



European Aviation Safety Agency
Comment-Response Document 2017-08

Appendix
to ED Decision 2018/002/R

RELATED NPA 2017-08 — RMT.0457 — 19.2.2018

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1. Summary of the outcome of the consultation

55 comments were received from 13 stakeholders. The following Table 1 shows the number of comments received by each commentator:

Commentators	# of comments
Airbus	13
DGAC France	1
EASP	2
ESSP-SAS	1
EUROCONTROL	1
FAA	13
Garmin International	8
GE Aviation	1
KID-Systeme GmbH	1
Luftfahrt-Bundesamt	1
THALES-Avionics	11
UK CAA	1
UTC Aerospace Systems	1

Total 55

Table 1

The subjects that received the more significant comments are listed in the following Table 2:

NPA 2017-08 segment	# of comments
Introduction and explanatory notes	16
Draft ETSO-C16b	1
Draft ETSO-C23f	1
Draft ETSO-C30d	2
Draft ETSO-2C63e	1
Draft ETSO-C96b	3
Draft ETSO-C115d	3
Draft ETSO-C145e	8
Draft ETSO-C146e	10
Draft ETSO-C166b A23	1
Draft ETSO-C209	4
Draft ETSO-C210	4
Draft ETSO-2C514a	1

Table 2

The commentators were in general supportive of the proposed amendments to CS-ETSO.

None of the comments was against the proposal or gave rise to significant controversy. The nature of the comments received ranged from specific technical comments, to observations aimed at improving the wording.

In some cases, the commentators focused on the differences between the proposed ETSOs and the corresponding FAA TSO.

The majority of these misalignments have been corrected in considering the comments received, and in some cases, the wording proposed by NPA 2017-08 has been improved for clarification purposes.

The majority of the comments submitted were either accepted or partially accepted, as shown in the following Table 3:

	ACCEPTED	PARTIALLY ACCEPTED	NOTED	NOT ACCEPTED	Σ
<i># of occurrences</i>	16	8	17	14	55
<i>percentage</i>	29%	15%	31%	25%	100

Table 3

The individual comments and the responses thereto are contained in Chapter 2 of this comment-response document (CRD).

A summary of the changes made compared to the text proposed in NPA 2017-08 is provided in the Explanatory Note of the Decision on 'CS-ETSO — Amendment 13'.



2. Individual comments and responses

In responding to comments, a standard terminology has been applied to attest EASA's position. This terminology is as follows:

- (a) **Accepted** — EASA agrees with the comment and any proposed amendment is wholly transferred to the revised text.
- (b) **Partially accepted** — EASA either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.
- (c) **Noted** — EASA acknowledges the comment but no change to the existing text is considered necessary.
- (d) **Not accepted** — The comment or proposed amendment is not shared by EASA.

2.1. CRD table of comments, responses and resulting text

(General Comments)	-
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comment 1

comment by: KID-Systeme GmbH

This general comment aims to a missing content. During the last year we were in discussion and found solution / criteria (see below) with the EASA Parts & Appliances section in terms of (non-)consideration of field loadable configuration files (PDIs according to /RTCA178C/) within the ETSO article configuration in order to keep a reasonable configuration management.

As per /RTCA178C/ configuration files are generally treated as Parameter Data Items (PDI). However, the consideration respectively non-consideration of CF and consequently the identification of CF within the ETSO Authorization certificate should depend on classification against certain criteria supported by the EASA Parts & Appliances section.

This classification should result in one of the following categories:

- *Category A) CF shall be identified within the ETSO Authorization certificate*
- *Category B) CF needs not to be identified within the ETSO Authorization certificate*

The compliance criteria to /RTCA178C/ for an ETSO applicant using CF should be given by the EASA as follows:

A) CFs should be identified in the certificate, if the CF is used:

- *to specify parameter, algorithms or combinatorial logics direct traceable to CS-ETSO or relevant MOPS requirements;*
- *to ensure or monitor partitioning, protection, timing or other safety requirements;*
- *to activate (potentially) functions with incomplete life cycle data.*

B) If items in A) are not applicable the CF should not appear on the certificate, if the CF covers only:

- *operational aspects (aeronautical databases, obstacle database, operator responsibilities, data used as a switch, ...);*
- *production aspects (calibration, correction factors, ...);*
- *aircraft specific aspects (equipment interfaces, ...);*



	<ul style="list-style-type: none"> • maintenance aspects (similar to PIN programming, ...); • non-ETSO aspects. <p>Discussion contact was the competent PCM Mr. [REDACTED]. We already informed Mr. [REDACTED] about the missing content, who asked to address this item officially via the EASA CRT. Please be so kind and contact in first instance Mr. [REDACTED] for further details.</p>
response	<p>Noted.</p> <p>EASA currently decides on a case-by-case basis whether or not the CF is included in the ETSO authorisation using engineering judgement.</p> <p>However, EASA appreciates that the publication of specific guidance/material on this subject may support the ETSO authorisation process. An internal evaluation will be done to define the most appropriate means and to define priorities for this task.</p>
comment	<p>26 comment by: UK CAA</p> <p>Thank you for the opportunity to comment on NPA 2017-08, Regular update of CS-ETSO.</p> <p>Please be advised that there are no comments from the UK Civil Aviation Authority.</p>
response	<p>Noted.</p>
comment	<p>28 comment by: THALES-Avionics</p> <p>Thales fully support this TSO/ETSO systematic transposition process and is very satisfied by the introduction of new ETSO such as ETSO-C210 Airborne Head Up Display, and by the transposition of FAA new TSO such as TSO C209 Electronic Flight Instrument System (EFIS) Display.</p>
response	<p>Noted.</p>
comment	<p>33 comment by: Luftfahrt-Bundesamt</p> <p>The LBA has no comments on NPA 2017-08.</p>
response	<p>Noted.</p>
comment	<p>34 comment by: DGAC France</p> <p>DGAC France has no specific comment on this NPA</p>
response	<p>Noted.</p>
comment	<p>49 comment by: Garmin International</p> <p>General:</p> <p>To be consistent with other ETSOs, all sections 3.2.1 should begin with the statement “See CS-ETSO Subpart A paragraph 2.4.”</p> <p>ETSO noted were ETSO-C63e, -C123c, C124c, and C-176a.</p>

response Accepted.
The affected ETSOs have been updated accordingly.

