

**Clearance Record  
DOCUMENT COMMENT LOG**

<b>Originating Office:</b> AIR-130	<b>Document Description:</b> TSO-113a	<b>Project Lead:</b> Charisse Green	<b>Reviewing Office:</b> ANM-100	<b>Date of Review:</b> 11/14/2011
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<b>Company &amp; Group</b>	<b>Page &amp; Paragraph</b>	<b>Comment</b>	<b>Rationale for Comment</b>	<b>Recommendation</b>	<b>Disposition</b>
<b>ANM-100</b>					
ANM-130L (T. Ebina)	Pg 1 Par 1: Purpose	This TSO should be limited to those articles whose functions perform the continued safe flight and landing of aircraft.	The proposed control display unit must not display such information as the surveillance of international border activities or passenger entertainment. These display unit functions must be approved under an STC, rather than a TSO.	Clarify the purpose of this TSO to limit its applicability to the specific airplane functions that are necessary for assurance of aviation safety.	<b>Not Accepted:</b> The purpose of the paragraph is to inform applicants of the purpose of the document and not the purpose of the equipment. The functionality is defined in paragraph 3.a., and does limit the application to electronic displays on the flight deck.
ANM-130L (T. Ebina)	Pg 2 par 3a: Functionality	Statement: "This TSO's standards apply to equipment intended for use as an electronic display in the flight deck by the flight crew..."	This statement should be limited to the aviation safety as discussed above.		<b>Not Accepted:</b> The MFD can be used for any function in the flight deck, as described in paragraph 3.a.
ANM-130L (T. Ebina)	Pg 3 par 3d: Environmental Qualification	Delete the "Note: The use of RTCA/DO-160D or earlier versions is generally not considered appropriate and will require substantiation via the deviation process"	The latest version of RTCA/DO-160 should be required to align with the past FAA practices. The current version is DO-160G.	Delete this note.	<b>Not Accepted:</b> This note is part of Order 8150.1B Change 1, and addresses current FAA policy on environmental qualification of TSO articles. The purpose of the note is to clarify that any versions of DO-160 with testing for HIRF and Lightning is acceptable.

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ANM-130L (T. Ebina)	Pg 4 Par 5a(4)	Statement:” This article meets the minimum performance and quality control standards required by a technical standard order (TSO). Installation of this article requires separate approval” This TSO should address the non TSO functions (if any) residing in an article. And, indicate that the non-TSO functions were evaluated per DO-178B and DO-254 under the TSO process. However, airworthiness approval of these non-TSO functions requires a separate approval at the time of their installation.	Today’s articles are designed with highly integrated functions. It is important to identify the TSO functions and the non-TSO functions residing in the same article for airworthiness assurance.	Should revise the paragraph accordingly.	<b>Not Accepted:</b> The statement in 5.a.(3) requires the manufacturer to add a limitation to the installation manual stating that the TSO is only a design/production approval and installation will require separate approval. This applies to all functions, TSO and non-TSO.
ANM-130L (T. Ebina)	Pg 4 Par 5c: If the article includes software: a plan for PSAC, SCI, and SAS	If non TSO functions reside in the article, they must be identified in the PSAC, SCI and SAS as well. Also, these non-TSO functions must be clearly addressed in the TSO required installation document or its equivalent manual.	Identification of the non-TSO functions in an article is necessary for demonstrating compliance of software with DO-178B.	Should address the non TSO functions in software documentation and TSO-required installation manual.	<b>Not Accepted:</b> Paragraph 5.f. outlines the data requirements for non-TSO functions in accordance with Order 8150.1b Change 1. Additionally, Paragraph 6.i. requires all data required in 6.a. through 6.h. to be provided for non-TSO functions. Paragraphs 6.g. and 6.h. require the DO-254 hardware and DO-178B software documentation.
SACO NM130S  Jay Yi	General	Clarify if Heads-Up Display (HUD) Projector is part of this TSO or it is excluded in this TSO.	Some applicants have attempted to seek TSO Authorization for Head-Up Display Projector.	Provide clarification if HUD projector is considered as component of this TSO-C113 or add clarification how the Head-Up Display Projector can be considered as component that provides an integrated non-TSO function within the TSO-C113 function.	<b>Accepted.</b> Sentence added to paragraph 3.a. stating that this TSO does not apply to Heads Up Displays. The statement is also specified in SAE AS 8034B.

