

## Field Document Comment Log

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#	Commenter	Page & Para. No.	Comment	Reason for Comment	Suggested Change	Comment Resolution
1.	Robert Joslin, CSTA	Page 2 Table 2	The failure condition classification for incorrect depiction of aircraft position on the airport surface does not indicate the appropriate hazard level.	The SURF-IA SPR (Draft) has a hazard classification of major, up to catastrophic, for a failure condition involving incorrect depiction of aircraft position depending on the aircraft states. <i>Flight crew takes an undesired action based on an untrue indication in a controlled environment</i> Furthermore, an incorrect position of ownship may results in a runway incursion high-speed collision accident	Change the failure condition classification for incorrect depiction of aircraft position on the airport surface to Major	<b>Not Accepted.</b> Failure condition classification for surface own-ship has long been classified as minor. The applicable application from DO-317A, Surface CDTI also classifies own-ship position on the surface at airspeeds less than 80 knots as minor.
2.	Robert Joslin, CSTA	Page 1-4 Para. 2.3.1.1	The required position sensor horizontal positional accuracy of 36m on the runway does not match any established NACp value (e.g. NACp 8 (92.6m), NACp 9 (30m), etc)	The horizontal positional accuracy of 36m lies somewhere between a NACp of 8 (92.6m) and NACp of 9 (30m), The ADS-B message element list that will be broadcasted in the	Harmonize the 36m horizontal positional accuracy with the NACp levels established in 14CFR 91.227 and AC-20-165A	<b>Not Accepted.</b> The 36 meter accuracy assumes the worst-case signal-in-space horizontal position value for a TSO-129a

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				same increments, hence at 36m value		GPS source and no WAAS. This accuracy is calculated using a very conservative model of a worst-case 2-satellite failure and using worst-case location assumptions, which when combined give a horizontal service availability threshold (HSAT) of 36 meters with a 95% confidence interval. This all comes out of the Global Positioning Service (GPS) Standard Positioning Service Performance

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						Standard, which was used to set this value for DO-257A. In reality this accuracy should be much better, with the all-in-view HSAT calculated at 13 meters with a 95% confidence interval, but the baseline budget was set using the more conservative approach.
3.	Robert Joslin, CSTA	Page 1-4 Para. 2.3.1.2	The required position sensor horizontal positional accuracy of 36m on the taxiway does not match any established NACp value (e.g. NACp 8 (92.6m), NACp 9 (30m), etc)	The horizontal positional accuracy of 36m lies somewhere between a NACp of 8 (92.6m) and NACp of 9 (30m), The ADS-B message element list that will be broadcasted in the same increments, hence at 36m value	Harmonize the 36m horizontal positional accuracy with the NACp levels established in 14CFR 91.227 and AC-20-165A	<b>Not Accepted.</b> Same as #2. See previous.
4.	Robert Joslin, CSTA	Page 1-9 Para.	The AMMD requirement mentions taxi routes, however	IAW RTCA/DO 257A (§1.4) the	Add a requirement to depict taxiways	<b>Not Accepted.</b> While I tend to

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		2.6.3.1.3	it does not state a requirement to depict taxiways (only runways)	intended function of the AMMD is to assist flight crew in orienting themselves on the airport surface by enhancing the pilot's awareness of ownship position on the airport surface and <b><u>improve pilot position awareness with respect to taxi operations</u></b>		agree and feel these systems should probably have taxiways, this requirement highlights the baseline functionality is at least for runways, so runways are required and taxiways are marked with a "should." The same approach is found in DO-317A for Surface CDTI with the baseline system being runways-only.
5.	Robert Joslin, CSTA	Page 1-9 Para. 2.6.1.3	The term "swath" is used, but is not defined	Missing definition for a unique technical term that can be misinterpreted	Add the RTCA/DO 257 definition of swath. "The swath is the slice of environment that is depicted on the VSD"	<b>Not Accepted.</b> Requirements for VSD have not changed with this MOPS update. The requirement section is

