus-Regulations-SRg</i></span></p> <p>PDF-page 54/125, Appendix 1, table 1, AS8049C section 3, change description for page 7: “...replace subsection 3.3.1 by Table 5...”</p> <p>Airbus proposal: New proposed Note to Table 5, second section: Please add “(see ref.: ARP6337)” to read as follows: “...with the crashworthiness requirements throughout its life (<a href="#">see ref.: ARP6337</a>).”</p> <p>Rationale: ARP6337 was developed by SAE together with the leading Airworthiness Authorities (FAA and EASA) for the introduction of composite materials into the primary load path of seats and covers the mentioned actions of the added wording. (The ARP6337 is an authority accepted procedure.)</p>
response	<p>Thank you for your contribution. Your comment is not accepted. ARP6337 as modified by this ETSO could be one mean of compliance but not one for compliance demonstration to CS requirements.</p>

comment	<p>23</p> <p style="text-align: right;">comment by: <i>Airbus-Regulations-SRg</i></p> <p>PDF-page 61/125, Appendix 1, table 1, AS8049C section 5, new subsection 5.3.1.5</p> <p>Airbus proposal: Airbus propose not to limit this new subsection only to “Sensor-driven restraint systems” but also to include the subject “HIC reducing features activated under inertia loads”.</p> <p>Rationale: Threshold tests for HIC reducing features activated under inertia loads were requested by EASA recently. In case of using existing ETSO-approvals for aircraft installations the substantiation of this specific feature in regard to thresholds might not be obvious without integrating this recent request into the ETSO.</p>
response	<p>Thank you for your contribution. Your comment is not accepted. The requested change has not been implemented in ETSO-C127c. So far, EASA has evaluated the performance of seating systems that incorporate HIC-reducing features that are activated by inertia loads. These have been addressed by EASA on a case-by-case basis in seat installation project. The experience accumulated so far, is relatively limited while the variability in the design solutions proposed for certification is significant. Consequently, EASA considers premature the inclusion of more specific guidance related on HIC-reducing features activated by inertia loads into ETSO-C127c. However, the following guidance will be taken into account in the certification of seating system incorporating the design features under discussion. A seat design may incorporate a feature that activates at a specified inertia load level. The activation of such feature may result in a step change in occupant protection for impacts at inertia load levels below and above the activation load level. It is acceptable for the seat design to have such non-linear or step change characteristics provided that the occupant injury criteria in CS 25.562(c) are met at any condition at which the mechanism does or does not deploy, up to the maximum severity pulse specified in CS 25.562(b)(1) and (2). The threshold of activation of the design feature should be identified through dedicated testing, taking into account any relevant tolerances, seat occupancy and, whenever applicable, the floor deformation conditions specified in CS 25.562(b). CS 25.562(c)(5) requires that protection must be provided or the seat be designed so that the head impact does not exceed a Head Injury Criterion (HIC) value of 1000 units. While the test conditions described for HIC are detailed and specific, it is the intent of the requirement that an adequate level of head injury protection be provided for passengers in a severe crash in the range of decelerations from zero up to the levels specified in CS 25.562(b)(2). The incorporation of a mechanism that activates before the backrest is impacted by the ATD head, may result in the relocation of the area that is impacted by the ATD head compared to what predicted in the dynamic test plan. Furthermore, it may also result in a reduction of the stiffness of the backrest, with consequent reduction of the HIC value. It must be shown that testing with deceleration pulses up to the mechanism activation threshold will result in HIC not exceeding 1000. In such testing, the</p>

activation of the mechanism should not occur before the backrest at the threshold is impacted by the ATD head.  
 The activation of the mechanism caused by interaction between the ATD hands/arms and the seat backrest is not considered acceptable.  
 For threshold testing, in order to minimize the risk that interaction between the ATD hands/arms and the backrest triggers the activation of the HIC reducing mechanism, EASA is ready to accept positioning of the ATD hands/arms alternative to that prescribed by FAA AC25.562-1B Ch.1, as long as it can be shown that the proposed alternative hands/arms position does not reduce the criticality of the head impact event.

comment

24

comment by: *Airbus-Regulations-SRg*

PDF-page 65/125, Appendix 1, table 1, AS8049C section 5, new subsection 5.4.11

Airbus proposal:

Subsection 5.4.11(b) shall be deleted.

And the remaining part of subsection 5.4.11 shall be adapted to be similar for the use of

FAA Hybrid II and Hybrid III.

Rationale:

Test series by several seat suppliers in the past have shown a  $N_{ij} > 1$  even with smooth head movement w/o stop (flat backrest surface). Due to this a  $N_{ij} > 1$  without any other

critical movement observation of the dummy in case of testing with FAA Hybrid III does not show evidence of an unsafe design.

response

Thank you for your contribution. Your comment is not accepted. Please refer to reply to comment number 67 for further details.

comment

25

comment by: *Airbus-Regulations-SRg*

Page 26, Appendix 1, table 2, ARP5526D section 3, page 7.

Airbus proposal:

Airbus propose to delete the part "If self aligning features are not provided..." of the new wording of the second subsection of 3.2.2 to read as follows:

*"Restraint system anchorages should provide self-aligning features.*

*The anchorage system must minimise the possibility of incorrect installation or inadvertent disconnection of the restraints."*

Rationale:

The criteria for sufficient testing without self-aligning features is not clear.

"...tests in this document should be conducted with the restraints and

*anchorages positioned in the most adverse configuration* allowed by the design."