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<b>ASW-100</b>					
G. Schwab ASW112	Page 2, Paragraph 3.b.	Description of Failure Condition Classifications needs to include Hazardous Misleading Display of Information.	If/when TSO applicants incorporate software partitioning; each partition should be defined and clearly associated with the function it is supporting.	Expand the discussion to make it clear to TSO applicants that all hazard classifications need to be appropriately addressed by the software and airborne electronic hardware DAL of the display.	<b>Not Accepted.</b> Agree that software and AEH design need to address the appropriate failure condition classification. Also agree that the software/AEH design in each partition needs to be clearly associated with the intended function. This comment is not accepted, because this requirement is included in paragraph 3.e. for the software qualification and paragraph 3.f. for the hardware qualification.
G. Schwab ASW112	Page 3, Paragraph 4.c.	Software and Airborne electronic hardware should be labeled	In addition to the configuration, the design assurance level(s) should also be on the label. Not just the highest DAL (again, when partitioning is incorporated in the design)	Add a note, or statement to reflect the DAL be included on the unit's label.	<b>Not Accepted.</b> In accordance with Order 8150.1b Change 1, the software and hardware levels do not need to be marked on the box. Paragraph 4.c. requires the part numbering scheme to identify the software and AEH configuration. Paragraph 5.a.(4) requires the applicant to provide data regarding software/AEH. Paragraph 7 requires all 5.a. data to be made available to the installer.  As this is a TSO policy issue, this comment will be forwarded to the appropriate office for consideration in future revisions to Order

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					8150.1b.
G. Schwab ASW112	Page 2, Paragraph 3.d.	Need to add a note or statement to remind applicants that equipment that is intended to be installed in rotorcraft must meet the appropriate environment requirements.	We are seeing a steady stream of TSO'd equipment that is being transitioned into rotorcraft from fixed wing and running into environmental qualification issues. This could be reduced if more TSO applicants sought the higher environmental qualifications initially.	Add note or statement to raise awareness of that issue.	<b>Not accepted.</b> We acknowledge this issue; however, the current TSO environmental policy has TSO applicants qualifying their equipment to the environmental category appropriate for the intended installation.
<b>ACE-100</b>					
R. Souter, ACE-119W	Page 1, Paragraph 3.Requirements, and AS 8034B, Page 5	Need some clarification on AS 8034B, page 5, note : “...ARP4256 gives recommended means, but not the only means of compliance to this standard for Part 25 LCD displays...”	Does this mean an applicant can choose ARP4256 alone for TSO-C113a compliance, for Part 25 LCD and also for Part 23, since the note goes on to state that these documents may be used for Part 23 aircraft? This is an awkward mix of TSO part MOPS with installation platform criteria.		<b>Not Accepted.</b> SAE ARP 4256 provides additional design guidance. This guidance is not required by SAE AS 8034B or TSO-C113a. In accordance with paragraph 3 of the TSO, an applicant must meet SAE AS 8034B. An applicant cannot choose SAE ARP 1874, 4067, or 4256 in lieu of SAE AS 8034B.
ACE-117C, Brenda Ocker	Page 2, Paragraph 3(a)	A multi-purpose display should not be TSO'd independent of a display application.	TSO-C113a should not be a stand-alone approval. The TSOA applicant should address the intended applications and how those will be authorized.	Add the following to the end of the paragraph: “TSO-C113a is intended to be used in combination with other TSOs or with non-TSO functions when there is no applicable TSO.” Reference the guidance for incomplete and multi-use systems and	<b>Not Accepted.</b> TSO-C113a equipment may be TSO'd without a specific application. We have discussed applying SAE 8034B in a fashion similar to DO-160, DO-178, and DO-254, however the fact that manufacturers do sometimes

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				non-TSO functions.	qualify equipment without a defined application combined with the historical precedence of TSO-C113 convinced us to continue with the existing approach.
R. Souter. ACE-119W	Page 3, Paragraph 4.d.	Need some clarification on the last sentence in 4.d. states “If electronic marking is used, it must be readily accessible without the use of special tools or equipment.”.	Is a display used to indicate ID, considered “equipment”?		<b>Acknowledged.</b> The intent is that electronic marking must not require external equipment, such as a test set. Typically, the electronic marking is available on the TSO-C113a equipment’s display.
R. Souter, ACE-119W	Page 4, Paragraph 5.f.	Why is “not evaluated” used rather than “not approved” in the referenced section “Identify functionality or performance contained in the article not evaluated under paragraph 3 of this TSO (that is, non-TSO functions). “?”	Guidance says that we accept (not approve) the non-TSO function, evaluating that development processes DO-178, DO-254, and DO-160 were used.	Use “not approved” in the referenced section.	<b>Not Accepted.</b> Current FAA policy, incorporated in Order 8150.1B Change 1, states that non-TSO functionality will be “accepted” versus “approved.”  As this is a TSO policy issue, this comment will be forwarded to the appropriate office for consideration in future revisions to Order 8150.1b.
R. Souter, ACE-119W	Page 8, Paragraph 3.	Second sentence reference to “Class 2” seems inconsistent.	This rest of the paragraph talks about “Class 3” MPD.	Change second sentence to refer to ‘Class 3’.	<b>Accepted.</b>