2.3. How we want to achieve it—overview of the proposals p. 4-11

comment 3 comment by: FAA

AIR-130	Page 10/140, Table 1	For ETSO-C210 row, “Corresponding FAA TSO” column states, “No corresponding TSO”.	FAA plans to publish TSO-C210 in late July 2017.	Change to read, “TSO-C210 (31.7.2017)” ...or actual publish date.
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response Accepted.
The actual publication date has been added in the explanatory note to the Decision.

comment 5 comment by: FAA

AIR-130	Page 5 of 140	Currently the FAA TSO corresponding to ETSO-C30d is at revision c. This update introduces more adequate requirements for LED technology but does not introduce significant different requirements.	Could you please clarify the intent of this statement? Does this mean that EASA does not agree with the MPS of TSO C30c? Are you recommending that FAA update FAA TSO C30 to rev d and try and harmonize with ETSO-C30d?	Clarify please
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response Noted.
EASA is convinced that the newest industry standard is the more adequate for the current technologies. Additionally, once ETSO-C30d is published, EASA applicants will no longer be required to request a deviation to use the latest industry standard. Before proposing this amendment, EASA coordinated with the FAA and the FAA did not object.

comment 6 comment by: FAA

AIR-130	Page 6 of 140	Currently the FAA TSO corresponding to ETSO-C96b is at revision a. This update introduces more adequate requirements for LED technology but does not introduce significant	Could you please clarify the intent of this statement? Does this mean that EASA does not agree with the MPS of TSO C96a? Are you recommending that FAA update FAA TSO-C96 to rev b and try and harmonize with ETSO-C96b?	Clarify please
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		different requirements.		
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response

Noted
EASA is convinced that the latest industry standard is more adequate for the current technologies. Additionally, once ETSO-C96b is published, EASA applicants will no longer be required to request a deviation to use the latest industry standard. Before proposing this amendment EASA coordinated with the FAA and the FAA did not object.

comment

7 comment by: FAA

AIR-130	Page 7 of 140	The main difference is that the concept introduced by TSO-C145d is not introduced in the ETSO-C145e.	Typo- you mean FAA TSO C145d? Just to be clear on which TSO.	Clarification
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response

Accepted.
Reference to the FAA TSO has been clarified in the explanatory note to the Decision

comment

8 comment by: FAA

AIR-130	Page 8 of 140	The main difference is that the concept introduced by TSO-C146d is not introduced in the ETSO-C146e.	Typo- you mean FAA TSO C146d? Just to be clear on which TSO.	Clarification
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response

Accepted
Reference to the FAA TSO has been clarified in the explanatory note to the Decision.

comment

9 comment by: FAA

AIR-130	Page 9 of 140	ETSO-C30d Position Lights No FAA corresponding TSO revision	Aircraft	The Table	Need to clarify statement.
				Changes to Index 1 of CS-ETSO Shows that there is no FAA corresponding TSO – however there is FAA TSO C30c. I suspect the intent was that there is no FAA corresponding TSO for ETSO C30d	

response Accepted.
The interpretation suggested is correct. The explanatory note already clarifies that the FAA TSO corresponding to ETSO-C30d is at revision c, additionally a new sentence has been added in Table 1 to further clarify this.

comment 10 comment by: FAA

AIR-130	Page 10 of 140	ETSO-C96b Anticollision Light System No corresponding FAA TSO revision	The Table Changes to Index 1 of CS-ETSO Shows that there is no FAA corresponding TSO – however there is FAA TSO C96a. I suspect the intent was that there is no FAA corresponding TSO for ETSO C96b	Need to clarify statement
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response Accepted.
The interpretation suggested is correct. The explanatory notes already clarify that the FAA TSO corresponding to ETSO-C96a is at revision c. Additionally, a new sentence has been added in Table 1 to further clarify this.

comment 21 comment by: AIRBUS

ETSO-C96b: Anticollision Light Systems (page 6)

The document is referencing "SAE Aerospace Standard AS8037C, 'Minimum Performance Standard for Aircraft Position Lights', dated July, 2013." which is incorrect.

The correct document reference should be:

AS8017C "Minimum Performance Standard for Anticollision Light Systems" dated Jun 20, 2011

response Accepted.
The text has been corrected as proposed.

comment 29 comment by: THALES-Avionics

Thales thanks EASA for defining the Airborne Head Up Display ETSO (C210) in coordination with FAA for harmonization purpose.
Thales also considers having an ETSO for Head Up display is a good first step for preparing a future ETSO for Head-Worn Displays.

Additionally, in this NPA, CS-ETSO Subpart A is not updated, but Thales is still requesting the suppression of the mention to EASA Certification Memo CM-SWCEH-001 Development Assurance of Airborne Electronic Hardware in § 2.3 Airborne electronic hardware (AEH) and



the suppression of of the mention to ED79A/ARP4754A guideline in § 2.4 2.4 Failure conditions classification and development assurance in this Subpart.

Regarding marking, CS-ETSO Subpart A may also be modified to take into account electronic marking. Ideed, in new or recently updated FAA TSO, a statement on electronic marking is added (e.g. TSO C145e, C146e, C209, C210, ...) stating that *"You may use electronic part marking to identify software or airborne electronic hardware components by embedding the identification within the hardware component itself (using software) rather than marking it on the equipment nameplate. If electronic marking is used, it must be readily accessible without the use of special tools or equipment."*

response Partially accepted.
EASA is currently working on AMC 20-152A in coordination with the FAA. Tthis document is intended to replace CM-SWCEH-001.
Today the CS-ETSO does not mandate the use of ED79A/ARP4754A, this document nevertheless provides useful guidance for ETSO applicants on the classification of failure conditions and development assurance.

Regarding electronic marking, EASA intends to include a provision and an associated requirement within one of the next CS-ETSO updates.

comment 47 comment by: EASP
EASP / European Association for Safety Parachutes supports the update of ETSO-C23f. It is a harmonisation of the technical requirements for manufacturing and testing.

response Noted.

2.4. What are the expected benefits and drawbacks of the proposals p. 11

comment 11 comment by: FAA

AIR-130	Page 11 of 140	Additionally, if the ASNRC equipment contains a memory retention device which is a rechargeable lithium battery, the flammability risk must be addressed.	Is it only the flammability risk be addressed for rechargeable lithium batteries? Is there no special condition to evaluate all possible hazards presented by lithium batteries?	Need to add special condition if exist in EASA process.
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response Noted.
EASA will consider the updating of CS-ETSO Section A during the next regular update of CS-ETSO. EASA is currently involved in the final drafting phase of a new industry standard dedicated to chargeable batteries (ref. RTCA DO-311A). That standard may be introduced in CS-ETSO Section A.



3. Proposed amendments - Draft CSs p. 12

comment

4

comment by: FAA

	Page 12/140, Index 1	FAA TSO's as follows (format, dd/mm/yyyy):	Current or near-future planned TSOs	Document current status
AIR-130		<ul style="list-style-type: none"> · TSO-C10c, 31.10.2016 · TSO-C13g, 3.2.2017 · TSO-C20a, 12.1.2017 · TSO-C26e, proposed for 31.8.2017 · TSO-C117b, proposed for 29.9.2017 · TSO-C127c, proposed for 30.11.2017 · TSO-C164a, 2.10.2015 · TSO-C196b, 20.12.2013 		

response

Noted.
The scope of this table is simply to provide an indication regarding the last amendment of each ETSO. This table is not intended to provide a comparison between ETSO and TSO revisions.

