U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ORDER 8150.1D

Effective Date:
3/17/2017

SUBJ: Technical Standard Order Program

This order explains how to evaluate and issue technical standard order (TSO) authorizations (TSOA) and letters of TSO design approval (LODA) for aviation-related articles.

In this revision to the order, the Federal Aviation Administration (FAA) updates and expands its guidance on procedures that Federal Aviation Administration (FAA) personnel follow when issuing a TSOA pursuant to Title 14 of the Code of Federal Regulations (14 CFR) 21.611 or a LODA pursuant to § 21.621.

The FAA designed this order to give FAA personnel a better understanding of their individual and mutual responsibilities and what they must expect from manufacturers.

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Chapter 1. Purpose of This Order

1-1. Purpose of This Order. This order provides guidance on evaluating and issuing TSOAs and LODAs for aviation-related articles.

1-2. Audience. All Federal Aviation Administration (FAA) Aircraft Certification Office (ACO) engineers, inspectors in Manufacturing Inspection District Offices (MIDO) or Manufacturing Inspection Satellite Offices (MISO), and the staffs that manage the TSO program.

1-3. Where Can I Find This Order? You can find this order on the MyFAA Employees website at https://employees.faa.gov/tools_resources/orders_notices or the FAA's Regulatory and Guidance Library (RGL) website at http://rgl.faa.gov.

1-4. Cancellation. This order cancels the following FAA orders:

a. FAA Order 8150.1C, *Technical Standard Order Program*, March 8, 2012.

b. FAA Order 8150.1C CHG1, *Technical Standard Order Program*, May 10, 2012.

c. FAA Order 8150.1C CHG2, *Technical Standard Order Program*, December 17, 2013.

1-5. Explanation of Changes. This revision:

a. Adds instructions for processing TSOA transfer requests and allows ACO personnel to review and approve transfer requests without AIR-100 involvement.

b. Corrects out-of-date references from FAA Order 8120.2 to FAA Order 8120.22 and from Order 1350.15 to Order 1350.14.

c. Adds instructions for reviewing open problem reports (OPR).

d. Adds a previously omitted section to the sample TSOA letter in appendix C advising that articles approved with a TSOA require a separate installation approval, and adds guidance for ACO personnel when requesting validations from countries that have bilateral agreements with the United States that recognize TSOs.

e. Adds gray formatting to the "Failure Condition Classifications" paragraph in the TSO template in appendix G, which was previously omitted.

f. Revises the wording in the "Software Qualification" section of the TSO template in Appendix G regarding acceptable use of RTCA, Inc. documents (DO) DO-178B and DO-178C, *Software Considerations in Airborne Systems and Equipment Certification*, and aligns paragraph 6g of the template with the new wording in the "Software Qualification" section.

g. Clarifies in Appendix H that there are deviations delegated to ACO personnel to review and approve/deny without AIR-100 involvement both in this order and in various TSOs.

h. Adds instructions for reviewing non-TSO functions (NTF) and a sample TSOA letter that includes NTF.

i. Corrects references from 14 CFR 21.502(a) to 21.502, 21.607 to 21.616(f), 21.611(b) to 21.619(b), and 21.619(b) to 21.619(a).

j. Adds missing references to AC 21-16, Order 8130.2 and 0000.1.

Chapter 2. The TSO Program

2-1. What Is a TSO? A TSO is a minimum performance standard, defined by the FAA, used to evaluate an article. An article can be a material, part, component, process, or appliance. (Refer to Title 14 of the Code of Federal Regulations (14 CFR) 21.1(b)(2)). Each TSO covers a certain type of article intended for use on civil aviation aircraft and provides a baseline standard intended to support compliance with airworthiness or operational requirements. However, compliance with a TSO or multiple TSOs cannot ensure the installation of the article will comply with airworthiness requirements. This determination is made during installation. Refer to Advisory Circular (AC) 21-50, *Installation of TSOA Articles and LODA Appliances*, for further information.

2-2. Why Were TSOs Developed?

a. Managing the FAA's Limited Resources. Before 1947, the FAA evaluated and approved articles the same way it approved airframes, engines, and propellers. The rapid growth of the aviation industry during the 1930s and early 1940s put an unprecedented demand on the FAA's certification resources, so it developed the TSO program to allow:

(1) The FAA to define standards for common articles;

(2) The manufacturer of an article to show compliance with a specific standard;

(3) The FAA to accept the manufacturer's statement certifying it meets the requirements of 14 CFR part 21, subpart O, and the specific requirements of the applicable TSO;

(4) The FAA to reduce its involvement in the evaluation and approval process for articles; and

(5) The FAA to focus limited resources on airframes, engines, and propellers.

b. Standardizing Approvals of Components Used on Products. Before it developed the TSO program, the FAA used a variety of "standards" to approve the same type of article, so the same article installed on two different airplanes often was approved to two different standards. The FAA developed the TSO program to ensure the adequacy of the standards used to approve articles and to standardize the approvals of those articles.