Testing of a not aligned configuration would be too ambiguous for a standard.



response

Thank you for your contribution. Your comment is not accepted. The requested change will not be implemented in ETSO-C127c.

EASA considers that the requirement questioned is unambiguous. The intent is to allow designs in which the safety belt is not equipped with self-aligning features, provided that the most adverse configuration allowed by the design of the restraint system is selected for the tests required by ETSO-C127c.

Furthermore, EASA has not experienced any controversial discussion with applicants in the specific projects in which the requirement in question has been applied.

comment

60

comment by: *Rayk Hey*

- Quote from page 65 of NPA 2021-07:
  - 5.4.11 If the ATD is exposed to impact with aircraft interior features during the test:
    - (a) if the test uses a Hybrid II ATD, then:
    - (b) if the test uses an FAA Hybrid III or equivalent, then:
- Discussion:
  - There is no CS-25 requirement to assess neck injury for forward and aft facing seats. An appropriate common standard should be set for seat performance regardless of ATD chosen. Requiring ETSO applicants to meet neck load criteria when performing dynamic testing with a FAA Hybrid III creates a potentially significant step change in expected seat performance based solely on whether a Hybrid II or FAA Hybrid III ATD is used during dynamic testing. This potentially significant difference in performance levels based on ATD versions will penalize those ETSO applicants that do not have access to Hybrid II 50% male ATDs. Furthermore, the proposed minimum performance standard requiring that the Hybrid II ATD head center of gravity not stop for more than 10ms when sliding down the seat back surface while the torso is still moving downward has not undergone sufficient technical evaluation to assess its validity or efficacy in assessing potential occupant injury. Furthermore, the proposed minimum performance standard requiring that the FAA Hybrid III ATD data calculation does not output NIJ values above 1 has not undergone sufficient technical evaluation to assess its validity or efficacy in assessing potential occupant injury.
- Proposed new wording for NPA 2021-07:
  - Delete para 5.4.11.

response

Thank you for your contribution. Your comment is not accepted. Please refer to reply to comment number 67 for further details.

comment

67

comment by: *SAE SEAT Committee***Comment:**

Delete criteria 5.4.1.1 (b)(2) and (b)(3), which adds neck load limits when testing with a FAA Hybrid III ATD.



	<p><b>Rationale:</b></p> <p>There are multiple issues with adding neck load criteria into the ETSO minimum performance standard.</p> <p>1) There is no CS-25 requirement to assess neck injury for forward and aft facing seats.</p> <p>2) An appropriate common standard should be set for seat performance regardless of ATD chosen. Requiring ETSO applicants to meet neck load criteria when performing dynamic testing with a FAA Hybrid III creates a potentially significant step change in expected seat performance based solely on whether a Hybrid II or FAA Hybrid III ATD is used during dynamic testing. This potentially significant difference in performance levels based on ATD versions will penalize those ETSO applicants that do not have access to Hybrid II 50% male ATDs. It also encourages the continued use of the Hybrid II ATD in seat dynamic testing for those ETSO applicants who do have access to the older ATD model, thereby providing a disincentive toward using the newer and more biofidelic FAA Hybrid III ATDs.</p> <p>If EASA would like to add additional performance criteria to the ETSO that is beyond the current scope of CS-25 requirements, we recommend that the criteria be removed from the ETSO required minimum performance standards and be included in the elective performance standards in Appendix 2.</p>
response	<p>Thank you for your contribution. Your comment is not accepted. The requested change will not be implemented in ETSO-C127c.</p> <p>EASA acknowledges the rationale provided but intends to keep the text of ETSO-C127c unchanged.</p> <p>Firstly, it is essential that ETSO-C127c is harmonized to the maximum extent possible with FAA TSO-C127c.</p> <p>Secondly, the requirements addressed in the comment do not create any potential for different treatment between applicants. In fact, the ETSO gives the possibility to select among different options in order to generate data that would be acceptable to EASA. Each applicant will have the same level of freedom to choose among the same alternative compliance approaches outlined in the ETSO and this, together with the harmonization with FAA TSO-C127cm, will ensure level playing field in Europe and in the USA.</p> <p>Lastly, the delay in the CS-ETSO effective date is also to account the novelties in the seat certification process, thus giving additional time to equipment manufacturers to adapt to them.</p>
comment	<p>68 <span style="float: right;">comment by: <i>SAE Aircraft Seat Committee</i></span></p> <p>Section: Appendix 1, added subsection 5.4.11</p> <p>Comment #1</p> <p>Delete criteria (b)(2)and (b)(3), which adds neck load limits when testing with a FAA Hybrid III ATD.</p> <p>Rationale:</p> <p>There are multiple issues with adding neck load criteria into the ETSO minimum performance standard.</p>

1. There is no CS-25 requirement to assess neck injury for forward and aft facing seats.
2. An appropriate common standard should be set for seat performance regardless of ATD chosen. Requiring ETSO applicants to meet neck load criteria when performing dynamic testing with a FAA Hybrid III creates a potentially significant step change in expected seat performance based solely on whether a Hybrid II or FAA Hybrid III ATD is used during dynamic testing. This potentially significant difference in performance levels based on ATD versions will penalize those ETSO applicants that do not have access to Hybrid II 50% male ATDs. It also encourages the continued use of the Hybrid II ATD in seat dynamic testing for those ETSO applicants who do have access to the older ATD model, thereby providing a disincentive toward using the newer and more biofidelic FAA Hybrid III ATDs.