3. Proposed amendments - Draft CS - ETSO-C16b p. 21-27

comment

27

comment by: UTC Aerospace Systems - Sensors & Integrated Systems

Segment 1.0, Page 21 - As currently written, the ETSO applies to probes designed and manufactured on or after the date of ETSO issuance. The FAA TSO version applies after 27-June-2018. UTAS recommends harmonizing with the FAA timeline. UTAS also recommends clarifying that the new ETSO version should apply to applications submitted after the effective date instead of "designed and manufacturerd" which could be confusing.

Segment 3.1.1, Page 21 - SAE International calls the document "AS8006A" and not "AS8006 rev A".

Segment 4.2, Page 22 - SAE International calls the document "AS8006A" and not "AS8006 rev A".

Appendix 1, first line, Page 24 - SAE International calls the document "AS8006A" and not "AS8006 rev A".

Appendix 1, Table 2 Header, Page 25 - SAE International calls the document "AS8006A" and not "AS8006 rev A".

Appendix 1, Page 26 - there was no FAA modification to section 2.2.6.



response

Appendix 1, Page 26 - Alteration to section 5.2.6 of AS8006A should be alteration to section 5.26.

Partially accepted.

The application date of the ETSO release is common to the whole of CS-ETSO Amendment 13.

A 6 month delay is provided, resulting in a nearly simultaneous application date for both the FAA and EASA.

The wording ‘designed and manufactured’ is common to all ETSOs. No modification was introduced.

AS8006 rev A was replaced by AS8006A

References to FAA modifications have been removed

Reference to AS8006 5.26 was corrected.

3. Proposed amendments - Draft CS - ETSO-C23f

p. 28-30

comment

48

comment by: EASP

EASP / European Association for Safety Parachutes supports these proposed changes. It brings technical standards for manufacturing and testing into a common US / EASA field.

response

Noted.

3. Proposed amendments - Draft CS - ETSO-C30d

p. 31-32

comment

16

comment by: AIRBUS

The purpose of this comment is to ensure a proper understanding by the industry of the change made by the EASA:

□The explanation about the content of Index 1 and Index 2 in CS-ETSO dates back to the original issue of CS-ETSO:

- for Index 1, item 1.1 of the explanation reads “Index 1 lists all those ETSOs which are technically similar to FAA-TSOs.”.

- for Index 2, item 2.1 of the explanation reads “Index 2 lists all those ETSOs which are not technically similar to FAA-TSOs; examples are: [...] When an FAA-TSO does not exist for a particular application.”

The explanation about the creation of ETSO-C30d in section 2.3 of NPA 2017-08 reads “Currently the FAA TSO corresponding to ETSO-C30d is at revision c. This update introduces more adequate requirements for LED technology but does not introduce significant different requirements.”



Similarly, the explanation about the creation of ETSO-C96b in section 2.3 of NPA 2017-08 reads “Currently there FAA TSO corresponding to ETSO-C96b is at revision a. This update introduces more adequate requirements for LED technology but does not introduce significant different requirements.”

The sentence “This update introduces more adequate requirements for LED technology but does not introduce significant different requirements.” raises the following questions:

- do ETSO-C30d and ETSO-C96b still belong to index 1 of CS-ETSO?
- if yes, could an aircraft manufacturer installing a piece of TSO-C30c or TSO-C96a equipment featuring LED technology be imposed at aircraft level extra requirements to deal with the new requirements in ETSO-C30d or ETSO-C96b?

response

Noted.

The ETSO does not deal with installation requirements. An ETSO is not required for an installation.

comment

17

comment by: AIRBUS

From an aircraft manufacturer point of view, having the same revision letter between FAA TSO and EASA index 1 ETSO is a very helpful means to easily establish the technical similarity between the different revisions of an FAA TSO and the different revisions of an EASA ETSO. In NPA 2017-08, this has been done for example for:

- ETSO-C63e: “For consistency with the FAA TSO, EASA decided to skip revision d and publish directly the revision e.”

- ETSO-166b A3: “The existing revision letter is, however, kept to ensure synchronisation with the revision letter of the FAA TSO. This is possible since there are no changes in the technical content. An amendment number is added to highlight the change.”.

With the proposed revision letters, ETSO-C30d and ETSO-C96b introduce an inexplicit specificity in the usual identification practices that could lead to confusion in the future.

response

Noted.

These ETSOs are just ETSOs where EASA is ahead of the FAA in order to facilitate the use of the latest industry standard without requiring a deviation.

3. Proposed amendments - Draft CS - ETSO-2C63e

p. 35-38

comment

36

comment by: EUROCONTROL

The EUROCONTROL Agency welcomes the publication by EASA of an NPA to CS-ETSO. It has one observation to make with respect to the proposed amendments to ETSO-C63e.

The newly introduced and-or amended text frequently indicates (on pages 35 and 36, five times in total) the notion/term ‘forward-looking’. While this term is one-on-one copied from the latest RTCA DO-220A, the meaning of this term could be considered not unambiguous enough especially addressing the wider context of weather. Therefore it could be considered to use a more unambiguous term in the European set of specifications.

‘Forward-looking’ could be explained as purely the capability to look in one direction (in front



of the aircraft) or could be explained in a more holistic way (and as explained in the dictionary) as ‘concerned with or planning for the future’. The latter explanation could suggest that this is about a ‘forecast’ type of functionality build into the weather radar equipment subject of the specification. The two possible interpretations, namely ‘the specification covers any forecast capability on wind shear or turbulence’ or ‘the specification exclusively covers the fact that in front of the aircraft wind shear or turbulence could be detected’ could be clarified.

response

Not accepted.
Forward-looking is a widely used term, and when associated with the term radar, it definitely refers to looking forward (meaning in front of the aircraft). From the EASA point of view, the term is established and understood without ambiguity by DO-220A users.

3. Proposed amendments - Draft CS - ETSO-C96b p. 46-47

comment

22 comment by: AIRBUS

ETSO-C96b: Anticollision Light Systems

Paragraph 3.1.1 - Minimum Performance Standard

The document is referencing “SAE Aerospace Standard AS8037C, ‘Minimum Performance Standard for Aircraft Position Lights’, dated July, 2013.” which is incorrect.

The correct document reference should be:

AS8017C “Minimum Performance Standard for Anticollision Light Systems” dated Jun 20, 2011

response

Accepted.
See the response to comment number 21.

