

# NOTICE

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

N 8150.NTF

dd/mm/05

Cancellation  
Date: dd/mm/06

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**SUBJ: NON-TSO FUNCTION(S) INTEGRATED IN A TSO ARTICLE**

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**1. PURPOSE.** This notice supersedes Federal Aviation Administration (FAA) Order 8150.1B, Technical Standard Order Program, Paragraph 17d(3), dated May 12, 2002. In it, we provide guidance to aircraft certification field offices on the appropriate means to evaluate a non-Technical Standard Order (TSO) function that a manufacturer might integrate into an existing or proposed TSO article.

**2. DISTRIBUTION.** This notice is distributed to the branch level in the Aircraft Certification Service and the Flight Standards Service; to the branch level in the Aircraft Certification Directorate offices and the regional Flight Standards Divisions; to the Federal Aviation Administration Academy and the Regulatory Support Division; to all Air Carrier; General Aviation, and Flight Standards District Offices; to all International Field Offices, International Area Offices; Aircraft Certification Field Offices; Manufacturing Inspection District and Satellite Offices. This information is also available on the FAA's Regulatory Guidance Library, at the FAA Web site: <http://www.airweb.faa.gov/RGL>.

**3. BACKGROUND.**

**a.** FAA Order 8150.1B, Paragraph 17d(3), allows for the incorporation of a non-TSO function into an article either previously issued a TSO authorization or in the process of receiving a TSO authorization, by stipulating that the safety and performance of the non-TSO function be evaluated under the appropriate airworthiness certification procedures (type certification (TC) or supplemental TC (STC)) during installation. In effect, the paragraph instructs the aircraft certification office (ACO) to ignore the added non-TSO function, deferring its evaluation to the installation phase of the certification process. However, the design data package referenced under the TSO Authorization contains data that defines the non-TSO function.

**b.** This approach requires no oversight by the ACO to ensure the performance of the hosting TSO article is unaffected by the added non-TSO function. Additionally, deferring the evaluation of the non-TSO function until installation is not ideal, since the installer generally does not have the equipment or expertise available to the TSO manufacturer to accomplish a thorough equipment performance evaluation, especially when the performance of the non-TSO function must be determined by laboratory simulation or under stressed conditions.

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c. The guidance in paragraph 4 of this notice brings greater scrutiny to non-TSO functions integrated in a TSO article by providing guidance to the ACO for the consistent performance evaluation of a non-TSO function at the time of TSO authorization. As with the TSO article itself, the integrated non-TSO function must have separate approval for installation in an aircraft. This guidance allows the ACO to acknowledge the software and hardware design assurance levels and environmental testing accomplished on the non-TSO function, to preclude the need for repeated evaluations for each installation approval.

#### 4. POLICY.

a. A non-TSO function is one that is not covered by a TSO-approved minimum performance standard (MPS), is distinct and independent, such that it does not support or affect the hosting article's TSO function(s), and could technically be implemented outside of the TSO article. A manufacturer may choose to integrate a non-TSO function into a TSO article to support a foreign airspace requirement; minimize the amount of line replaceable units and interconnect wiring systems in an aircraft installation; address a specific customer/industry need; or for product differentiation. Non-TSO function(s) may be included and evaluated as part of a manufacturer's TSO submittal, and a TSO authorization issued for the article, if it meets all of the following conditions:

(1) The hosting article must be eligible for TSO authorization and meet the applicable TSO performance requirements, provided for in FAA Order 8150.1B, paragraph 17a(1) and 17a(2);

(2) There is no existing applicable TSO for the non-TSO function;

(3) The added non-TSO function does not affect the hosting TSO article's required MPS or violate any limitations imposed by the hosting TSO; and,

(4) The non-TSO function is compatible with the hosting TSO article's hardware and software design assurance levels.