If EASA would like to add additional performance criteria to the ETSO that is beyond the current scope of CS-25 requirements, we recommend that the criteria be removed from the ETSO required minimum performance standards and be included in the elective performance standards in Appendix 2.

response Thank you for your contribution. Your comment is not accepted. Please refer to reply to comment number 67 for further details.

comment **81** comment by: *Safran Seats*

Page 65: 5.4.11 (b)

If Hybrid III is used for HIC tests, Nij collection should not be mandatory unless questionable behavior related to neck injury (e.g., chin hang up) is observed. As for example, if an applicant run HIC tests with Hybrid III and if there is no questionable behavior related to neck injury then Nij calculation is not required. On the other hand, if video analysis shows any questionable behavior then the applicant could rerun test to collect Nij or implement design change followed by Test.

Please refer to FAA memo ANM-115-17-002, dated March 9, 2017 [Enclosure 2, Item4, Q2] for FAA response related to this topic.

response Thank you for your contribution. Your comment is not accepted. Please refer to reply to comment number 67 for further details.

comment **82** comment by: *Safran Seats*

Page 78: 'releasing' can be misleading. Propose to replace with 'activating' or 'pressing'

response Thank you for your contribution. Your comment is accepted. The document has been updated accordingly.



comment	<p>83 <span style="float: right;">comment by: <i>Safran Seats</i></span></p> <p>replace 1 000 with 1000 (i.e. remove spacing between digits, where applicable)</p>
response	<p>Thank you for your contribution. Your comment is accepted. The document has been updated accordingly.</p>
comment	<p>85 <span style="float: right;">comment by: <i>Boeing</i></span></p> <p>Page: 65 Para: Appendix 1, subsection 5.4.1.1(b)(2) and (b)(3)</p> <p><i>If the ATD is exposed to impact with aircraft interior features during the test:</i></p> <p><i>(a) if the test uses an FAA Hybrid III ATD or equivalent, then:</i>  <i>(2) the <math>N_{ij}</math> (calculated in accordance with 49 CFR 571.208) must be below 1.0, where <math>N_{ij} = (F_z/F_{zc}) + (M_{oc}/M_{yc})</math>, and the <math>N_{ij}</math> critical values are:</i></p> <p><i>i. <math>F_{zc} = 1\,530</math> lbf for tension</i>  <i>ii. <math>F_{zc} = 1\,385</math> lbf for compression</i>  <i>iii. <math>M_{yc} = 229</math> lbf ft in flexion</i>  <i>iv. <math>M_{yc} = 100</math> lbf ft in extension</i></p> <p><i>(3) the peak upper neck <math>F_z</math> is less than 937 lbf in tension and 899 lbf in compression.</i></p> <p><b>We suggest deleting criteria (b)(2) and (b)(3), which add neck load limits when testing with a FAA Hybrid III ATD or equivalent.</b></p> <p>We recommend EASA remove some of the criteria for testing with a FAA Hybrid III ATD or equivalent. There are multiple concerns with adding neck load criteria into the ETSO minimum performance standard:</p> <p>There is no CS-25 requirement to assess neck injury for forward and aft facing seats.</p> <p>An appropriate common standard should be set for seat performance regardless of ATD chosen. Requiring ETSO applicants to meet neck load criteria when performing dynamic testing with a Hybrid III creates a potentially significant step change in expected seat performance based solely on whether a Hybrid II or Hybrid III ATD is used during dynamic testing. This potentially significant difference in performance levels based on ATD versions will penalize those ETSO applicants that do not have access to Hybrid II 50% male ATDs. It also encourages the continued use of the Hybrid II ATD in seat dynamic testing for those ETSO applicants who do have access to the older ATD model, thereby providing a disincentive toward using the newer and more biofidelic Hybrid III ATDs.</p> <p>Boeing recommends that the criteria be removed from the ETSO required minimum performance standards and that these criteria instead be included in the elective performance standards found in Appendix 2.</p>
response	<p>Thank you for your contribution. Your comment is not accepted. Please refer to reply to comment number 67 for further details.</p>

**APPENDIX 1 to ETSO-C137a - MPS FOR AIRCRAFT PORTABLE MEGAPHONES**

p. 92

comment	30	comment by: FAA
	<ul style="list-style-type: none"> <li>· ETSO-C137a – Aircraft Portable Megaphones – Page: 92 Sufficiently Harmonized? Yes</li> <li>o Jamie Lessard – “I approve of EASA’s change, it looks like they simply have aligned with our TSO.”</li> </ul>	
response	Thank you for your contribution. Your comment is noted.	

**ETSO-C139a A1 Audio Systems and Equipment**

p. 93

comment	31	comment by: FAA
	<ul style="list-style-type: none"> <li>· ETSO-C139a – Aircraft Audio Systems and Equipment – Page: 93 Sufficiently Harmonized? Yes</li> <li>o Steve Ramdeen – “I have reviewed the TYPO corrections in ETSO-C139a A1 and agree with the TYPO changes.”</li> </ul>	
response	Thank you for your contribution. Your comment is noted.	

