Clearance Record
DOCUMENT COMMENT LOG

Originating Office:	Document Description:	Project Lead:	Reviewing Office:	Date of Review:
AIR-130	TSO-C147a	Steve Plummer, 650-756-0227 x166		

Index No.	Name of Reviewer	Page & Paragraph	Comment	Suggested Change & Rationale	Disposition
1	R.Joslin	Page 1, Para 3	The requirements reference RTCA Document RTCA/DO-197A, Minimum Operational Performance Standards for An Active Traffic Alert and Collision Avoidance System I (ACTIVE TCAS 1), Section Two (2) September 12, 1994, **without including Change 1 which was published on July 29, 1997**	Rationale: The reference for the requirements does not cite Change 1, issued on July 29, 1997 Suggested Change: RTCA Document RTCA/DO-197A, Minimum Operational Performance Standards for An Active Traffic Alert and Collision Avoidance System I (ACTIVE TCAS 1), Section Two (2) September 12, 1994 ***with Change 1 dated July 29,1997***	**Not accepted.** This proposed revision updates the existing TSO for TAS, TSO-C147, by adopting the latest structure for TSOs as specified by FAA Order 8150.1C, Technical Standard Program. No significant technical changes have been made to the document. Appendix 1 of TSO-C147 changed most of the same sections of DO-197A that the Change 1 document does but it adopted different requirements. It should be noted that Appendix 1 makes extensive changes to DO-197A of which the Change 1 alterations are a small subset. Appendix 1 has been carried forward into TSO-C147a. Also, it should be noted that TSO-C147 was published Apr 6, 1998, 9 months after RTCA/DO-197 Change 1 (Jul 29, 1997). In the drafting of TSO-C147, due consideration would have been given to adopting, or not, that Change 1 document.

Index No.	Name of Reviewer	Page & Paragraph	Comment	Suggested Change & Rationale	Disposition
2	R.Joslin	Page 10-11, Appendix 1 Para 1.6	The Table appears to be identical to the one that DO-197A Change 1 replaced in the original basic order	Rationale: The Table does not appear to show any change from DO-197A Chg 1 Suggested Change: Delete the Table on Pages 10-11	**Not accepted.** This proposed revision updates the existing TSO for TAS, TSO-C147, by adopting the latest structure for TSOs as specified by FAA Order 8150.1C, Technical Standard Program. No significant technical changes have been made to the document nor are any required
3	R.Joslin	Page 12 Appendix 1 Conditions	The number of Intruders is inconsistent with Change 1 of DO-197A, however it is not clear if this was what the proposed TSO revision intended to do, or if the TSO revision was just based on the original DO-197A without Change 1 incorporated	Rationale:The number of Intruders is inconsistent with Chg 1 to DO-297A Suggested Change; Intruders 1-**9** Intruders **10-16** Intruders **17**-22	**Not accepted.** See Index No. 1 and 2.
4	R.Joslin	Page 14 Appendix 1 Scenario A	The radiated power/sec is inconsistent with Change 1 of DO-197A, however it is not clear if this was what the proposed TSO revision intended to do, or if the TSO revision was just based on the original DO-197A without Change 1 incorporated	**Rationale**:The radiated power/sec is inconsistent with Chg 1 to DO-297A **Suggested Change:** 250 watts/sec measured at T = 20 sec **250** watts/sec measured at T = 60 sec **144** watts/sec measured at T = 120 sec 42 watts/sec measured at T = 180 sec	**Not accepted.** See Index No. 1 and 2.
5	R.Jolsin	Page 14 Appendix 1 Scenario B	The radiated power/sec is inconsistent with Change 1 of DO-197A, however it is not clear if this was what the proposed TSO revision intended to do, or if the TSO revision was just based on the original DO-197A without Change 1 incorporated	**Rationale:**The radiated power/sec is inconsistent with Chg 1 to DO-297A Suggested Change: 118 watts/sec measured at T = 20 sec **74** watts/sec measured at T = 60 sec **41** watts/sec measured at T = 120 sec 12 watts/sec measured at T = 180 sec	**Not accepted.** See Index No. 1 and 2.

Index No.	Name of Reviewer	Page & Paragraph	Comment	Suggested Change & Rationale	Disposition
6	R.Joslin	Page 19 Para 3.1 Note at bottom of Page	It appears that aural alerts for aircraft configured with fixed landing gear and **without a radio altimeter** is not clearly addressed	**Rationale:** It appears that aural alerts for aircraft configured with fixed landing gear and without a radio altimeter is not clearly addressed **Suggested Change:** Note: When the TAS is installed on a fixed gear aircraft with **or without** a radio altimeter, the aural annunciation will never be inhibited.	**Partially accepted.** The note has been changed to indicate that when a Class B TAS is installed on a fixed gear aircraft without a radio altimeter, the aurals will never be inhibited.
7	R.Joslin	Page 19 Note at top of Page	It appears that aural alerts for aircraft configured with fixed landing gear and **without a radio altimeter** is not clearly addressed	**Rationale**: It appears that aural alerts for aircraft configured with fixed landing gear and without a radio altimeter is not clearly addressed **Suggested Change:** Note: When the TAS is installed on a fixed gear aircraft with **or without** a radio altimeter, the aural annunciation will never be inhibited.	**Not accepted.** The note correctly identifies to the reader that when a Class A TAS is installed on a fixed gear aircraft without a radio altimeter, the aural annunciations will never be inhibited.