**NOTE:** Depending on the complexity and/or degree of pilot interface added by the non-TSO function, the ACO may require a concurrent TC or STC project evaluation prior to issuance of the TSO authorization.

b. Since the integrated non-TSO function is not covered by a TSO-approved MPS, the ACO will need adequate time to review the manufacturer's declared performance requirements for the non-TSO function, and resolve any certification approval issues with the manufacturer. Manufacturers intending to integrate non-TSO functions in a proposed TSO article should plan accordingly and coordinate with their ACO at the earliest opportunity, to avoid potential delays to their project. Use of the Partnership for Safety Plan (PSP) should be encouraged to formalize and adapt required integrated non-TSO function process steps to each manufacturer's internal TSO procedures.

c. Data submitted to the ACO to permit review of the non-TSO function should include, as a minimum, the following:

(1) A description of the non-TSO function.

(2) The manufacturer's declared performance requirements. Where possible, the manufacturer should adopt existing industry-accepted standards (for example, RTCA, EUROCAE, SAE, and ARINC).

(3) The manufacturer's proposed test procedures to validate their performance requirements for the non-TSO function, including RTCA Document (RTCA/DO)-160(revision level same as hosting TSO article)environmental test conditions.

(4) The proposed hazard classification of the non-TSO function (for example, minor, major, and so forth), as installed in accordance with the manufacturer's installation instructions, supported by a functional hazard analysis if appropriate.

(5) The manufacturer's verification that the hosting TSO article's software and hardware design assurance levels, including applicable RTCA/DO-254 complex electronic hardware requirements, remain appropriate for the non-TSO function.

**NOTE:** If the non-TSO function includes software components, all RTCA/DO-178 (revision level same as hosting TSO article) software artifacts normally furnished to the ACO or retained by the manufacturer must clearly describe the non-TSO function software components and demonstrate compliance with the requirements of paragraph 4a(3).

d. The manufacturer should incorporate the non-TSO function(s) within the data provided to the ACO. With ACO acceptance of the statement of conformance for the data submittal requirements of paragraph 4c, the non-TSO function may be integrated and qualified in accordance with the manufacturer's existing configuration control and TSO qualification procedures. However, as with any article, the FAA reserves the right to witness testing at its discretion.

e. The TSO Authorization letter issued to the manufacturer should document the TSO authorizations being granted, including the integrated non-TSO function(s) that were evaluated by the ACO in conjunction with the hosting TSO article approval. Appendix 1 of this notice contains a sample TSO Authorization letter wording when a non-TSO function is included. It is essential to note that the TSO article and any integrated non-TSO function(s) are now inseparable at the article level, and should be covered by a common manufacturer's hardware and/or software part number. The TSO Authorization letter conveys design and production approval for both the TSO and non-TSO functions. However, because the non-TSO function is not covered under the TSO authority granted by 14 CFR § 21.603(a), the following additional information must be included in the manufacturer's installation manual or component maintenance manual to support the aircraft installation approval requirements:

- (1) A description of the non-TSO function(s), including software, hardware, environmental, flammability, etc., qualification levels.
- (2) Interface requirements for the non-TSO function(s).
- (3) Installation and operating instructions/limitations, including any instructions for continued airworthiness (ICAW), for the non-TSO function(s) as applicable.
- (4) For non-TSO function(s) having catastrophic or hazardous failure effects, the manufacturer should also provide the expected reliability and fault detection rates.

f. Because the TSO article and any integrated non-TSO function(s) are inseparable at the article level, both must be covered by a common manufacturer's hardware and/or software part number, and accepted under the TSOA letter. All subsequent design changes to the non-TSO function(s) must be treated identically to design changes made to a TSO function (reference 14CFR § 21.611 and Order 8150.1B, paragraph 15). When evaluating a proposed major design change, the ACO should work with the manufacturer to determine if an applicable TSO or industry-accepted standard has become available for the non-TSO function since its initial approval. If a new TSO is available, the manufacturer must adopt the new TSO MPS for the original non-TSO article as required by paragraph 4a(2), or elect not to follow the TSO process for the changed article and approve the entire article under the TC/STC process. If a new or updated industry-accepted standard has become available, the manufacturer should be encouraged to re-qualify the non-TSO function to that subsequent standard. Similarly, the FAA's ability to rescind a TSOA in accordance with 14 CFR § 21.619 applies equally to any issues associated with the integrated non-TSO function.