**Appendix 1 to ETSO-C139a A1 - Correction to RTCA DO-214A, 'Audio Systems Characteristics and Minimum Performance Standards for Aircraft Audio Systems and Equipment'**

p. 95

comment	86	comment by: Boeing
	<p>Page: 95 of 125 Paragraph: <i>A1.2 Correction</i></p> <p><b>THE PROPOSED TEXT STATES:</b> <i>In Section 2.8.2.9 of RTCA DO-214A, 'Audio Systems Characteristics and Minimum Performance Standards for Aircraft Audio Systems and Equipment', '0.01 pF' is replaced by '10 nF'.</i></p> <p><b>REQUESTED CHANGE:</b> In Section 2.8.2.9 of RTCA DO-214A, 'Audio Systems Characteristics and Minimum Performance Standards for Aircraft Audio Systems and Equipment', '0.01 pF' is replaced by '10 nF (preferred), or 0.01pF (alternate)'.</p> <p><b>JUSTIFICATION:</b> We recommend that EASA add the requested text, clarifying that either capacitor value is acceptable, and welcome coordination with the FAA to ensure that articles imported from EASA suppliers under the Design Approval Procedures are still accepted under the proposed ETSO text. This is important because, if adopted (either the EASA original Proposed Text or the Suggested Change text), EASA (ETSO-C139a A1) and FAA (TSO-C139A, which uses straight DO-214A without modification) will diverge on that test. Additionally, the proposed ETSO text makes the test less</p>	





	stringent than the test contained within the TSO-referenced RTCA DO-214A due to the 0.01 pF value.
response	Thank you for your contribution. Your comment is not accepted. Please refer to comment 31 where the FAA considers this as a typo change which was not identified during the public consultation of the RTCA document.
comment	<p>87 <span style="float: right;">comment by: Boeing</span></p> <p>Page: 95 of 125 Paragraph: <i>A1.3 Clarification</i></p> <p><b>THE PROPOSED TEXT STATES:</b>  <i>“The hot microphone ensures that, in addition to the recording of the radio transmissions to and from the aircraft, all the sounds received by <b>all the microphones of each crew station</b> are recorded continuously <b>on the corresponding channel</b> irrespective of the position of the audio selector switches, and without interruption.”</i></p> <p><b>REQUESTED CHANGE:</b>  <i>“The hot microphone ensures that, in addition to the recording of the radio transmissions to and from the aircraft, all the sounds received by <del>all the microphones of each crew station</del> are recorded continuously <del>on the corresponding channel</del> <b>the microphone most likely to be used by a crew member is continuously recorded,</b> irrespective of the position of the audio selector switches, <del>and</del> without interruption.”</i></p> <p><b>JUSTIFICATION:</b>  We recommend EASA revise the proposed text to clarify the modification of DO-214A Section 1.4.5. This is important because as written, the double usage of “all” in the proposed text appears to indicate that all the microphones of each station must continuously record all sounds all the time. Note that in Boeing Flight Decks, there can be up to 3 microphones connected to each station: Boom Mic, Oxygen Mask Mic, and Hand Mic. If all sounds from all mics were recorded at all times, the recording would become extremely noisy, possibly resulting in phase cancellations of the signals, and thus significantly degrading the recorded signal quality.</p> <p>Boeing refers to the mic “most likely to be used” as the Source Microphone; exactly 1 microphone can be the Source Mic at a time. Most of the time, the Source Mic is the Boom Mic, however, it will switch to the Oxygen Mask Mic when warranted (whether automatically switched when the Oxygen stowage box is opened, or manually by a switch on the ACP; the exact method is ACP dependent). When the Hand Mic PTT is pressed, that mic becomes the Source Mic for the duration of the PTT Event, before reverting to either Boom or Oxy Mic (depending on which is selected as Source Mic per the auto or manual means discussed above).</p>
response	Thank you for your contribution. Your comments is partially accepted.  The initial text of DO-214A states that ‘The Hot Microphone feature is implemented by summing each crew member’s microphone signal with the headset signal before being reproduced to the CVR input.’ EASA proposed modification of the standard only aimed at clarifying that the summing applies per station, in opposition to an

interpretation of an applicant that thought that all mikes of all stations should be summed.

After discussion with experts from investigation authorities, EASA concurs that the summing of the signals from all the mikes of a specific station is not desirable as it would adversely affect the quality of the recording. However, the current DO-214A and ETSO-C139a are containing the requirement to sum the signals. Boeing's proposal is therefore changing the intent of the current standard as only one mike would be recorded per station. This would require an evolution of the ETSO revision and prior harmonization with the FAA and with the industry.

EASA is then removing the proposed change from C139a A1, and will handle the issue on potential upcoming applications through the deviation process, pending an industry update of DO-214A.

**ETSO-C157c Flight Information Services-Broadcast (FIS-B) Equipment**

p. 96

comment	32	comment by: <i>FAA</i>
	<ul style="list-style-type: none"> <li>· ETSO-C157c – Aircraft Flight Information Service - Broadcast (FIS-B) – Page: 96 Data Link Systems and Equipment Sufficiently Harmonized? Yes <ul style="list-style-type: none"> <li>o Moin Abulhosn (Primary) – “I am still the SME for TSO C157C too and I responded that I agree.”</li> </ul> </li> </ul>	
response	Thank you for your contribution your comment is noted.	
comment	46	comment by: <i>Garmin International</i>
	<p><b>ETSO C157c Table 1 Note - Page 97:</b></p> <p>The note states "This ETSO is intended for equipment used in the US National Airspace System. UAT is not intended to be operated in European airspace". The implied restriction on UAT is too broad and not entirely accurate.</p> <p>This note seems overly broad and does not acknowledge that national regulations apply and UAT may be operated in some Member States. Replace existing note with: UAT is not approved for unrestricted usage across the European Union. National regulations apply and UAT may be operated in some Member States.</p>	
response	<p>Thank you for your contribution your comment is not accepted.</p> <p>The note is factually correct. There is currently no intention at European level to build an infrastructure that supports UAT. It is, however, broad enough to allow Member States to specifically authorise the use of UAT at national level.</p>	
comment	47	comment by: <i>Garmin International</i>
	<p><b>ETSO C157c Section 3.2.1 - Page 98:</b></p> <p>Paragraph 3.11 is incorrectly referenced. Change reference paragraph 3.11 to reference paragraph 3.1.1.</p>	



response Thank you for our contribution. Your comment is accepted. The reference will be updated accordingly.