2-3. What Is a TSOA and/or LODA?

a. Definition of TSOA. A TSOA is an FAA design and production approval issued to the manufacturer of an article that has been found to meet a specific TSO. A manufacturer is the person who controls the design and quality of the article produced to ensure it meets the TSO. The manufacturer also must control all the suppliers it uses for parts or services in the design and production of the TSO article (refer to 14 CFR 21.601(b)(5)). The FAA issues TSOAs only to U.S. manufacturers.

When the FAA issues a TSOA, it finds:

(1) The manufacturer's article design meets the applicable TSO.

(2) The manufacturer has a quality system that will produce every article to conform to the approved design.

(3) The United States is the state of design (SOD), as defined by the International Civil Aviation Organization (ICAO), for a TSOA.

(4) The United States is the state of manufacture (SOM), as defined by ICAO, for a TSOA.

b. Definition of LODA. A LODA is a finding by the FAA that a foreign manufacturer's article design meets a specific TSO. The manufacturer's ability to manufacture articles that conform to the approved design is overseen by a foreign civil aviation authority (CAA) with which the United States has a bilateral agreement. All articles destined for import into the United States must be accompanied by a certificate of airworthiness for export pursuant to 14 CFR 21.502.

When the FAA issues the LODA, it finds:

(1) The manufacturer's article design meets the applicable TSO.

(2) A Civilian Aviation Authority (CAA) with which the United States has a bilateral agreement addressing TSOs will oversee the manufacturer's quality system to ensure every article produced will conform to the approved design.

(3) The manufacturer's country is the SOD, as defined by ICAO, for a LODA.

(4) The manufacturer's country is the SOM, as defined by ICAO, for a LODA.

2-4. What Is a Deviation? A deviation is any alternative method used to meet performance criteria specified in the TSO. A deviation must have an equivalent level of safety (ELOS) determination instead of literal compliance with the TSO requirement.

a. When Does an Applicant Need a Deviation? The FAA requires an applicant to propose and get FAA approval for any deviation from the applicable TSO, regardless of the significance of the TSO criteria from which it wants to deviate. For example, the FAA requires applicants to get a deviation approval even when they propose to use a more recent version of an industry standard than the one referenced in the specific TSO, or to mark only the primary TSO on the article and reference the additional TSOs in a particular section in the installation and limitation manual for the article (the primary TSO is typically the TSO for the main function of the article).

b. How Does an Applicant Get Approval? To get FAA approval for a deviation, an applicant requests a deviation from the appropriate ACO and must show that compensating

features or factors create an ELOS to the TSO performance requirement(s) from which it proposes to deviate.

2-5. Does the FAA Require TSO Authorizations (TSOA or LODA)? TSOAs and LODAs are not mandatory. TSOAs and LODAs are two ways to get an article approved pursuant to 14 CFR 21.8(b) when required by § 21.8. You may also use the other provisions in § 21.8 to have your article approved.

2-6. What Does a TSO Marking on the Article Mean? Per 14 CFR 45.15, the FAA does not allow a person to mark an article with a TSO unless (1) that person produced the article under part 21 subpart O or under the provisions of an agreement between the United States and another country or jurisdiction for the acceptance of products and articles, and (2) that article conforms to its approved design and is in a condition for safe operation. In addition to these requirements, TSO articles must meet the applicable performance standards.

a. A TSO marking made under a TSOA or LODA means:

(1) The article's design meets the TSO for which it is marked.

(2) The article was produced under an approved quality system and conforms to the TSO-approved design.

b. A TSO marking made under a TSOA or LODA does not mean:

(1) The article's design meets airworthiness regulations for the product.

(2) The article is approved for installation on a product.

Chapter 3. FAA Responsibilities

The Roles of FAA Offices. Figure 3-1 broadly summarizes the basic roles of the FAA offices as well as the applicant responsibilities as described in AC 21-46, *Technical Standard Order Program*. Coordination between the ACO and MIDO ensures the applicant produces TSO articles that meet the approved design. Approving a TSOA application requires the ACO to approve the design and the MIDO to approve the production system. A LODA is an FAA design approval only. Approving a LODA application requires the ACO to approve the design of the foreign-manufactured article. The applicable CAA issues the corresponding production approval and oversees the production of the article(s).