**5. DISPOSITION.** This notice will be incorporated into Order 8150.1 at a future revision.

David W. Hempe  
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Aircraft Certification Service

**APPENDIX 1. FORMAT AND GUIDANCE FOR THE PREPARATION OF TSO  
AUTHORIZATION LETTER THAT INCLUDES A NON-TSO FUNCTION**

U.S. Department of Transportation  
*{enter appropriate ACO }*  
*{enter ACO address}*

**Federal Aviation Administration**

*{enter date}*

In reply refer to: *{enter reference number}*

*{enter name of applicant point of contact (POC)}*  
*{enter POC's title}*  
*{enter name of company}*  
*{enter street address}*  
*{enter city and mail code}*

Dear *{Mr./Mrs./Ms. enter name of applicant POC}*:

This is in reply to your letter of *{enter date of application}* requesting TSO authorization for your *{insert type of article}*. The statement of conformance to TSO-C*{enter applicable TSO number}* and the submitted data are accepted.

Effective this date, you are authorized to identify the following *{insert type of article}* with the marking requirements defined in 14 CFR § 21.607(d) and in TSO-C*{enter applicable TSO number}*.

<u><i>{Enter Part/Model}</i></u> <b>Number</b> <i>{list each part number, with open brackets to allow for minor changes, model number or if both are necessary use two separate columns}</i>	<u><i>{Enter type of article}</i></u> <b>Description</b> <i>{enter a basic description of equipment, major features that distinguish this part or model number from other part or model numbers in the list}</i>
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Additional non-TSO functions contained in this article are:

<u>Non-TSO Function(s)</u> <i>{enter name and basic description of each added function}</i>	<u>Performance Requirements</u> <i>{List manufacturer's declared performance requirements document, or appropriate section(s) thereof, that refer to the non-TSO function(s).}</i>
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**APPENDIX 1. FORMAT AND GUIDANCE FOR THE PREPARATION OF TSO  
AUTHORIZATION LETTER THAT INCLUDES A NON-TSO FUNCTION  
(CONTINUED)**

The statement of conformance for functional performance at the equipment level, hardware and software design assurance, and environmental qualification for the non-TSO function(s) is also accepted. The applicable Installation Manual contains the information on the non-TSO function(s) necessary to support installation approval.

Your Quality Control System, as defined in your Quality Control Manual, *{insert date of manual}*, is considered satisfactory for production of this article at your *{enter location of applicant's manufacturing facility}* facility.

The following statement must be furnished to the original owner/installer of each article or multiple articles, if furnished to one source:

"The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

*{A summary statement must be included to describe any approved deviations.}*

Any design change to this TSO article, or the non-TSO function contained within, must be forwarded to this office as outlined in 14 CFR § 21.611 with minor change submittal intervals not to exceed six months. Also, as recipient of this authorization, you are required to report any failure, malfunction, or defect relating to this authorization in accordance with the provisions of 14 CFR § 21.3.

This authorization is not transferable to another person or location and is effective until surrendered, withdrawn, or otherwise terminated by the Administrator.

Please note that technical data retained by the FAA may be subject to Freedom of Information Act (FOIA) requests. As such, this office will notify you of all such requests pertaining to your data and afford you the opportunity to defend the release of the data.

**APPENDIX 1. FORMAT AND GUIDANCE FOR THE PREPARATION OF TSO  
AUTHORIZATION LETTER THAT INCLUDES A NON-TSO FUNCTION  
(CONTINUED)**

If you have any questions regarding this authorization, contact *{enter FAA ACO contact and phone number}*

Sincerely,  
*{insert name of ACO manager}*  
*{enter appropriate FAA ACO}*

cc: AIR-140; *{insert routing symbol of responsible MIDO/MISO}*