comment 48 comment by: *Garmin International*

**ETSO C157c Section 3.2.2 - Page 98:**

Spacing and separation of paragraphs appears incorrect when compared to the TSO. Paragraph 3.2.2(b) ends with the phrase "NAS status conditions, or both". The next phrase "FIS-B information, including weather information" should begin a new paragraph at the same level as the first paragraph stating what the manual shall contain.

Formatting, grouping, and flow of the ETSO instructions for what to include in the manual appear incorrect when compared to the TSO. Match the formatting of the TSO. Begin a new paragraph between "NAS status conditions, or both" and "FIS-B information, including weather information," and decrease the indent of the next paragraph, which begins with "FIS-B information may be used".

response Thank you for our contribution. Your comment is accepted. The format will be updated accordingly.

comment 49 comment by: *Garmin International*

**ETSO C157c Section 3.2.2 - Page 99:**

The formatting and nomenclature for these paragraphs appears to have several errors. The paragraphs beginning with 'In addition to the above operating instructions' should not be indented or italic, and since they do not call out the '(c)' or '(d)' label for the following paragraphs, those labels should be removed from those paragraphs. The result should be two paragraphs of non-italic/non-indented text starting with 'In addition to the above operating instructions' each with a following paragraph, quoted and italicized, showing the text to be added for each of the two

Equipment	Class	options.
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Formatting, grouping, and flow of the ETSO instructions for what to include in the manual appear incorrect when compared to the TSO. Match the formatting of the TSO. Do not indent or italicize the two paragraphs beginning with "In addition to the above operating instructions", and remove the '(c)' and '(d)' paragraph labels as they are not used in the ETSO's format/presentation.

response Thank you for our contribution. Your comment is accepted. The format will be updated accordingly.

comment 50 comment by: *Garmin International*

**ETSO C157c Section 3.2.2 - Page 99:**

The last two paragraphs of this section should not be italicized. These paragraphs are giving instructions as to what shall be included in the manual, and are not quotations of what shall be included in the manual, and thus should not be italicized.



	Do not italicize the text in the last two paragraphs. One starting with "The manual shall describe in detail the functionality of each FIS-B Equipment Class" and the other stating "The manual shall describe any deviation in detail".
response	Thank you for our contribution. Your comment is accepted. The format will be updated accordingly.
comment	51 <span style="float: right;">comment by: <i>Garmin International</i></span> <b>ETSO C157c Section 4.2.(a).(3) - Page 99:</b>
	The final sentence needs rewording. Remove the word 'mark'. Reword to read: "For example, equipment that incorporates...shall be marked..."
response	Thank you for our contribution. Your comment is noted. The example has been redrafted.
comment	57 <span style="float: right;">comment by: <i>Garmin International</i></span> <b>ETSO C157c Table 1 - Page 97:</b>
	Within the 'Functionality' column for Equipment Class 1, a reference is called out to Section 2.2.1.9. This appears to be a typo. In the TSO, this same reference is to Section 2.1.9. The correct section should be referenced. Change the reference to Section 2.1.9.
response	Thank you for our contribution. Your comment is accepted. The table has been updated accordingly.
comment	62 <span style="float: right;">comment by: <i>Airbus Helicopters</i></span>
	The term "flight conditions" interpretation is different from the one addressed in 21.A.708
	To avoid misinterpretation, the sentence below may be added: (similar to FAA explanation in TSO-C157c wording): This includes weather conditions and U.S. National Airspace System (NAS) flight advisory information.
	The Note below Table 1 provides similar information: Note: This ETSO is intended for equipment used in the US National Airspace System. UAT is not intended to be operated in European Airspace.
response	Thank you for our contribution. Your comment is accepted. "Flight conditions" has been replaced by "conditions of flight".