Figure 3-1. Basic Roles of the FAA and Applicant in the TSO Process

Applicant	AIR-100	ACO	MIDO
• Control the design and quality of the article. • Show compliance with applicable TSO standard. • Set up and maintain a quality system that meets § 21.607 or is in accordance with a bilateral agreement. • Provide a statement of conformance to the applicable TSO(s). • Request approval to deviate from the TSO(s). • Establish and provide installation instructions, operational limitations, and maintenance instructions. • Provide maintenance instructions and installation limitations to each person who receives articles, to ensure the article continues to meet the minimum performance standards (MPS) of the TSO after installation. • Mark each article according to § 45.15(b) and as specified in each applicable TSO. • Report service difficulties pursuant to 14 CFR 21.3 • As applicable, work with ACO to develop Partnership for Safety Plans (PSP) per paragraph 6-6.	• Administer TSO program policy. • Develop and issue new TSOs. • Determine when TSOs require revisions. • Cancel obsolete TSOs. • Determine if all TSOAs for a particular TSO must be withdrawn, and publish intentions of withdrawal in the Federal Register before the withdrawal. If it is determined necessary the process in paragraph 4-5 of this order will be followed. • Grant/deny deviation requests not delegated to the ACOs. • Maintain records for TSOs, including canceled TSOs.	• Process TSOA applications and LODA applications from a CAA if applicable. • Recommend approval or denial of deviations to the TSO to AIR-100. • Grant/deny deviations that this order or a specific TSO has delegated to the ACO. • Coordinate with MIDO (TSOA) or follow the procedures defined in the bilateral agreement (LODA) before issuing TSOA/LODA letters. • Witness various functions if deemed necessary. (Refer to § 21.610) • Find that the article design complies with the applicable TSO. • Send applicant TSOA, LODA, or denial letter. • Investigate reports of service difficulties and noncompliance. • Submit enforcement reports when holders do not comply with part 21, subpart O. • As applicable, work with applicants to develop Partnership for Safety Plans (PSP) per paragraph 6-6	• Verify production system produces articles that conform to the approved design. • Approve the quality system. • Issue TSOA article production approval letter to ACO. • Conduct surveillance at the TSOA holder's and supplier's facilities (both domestic and foreign if appropriate). • Investigate service difficulty reports and nonconformities. • Submit enforcement reports when holders do not comply with part 21, subpart O.
Refer to the applicable TSO and part 21, subpart O, for further details.	Refer to Chapter 4 of this order for further details.	Refer to Chapters 5 through 8 of this order for further details.	Refer to FAA Order 8120.22 for further details.

Chapter 4. AIR-100 Responsibilities

4-1. General Responsibilities. AIR-100 has the following responsibilities:

a. Administer the TSO program.

b. Provide procedures, policy, and guidance to ensure effectiveness and uniformity of the TSO program.

c. Develop TSO performance standards.

d. Issue new TSOs.

e. Monitor existing TSOs for necessary revisions.

f. Cancel obsolete TSOs as needed.

g. Grant or deny deviation requests that have not been delegated to the ACOs for approval/denial.

h. Maintain records, including canceled TSOs.

4-2. Developing TSO Performance Standards. AIR-100 supports the development of new or revised minimum performance standards (MPS) for materials, parts, processes, or appliances. AIR-100 prepares and issues revised and new TSOs using the template in Appendix G to this order.

4-3. Granting or Denying Deviation Requests. AIR-100 performs the following functions in granting or denying deviation requests:

a. Reviews ACO recommendations and data submitted by applicants to confirm an ELOS to the applicable TSO, and ensures consistent application of ELOS determinations between projects. Refer to Chapter 7 of this order for more information on deviations.

b. Provides final approval to ACOs to grant or deny deviations to TSOs pursuant to 14 CFR 21.618 that have not already been delegated to the ACOs for approval/denial.

4-4. Maintaining Records. AIR-100 does the following:

a. Maintains an index in the RGL of current, historical, and cancelled TSOs as well as approved manufacturers of TSO articles.

b. Updates the index, as needed, for new TSOs and manufacturers' approvals.

c. Has the authority to dispose of technical data relating to the TSO or TSO deviations (not any specific TSOA or LODA technical data) as the office of primary responsibility.

Note: Destruction of TSO data files is not authorized under FAA records disposition schedules without a request for disposition authority from the office of primary responsibility (refer to FAA Order 1350.14, *Records Management*.)

4-5. Withdrawing All TSOAs and LODAs to a Cancelled TSO. In certain circumstances, AIR-100 may determine that all TSOAs and LODAs should be withdrawn when a TSO is cancelled. AIR-100 will publish proposals for withdrawal of all TSOAs and LODAs for public comment. After public comment and disposition of comments, if AIR-100 determines withdrawal is appropriate to cease production of articles to the cancelled TSO, it will notify the ACOs to withdraw each holder's approval.