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						actually 2.4.1.1 where swath is very clearly defined. 2.6.1.3 is actually the functional test requirement for 2.4.1.1.
6.	Robert Joslin, CSTA	Page 1-11 Para. 2.6.3.1.10	The required position sensor horizontal positional accuracy of 36m on the runways and taxiways does not match any established NACp value (e.g. NACp 8 (92.6m), NACp 9 (30m), etc)	The horizontal positional accuracy of 36m lies somewhere between a NACp of 8 (92.6m) and NACp of 9 (30m), The ADS-B message element list that will be broadcasted in the same increments, hence at 36m value	Harmonize the 36m horizontal positional accuracy with a NACp level established in 14CFR 91.227 and AC-20-165A	<b>Not Accepted.</b> Same as #2. See previous.
7.	J. Yi, ANM-130S	Throughout document provide acronyms for all abbreviations	Provide acronyms for all abbreviations.	Don't understand the acronyms.	Provide a section that explains the acronyms.	<b>Not Accepted.</b> Acronyms are specified at first use per accepted format.
8.	J. Yi, ANM-130S	Page 1 Paragraph 2a	Suggest rewording for clarity.	Unclear.	Change the sentence as follows: All prior revisions to this TSO are no longer effective. We will not accept applications for	<b>Not Accepted.</b> Language is boilerplate from TSO template.

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					the previous revision after the effective date of this TSO. We may accept, however, up to six months after approval of this TSO, if we know you were working against the prior MPS before the new change became effective.	
9.	J. Yi, ANM-130S	Page 3  Paragraph 3e	Paragraph calls out RTCA/DO-178B.  (AC20-115B calls out RTCA/DO178B)	RTCA/DO-178C and its supplements have been released. AC20-115C is in work.	Refer to latest version of RTCA/DO-178 as called out in AC20-115X.	<b>Not Accepted.</b> Current version of AC is AC 20-115B. When AC 20-115C is published, then use of DO-178B or C will be allowed, as applicable.
10.	C. Helgeson, ANM-160S	Page 2, section b. (1)	First sentence: "Failure of the function defined..." Suggest making function plural (functions).	Previous revision of this TSO had function pluralized & the paragraph referenced lists multiple items, therefore there are multiple functions.	Failure of the functions defined....	<b>Accepted.</b>
11.	C. Helgeson, ANM-160S	Page 2, section b. (1)	Second sentence: "Failure of the function defined..."	Previous TSO had function pluralized &	Failure of the functions defined....	<b>Accepted.</b>

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			Suggest making function plural (functions).	the paragraph referenced lists multiple items, therefore there are multiple functions.		
12.	C. Helgeson, ANM-160S	Page 2, section b. (3)	This section seems unclear to me. Suggest including wording from the previous revision of this TSO to help clarify intent.	Provide more clarity on intent of this section.	(3) The applicant must design the system to at least the design assurance level commensurate with the failure condition classifications, as listed in Table 2.	<b>Accepted.</b>
13.	J. Yi, ANM-130S	Page 3 Paragraph 3d	Unclear	Unclear	At the end of second sentence add "with prior approval from the FAA"	<b>Not Accepted.</b> Language is boilerplate from TSO template.
14.	J. Yi, ANM-130S	Page 3 Paragraph 3e	Software is a complex item. I would limit this TSO to all software level A and B not part of this TSO. Only apply to software levels C, D and E. TSO is supposed to be for simple devices and going into the software will make the TSO complex therefore, limiting it to level C and below would be OK for this TSO.	This TSO is open to all software levels and does not make sense to have level A and B as part of this TSO since it requires more scrutiny. This makes sense since the highest hazard effect on this TSO is limited to hazardous classification of "MAJOR."	Limit this TSO to only apply to level C, D, and E only not level A and B as clarity.	<b>Not Accepted.</b> Language is boilerplate from TSO template. There is no reason to limit as these are minimum requirements.
15.	T. Ebina,	Page 3	Should reference RTCA/DO-	Since the FAA will	Replace the DO-178B	<b>Not Accepted.</b>