3. Proposed amendments - Draft CS - ETSO-C115d p. 48-54

comment

12 comment by: FAA

AIR-130	Page 52 of 140.	As written, section 2.2.1.2.9.2 has an incorrect requirement that can cause different RNP system implementations to execute a different transition path turn radius.	An FRT is an enroute application of an Advanced Required Navigation Performance function. FRTs define a repeatable, curved-path transition at an enroute waypoint with a fixed, defined radius either along an airway or transitioning from one airway to another. FRTs	Add the following requirements change to for section 2.2.1.2.9.2 to ETSO-C115d, Appendix 1: 2.2.1.2.9.2 Fixed Radius Transitions. Change the second paragraph as follows and delete the third paragraph:
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			<p>have not yet been implemented anywhere in the world and implementation is not expected in the near-term. When implemented, States will define the FRT turn radius in their Aeronautical Information Publications (AIP) with the AIP-defined radius included in the RNP system database. The expectation is the database-defined turn radius will ensure all aircraft follow the same path for the specified transition.</p> <p>The FAA will issue a policy letter to manufacturers to add the recommended change for TSO-C115d. The policy letter will be posted next to TSO-C115d on the FAA website.</p>	<p>The RNP system shall use the discreet, navigation database-specified FRT turn radius associated with an enroute waypoint transition to execute an FRT from the airway inbound course to the outbound course. The RNP system shall output lateral guidance commands relative to the FRT path. The discreet turn radius is defined by a 3-digit numeric field representing the radius to one decimal place (tenths, decimal point suppressed) in nautical miles. A blank entry in the database field indicates that no fixed radius transition is required.</p>
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response Accepted
Appendix 1 amended accordingly.

comment 32 comment by: THALES-Avionics

In § 3.2.1 Failure Condition Classification, text proposed by ETSO is less precise than FAA one regarding reference of documents to be used to determine failure condition to be taken into account.

ETSO text is stating that "Design the system to the appropriate failure condition classification(s) as detailed in the guidance material for the different types of navigation specification (for instance RNP1, Advanced RNP, RNP-APCH ...)."

But it seems that there is no guidance material up to now for Advanced RNP or RNP1 for instance.

Could you clarify the reference of documents to be taken into account, or give a list of conditions as for FAA TSO.

response Not accepted.



The failure condition classification will be addressed within the next publication of CS-ACNS.

comment

50

comment by: *Garmin International*

ETSO-C115d section 3.2 says to (emphasis added):

“Define the ... (DQR) for database that are not included in the ETSO article configuration. DQR shall be in a form available to the user.”

The FAA TSO-C115d does not include a similar requirement.

It is not clear how an ETSO article would provide a database “not included in the ETSO article configuration.”

DO-283B already specifies requirements related to the navigation database standard (2.2.1.2.11.1), which is to be DO-200B, with the following requirements related to DQR:

“The equipment manufacturer shall ensure that the requirements for generating their navigation database are specified in ... (DQR) documentation that follows DO-200B/ED-76A.

The DQR shall require that the process generating the navigation data meets the standards specified in DO-200B/ED-76A.

The RNP equipment manufacturer shall ensure that their DQR documentation defines and describes the content contained in the navigation database that is used to enable the RNP equipment functionality.”

Additionally, there are aspects of DO-200B/ED-76A DQRs that an ETSO holder may consider proprietary (e.g., the binary format) and, thus, are inappropriate to provide “in a form available to the user”.

Due to the lack of clarity about what is requested, the proprietary nature of aspects of the DQRs, and to be truly harmonized with the FAA TSO, EASA should delete these statements from section 3.2.

response

Partially accepted.

EASA agrees that DQR definition is part of the DO-283B requirements in Section 2.2.1.2.11.1. Nevertheless, it is also important to provide the DQR to the Type 2 Database Provider, and EASA agrees that the user needs only the reference of the DQRs in order to properly verify that its database meets the equipment-specific DQRs.

3. Proposed amendments - Draft CS - ETSO-C145e

p. 67-72

comment

13

comment by: *FAA*

AIR-130	Page 68 of 140	If the equipment can satisfy the requirements of RTCA/DO-229E only when used with a particular antenna, the use of that antenna (by part	Since the antenna is needed to meet the requirement under RTCA DO-229E, the ‘should’	Change ‘should’ to ‘must’
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		number) should be a requirement on the installation. This requirement should be included in the installation manual (IM) as a limitation.	needs to be a 'must'	
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response Partially accepted.
'should' has been replaced by 'shall' wherever considered appropriate.

comment 30 comment by: THALES-Avionics

FAA TSO C145e gives the possibility to use a TSO-C204a SBAS CCA (Circuit Card Assembly) functional sensor.

Applicants choosing to use a TSO-C204a SBAS CCA can take certification compliance credit by virtue of the TSO-C204a TSOA for:

- Meeting the MPS section 2.1 requirements;
- The hardware/software qualification;
- The failure condition classification; and,
- MPS section 2.5 performance testing (functional qualification) except those specified in Appendix 1 of the TSO.

Thales would have expected to have the same possibility on ETSO C145e side and considers ETSO C204a should have been part of this NPA.

These TSO correspond to evolution of industry product policy and workshare cases while making equipment. It can also be safer and time saving to have a circuit card granted with an ETSO by one authority and being completed at equipment level by another manufacturer with another authority or even the same one.

This kind of practices can also be applied in the future to other equipment such as Inertial Reference Systems, FMS, ...

Moreover, it will ensure a level-playing field with US industry.

response Noted.
EASA has not transposed FAA TSO-C145e paragraphs 3.b and 3.c because there is no ETSO-C204.

comment 38 comment by: THALES-Avionics

ETSO C145e, Appendix 2, addition to RTCA/DO-229E § 1.8.3

To address information security, the document should refer to EUROCAE/RTCA documents such as ED-202A/DO-326A, ED-204/DO-355, or upcoming ED-203A/DO-356A.

While the ETSO may reference some active security measures as recommendations, the document should clearly promote the use of Standards.

A sentence should be added, in Appendix A, § 1.8.3 as appropriate stating that: "it is recommended that manufacturers document their Security Assurance Level objectives to

response	<p>protect the main functions of equipment with a low direct impact and avoid propagating an attack to other equipment. In this purpose, supplemental guidance material may be found in EUROCAE/RTCA documents such as ED-202A/DO-326A, ED-204/DO-355, ED-203A/DO-356A.</p> <p>Noted. The new paragraph 1.8.3 does not contain requirements and it is just a copy and paste from the FAA to keep alignment between the 2 texts.</p>
comment	<p>40 comment by: THALES-Avionics</p> <p>TSO C145d remains effective until November 5, 2018. It would be appreciated that equivalent possibility should be proposed to EU applicants to ETSO C145.</p>
response	<p>Accepted. EASA will allow a transition period of 6 months.</p>
comment	<p>43 comment by: AIRBUS</p> <p>Page 72 Appendix 4:</p> <p>The added requirement to restrict the use to the L1 NAV is not necessary.</p> <p>As of today, in the Annex 10 of the ICAO Aeronautical Communications vol I SARPS, only L1 C/A NAV message is described for GPS satellites. CNAV message carried by L1, L5 and L2 frequencies and spread by BOC codes are not described in the Annex 10.</p> <p>2. PROPOSED TEXT / COMMENT : Remove Appendix 4</p> <p>3. RATIONALE / REASON / JUSTIFICATION for the Comment: Reduce burden</p>
response	<p>Not accepted. The original DO-229 refers to a GPS ICD, which did not contain the features that are now excluded through Appendix 4. When the ICD reference in DO-229 was updated to a later version of the GPS ICD which contained these features, the maintenance action to exclude these new features was missed in DO-229.</p>
comment	<p>45 comment by: AIRBUS</p> <p>1. Page 68 §3.2.2:</p> <p>“The applicant shall provide all the data necessary to evaluate the geo stationary (GEO) satellite bias as defined in RTCA/DO-229E, Section 2.1.4.1.5 to EASA.” In the corresponding TSO, compliance to TSO-204 is accepted as a mean to not provide the data. Why is it different for the ETSO?</p> <p>2. PROPOSED TEXT / COMMENT :</p>