Chapter 5. General ACO and MIDO Responsibilities

5-1. General Responsibilities. The ACOs have overall responsibility for TSOA and LODA applications as applicable. Not all ACOs have LODA responsibilities. The ACO:

a. Accepts applications.

b. Evaluates the technical data sent in with applications.

c. Manages design review and approval.

d. Reviews and approves or denies requests for deviation that have been delegated to the ACO. (Refer to paragraph 7-4e and Appendix H of this order.)

e. Recommends approval or denial of the applicant's deviation requests to AIR-100 for deviations that have not been delegated to the ACOs for approval/denial.

f. Investigates reports of noncompliant articles.

g. Reports TSOAs, LODAs, and future changes to the manufacturer's name or address to AIR-100.

h. Maintains records per chapter 9, paragraph 7.c. of this Order.

i. Monitors TSOA holders.

j. Coordinates with the responsible MIDO to ensure the applicant's quality system has been approved before issuing a TSOA.

k. Issues or denies TSOAs and LODAs.

5-2. Reports of Noncompliance or Nonconformance for Articles Approved With a TSOA.

a. If it is determined that an article's design does not comply with the TSO, the ACO must instruct the manufacturer to take corrective action to bring the article's design back into compliance with the TSO before manufacturing any more articles. The ACO must work with the manufacturer to determine how to address in-service articles that do not meet the TSO. TSOA holders should be encouraged to develop service information for those safety issues that rise to the level of a special airworthiness alert bulletin (SAIB).

b. If an article does not conform to its approved design, the MIDO must instruct the manufacturer to take corrective action to stop marking and shipping articles until they conform to the approved design. The MIDO and ACO must work with the manufacturer to determine how to address in-service articles that do not conform to the approved design. The manufacturer

should develop a corrective action plan, including notifying any recipients of nonconforming articles.

c. If the manufacturer does not provide design changes or production changes adequate to correct an unsafe article, the ACO must withdraw the TSOA. The ACO must notify the MIDO to coordinate this activity. (Refer to FAA Order 2150.3, *FAA Compliance and Enforcement Program*.)

5-3. Reports of Noncompliance or Nonconformance for Articles Approved With a LODA.

a. The appropriate ACO must notify the LODA holder's CAA when the ACO is aware of reports of a TSO article that is:

(1) Experiencing service difficulty,

(2) Being produced and does not comply with the applicable TSO, or

(3) Being produced and does not conform to the approved design.

b. The ACO must ask the complainant to disclose all the facts, data, names, and places to support the allegation and forward this information to the LODA holder's CAA.

c. The ACO must ask the CAA to provide its findings from the investigation. Depending on the facts and circumstances, the ACO may have to ask the CAA to require additional TSO article testing by the LODA holder to prove compliance with the TSO. The ACO must work with the CAA to determine the appropriate corrective actions.

d. If the FAA determines that an article creates an unsafe condition, the ACO must inform the CAA of this determination. The CAA will then conduct its own investigation and the FAA will issue an airworthiness directive (AD).

e. If the manufacturer does not provide design changes or production changes adequate to correct an unsafe, noncompliant, or nonconforming article, the ACO must withdraw the LODA. Refer to FAA Order 2150.3 for more information.

f. The ACO must instruct manufacturers not to ship unsafe, noncompliant, or nonconforming articles. For example, manufacturers must not ship Type A seats approved under TSO-C39c without the cushions. A TSOA holder violates 14 CFR 21.616(c) when they ship an unsafe, noncompliant, or nonconforming TSO article.

5-4. Processing Name Changes and Facility Relocations.

a. Articles Approved With a TSOA. When a TSOA holder informs the ACO or MIDO that it would like to relocate a design or manufacturing facility, the following steps will occur:

(1) If the ACO receives the request, the ACO forwards this information immediately to the responsible MIDO.

(2) If the MIDO receives the request, the MIDO forwards this information immediately to the responsible ACO.

(3) In either case, the responsible ACO informs the TSOA holder not to ship any articles until a new TSOA letter has been re-issued.

(4) For manufacturing facility location changes only, the MIDO must inspect and approve the new facility after determining that the TSOA holder's quality system meets 14 CFR 21.137 and can produce every article to conform to the approved design (Per Order 8120.22). Either the MIDO or ACO may then re-issue the TSOA letter with the same revision levels of the TSOs on the original TSOA letter. The office re-issuing the TSOA letter should inform the holder to return the original letter. The original TSOA letter should be used as a template for the new TSOA letter with the original TSOA letter date referenced.

Note: If the MIDO re-issues the new TSOA letter, they must coordinate with the ACO to inform them that the new letter will be issued by the MIDO. The MIDO must then send a copy to the ACO for the master file and send a digitally signed copy to RGL as specified in chapter 6, paragraph 8a of this order.

Note: If the TSOA holder is relocating both the design and production facility or requesting a company name change, the ACO will be the re-issuing office.

(5) For design facility location changes or company name changes, the ACO will reissue the TSOA letter. The ACO may re-issue the TSOA letter with the same revision levels of the TSOs on the original TSOA letter.