**ETSO-C161b Ground-Based Augmentation System Positioning and Navigation  
Equipment**

p. 101

comment 36

comment by: *FAA*



	<p>· ETSO-C161b – Ground Based Augmentation System Positioning and Navigation Equipment – Page 101 Sufficiently Harmonized? No</p> <p>o Hamza Abduselam (Primary) – “ETSC-C161a, Page 101, section 3.1.1, middle of last paragraph; Neither TSO-C161b nor RTCA DO-253D cover integration of GBAS position outputs with automatic dependent surveillance broadcast (ADS-B). ADS-B integrations issues are covered in other documents such as AC 20-165 (). Recommend deletion of the following sentence. “These standards do not address integration issues with other avionics except for automatic dependent surveillance” Rationale: Correction.” Avoid using Radio Technical commission for Aeronautics for RTCA. RTCA is not an acronym Rationale: Correction.</p>
response	Thank you for your contribution. Both of your comments are accepted. The text has been adapted accordingly.
comment	<p>52 <span style="float: right;">comment by: <i>Garmin International</i></span></p> <p><b>ETSO C161b Section 3.1.1 - Page 101:</b></p> <p>The last paragraph includes the sentence: "These standards do not address integration issues with other avionics except for automatic dependent surveillance" which does not appear in the TSO. This is a difference between the TSO and the ETSO.</p> <p>Ensure the sentence "These standards do not address integration issues with other avionics except for automatic dependent surveillance" is accurate and desired for inclusion in the ETSO, while not present in the TSO.</p>
response	Thank you for your contribution. Your comment is accepted. The text has been adapted accordingly.
comment	<p>63 <span style="float: right;">comment by: <i>Airbus Helicopters</i></span></p> <p>Comment on ETSO-C161b section: 3.2 Specific 3.2.1 Failure Condition Classification See CS-ETSO, Subpart A, paragraph 2.4. QUOTE from CS ETSO 2.4 Failure conditions classification and development assurance During the development of an ETSO article, consideration should be given to failure conditions, and the ETSO article should then be developed in accordance with the possible effects of those failure conditions at the system and aircraft levels (see, for instance, <b>AMC CS xx.1309</b> or AMC CS 23.2500/2510 for further guidance). UNQUOTE</p> <p>References like AMC CS 27.1309, AMC CS 25.1309 and AMC CS 29.1309 do not exist. The only one published by the Agency is AMC 25.1309 within CS 25. Recommendation: remove the wording “CS” from <b>AMC <del>CS</del> xx.1309</b>.</p>



response Thank you for your contribution. Your comment is accepted. The text has been further updated to clarify.

**ETSO-C162b Ground-Based Augmentation System Very High Frequency Data Broadcast Equipment** p. 103

comment 37 comment by: *FAA*

· ETSO-C162b – Local Area Augmentation System Very High Frequency Data Broadcast Equipment – Page: 103  
Sufficiently Harmonized? No  
o Hamza Abduselam (Primary) – “ETSO-C162b, page 103, section 3.1.1 note; Typo. Appendix 2 should be deleted.  
Rationale: Correction.  
Avoid using Radio Technical commission for Aeronautics for RTCA. RTCA is not an acronym  
Rationale: Correction.”

response Thank you for your contribution. Your comments are accepted. The text has been adapted accordingly.

comment 53 comment by: *Garmin International*

**ETSO C162b Section 3.1.1 - Page 103:**

At the end of the 'Note' there appears to be unnecessary text stating 'Appendix 2'. The reference to Appendix 2 appears to need removal along with the surrounding text that is removed. Remove 'Appendix 2' from this Note.

response Thank you for your contribution. Your comment is accepted. The text has been adapted accordingly.

comment 56 comment by: *Garmin International*

**ETSO C162b Section 3.1.1 - Page 103:**

For the MPS, the TSO Calls out 'Section 2' at the end of the reference to DO-253D, Change 1. The ETSO does not appear to call out 'Section 2'. This is a difference between the TSO and the ETSO.

Verify if 'Section 2' should remain omitted from the MPS paragraph.

response Thank you for your contribution. Your comment is noted. The verification has been done the text remains unchanged.

comment 64 comment by: *Airbus Helicopters*

Comment on ETSO-C162b section:  
3.2 Specific  
3.2.1 Failure Condition Classification



	<p>See CS-ETSO, Subpart A, paragraph 2.4.          QUOTE from CS ETSO          2.4 Failure conditions classification and development assurance During the development of an ETSO article, consideration should be given to failure conditions, and the ETSO article should then be developed in accordance with the possible effects of those failure conditions at the system and aircraft levels (see, for instance, <b>AMC CS xx.1309</b> or AMC CS 23.2500/2510 for further guidance).          UNQUOTE</p> <p>References like AMC CS 27.1309, AMC CS 25.1309 and AMC CS 29.1309 do not exist. The only one published by the Agency is AMC 25.1309 within CS 25.          Recommendation: remove the wording “CS” from <b>AMC CS xx.1309</b>.</p>
response	Thank you for your contribution. The comment is accepted. The text has been updated to further clarify

**ETSO-2C168a Aviation Visual Distress Signals**

p. 109

comment	38	comment by: <i>FAA</i>
	<ul style="list-style-type: none"> <li>· ETSO-C168a – Aviation Visual Distress Signals - Page: 109</li> <li>Sufficiently Harmonized? Yes               <ul style="list-style-type: none"> <li>o Michael Johnson – “I concur with ETSO-2C168a changes, as it’s just an update to the latest Aerospace standard. (AS5134 revision B).”</li> </ul> </li> </ul>	
response	Thank you for your contribution. Your comment is noted.	

comment	54	comment by: <i>Garmin International</i>
	<p><b>ETSO 2C168a Section 3.1.1 - Page 109:</b></p> <p>The new text gives the title of AS5134B as 'Aviation Distress Signals' and only the month (no day, which would be the 12th) for the date. The actual title appears to be 'Aviation Visual Distress Signals' and the previous paragraph gives both the month and day for the date. Choose if the standard's date is to include the day, and make sure both paragraphs use the same format. Consider changing the name of AS5134B to 'Aviation Visual Distress Signals' and if updating to AS5134C (from 25 August 2020) is an option.</p>	
response	Thank you for your contribution. Your comment is accepted. The text has been adapted	

**ETSO-C178a Aircraft Circuit Breakers**

p. 111

comment	55	comment by: <i>Garmin International</i>
	<b>ETSO C178a Table 1 - Page 111:</b>	