	<p>Accept compliance to TSO-204 as a way to not provide data</p> <p>3. RATIONALE / REASON / JUSTIFICATION for the Comment:</p> <p>For harmonisation with the FAA</p>
response	<p>Partially accepted.</p> <p>The requirement to provide to EASA the GEO stationary satellite bias data has been revised and it is now aligned with FAA.</p> <p>There is no ETSO-C204, therefore, the proposed route is not possible in the EASA system. See also response to comment number 30.</p>
comment	<p>51 comment by: <i>Garmin International</i></p> <p>ETSO-C145e section 3.2.2 includes the following: “The applicant shall provide all the data necessary to evaluate the geo stationary (GEO) satellite bias as defined in RTCA/DO-229E, Section 2.1.4.1.5 to EASA.”</p> <p>FAA TSO-C145e includes a similar requirement under its section 6 “Manufacturer Data Requirements”. However, the FAA TSO only requires the manufacturer to “have the following technical data available for review by the responsible ACO”. In other words, the FAA doesn’t require that the GEO satellite bias data be submitted, rather it only needs to be available.</p> <p>To be truly harmonized, EASA should only ask that the GEO satellite bias data be available for review.</p>
response	<p>Accepted.</p> <p>The text has been aligned to achieve the same effects for the applicant.</p>
comment	<p>52 comment by: <i>Garmin International</i></p> <p>ETSO-C145e Appendix 4 adds new requirements to restrict demodulation of data to “the necessary subset of the data defined in Appendix II of IS-GPS-200D, ... provided on RF link L1. The pseudo-ranging shall be performed on RF link L1 utilizing the coarse/acquisition (C/A) code.”</p> <p>Appendix 4 further explains that the reason for including these requirements “is to ensure that only the L1 NAV data, for which the SBAS provides corrections and integrity, is used, and that no CNAV data, which is defined in Appendix III of IS-GPS-200D, is used, for which the SBAS does not provide integrity.”</p> <p>As described in IS-GPS-200D, the CNAV message is only present on the L2C signal at 1227 MHz. There are other requirements present in RTCA DO-229E that would preclude using the L2 signal. Consequently, these requirements are unnecessary.</p> <p>Additionally, these requirements are not present in FAA TSO-C145e.</p> <p>To be truly harmonized, EASA should remove these additional and unnecessary Appendix 4 requirements.</p>
response	<p>Not accepted.</p>



See also the response to comment number 43.

3. Proposed amendments - Draft CS - ETSO-C146e

p. 73-80

comment 14

comment by: *FAA*

AIR-130	Page 73 of 140. This statement is also in other places.	The standards in this ETSO apply to equipment intended to accept a desired flight path and provide deviation commands keyed to that path. Pilots and autopilots will use these deviations to guide the aircraft. Except for automatic dependent surveillance with Class Gamma, these TSO standards do not address integration issues with other avionics.	Not sure of the intent of this statement since the definition of TSO is same for FAA as well as EASA. TSO is a design and production This statement is true of all FAA TSO's as well as ETSO's.	Delete statement from other places as well Maybe can have one blanket statement that will state the fact that ETSO's do not address integration issues with other avionics or other aircraft systems and need to be evaluated during installation approval on aircraft.
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response

Not accepted.
The proposed wording is the same as used in the FAA TSO, as EASA did not identify any need to introduce a difference between the ETSO and the FAA TSO with regard to this aspect.

comment 23

comment by: *ESSP-SAS*

ESTO-c146 Section 2.2.3.1 includes an item describing the available Path terminators. It would be useful also to reference Radius to fix (RF), a path terminator included in RNP APCH specification and therefore supported by SBAS according to ICAO PBN Manual (see Table II-A-1-2).

response

Not accepted.
For harmonisation with the FAA, the additional terminators are not included.

comment 31

comment by: *THALES-Avionics*

Same comment as for ETSO C145e.

FAA TSO C146e gives the possibility to use a TSO-C205a SBAS CCA (Circuit Card Assembly) functional sensor.

Applicants choosing to use a TSO-C205a SBAS CCA can take certification compliance credit by virtue of the TSO-C205a TSOA for:

- Meeting the MPS section 2.1 requirements;



	<ul style="list-style-type: none"> • The hardware/software qualification; • The failure condition classification; and, • MPS section 2.5 performance testing (functional qualification) except those specified in Appendix 1 of the TSO. <p>Thales would have expected to have the same possibility on ETSO C145e side and considers ETSO C205a should have been part of this NPA.</p> <p>These TSO correspond to evolution of industry product policy and workshare cases while making equipment. It can also be safer and time saving to have a circuit card granted with an ETSO by one authority and being completed at equipment level by another manufacturer with another authority or even the same one.</p> <p>This kind of practices can also be applied in the future to other equipment such as Inertial Reference Systems, FMS, ...</p> <p>Moreover, it will ensure a level-playing field with US industry.</p>
response	<p>Noted.</p> <p>EASA has not transposed FAA TSO-C146e paragraphs 3.b and 3.c because there is no ETSO-C204.</p>
comment	<p>39 comment by: <i>THALES-Avionics</i></p> <p>ETSO C146e, Appendix 2, addition to RTCA/DO-229E § 1.8.3 (same comment as for ETSO C145e, Appendix 2, addition to RTCA/DO-229E § 1.8.3)</p> <p>To adress information security, the document should refer to EUROCAE/RTCA documents such as ED-202A/DO-326A, ED-204/DO-355, or upcoming ED-203A/DO-356A.</p> <p>While the ETSO may reference some active security measures as recommendations, the document should clearly promotes the use of Standards.</p> <p>A sentence should be added, in Appendix A, § 1.8.3 as appropriate stating that: "it is recommended that manufacturers document their Security Assurance Level objectives to protect the main functions of equipment with a low direct impact and avoid propagating an attack to other equipment. In this purpose, supplemental guidance material may be found in EUROCAE/RTCA documents such as ED-202A/DO-326A, ED-204/DO-355, ED-203A/DO-356A.</p>
response	<p>Noted.</p> <p>The new paragraph 1.8.3 does not contain requirements, it is just a copy and paste from the FAA to keep alignment between the ETSO and TSO texts.</p>
comment	<p>41 comment by: <i>THALES-Avionics</i></p> <p>TSO C146d remains effective until November 5, 2018.</p> <p>It would be appreciated that equivalent possibility should be proposed to EU applicants to ETSO C146.</p>
response	<p>Accepted.</p> <p>See the response to comment number 21.</p>
comment	<p>44 comment by: <i>AIRBUS</i></p> <p>Page 80 Appendix 4: (idem as page 72)</p>