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	ANM-130L	Para 3e	178C, rather than RTCA/DO-178B.	imminently adopt RTCA/DO-178C, we might want to consider referencing the latest version, rather than the DO-178B.	with DO-178C.	Current version of AC is AC 20-115B. When AC 20-115C is published, then use of DO-178B or C will be allowed, as applicable.
16.	J. Yi, ANM-130S	Page 3 Paragraph 3f	This section also discusses about the AEH. This is also very complex device so I would limit this TSO to design assurance level C, D, and E only not level A and B.	TSO should be limited to simple device not complex therefore limit this TSO to level C, D, and E only not level A and B. This makes sense since the highest hazard effect on this TSO is limited to hazardous classification of "MAJOR"	Limit this TSO to only apply to level C, D, and E only not level A and B as clarity.	<b>Not Accepted.</b> Language is boilerplate from TSO template. There is no reason to limit as manufacturer is able to use all acceptable AEH levels.
17.	ANM-111	Pg 4 par 5.(3)	Fully agree with the need to include installation instructions and limitations in the required data. Also agree that certain installation requirements that affect TSO-compliance be provided by the manufacturer.	Though, technically, the TSO requires this information, these universal installation requirements might be overlooked during the approval process, with the result of	Suggest that the manufacturer be required to document installation requirements which apply universally to TSO C165A articles, be spelled out in this	<b>Accepted.</b>

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			However, would suggest that certain unconditional installation requirements for TSO compliance be spelled out explicitly. For example, TSO compliance requires use of a TSO-approved GNSS positioning source, and that even databases external to the TSO article comply with DO-200A.	inappropriate installations.	paragraph. “Installation requirements must include: <ul style="list-style-type: none"> <li>• The positioning source must be from a TSO-approved GNSS sensor.</li> <li>• Databases that are external to the TSO device, but part of its functionality, must meet the requirements of RTCA/ DO-200A.”</li> </ul> Plus any other such requirements	
18.	R. Derby, ANM-100D	P. 7 ¶ 8.b	<a href="http://www.access.gpo.gov">www.access.gpo.gov</a> is no longer used.	<a href="http://www.access.gpo.gov">www.access.gpo.gov</a> currently redirects visitors to <a href="http://www.gpo.gov">www.gpo.gov</a> , and the instructions (Select “Access,” then “Online Bookstore.” Select “Aviation,” then “Code of Federal Regulations.”) are no longer valid.	Replace “You can also order copies online at <a href="http://www.access.gpo.gov">www.access.gpo.gov</a> . Select “Access,” then “Online Bookstore.” Select “Aviation,” then “Code of Federal Regulations.”” with “You can also order copies online at	<b>Accepted.</b>

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					<a href="http://www.gpo.gov">www.gpo.gov</a> ".	
19.	J. Yi, ANM-130S	Page 1-2 Paragraph 2.2.4	Remove wording "(e.g. providing a red cross)"	Unnecessary wording.	Suggest deleted the wording "(e.g. providing a red cross)"	<b>Accepted.</b>
20.	C. Helgeson, ANM-160S	Page 1-2, section 2.2.4, new subsection 25	This section uses "providing a red cross" as an example, but this may not work for some displays. Suggest removing this example. Also, this section doesn't clarify anything the display of invalid data. Suggest including language to make clearer.	TSOs often lack more guidance on how or when something should be display. The reference should not be overly directive in nature, but directive enough to ensure key human factor elements are met.	"...or to indicate the invalid data. The indication of the invalid data should be sufficient to provide discernibly & readability of the displayed information without presenting misleading, distracting or confusing information."	<b>Partially Accepted.</b> Added "clearly" prior to indicate to emphasize discernibility.
21.	C. Helgeson, ANM-160S	Page 1-2, section 2.2.5, 2 notes (2)	Out-of-date data would not likely be intuitive with a distinct color or shape alone. Suggesting using a combination of these along with a label to provide better clarity to the crew.	Unique color and shape are not likely distinct enough to identify out-of-date data. A combination of them may be. More information can be obtained from AC 25-11A.	"2. Using a distinct means of identifying out-of-date data on the display. This may include, but is not limited to a combination of text, labels, symbols, and colors; or"	<b>Accepted.</b>
22.	C. Helgeson, ANM-160S	Page 1-3, section 6	More guidance should be given as to how/when the alert should be given to the crew & what alert level the	This section does not give any guidance on how & when to announce the	"Corruption of the EMD database shall be detected and announced to the flight	<b>Partially Accepted.</b> Added "clearly and in a timely