(6) The ACO must forward all information regarding name, address, or facility relocation changes to the Continued Operational Safety Policy Section as specified in chapter 6, paragraph 8a of this order.

b. Articles Approved With a LODA. When a CAA informs the ACO that one of its manufacturers that holds a LODA is changing its name, relocating facilities, or being acquired by another company in accordance with chapter 5, paragraph 5b of this order, the ACO:

(1) Verifies the CAA provided written confirmation that the manufacturer's legal status remains unchanged after an acquisition.

(2) Verifies the CAA notified the manufacturer not to mark or ship any articles with the TSO marking until the FAA has reissued the LODA for name changes or facility relocations.

Note: Reissuing the LODA is not required for all countries. Refer to the applicable bilateral agreement for specific details.

(3) May reissue the LODA at the same revision level as the original TSO after receiving written confirmation from the CAA that the LODA holder's articles meets the TSO after a name change(s) or facility relocation.

(4) Forwards all information regarding name, address, or facility relocation changes to RGL for updating the TSO manufacturer's data on the RGL website.

5-5. Processing TSOA Transfers. As stated in 14 CFR 21.614, TSOA holders may not transfer TSOAs. However, they may submit a request to the FAA for a transfer. Effective on the date of this order, ACO personnel may process and approve TSOA transfer requests without further involvement from AIR-100.

a. Transfer. A TSOA holder's transfer request must be approved by the FAA prior to the FAA reissuing the TSOA to another legal entity. This process may occur as the result of a change of the legal status of a company that holds TSOA(s) through sale or liquidation, the sale of TSOA design data from one company to another, an agreement between companies within a corporation, or other means. For example, the acquisition of a company with a TSOA by a holding company would be considered a transfer if the acquired company is disbanded or absorbed into the purchasing corporation. In this case, the legal entity that currently holds the TSOA will no longer exist so the original holder would be required to request a transfer of the TSOA to the purchasing corporation before being disbanded or absorbed. The term "transfer" applies only to the TSO design approval. The production approval process that the MIDO accomplishes during a transfer is the same process for a new applicant or an applicant that is adding additional capability to an existing facility. TSOA transfer requests must be made by the current holder of the TSOA.

> **Example:** ABC Corporation purchases XYZ Company. XYZ Company holds a TSOA. ABC Corporation plans to disband XYZ Company and absorb the assets of XYZ into the ABC Corporation. In this case the legal status of XYZ has changed (i.e., the company no longer exists as a legal entity). If ABC Corporation wants to hold the XYZ Company TSOA, a transfer would be required.

b. Name Changes or Facility Relocations. A company changing its name or relocating its facilities is not considered a transfer. Under the following conditions, the acquisition of a company with a TSOA by a holding company would not be considered a transfer if the acquired company continued to exist as the same legal entity to which the original TSOA was issued:

(1) The acquired company retains possession of the TSOA.

(2) The acquired company retains the same quality system.

(3) The acquired company continues to operate at the same location with the same core management for manufacturing and design.

(4) The TSOA holder provides written confirmation that its legal status remains unchanged after an acquisition.

Example: ABC Corporation purchases XYZ Company. XYZ Company holds a TSOA and will continue to operate under the same name, in the same location, with the same management, and under the same production system. In this case, the legal status of XYZ has not changed, and is therefore not considered a transfer.

c. Transfer Process.

(1) A company that wishes to transfer its TSOA may do so by submitting a transfer request to its issuing ACO.

(2) The ACO must instruct the TSOA holder to provide the relevant details of the transfer request, including the TSOA(s) and the name and address of the company that will receive the transferred authorization.

(3) The ACO must inform the TSOA holder that the new holder may not ship any articles until the MIDO has approved the new quality manual and notified the ACO that the new holder is approved for production, and the ACO has reissued the TSOA in the new holder's name and address.

Note: Re-issued TSOA letters should have the current date of the re-issue and also reference the original approval date and revision levels of the TSOs.

(4) The ACO receiving a transfer request must send a copy of the request to the responsible MIDO/MISO, as they will need to coordinate during the transfer process.

(5) The ACO must consider the following, as appropriate, and include them as conditions in the transfer approval letter stating the transfer is contingent on the applicant meeting/accepting all the conditions. Any contingencies must be met before the ACO responsible for the new holder can reissue the TSOA letter to the new holder.

Note: For the purposes of this paragraph, the term "original ACO" means the ACO with oversight responsibility for the current holder of the TSOA requesting the transfer. The term "receiving ACO" means that the ACO with oversight responsibility for the recipient of the TSOA after the transfer. In some cases, the original ACO and the receiving ACO are the same.

(a) The new holder is fully responsible for continued operational safety, including compliance with § 21.3 for all articles manufactured by the previous holder transferred under the transfer request.

(b) If the current holder has a data retention agreement with the original ACO, all data must be given to the original ACO before the transfer, or the new holder may request a data retention agreement with the applicable ACO.