response	<p>The added requirement to restrict the use to the L1 NAV is not necessary.</p> <p>As of today, in the Annex 10 of the ICAO Aeronautical Communications vol I SARPS, only L1 C/A NAV message is described for GPS satellites. CNAV message carried by L1, L5 and L2 frequencies and spread by BOC codes are not described in the Annex 10.</p> <p>2. PROPOSED TEXT / COMMENT : Remove Appendix 4</p> <p>3. RATIONALE / REASON / JUSTIFICATION for the Comment: Reduce burden</p> <p>Not accepted. See the response to comment number 43.</p>
comment	<p>46 comment by: AIRBUS</p> <p>1. Page 74 §3.2.2:(idem as page 68)</p> <p>“The applicant shall provide all the data necessary to evaluate the geo stationary (GEO) satellite bias as defined in RTCA/DO-229E, Section 2.1.4.1.5 to EASA.” In the corresponding TSO, compliance to TSO-204 is accepted as a mean to not provide the data. Why is it different for the ETSO?</p> <p>2. PROPOSED TEXT / COMMENT :</p> <p>Accept compliance to TSO-204 as a way to not provide data</p> <p>3. RATIONALE / REASON / JUSTIFICATION for the Comment:</p> <p>For harmonisation with the FAA</p>
response	<p>Partially accepted. The text has been changed to require only data availability for review by EASA. As EASA has no ETSO-C204, that requested route is not possible. See also response to comment number 31.</p>
comment	<p>53 comment by: Garmin International</p> <p>ETSO-C146e section 3.2.2 includes the following: “Applicants shall provide all the data necessary to evaluate the geo stationary (GEO) satellite bias as defined in RTCA/DO-229E, Section 2.1.4.1.5 to EASA.”</p> <p>FAA TSO-C146e includes a similar requirement under its section 6 “Manufacturer Data Requirements”. However, the FAA TSO only requires the manufacturer to “have the following technical data available for review by the responsible ACO”. In other words, the FAA doesn’t require that the GEO satellite bias data be submitted, rather it only needs to be available.</p>

response	<p>To be truly harmonized, EASA should only ask that the GEO satellite bias data be available for review.</p> <p>Accepted. The text has been aligned.</p>
comment	<p>56 comment by: <i>Garmin International</i></p> <p>TSO-C146e Appendix 2 adds new requirements to be consistent with similar requirements added in FAA TSO-C146e Appendix 2.</p> <p>However, ETSO-C146e Appendix 2 is missing the following sections added in TSO-C146e Appendix 2:</p> <p>2.2.1.3.13 Hold to Altitude (HA) 2.2.1.3.14 Hold to Fix (HF) 2.2.1.3.14 Hold to Clearance (manual termination) (HM) Table 2-14 through Table 2-20</p> <p>To be truly harmonized, EASA should include these missing sections in Appendix 2.</p>
response	<p>Accepted. The missing text has been added.</p>
comment	<p>57 comment by: <i>Garmin International</i></p> <p>ETSO-C146e Appendix 4 adds new requirements to restrict demodulation of data to “the necessary subset of the data defined in Appendix II of IS-GPS-200D, ... provided on RF link L1. The pseudo-ranging shall be performed on RF link L1 utilizing the coarse/acquisition (C/A) code.”</p> <p>Appendix 4 further explains that the reason for including these requirements “is to ensure that only the L1 NAV data, for which the SBAS provides corrections and integrity, is used, and that no CNAV data, which is defined in Appendix III of IS-GPS-200D, is used, for which the SBAS does not provide integrity.”</p> <p>As described in IS-GPS-200D, the CNAV message is only present on the L2C signal at 1227 MHz. There are other requirements present in RTCA DO-229E that would preclude using the L2 signal. Consequently, these requirements are unnecessary.</p> <p>Additionally, these requirements are not present in FAA TSO-C146e.</p> <p>To be truly harmonized, EASA should remove these additional and unnecessary Appendix 4 requirements.</p>
response	<p>Not accepted. See the response to comment number 52.</p>

comment	<p data-bbox="359 235 391 280">58</p> <p data-bbox="1053 235 1484 280">comment by: <i>Garmin International</i></p> <p data-bbox="359 302 526 336">Section 3.2.1:</p> <p data-bbox="359 369 1484 515">The second note specifies the aircraft level continuity of “the function defined in paragraph 3.1.1 of this ETSO”. The cited continuity from EU No 1207/2011 is for the transmit function (ADS-B Out), while paragraph 3.1.1 of the ETSO defines both the receive and the transmit function for ADS-B.</p> <p data-bbox="359 548 1484 761">Further, the direct reference to EU No 1207/2011 may become obsolete in the future, and is inconsistent with EASA’s own CS-ACNS. The reference may shortly become obsolete as a current rulemaking task, RMT.0679, is in the process of recommending updates to the SPI Implementing Regulation. We also note that the continuity requirement of CS-ACNS, at Remote, corresponds to 1E-5 per flight hour. We acknowledge that CS-ACNS Deviation 1 has allowed a deviation from CS-ACNS continuity requirement of ADS-B Out to 2E-4.</p> <p data-bbox="359 795 1484 1052">The above description of the current state of continuity requirements demonstrates that making yet another statement in the ETSO poses risk of conflict and obsolescence. It is suggested that the note be restated in more general terms as: “Note: The allowed discontinuity probability of the transmit function defined in paragraph 3.1.1 of this ETSO at the aircraft level may be defined in operational regulations (e.g. COMMISSION IMPLEMENTING REGULATION (EU) No 1207/2011) and in aircraft level certification specifications (e.g. EASA CS-ACNS).”</p>
response	<p data-bbox="359 1064 582 1108">Partially accepted.</p> <p data-bbox="359 1108 1484 1288">The note has been reworded as follows: ‘COMMISSION IMPLEMENTING REGULATION (EU) No 1207/2011 of 22 November 2011 laying down requirements for the performance and the interoperability of surveillance for the single European sky requires that the discontinuity probability of the transmit function defined in paragraph 3.1.1 of this ETSO at aircraft level shall be equal to or less than 2E-4 per flight hour.’</p>