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			annunciation should be.	corruption of the EMD database to the crew. It also does not provide any guidance for the level of annunciation that should be given to the crew. More information can be obtained from AC 25-11A & 14 CFR 25.1322.	crew. Annunciations & indications should be clear, unambiguous, timely & consistent with the flight deck design philosophy. Annunciations and indications should be consistently located in a specific area of the electronic display. Annunciations that may require immediate flight crew awareness should be located in the flight crew's forward/primary field of view..."	manner" to better emphasize minimum requirement for how/when alert should be given.
23.	C. Helgeson, ANM-160S	Page 1-8, section 2.6.3.1.3, 2	Many systems can create user defined waypoints as a type of fix. Suggest this be included.	Many systems can create user defined waypoints as a type of fix. Suggest this be included.	"2. The EMD shall display distinctive symbols for different fixes types (waypoints to include user defined waypoints, airports, VORs, NDBs, intersections) and the aircraft (own-ship)...."	<b>Not Accepted.</b> These are minimum requirements. User defined waypoints would be a great option, but is not required by the minimum system.
24.	C. Helgeson, ANM-160S	Page 1-11, section	This section uses "providing a red cross" as an example, but	TSOs often lack more guidance on how or	"...or to indicate the invalid data. The	<b>Partially Accepted.</b>

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		2.6.3.2.4, 7	this may not work for some displays. Suggest removing this example. Also, this section doesn't clarify anything the display of invalid data. Suggest including language to make clearer.	when something should be display. The reference should not be overly directive in nature, but directive enough to ensure key human factor elements are met.	indication of the invalid data should be sufficient to provide discernibly & readability of the displayed information without presenting misleading, distracting or confusing information."	Added "clearly" prior to indicate to emphasize discernibility.
25.	T. Ebina, ANM-130L	Page 1A-1 Table 1A-1	The required Moving Map environmental qualification tests should align with the Integrated Modular Avionics tests that are specified in IMA AC 20-170.	Requisite environmental qualification tests should be standardized because all the airborne systems in the cockpit will be eventually subjected to the Temperature Survey test of products for airworthiness approval.	Change the environmental qualification tests to align with the IMA environmental qualification tests for tests standardization.	<b>Not Accepted.</b> These tests are a minimum set updated from the previous TSO. IMA may require additional testing.
26.	ANM-111	General  Summary of Changes (separate document)	<i>The review package included a separate file with a summary of the changes. This was extremely helpful during the review and hope this becomes adopted as a best practice.</i>			<b>Accepted.</b> You are welcome.
27.	ASW-111/112	App A:	Is Intent to require use of an	Clarification. Unclear	IF intent is to require	<b>Not Accepted.</b>

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		medium 1-1, 3)	aerodrome DB that meets 272C medium quality definitions or to require the EMD OEM to QC DBs to ensure they are produced to meet 272C medium quality?	as to who is responsible for developing the medium quality aerodrome DBs. Will this TSO be applicable to the producers of aerodrome DBs or just the EMD OEMs?	the use of medium quality DBs suggest:  3) to require the use of aerodrome DBs meeting the medium quality definition of RTCA/D0-272C	This MOPS specifies the AMM database be DO-200A compliant and meet the DQRs of DO-272C. This MOPS also requires the hardware specify DQRs to command these compliances.
28.	ASW-111/112	App A: 1-3, 4.	"The processes producing and updating aeronautical databases shall meet ..."	Clarify	"For internal databases, the processes ..."	<b>Not Accepted.</b> The lead in sentence already covers this stating "If an internal or external database is being used, the following requirements apply:..."
29.	ASW-111/112	App A: 1,8	Display programmed flight plan and verify compliance.....  Should mention a common color philosophy within the	We have seen installations where active legs were shown in different colors on different	Suggest adding; Color philosophy shall be consistent across displays depicting flight plan and navigation	<b>Accepted.</b> The color guidance in section 2.1.6 of DO-257A is

