Index No.	Name of Reviewer	Page & Paragraph	Comment	Suggested Change & Rationale	Disposition
1	FAA, AJM-2	General	No mention is made in the draft TSO-C147a of any ADS-B-In application, including Traffic Situation Awareness with Alerts.	Given that TSO-C195b describes the interface between a TAS/TCAS-I and TSAA, one would expect to find a reciprocal section about that here. "If you include ADS-B-In functionality, it must conform to…"	**Not accepted.** This proposed revision will update the existing TSO for TAS, TSO-C147, by adopting the latest structure for TSOs as specified by FAA Order 8150.1C, Technical Standard Program and as modified by recently established AIR-130 policy for section 2, Applicability and section 3.e, Software Qualification. If TSO-C195( ) equipment is intended for installation in an aircraft with TAS or TCAS I, the TSO-C195 equipment must be capable of interfacing with the TAS or TCAS I. There is no need for such an integration requirement in TSO-C147 as TSO-C195 controls the allowed installation configurations.

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2	Garmin	Page 1, Para 2.	The verbiage in this section is inconsistent with recently released TSOs. For example, "is applicable for new applications on {mm/dd/yyyy}" is used in this draft TSO, while the draft of TSO-C195b used, "affects new applications submitted after its effective date". Additionally, sub-paragraph 2.a contains verbiage that is also inconsistent with recent draft TSOs. The verbiage in draft TSO-C147 implies a hard 'break' with all applications before the date required to be for TSO-C147, and any application after the date to be TSO-C147a. Other recent draft TSOs (e.g. draft TSO-C195b) contain verbiage that allows application under either version of the TSO during the 18 month period following the effective date of the new TSO.	To remain consistent with other recent draft TSOs, and to allow a transition period between TSO versions, we suggest revising paragraphs 2. and 2.a as follows: 2. Applicability. This TSO affects new applications submitted after its effective date. a. TSO-C147 will also remain effective until 18 months after the effective date of this TSO. After this date, we will no longer accept applications for TSO-C147.	**Not accepted.** This proposed revision will update the existing TSO for TAS, TSO-C147, by adopting the latest structure for TSOs as specified by FAA Order 8150.1C, Technical Standard Program and as modified by recently established AIR-130 policy for section 2, Applicability and section 3.e, Software Qualification.

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3	Garmin	Page 1, Para 3.	Includes the statement: New models of TAS identified and manufactured on or after the effective date of this TSO must meet the MPS qualification and documentation requirements in RTCA Document No. 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, as modified by appendix 1 of this document. Reference to the entire DO-197A section 2 as providing the minimum functional and performance requirements leads to confusion because DO-197A section 2 also includes the environmental qualification and test conditions.	Suggest changing to: New models of TAS identified and manufactured on or after the effective date of this TSO must meet the MPS qualification and documentation requirements in Sections 2.1 and 2.2 of RTCA Document No. RTCA/DO-197A, Minimum Operational Performance Standards for An Active Traffic Alert and Collision Avoidance System I (ACTIVE TCAS 1), dated September 12, 1994, as modified by appendix 1 of this document. In a recent discussion on another TSO, FAA AIR-120 indicated that test sections are not part of the minimum functional and performance requirements that the equipment must meet in order to provide the intended function defined in paragraph 3.a of this TSO. In other words, TSO deviations do not need to be obtained in cases where the tests are not conducted precisely in accordance with the procedures defined within the MPS test section although the intent of the test must be followed and any modifications to the test must be validated.	**Accepted.** The intent of the comment has been incorporated.

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4	Garmin	Page 2, Para 3.b.(1)	Includes the statement: Failure of the function 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 The statement is not supported by a recent and very thorough operational safety assessment contained in Section C.5.4 of RTCA/DO-348 Safety, Performance and Interoperability Requirements Document for Traffic Situation Awareness with Alerts (TSAA). The DO-348 safety assessment is for an ADS-B enabled situational awareness with alerting- a function that is equivalent to TAS.	Suggest changing to: Failure of the function defined in paragraph 3.a of this TSO has been determined to be a minor failure condition for malfunctions causing the display or annunciation of misleading information in airborne aircraft. Section C.5.4.4 of RTCA/DO-348 specifically addresses the hazard of False alerts under varying flight crew reaction scenarios and, in all cases, finds a DO-264 Severity Classification of 4 (Slight reduction in safety margins or aircraft functional capabilities). This corresponds to a MINOR failure condition. Requiring higher failure classifications with the consequent higher design assurance levels will inappropriately stifle the installation of the safety-enhancing TAS functionality, which is in direct contradiction to the FAA's charter.	**Not accepted.** The classification RTCA established in DO-348 for TSAA has not been accepted by the FAA in the proposed TSO-C195b. That TSO, currently in the public comment phase, establishes the minimum performance standard for TSAA, known as ATAS therein. No change is made to the failure classification for TAS equipment in TSO-C147a.
5	Garmin	Page 2, par 3.b.(2)	Paragraph 3.b.(1) recognizes that misleading classification is in "airborne aircraft", paragraph 3.b.(2) needs the same scope.	Recommend adding "in airborne aircraft" to the end of 3.b.(2). Also recommend including this in the TSO template.	**Not accepted.** It is unnecessary to add the suggested language as the context is clear since the entire TSO specifies requirements for airborne equipment.