	<p>In the Minimum Performance Standards column, the TSO begins each entry with 'Section 3 of' while the ETSO does not list the section number. This is a difference between the TSO and the ETSO. TSO-C178a calls out requirements in section 3 of SAE 58091A/6019/5692 documents and functional tests in sections 4.5 and 4.7 of SAE 58091A/6019/5692 documents. It would be preferable if ETSO matched since other sections of SAE documents include requirements for part numbering schemes, material inspection, and quality processes.</p> <p>Update Minimum Performance Standards column of Table 1 to only specify sections 3, 4.5, and 4.7 of SAE AS 58091A/6019/5692.</p>
response	<p>Thank you for your contribution. Your comment is not accepted. ETSO standards do not point to the specific sections of the MPS as do TSO (except in very specific case e.g. exclusions or marking requirements). This policy applies to this ETSO as well.</p>

**ETSO-2C520 406-MHz SATELLITE PERSONAL LOCATOR BEACON**

p. 113

comment	<p>66 <span style="float: right;">comment by: <i>Airbus Helicopters</i></span></p> <p>QUOTE Failure Condition Classification See CS-ETSO, Subpart A, paragraph 2.4. A classification of 'no safety effect' is acceptable for failures of PLBs that are not intended to be installed and not required to be approved by operational regulations. UNQUOTE</p> <p>Comment: "required to be approved by operational regulations" is understood as the requirement to have equipment required by OPS approved. According to operational rules CAT(NCC)(SPO)(NCO).IDE.H.100 (a) (a) Instruments and equipment required by this Subpart shall be approved in accordance with the applicable airworthiness requirements, except for the following items: (1) independent portable lights; (2) an accurate time piece; (3) chart holder; (4) first-aid kit; (5) megaphones; (6) survival and signalling equipment; (7) sea anchors and equipment for mooring; (8) child restraint devices.</p> <p>Assuming the PLB fall under the (a) (6) above, there is no requirement to have the PLB approved under an airworthiness certificate, although the equipment might be required to be carried under specific requirements (e.g. NCO.IDE.H.170) Could EASA please confirm this understanding is correct? Furthermore, it seems the PLB enters into the definition of Non-Installed Equipment (NIE) of the EASA basic regulation. Could EASA confirm whether the NIE future implementing rules will address the level of required certification or declaration for PLB equipment?</p>
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response Thank you for your contribution. Your comment is accepted.  
EASA confirm that the PLB is not required to be approved by the Air Ops Regulation.  
Until a process to approve NIE is fully defined and implemented, EASA offers to applicants the ETSO path for those articles. This approach is consistent with other types of articles such as ELT(S) or headsets that can be a part or a NIE and for which an ETSO standard exist. This is also consistent with standards introduced in this amendment of CS-ETSO, e.g. ETSO-2C521 for EFB or ETSO-C137 for megaphones.

**ETSO-2C521 Electronic Flight Bag (EFB) Software Applications Approval**

p. 115

comment 70 comment by: THALES AVS  
It is not understood with the term "Approval" is part of the title.  
Term "Approval" should be removed from the title, to be consistent with others ETSOs.

response Thank you for your contribution. Your comment is accepted. The title has been reviewed.

comment 71 comment by: THALES AVS  
Reference to See CS-ETSO, Subpart A, paragraph 2.2 is not relevant as there is no correspondance between the "Function Qualification Level" introduced by ED-273 and the "software level" introduced subpart A, paragraph 2.2.  
Reference to CS-ETSO, Subpart A, paragraph 2.2 should be removed.  
  
§3.1.3 Software  
~~See CS-ETSO, Subpart A, paragraph 2.2.~~  
See the software development assurance method described in EUROCAE ED-273, 'Minimum Operational Performance Standard for Electronic Flight Bag (EFB) Software Applications'11.

response Thank you for your contribution. Your comment is accepted. The text has been reviewed and further clarified.

comment 72 comment by: THALES AVS  
3.2.1 Failure Condition Classification  
See CS-ETSO, Subpart A, paragraph 2.4.  
  
Subpart A, paragraph 2.4. is not relevant for EFB applications and is not compatible with ED-273 approach.  
Reference to CS-ETSO, Subpart A, paragraph 2.4 should be removed.  
The reference to Section 2.3 must be removed as it may change in the final ED-273 version.  
  
3.2.1 Failure Condition Classification  
~~See CS-ETSO, Subpart A, paragraph 2.4.~~



response	<p>An operational risk assessment must be performed per EUROCAE ED-273, 'Minimum Operational Performance Standard for Electronic Flight Bag (EFB) Software Applications', <del>Section 2.3</del>. The assumptions, mitigation and prevention means identified in this risk assessment must be made available to the aircraft operator as required by the standard.</p> <p>Thank you for your contribution. Your comment is accepted. The text has been reviewed.</p>
comment	<p>73 <span style="float: right;">comment by: <i>THALES AVS</i></span></p> <p>3.2.2 Documentation The applicant shall develop and make available to the aircraft operator the application operational data as defined in EUROCAE ED-273, Chapter 4.</p> <p>the reference to Chapter 4 must be removed as it may change in the final ED-273 version.</p> <p>3.2.2 Documentation The applicant shall develop and make available to the aircraft operator the application operational data as defined in EUROCAE ED-273, <del>Chapter 4</del>.</p>
response	<p>Thank you for your contribution. Your comment not accepted. The standard has been published and the reference matches the MPS.</p>
comment	<p>88 <span style="float: right;">comment by: <i>Boeing</i></span></p> <p>Page: 115 and Appendix Paragraph: Entire</p> <p><b><u>THE PROPOSED TEXT STATES:</u></b> [States establishment of new ETSO for Electronic Flight Bag software applications.]</p> <p><b><u>REQUESTED CHANGE:</u></b> Suggest to remove this specific ETSO from this Regular Update of CS-ETSO.</p> <p><b><u>JUSTIFICATION:</u></b> We recommend to remove the new ETSO for EFB software applications as RMT.0727 is still in development. Our understanding is that RMT.0727 is intended to amend Part-21 to include a new oversight system that is proportionate to the risk associated with a product and its operations (i.e. to moderate Part 21 requirements and administration for some types of products and functions that have a Minor failure effect only). As presently constituted and without the new "right-sized" system, this ETSO would align to existing Part 21 requirements applicable to Airworthy components / functions. This is important to note because the overhead for EFB software would be significantly increased and not proportionate to the risk that such applications impose—a risk that is already mitigated by each operator as required for Operational Approval to be granted.</p> <p>In summary, Boeing recommends completion of rulemaking RMT.0727 before ETSO-2C521 becomes effective in order to establish the Part-21 modifications to amend</p>