(c) If the current holder has any minor changes that have not been submitted to the FAA, the minor change data must be submitted to the original ACO before the transfer.

The ACO should consider an audit of these minor design changes to determine if they are in fact minor before processing the transfer. This is not mandatory.

(d) The current holder must provide all descriptive and substantiating data to the recipient of the transfer.

(e) Once the transferred TSOAs are reissued to the new holder, the previous holder may no longer produce the transferred models.

(f) Before the new holder can commence production of the transferred models, the applicable MIDO must inspect and approve the new holder's production and quality system, and the receiving ACO must reissue the TSOA letter.

(g) The original ACO must coordinate the transfer of the TSOAs with the receiving ACO and the receiving MIDO, including providing them with a copy of the TSO transfer approval letter (provided the transfer involves a different ACO than the original ACO).

(h) The receiving ACO, with MIDO confirmation that the new holder has met the quality system requirements, will reissue the TSOA letter. The TSO(s) listed on the original TSOA letter may be reissued at the same TSO revision level as the original TSOA letter.

(i) Once the transferred TSOAs are reissued to the new holder by the receiving ACO:

(1) The original ACO must provide all original data files related to the transferred models to the receiving ACO. The receiving ACO must retain these files.

(2) The receiving ACO must coordinate with RGL to update the RGL to reflect the transfer to the new holder and removal of the original holder's approvals.

(3) If the original holder of the TSOA also holds validation(s) from any CAA with which the United States has a bilateral agreement, then the ACO should ask the original holder if it will be asking to have those transferred. If so, the ACO must follow the procedures in the applicable bilateral agreement for notifying the CAA of the transfer and requesting reissue of the validation under the new name and address as applicable.

(4) The receiving ACO must inform the original ACO and the original MIDO that the transfer has been completed.

Chapter 6. ACO Responsibilities When Processing Applications

6-1. Reviewing TSOA Applications.

a. The ACO must ensure that an applicant submits a TSOA application to the appropriate ACO pursuant to 14 CFR 21.603. When a manufacturer has multiple facilities, the principal facility that controls the design and quality of the article(s) should submit the TSOA application. The authorization letter must include addresses for all of the applicant's facilities. If manufacturing facilities are in different geographical areas, all appropriate MIDOs must be copied in the address line. (Refer to FAA Order 8120.22, *Production Approval Procedures.*)

Note: The applicant may not know what the appropriate ACO is when making application to the FAA. In this case the ACO reviews the application and determines which ACO is appropriate and notifies the applicant. The appropriate ACO normally is that which is responsible for the geographic location in which the applicant's principal design facility is located; however, when circumstances dictate, if the geographical ACO and another ACO concur that the geographical ACO is not appropriate, the involved ACOs decide which is the appropriate ACO.

b. The ACO must ensure all applicants applying for a TSOA make a statement that their article meets "…the applicable TSO that is effective on the date of application for that article," pursuant to § 21.603(a)(1). Otherwise, the ACO must instruct them to petition for an exemption to § 21.603(a)(1) as outlined in 14 CFR part 11.

Note: Some TSOs allow the previous version of a revised TSO to remain effective for a period of time. During this time when two different versions are effective, the ACO may accept new applications and issue TSOAs for either version.

c. The ACO must check incoming applications for completeness. The ACO must notify the applicant in writing of any deficiencies or omissions as required by § 21.603(c). The ACO must verify the application includes:

(1) The TSO number(s) for which the approval is requested;

(2) The applicant's name and the physical address of the principal facility that controls the design and quality of the article;

(3) A statement from the manufacturer certifying that it meets the requirements of part 21, subpart O, and the specific requirements of the applicable TSO;

(4) A copy of the technical data required by the TSO;

(5) A description of the applicant's organization as required by 14 CFR 21.605; and

(6) A manual describing the applicant's quality system that meets the requirements of § 21.607 as required by 14 CFR 21.608. The ACO may accept revisions to the existing quality manual (as applicable) or consider this item complete if the applicant currently holds TSOA(s).

d. The ACO must coordinate with the appropriate MIDO to evaluate the applicant's quality system before issuing the TSOA.

6-2. Reviewing LODA Applications.

a. An applicant submits a LODA application through its CAA, pursuant to § 21.621.

b. The ACO must use the Implementation Procedures in the applicable bilateral agreement for issuing of a LODA for any country-specific requirements. Implementation Procedures may be limited to issuing a LODA only for noncomplex or specific TSOs. A bilateral agreement that recognizes TSOA and LODA in its Implementation Procedures must be in place before a LODA can be issued. These documents can be found at the following link: http://www.faa.gov/aircraft/air_cert/international/bilateral_agreements/baa_basa_listing.

c. The ACO must verify the CAA making an application for a LODA on behalf of a manufacturer is applying for the applicable TSO that is effective on the date of application for that article, pursuant to § 21.603(a)(1). Sometimes, applicants want approval to manufacture an article under an earlier version of a TSO. When this happens, the ACO must instruct the CAA to inform the applicant to ask for an exemption to § 21.603(a)(1) as outlined in 14 CFR part 11.