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6	Garmin	Page 2, Para 3.c	Includes the statement: Demonstrate the required functional performance under the test conditions specified in RTCA/DO-197A section 2 as modified by the changes in appendix 1 of this document. The test conditions are specifically defined in DO-197A Section 2.4.	Suggest changing to: Demonstrate the required functional performance under the test conditions specified in RTCA/DO-197A section 2.4 as modified by the changes in appendix 1 of this document. The change will avoid confusion between functional/performance requirements, and test procedures.	**Accepted.**
7	Garmin	Page 3, par 4.b.(2)	Paragraph 4.b.(2) states: Each subassembly of the article that you determined may be interchangeable. This language is confusing.	The language for this requirement is confusing. This could mean that a stuffed printed circuit board needs the TSO number. Suggest removing the statement or if removing causes problems, work with industry to establish wording that is better understood.	**Not accepted.** The language in this section is dictated by the TSO template in FAA Order 8150.1C CHG 2 dated 12/17/13.

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8	Garmin	Page 5, par 5.f	TSO paragraph 5.f and its subparagraphs include definition of non-TSO functions and the data to be submitted to the ACO for non-TSO functions. This guidance is inconsistent with Order 8110.4C CHG 4.	TSO paragraph 5.f states "Identify functionality or performance contained in the article not evaluated under paragraph 3 of this TSO (that is, non-TSO functions)." Use of the term "performance" in the definition of a non-TSO function is inconsistent with the Order 8110.4C CHG 4 paragraph 6-9.b.(1) and 6-9.b.(3)(a) guidance regarding how to define a non-TSO function. The issue is non-TSO should not be defined as "performance". It will create difficulty if these criteria are used. For example, if a TSO requires a minimum 10 watt transmitter and a company makes equipment that is robust at 11 watts, the performance exceeding the TSO is not called out under the TSO; consequently, by the paragraph 5.f "performance" definition, the 11 watt transmitter has a non-TSO 1 watt capability. The distinction of a "function that can be accomplished outside the TSO box" as is specified in Order 8110.4C CHG 4 paragraph 6-9 is critical to making non-TSO function work long term. Adjust the wording in the TSO (and template) to be consistent with the 8110.4C CHG 4 intent.	**Not accepted**. The format of paragraph 5.f is dictated by the TSO template. However, the apparent disconnect between the two Orders (8110.4C CHG4 and 8150.1C CHG 2) is noted and it has been discussed with the AIR-111 organization. They expect to coordinate with AIR-110 (the responsible organization for Order 8110.4C) to resolve the inconsistencies between the two orders. At this time the expected resolution will be to remove the non-TSO functionality guidance from order 8110.4C and absorb it into a future revision of Order 8150.1C.

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9	Garmin	Page 6, par 7.b	TSO paragraph 7.b contains wording that is inconsistent with Order 8110.4C CHG 4.	TSO paragraph 7.b includes additional guidance about what furnished data should be provided to an operator or repair station when the equipment includes a non-TSO function. The problematic guidance states "include one copy of the data in paragraphs 5.f.(1) through 5.f.(4)." This guidance is inconsistent with Order 8110.4C CHG 4. Order 8110.4C CHG 4 paragraph 6-9.b.(6) defines the FAA-industry agreed data that must be provided to an installer when equipment includes a non-TSO function. Adjust the wording in the TSO (and template) to be consistent with the 8110.4C CHG 4 intent.	Refer to #8 for disposition.
10	ACSS	Appx 1, 2.1.3	This section defines symbology for the display of traffic data with the requirements largely unchanged from the original TSO which was issued in 1998. Since that time, other definitions of TAS and TCAS symbology have been developed and should be listed as acceptable alternatives.	Suggest adding text that allows the traffic symbology defined in RTCA DO-317a, 2.3.4.2.3.2, as an acceptable alternative.	**Not accepted.** The specified symbology is the acceptable level of performance for the equipment. If an applicant wishes to implement symbology different than that defined therein they should apply for a deviation under the provision of 14 CFR § 21.618.

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11	ACSS	Appx 1, 2.1.3, Note	The suggested change is making a reference to a memorandum of interim guidance issued in 1995, yet that memorandum is not found at any normal source, including the FAA's website.	Suggest the memorandum or the relevant portions of the memorandum be included in the TSO as an additional appendix.	**Partially accepted.** The policy memo and the attached draft AC total 38 pages in length. Appending that to TSO-C147a would make the TSO prohibitively lengthy (at approximately 57 pages). We will investigate the feasibility of adopting an alternate solution, namely posting the policy memo and the attached draft AC to RGL adjacent to TSO-C147a. It should be noted that copies of the policy memo and the draft AC can be obtained by contacting AIR-130 or your local ACO.