3. Proposed amendments - Draft CS - ETSO-C209

p. 126-127

comment	<p data-bbox="359 1438 391 1482">18</p> <p data-bbox="1212 1438 1484 1482">comment by: <i>AIRBUS</i></p> <p data-bbox="359 1500 1484 1579">In order to improve the accuracy of the applicability, we suggest to formulate the paragraph 1 as follows:</p> <p data-bbox="359 1612 550 1646">1 - Applicability</p> <p data-bbox="359 1646 1484 1758">This ETSO provides the requirements for the EFIS displays which are designed and manufactured on or after the date of this ETSO in order to be identified with the applicable ETSO marking.</p>
response	<p data-bbox="359 1758 534 1803">Not accepted.</p> <p data-bbox="359 1803 1484 1892">The commented sentence is standardised across all ETSOs. EASA believes that it is consistent with the meaning.</p>
comment	<p data-bbox="359 1892 391 1937">19</p> <p data-bbox="1212 1892 1484 1937">comment by: <i>AIRBUS</i></p> <p data-bbox="359 1993 837 2038">3.1.1 - Minimum Performance Standard</p>



	<p>In order to obtain a clear section, with precise details and easy to understand, we suggest to reformulate this section as follows:</p> <p>The standards set forth in SAE: - AS6296 (dated in 1st March 2016) which specifies the minimum Performance standard for EFIS displays that are intended for use in the flight deck by the flight crew. And - AS8034B (dated in 27th June 2011) which specifies the minimum performance standards for all types of Electronic Displays and Electronic Display Systems that are intended for use in the flight deck by the flight crew.</p>
response	<p>Not accepted. The commented sentence is harmonised with the FAA. EASA believes that it is acceptable and unambiguous.</p>
comment	<p>35 comment by: <i>THALES-Avionics</i></p> <p>§ 3.1.1, where EASA requires to meet the MPS qualification and documentation requirements for all sections of SAE AS6296 and SAE AS8034B, FAA TSO C209 requires to meet the MPS qualification and documentation requirements for sections 3,4 and 5 of SAE AS6296 and of sections 4 and 5 of AS 8034B.</p> <p>Compliance to other sections of SAE AS6296 (especially section 2 for General Standards) and SAE AS8034B (especially section 3 for General Standards and section 6 for Test procedure) is not referenced nor required for TSO C209. In perspective of EU/US ETSO/TSO harmonisation, it may be consolidated.</p>
response	<p>Not accepted. The differences are considered as a support to the definition of the ETSO function and are considered useful according to EASA's understanding. More in detail:</p> <ul style="list-style-type: none"> — AS 8034B Section 3 provides a meaningful set of standards and is valuable. Nevertheless, some elements can be considered as support for compliance with Section 4 — AS 8034B Section 6 doesn't prescribe test procedures (they are in Section 5) but introduces test environment definitions by the manufacturer. — The glossary of terms in Section 5 of ARP 4256 is helpful and doesn't represent any issue. <p>EASA does not consider that these differences show any lack of harmonisation.</p>
comment	<p>42 comment by: <i>GE Aviation</i></p> <p>Section 3.1.1 of ETSO-C209 calls out to SAE AS6296 for Minimum Performance Standards. A number of comments are raised against specific sections of SAE AS6296, captured below:</p> <p><u>AS6296 section 4.1.1.2.b - Airspeed Graduations</u> Requirement 4.1.1.2b of SAE AS6296 is confusing and has several interpretations. Question: Can a diagram be provided to clarify the intent?</p> <p>Requirement 4.1.1.2b of SAE AS6296 states if minor graduations are used, they shall be half</p>

the value of the major graduations. For typical metric displays, the major graduations are 50kph with minor graduations at 10kph.

Question: Is it acceptable for minor graduations to be less than half the value of the major graduation's? If agreed, will clarification be added against ETSO-C209, or should a deviation be requested on issue of ETSO-C209?

AS6296 section 4.1.1.4 - Airspeed Identification

Requirement 4.1.1.4 of SAE AS6296 states if the units of measure are other than knots or mach, the units of measure shall be labelled. This requirement is similar to deviation ETSO-C2d#2 (Airspeed Instruments), which allows units of measure not to be displayed, regardless if imperial or metric. For a standby display, the display has a compact format and hence space is an issue to display the multifunctional information. ARP4102-7 also does not recommend labelling of the function or units for airspeed.

Question: It is acceptable not to display units of measure for both metric and imperial? If agreed, will clarification be added against ETSO-C209, or should a deviation be requested on issue of ETSO-C209?

AS6296 section 4.1.3.2 - Altimeter Identification

Requirement 4.1.3.2 of SAE AS6296 states if the unit of measure is other than feet, the unit of measure shall be labelled. For a standby display, the display has a compact format and hence space is an issue to display the multifunctional information. A similar instance exists with Airspeed, where deviation ETSO-C2d#2 (Airspeed Instruments) allows units of measure not to be displayed, regardless if imperial or metric. The symbology should be consistent across functions provided on the display.

Question: It is acceptable not to display units of measure for both metric and imperial? If agreed, will clarification be added against ETSO-C209, or should a deviation be requested on issue of ETSO-C209?

AS6296 section 4.1.3.8 - Altimeter Graduations

Requirement 4.1.3.8 of SAE AS6296 defines minimum graduations of 20ft and major at 100ft. Deviation ETSO-C10b#5 – Aircraft Altimeter, Pressure Actuated, Sensitive Type allowed graduations every 100ft and major at 500ft. In addition, there is no equivalent requirement defined for metric.

Question: Is it acceptable to provide graduations which exceed the defined requirement, in accordance with deviation ETSO-C10b#5? Is it acceptable to provide numbered denominations at 200ft intervals and unnumbered denominations at 100ft intervals for imperial displays? Is it acceptable to provide numbered denominations at 100m intervals and unnumbered denominations at 20m intervals for metric displays? If agreed, will clarification be added against ETSO-C209, or should a deviation be requested on issue of ETSO-C209?

AS6296 section 4.1.4.4 - Attitude Accuracy

Requirement 4.1.4.4 of SAE AS6296 states the error contributed by the EFIS shall not exceed a total scale error of 2.5 degrees. This accuracy is too extreme for a standby display instrument.

Question: Is there any opportunity to relax the accuracy defined for a standby display, where 4 degrees is proposed? In addition, clarification required if the accuracy is defined over 360 degrees in pitch and roll? Is it allowable to restrict the range over which 2.5 degrees accuracy is achievable?

AS6296 section 4.1.8.4 - Turn and Slip Accuracy

response

Requirement 4.1.8.4 of SAE AS6292 is not verifiable as the term "significantly" is vague.
Question: Please confirm how significantly is defined to support verification?