Note: Some TSOs allow the previous version of a revised TSO to remain effective for a period of time. During this time when two different versions are effective, the ACO may accept new applications and issue LODAs for either version.

d. The ACO must check incoming applications for completeness. The ACO must notify the applicant's CAA in writing of any deficiencies or omissions, as required by § 21.603(c). The ACO must verify the application includes the items required for a TSOA, along with—

(1) The TSO number for which the approval is requested,

(2) The applicant's name and the physical address of the principal manufacturing facility that controls the design and quality of the article,

(3) A statement from the CAA certifying it has determined the applicant's article meets the FAA's applicable TSO pursuant to § 21.621(a)(2)(i).

(4) A copy of the technical data required by the TSO.

6-3. Foreign TSOAs for U.S. Article Manufacturers. The processes for an ACO to follow when assisting a U.S. TSOA holder in applying for a CAA equivalent of an FAA TSO or for a foreign manufacturer holding the equivalent of an FAA TSO and applying for a LODA can be found at:

http://www.faa.gov/aircraft/air_cert/international/bilateral_agreements/baa_basa_listing. This site includes bilateral agreements between each CAA and the FAA. Responsibilities and TSOA/LODA requirements of the applicant, the FAA, and the foreign CAA are identified in their respective bilateral agreement Implementation Procedures.

6-4. Evaluating the Technical Data for TSOAs or LODAs. The ACO may examine the technical data submitted to determine if it confirms the article meets the applicable TSO. The ACO consults with AIR-100, FAA directorates, chief scientific and technical advisors (CSTA), and other ACOs as needed. The ACO must consult with AIR-100 for any interpretations of the TSO. The level of review must consider the experience of the company and the expected use of the article itself. When evaluating the technical data, the ACO may:

a. Confirm drawings are adequate to define the article.

(1) Review material specifications, manufacturing procedures and process specifications called out on the drawings that may affect the part's ability to meet the TSO approved design.

(2) Confirm the TSOA applicant controls all drawings necessary to define the article, including those created and held by suppliers.

b. Verify the applicant submitted all applicable detail drawings and specifications from suppliers needed to control the article design as required by the specific TSO.

c. Confirm the applicant has met the part marking requirements in the TSO and § 45.15(b).

d. Verify electronic identification of software and airborne electronic hardware (AEH) part numbers is acceptable and verifiable through an electronic query, such as an electronic display. (Refer to FAA Order 8110.49, *Software Approval Guidelines*, for additional information.)

e. Verify substantiating data, such as analysis and test reports, are sufficient to meet all the performance criteria in the TSO.

f. Verify compliance to RTCA/DO-178B/C, and RTCA/DO-254, *Design Assurance Guidance for Airborne Electronic Hardware*, using the risk-based strategy outlined in FAA Order 8110.49, *Software Approval Guidelines*, and FAA Order 8110.105, *Simple and Complex Electronic Hardware Approval Guidance*, to determine the appropriate level of review or oversight for TSOA applications.

g. Review the summary of open problem reports (OPRs) to ensure that sufficient information is provided so that a proper assessment is made for installation or operational impacts by the applicant for installation approval. OPRs are software or airborne electronic hardware problems (or potential problems) that have been identified, but not yet resolved. OPRs with a potential safety effect, or which result in noncompliance with the TSO/MOPS, must be corrected before approval. The summary must include OPRs for all functions of the article. If the TSOA applicant proposes to provide a subset of the OPR listing based on classification,

ensure that the applicant has classified the OPRs appropriately so that any OPR with a potential functional effect or effect on the installation approval holder is included in the subset.

Note 1: This may require the ACO to review the applicant's process for classifying OPRs or confirm the ACO agrees with each OPR classification.

Note 2: Review the means the applicant will use for transmitting the summary of OPRs to the applicant for installation approval and confirm that it will facilitate updates in case additional OPRs are discovered after the TSOA is issued, and that the applicant has a means of entering problems reported from the installation approval holders and operators into the problem reporting system for tracking and disposition. Confirm the applicant has a process for providing OPR support to the installation approval holder.

h. Verify the installation instructions are adequate to ensure the article will continue to meet the TSO when installed.

i. Confirm the applicant's proposed maintenance instructions and installation limitations, as required by the TSO, are adequate. Refer to FAA Order 8110.54, *Instructions for Continued Airworthiness Responsibilities, Requirements, and Contents*, for further details. If the applicant states no maintenance instructions or installation limitations are necessary, the ACO must review the applicant's substantiation for that statement.