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R. Souter, ACE-119W	Pages 9 and 11	Section 4.3.4.1, Color Uniformity is not included in the list of Sections and Title.		Include Section 4.3.4.1	<b>Accepted.</b>
R. Souter, ACE-119W	Pages 10 and 11	Section 4.6.1.1 Power Transient Recovery is not included in the list of Sections and Title.		Include Section 4.6.1.1.	<b>Accepted.</b>
J. Brys ACE-117W	TSO Page 1 (Applicability)	Need to state that this TSO is only applicable to Airborne Multipurpose Displays.	Previously this TSO has been misused to include a lot of things that did not have anything to due with an electronic display. We need to be clear that this TSO is only for Airborne Multipurpose Displays and not cursor control devices, HUDs, etc.	Include a statement in Section 2, Applicability of the TSO to clarify this.	<b>Not Accepted.</b> We have detailed within the document the main components that make up a multi-function display. We also included an appendix that discusses the purpose of each component. Additionally, the appendix specifically addresses the AS 8034B requirements that each individual main component must meet in order to obtain TSO-C113a approval.
<b>ANE-100</b>					
Marc Ronell ANE-150		Open problem reports left over from DO-254 or DO-278 processes should identified and furnished by the TSO holder to the installer in case they are relevant to integration of the part.	There is no mention of this current concern.	Complex software and complex hardware should be part of the TSO process. It seems to be negligent to allow the practice to continue.	<b>Not Accepted.</b> RTCA/DO-178B and RTCA/DO-254 both require an accomplishment summary to be submitted as part of the TSO data submittal. The accomplishment summary contains a summary of problem reports unresolved at the time of certification.

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					Currently, this type of data is not required to be provided to the installer. Creating a requirement to provide this data to the installer is a TSO policy issue, versus being a unique TSO-C113a issue. This comment will be forwarded to the appropriate office for consideration in future TSO policy making efforts, and/or revision to Order 8150.1B.
Nick Rediess ANE-150	Paragraph 3.b.	I applaud this approach to failure condition classification. Since the failure condition classification is often driven the architecture of the system that incorporates the TSO article. In my opinion, the failure condition should not be specified in the TSO. The applicant should decide what it should be based on the intended market.	This approach will eliminate TSO deviations for design assurance level that are not compatible with the TSO specified failure condition.	Leave as is. Extend this approach to all future TSO revisions.	<b>Acknowledged.</b> Because of the broad application of this TSO we were not able to set a minimum design assurance level. However, current policy does require setting the minimum design assurance level when appropriate.
Nick Rediess ANE-150	Appendix 1, Tables 1 and 2	You only need one column to indicate whether the AS section applies and leave blank if it does not. This would lead to a simplification of the language in Appendix 1, sections 3 and 4.	Tables are associated text are confusing.	Single column to indicate whether the section applies or not. Simply text in Appendix 1, Section 3 and 4 to say “see Table X to see what sections of AS8034B apply to y.”	<b>Accepted.</b> The tables were simplified by removing the “Not applicable” column.
Nick Rediess ANE-150	Appendix 1, Section 3	The applicant should identify the compatible DU used to show compliance with the applicable requirements. That should be identified in the qual report. The compatible DUS that, together with the SG,	Most of the requirements identified as being applicable to the SG are affected by both the DU and SG. As such the compatible equipment used to show compliance needs to be identified as installation limitations for the TSO article. A similar argument could be made		<b>Acknowledged.</b> This requirement is contained in paragraph 5.a.(3) which states that the install procedure/limitations must provide sufficient guidance to ensure the equipment meets

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		show compliance to the relevant MOPS need to be identified in the limitations in the installation manual.	regarding the DU and the Control Panel.		the TSO requirements when installed. If the DU only meets the TSO requirements when paired with certain symbol generators, this is a requirement that must be included in the install procedures to comply with 5.a.(3).