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			cockpit displays.	displays. For example if the OEM defines an active nav leg color is magenta, then magenta should be used to code active nav legs across all displays in the cockpit.	information (or something similar)	still effective and should cover this item sufficiently. It states "The use of all colors must be consistent with commonly accepted aviation practice."
30.	ASW-170	Page 3, Para 3(f)	If the failure condition classification is minor, or no effect, an existing design assurance practice may be used to develop the complex custom AEH.	If the failure condition classification is minor, or no effect, should the design assurance practice be just custom AEH.	If the failure condition classification is minor, or no effect, an existing design assurance practice may be used to develop custom AEH.	<b>Accepted.</b>
31.	ASW-170	Page 4, Para 4(c)	If the article includes software and/or airborne electronic hardware, then the article part numbering scheme must identify the software and airborne electronic hardware configuration. The part numbering scheme can use separate, unique part numbers for software, hardware, and airborne electronic hardware.	When identifying software and airborne electronic hardware for their part IDs, the software and AEH version/part number needs to be recorded in software and AEH configuration record.	Add ..."software and AEH version identification needs to be recorded in the configuration record."	<b>Not Accepted.</b> Language is boilerplate from TSO template. This paragraph is for marking and this suggestion is covered under the application data requirements.

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						There you will find a requirement to “List of all drawings and processes (including revision level) defining the article’s design...” which should encompass this issue.
32.	ASW-170	Page 5, Para 5(c) and (d)	In addition to the PSAC, SCI, and SAS for software and PHAC, HCI, and HAC for AEH. The applicant needs to include open deferred problem reports that are associated with software and AEH.	TC. STC. ATC and ASTC projects require subject matter experts to review and evaluate the open deferred problem reports.	Along with SAS and HAS, add open deferred problem reports to paragraphs 5(c) and (d).	<b>Not Accepted.</b> Language is boilerplate from TSO template.
33.	ASW-170	Page 1-3, Para 2.2.5, 2.6	Not only are we concerned if the database that is loaded in the EMD is corrupt, but if the loading of the database corrupts other systems with the EMD.	This section seems to be only concerned with the corruption of the database itself and not the loading of the database corrupting other systems with the EMD.	Add. “Make verifiable that the loading of a database to the EMD does not corrupt any other software or system with the EMD after the loading process.”	<b>Not Accepted.</b> This seems to be a systems security/data connectivity installation requirement and would be somewhat unenforceable

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						at the box-level.
34.	Wichita ACO	Page 4 Paragraph 5	It appears the nameplate drawing has been removed from the application data requirements.	The nameplate drawing provides a means to ensure the design included the correct TSO and qualifications markings.	It is suggested the nameplate drawing be included in the application data requirements.	<b>Not Accepted.</b> Language is boilerplate from TSO template. However, paragraph 5.e still has requirement for drawings for marking.
35.	Wichita ACO	general comment	In the past, the FAA incorporated MOPS requirements in the TSO. This was considered undesirable because it made it difficult for both the ACO engineers and TSO applicants to interpret the requirements for compliance.	The FAA has provided RTCA with committee support to avoid the need to implement MOPS requirements in the TSO. Most recent MOPS have had FAA concurrence prior to being called out in the TSO. This appears to be a step backwards.	Suggest revising the MOPS (RTCA DO-257A) to incorporate appendix A of the TSO.	<b>Acknowledged.</b> At some point in the future these requirements will get incorporated into a revision of the MOPS when resources permit. Until then, the requirements can still be found in DO-257A, as well as this detailed update to avoid confusion.