Index No.	Name of Reviewer	Page & Paragraph	Comment	Suggested Change & Rationale	Disposition
8	R. Joslin	Page 20 Para.3.1(2)(a)	Missing factors that should be evaluated for acceptability of the aural annunciations, as recommended by (§ 25.1301(a)) and [AC 25.1322-1, Appendix 2, 3.f.(3)(a)]	**Rationale:** Missing factors that should be evaluated for acceptability of the aural annunciations, as recommended by (§ 25.1301(a)) and [AC 25.1322-1, Appendix 2, 3.f.(3)(a)] **Suggested Change**: Aural voice alerting must be audible to the flightcrew in the worst-case (ambient noise) flight conditions whether or not the flightcrew is wearing headsets (taking into account the headsets' noise attenuation characteristics) (§ 25.1301(a)). Aural voice alerting should not be so loud and intrusive that it interferes with the flightcrew taking the required action. The minimum volume achievable by any adjustment (manual or automatic) (if provided) of aural voice alerts should be adequate to ensure it can be heard by the flightcrew if the level of flight deck noise subsequently increases. [AC 25.1322-1, Appendix 2, 3.f.(3)(a)]	**Not accepted.** Although the suggested changes are considerations an applicant must account for at the time of initial certification, they are not appropriate for inclusion in a TSO. See also Index Number 2.
9	J. Ramos, ANM-130L	Page 1, Section 3	TSO requires meeting "RTCA/DO-197A, section two (2) September 12, 1994, as modified by appendix 1 of this document." However, RTCA/DO-197A, Change 1 was issued on July 29, 1997, which also affected section two (2) – i.e. "2.2.3.2 Transmitter RF Power Output"; and **etc..**. There also seem to have some value(s) in RTCA/DO-197A, initial release or Change 1, that is not consistent with the values in Appendix 1 of TSO-C147a – i.e. "Duration Tolerance = +0.075."	Incorporation of published later change (change 1) to RTCA/DO-197A should be considered in the TSO. If the published later change is intentionally being left out, then this should be stated in the TSO.	**Not accepted.** See Index Number 1.

Index No.	Name of Reviewer	Page & Paragraph	Comment	Suggested Change & Rationale	Disposition
10	T. Nguyen, ANM-130S	Page 2, para 3.b.(1)	Need clarification. It says "Failure of the functions defined in paragraph 3.a of this TSO has been determined to be a major failure condition for malfunctions causing the display or annunciation of hazardously misleading information in airborne aircraft"	This condition should be Hazardous not Major?? Need clarification.	**Not accepted.** TSO-C147 equipment does not provide resolution advisory alerts to the pilot; the equipment only provides traffic advisory alerts to the pilot. Failure conditions for malfunctions causing the display or annunciation of hazardously misleading information in airborne aircraft has been deemed to be major.
11	T. Nguyen, ANM-130S	Page 2, para 3.b.(2)	Need clarification. It says "Loss of the function defined in paragraph 3.a is a minor failure condition"	This condition should be categorized as Major condition not Minor?? Need clarification.	**Not accepted.** TSO-C147 equipment does not provide resolution advisory alerts to the pilot; the equipment only provides traffic advisory alerts to the pilot. Failure conditions for malfunctions causing the loss of function in airborne aircraft have been deemed to be minor.
12	J. Yi, ANM-130S	Page 2, Para 3.d	Wrong DO document is listed.	RTCA/DO-197A needs to change to RTCA/DO-160D or current revision both on the main paragraph and Note section.	**Accepted.**
13	J. Yi, ANM-130S	Page 2, Para 3.e	Did not list the latest RTCA/DO-178.	Change RTCA/DO178B to RTCA/Do178B or current revision.	**Partially accepted.** The new TSO template language for the software qualification section, recently agreed by AIR-130, replaces the text in this section (and section 6.g). That text invokes the DO-178C standard.

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14	J. Yi, ANM-130S	Page 4, Para 5.a.(5)	Prefer changing RTCA/DO-160G.	Change it to RTCA/DO160G or current revision.	**Accepted.**
15	J. Yi, ANM-130S	Page 6, Para 6.g.	Not current RTCA/DO-178.	Change the RTCA/DO178B to RTCA/DO-178B or current revision.	**Partially accepted.** See index 13.
16	K. Green, ANM-160S	Page 14 Para 1.8	Typo: The word "closest" is misspelled in this sentence: "Traffic advisories indicate the relative positions of intruding aircraft that meet certain range and altitude criteria and are approximately 30 seconds from closet point of approach."	Correct typo and change word to: "closest."	**Accepted.**
17	Tony Pigott/ ANE-150	Page 1 & Paragraph 2 Applicability	This TSO is redundant to existing TSO-C118	Add statement: 'This TSO supercedes TSO-C118'. TSO-C118 should be cancelled, pointing to TSO-C147a.	**Not accepted.** Although the two TSOs are similar, they are not redundant. TSO-C118 specifies a minimalist traffic alerting system. TSO-C147 builds on that minimalist system by specifying two separate classes of TAS equipment that have more stringent performance standards of DO-197A as modified by Appendix 1 of TSO-C147a .

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18	Nick Rediess/ ANE-150	Page 2/Para. 3e	Suggest referencing current revision of AC 20-115 for use of alternate revisions of DO-178	See comment.	**Not accepted.** The text in this paragraph is controlled by the TSO Order and AIR-130 policy.
19	B. Verna (AFS-360)	Appendix 1	General formatting issues identified in the .pdf copy I reviewed. The spacing of Appendix 1 skips over an entire blank page on pages 13 and 17.	Double check the format of the Appendix line spacing.	**Not Accepted.** The pagination cited by the commenter is not present in the surviving document but it is observed to be present in the pdf version which was circulated for field review. Why that pdf version paginated as it did is unknown.