Requirement 4.1.8.4 of SAE AS6292 is confusing and unclear on the intent.
Question: Can clarification on the meaning of this requirement be provided in order to demonstrate compliance?

Not accepted.

Regarding airspeed graduation and metric aspects, EASA considers that the MOPS standard is coherent with other standards such as airspeed instruments, AS8019. Therefore, no diagram is found necessary and a diagram would only be an example. Concerning the graduations for metric display, this question is considered to be a specific project-related item that should be handled within a project and demands a deviation from the standard, which should be analysed.

Regarding unit of measure aspects, deviation ETSO-C2d#2 is superseded by deviation ETSO-C2d#2 Rev A (published).

Deviation ETSO-C2d#2 revA mandates a condition for the equipment and for the installation :

- the equipment has only one unique unit of measure.
- ‘the equipment shall be installed only in flight deck systems using Airspeed indication being “xxxx”* ‘

Instead of creating a systematic alternate to requirements 4.1.X.X, EASA prefers the process of a deviation for the exceptional cases where the units might not be displayed and per the agreed limitations as stated above.

3. Proposed amendments - Draft CS - ETSO-C210

p. 128-129

comment

2

comment by: FAA

Comment #1:

ETSO-C210 Head Up Display. Paragraph 3.2.1 Failure Condition Classification (Page 128). The FAA's draft TSO-C210 proposes a minimum failure condition classification of MAJOR. The proposed language of the corresponding FAA TSO-C210 reads as follows:

3. b. Failure Condition Classifications. The minimum failure condition classification for this TSO is major. The failure condition classification appropriate for the equipment may be higher than major and will depend on the intended function of the equipment in a specific aircraft. Document the loss of function or malfunction failure condition classification for which the equipment is designed, keeping in mind obstructions to the pilot's field of view resulting from potential malfunction conditions.

Comment #2:

ETSO-C210 Head Up Display. General Comment (Page 128). The FAA proposes adding clarifying language to the functional qualification paragraph of FAA TSO-C210. The language reads as follows:

3. c. Functional Qualification. The manufacturer must define the appropriate tests to verify compliance to section 4 of SAE AS8055A. Portions of SAE AS 8055A section 4 are installation dependent. The installation procedures required in Section **5.a(3)** of this TSO



	<p>must define the functional qualification required to ensure the installed performance meets AS 8055A. Comment POC: Rich Adler. FAA AIR-6B1. 202-267-9834. Richard.Adler@faa.gov</p>
response	<p>Partially accepted.</p> <p>Comment #1: the suggestion of a minimum classification to Major is found to be misleading and does not represent current installations. EASA intends to follow the same approach used for C113a without recommending a minimum failure condition. EASA and the FAA have consolidated their views on this item.</p> <p>Comment #2 : EASA agrees that there are some installation-dependent items in Section 4, but still there is a need to test the performance of the ETSO article. The proposed text has been updated taking into account this comment, and later on harmonised with the FAA.</p>
comment	<p>24 comment by: AIRBUS</p> <p>1 – Applicability</p> <p>For clarification of the ETSO applicability, Airbus suggests to replace the first sentence:</p> <p><i>“This ETSO provides the requirements which airborne head up displays that are designed and manufactured on or after the date of this ETSO must meet in order to be identified with the applicable ETSO marking.”</i></p> <p>by:</p> <p>This ETSO provides the requirements applicable to head up displays that are designed and manufactured on or after the date of this ETSO, in order to be identified with the applicable ETSO marking.</p>
response	<p>Not accepted. See the response to comment number 18.</p>
comment	<p>25 comment by: AIRBUS</p> <p>1 – Applicability</p> <p>For clarification of the systems "out of the scope" and in order to better understand the applicability of this ETSO, Airbus suggests to replace the second sentence:</p> <p><i>“This ETSO standard does not address sensor imaging systems, displays worn by the pilot (goggles, helmet-mounted displays) or specific symbology to be displayed.”</i></p> <p>by:</p> <p>This ETSO standard does not address Enhanced Vision Systems (either infrared, millimeter wave or other imaging technologies), displays worn by the pilot (goggles, helmet-mounted displays, Head Mounted Displays) or specific symbology to be displayed.</p>

response	Accepted. The text has been amended accordingly.
comment	<p>37 comment by: THALES-Avionics</p> <p>§ 3.2.1 Failure condition Classification, p. 129 Where EASA ETSO C210 does not requires minimum failure condition classification as it will depend of the HUD intended function, FAA TSO C210 (draft version under consultation until 5th of September) requires a MAJOR minimum failure condition classification whatever intended function can be.</p> <p>Thales agrees with EASA proposal to not require minimum failure condition classification in ETSO/TSO, and considers that in perspective of EU/US harmonisation, this should be consolidated with FAA, TSO C210 being also under consultation.</p>
response	Accepted. The suggestion of a minimum classification to Major is found to be misleading by EASA and doesn't represent current installations. Feedback has been provided to the FAA and the text in paragraph 3.2.1 is now harmonised.

3. Proposed amendments - Draft CS - ETSO-2C514a

p. 130-137

comment	<p>20 comment by: AIRBUS</p> <p>Please add the highlighted sentence for further clarification:</p> <p>Paragraph 2. GENERAL DESIGN REQUIREMENTS [...] <u>OPERATION OF CONTROLS</u> [...] <i>The issuance of a radio or telecommunication station license in accordance with national regulations is mandatory. For non-aviation services, which are not covered by EASA ETSOs, an EN standard is the appropriate definition for the transmission characteristic for a specific service in Europe. The EN applicable standard should be identified in the installation manual and DDP.</i></p> <p>For instance, the article §3.2 of the EU Radio Equipment Directive 2014/53/EC (RED) should be considered for ASNRT radio equipment. The article §3.2 covers the requirement of “Efficient and effective use of spectrum”. Compliance to article §3.2 of RED is guaranteed by applying appropriate EN standards for radio services in Europe. Other requirements of the EU RED, given in article §3.1 and article §3.3, should be substituted by applicable aviation standards established by this ETSO.</p> <p><u>Rationale:</u> This precision is essential to give a clear statement regarding the relevance of existing regulation: Although the aviation sector is clearly exempted from CE marking and the addressed equipment falls under the scope of article 3 of regulation (EC) 216/2008 and is therefore exempted as well, the link to article 3.2 provides the technically relevant means to ensure technical integrity and the technical necessary efficient use of spectrum</p>
response	Not accepted.



According to the guidance provided in Appendix 1, Section 2, the issuance of a radio or telecommunication station license in accordance with national regulations is mandatory. For non-aviation services, which are not covered by EASA ETSOs, EU Radio Equipment Directive 2014/53/EC Chapter 3 and Article 3 in support of an appropriate EN standard should be considered for ASNRT radio equipment.

The applicable EN standard should be identified in the installation manual and the DDP.

The above guidance is considered sufficient to address the need to comply with national standards.