	Part-21 to include a new oversight system that is proportionate to the risk associated with a product and its operations.
response	<p>Thank you for your contribution. Your comment is not accepted.</p> <p>The ETSO path is optional and the introduction of this new ETSO does not result in additional obligations to operators and EFB developers. It immediately provides a path for those EFB developers who wish to use the ETSO process. Once RMT.0727 is completed, CS-ETSO might be amended. The path might remain available or the new process might also use CS-ETSO as an acceptable source for technical standards covering Non-Installed Equipment.</p>
comment	<p>89 <span style="float: right;">comment by: <i>Boeing</i></span></p> <p>Page: 115 and Appendix Paragraph: 1 Applicability</p> <p><b><u>THE PROPOSED TEXT STATES:</u></b> <i>“This ETSO provides the requirements which electronic flight bag software applications that are designed on or after the date of this ETSO must meet in order to be identified with the applicable ETSO marking.”</i></p> <p><b><u>REQUESTED CHANGE:</u></b> <i>“For manufacturers that desire ETSO Authorization for their EFB product, this ETSO provides the requirements that electronic flight bag software applications, designed on or after the date of this ETSO, must meet in order to be identified with the applicable ETSO marking. Note: pursuing this ETSOA is optional and not a requirement for Operational Approval to be granted to an operator by their National Authority for that operator’s EFB Program.”</i></p> <p><b><u>JUSTIFICATION:</u></b> The requested change aligns with statements from the participating EASA representative in the context of EUROCAE WG 106 drafting of ED-273.</p>
response	<p>Thank you for your contribution. Your comment is not accepted. The ETSO path is optional and the introduction of this new ETSO does not result in an obligation for EFB developer to apply. This statement is true of any ETSO standard and is also valid in FAA system. The only restriction is that the ETSO marking cannot be applied if the process is not applied.</p>

**ETSO-2C522 Helicopter Terrain Awareness and Warning System (HTAWS) Advanced Features**

p. 117

comment	<p>65 <span style="float: right;">comment by: <i>Airbus Helicopters</i></span></p>
	<p>Equipment class Helicopter Offshore Operations (HOFO) is not consistent with EASA SPA.HOFO.160 (c) Equipment requirements.</p> <p>QUOTE (c) Helicopter terrain awareness warning system (HTAWS) Helicopters used in CAT operations with a maximum certificated take-off mass of more than 3 175 kg or a MOPSC of more than 9 and first issued with an individual CofA after 31 December</p>



	<p>2018 shall be equipped with an HTAWS that meets the requirements for class A equipment as specified in an acceptable standard.</p> <p>UNQUOTE</p> <p>HTAWS Classes are not yet defined within ETSO-C194 associated MOPS. TAWS classes are detailed in ETSO-C151d technical conditions i.e. A, B and C.</p> <p>Is the 4-th class introduced with ETSO-2C522 (Class HOFO) intended to be addressed within air operations rules instead of the Class A or will Class HOFO be addressed as an alternative solution to Class A?</p>
response	<p>Thank you for your contribution. Your comment is noted. Its relates to an issue in the Commission regulation on air operations (EU) 965/2012 and should be addressed at that level.</p>

65 bis

comment by: UK CAA

Paragraph 3.2.1

This states that “Failure of the function defined in paragraph 3.1.1 resulting in false warnings or an unannounced loss of function is a major failure condition”.

From this statement, it is unclear whether Mode 1 Red Alerts are included. If so, further information on the rationale for classifying unannounced loss of function with respect to Mode 1 Red Alerts as Major rather than Hazardous would aid understanding of the statement.

If the quoted text does not apply to Mode 1 Red Alerts, it may be helpful to add a specific statement to this effect to avoid future confusion.

**Justification:**

The rationale for a blanket classification of failure conditions linked to unannounced loss of function is unclear.

Thank you for your contribution. Your comment is not accepted.

Statement is applicable to all functions provided in paragraph 3.1.1. The Offshore HTAWS equipment is intended to provide alerting aids aimed at reducing the risk of a CFIT accident through increased awareness of the aircraft state relative to terrain. Offshore HTAWS is not a navigation aid or an aircraft system status monitor. The Offshore HTAWS shall be therefore a mean to increase crew situational awareness and not the only mean to avoid CFIT accident. For this reason, unannounced loss of function is considered as major failure condition, due to the increase in pilot workload given the reduced situational awareness. Classification of the failure is also consistent with fixed wing TAWS ETSO-C151c and with HTAWS ETSO-C194.