6-5. Managing Design Review and Approval for TSOAs and LODAs. The rigor and scope of the review of design data depends on the TSO article's complexity, the TSO applicant's experience, or both.

a. For applicants experienced in meeting FAA requirements who have demonstrated technical competence and whose article is of low risk, the ACO may only need to check that the package is complete. The ACO may check drawings, article installation instructions, and article limitations for completeness and adequacy.

b. For new applicants and applicants not experienced in meeting FAA requirements, who have not demonstrated technical competence, or whose article is of significant risk, the ACO may evaluate their data for compliance with the TSO more thoroughly. Someone from the ACO may visit the applicant's facility to determine its competence to make a valid certifying statement to the applicable TSO and part 21, subpart O, and to ensure it adequately conducts any tests required by the TSO.

6-6. Considering Service History at Time of TSOA or LODA Application. The ACO must not issue a TSOA for an article that is not in a condition for safe operation (refer to § 45.10(b)). The ACO may review the service history of the article when it is a known derivative of a prior design. The ACO should verify the prior design is neither subject to an AD nor found as a causal factor in an accident investigation. If a prior design presents a potentially unsafe condition and the proposed article has a similar design, the ACO must ensure that the unsafe condition has been corrected in the new design prior to issuing a TSOA.

6-7. Issuing a TSOA. After the applicant's design has been found to meet the TSO and the applicant meets part 21, subpart O, as explained in chapter 6, paragraphs 1 and 4 of this order, the ACO issues a TSOA. The TSOA is issued to the principal facility that controls the design and quality of the article(s). The ACO must:

a. Prepare the TSOA letter using the sample in Appendix C to this order as a guide. The ACO modifies or adds details to the TSOA letter as necessary. Send the original letter to the manufacturer and keep a copy for the TSOA master file. If requested, the ACO may send a scanned copy of the letter to the manufacturer, as long as it also sends the original. Notify the MIDO responsible for inspecting and monitoring the manufacturer. Also, the ACO must electronically send a copy of the letter in Microsoft Word in a digitally signed email to RGL at rgl@faa.gov. They will add it to the TSO approval database.

b. Specifically list in the TSOA letter all pertinent data submitted by the applicant. The letter must state:

(1) The FAA authorizes the applicant to identify the article with the applicable TSO marking.

(2) The TSOA is based on the applicant's:

(a) Statement certifying the applicant meets the requirements of part 21, subpart O;

(b) Statement certifying the article complies with the TSO in effect on the date of application; and

(c) Quality system, which complies with the requirements of § 21.607 and has been found satisfactory for production of the article.

(3) The FAA requires the applicant to:

(a) Report failures, malfunctions, or defects, pursuant to § 21.3.

(b) Notify the ACO and MIDO of name, address, or proposed ownership changes.

(c) Furnish a copy of the data required by the TSO to the original owner/installer of each article or multiple articles if furnished to one source (e.g., an operator, type certificate holder, or repair station).

(d) Establish a process for the timely submittal of minor design changes, as required by 14 CFR 21.619 to its responsible ACO (refer to chapter 9, paragraph 4 of this order for more information).

Note: After a name, address, or ownership change, the TSOA holder may not identify articles with the TSO marking without further FAA approval (refer to chapter 5, paragraph 4 of this order).

c. Use FAA Order 8130.2, *Airworthiness Certification of Products and Articles*; FAA Order 8130.21, *Procedures for Completion and Use of the Authorized Release Certificate*, FAA Form 8130-3, Airworthiness Approval Tag; and FAA Form 8130-3 for information on export airworthiness approval of TSOA approved articles.

6-8. Issuing a LODA. After the applicant's article has been found to meet the TSO and the applicant meets part 21, subpart O, as explained in chapter 6, paragraphs 2 and 5 of this order, the ACO will issue a LODA. The ACO must:

a. Prepare the LODA (using the sample in Appendix D to this order as a guide), modify or add details to the LODA as necessary, give the original letter to the CAA responsible for the manufacturer, and keep a copy in the LODA master file. If requested, the ACO may send a scanned copy of the letter to the CAA as long as it also sends the original. Also, the ACO must electronically send a copy of the letter in Microsoft Word in a digitally signed email to RGL at rgl@faa.gov. They will add it to the TSO approval database.

b. Specifically list in the LODA all pertinent data the CAA submitted on behalf of the applicant. The letter must state that:

(1) The FAA authorizes the applicant to identify the article with the applicable TSO marking.

(2) The LODA is based on:

(a) The CAA's statement certifying the applicant's article meets the FAA's applicable TSO.

(b) The FAA's determination the applicant has complied with the requirements of part 21, subpart O.

(3) The CAA must notify the ACO of any proposed changes to the applicant's name, address, or ownership.

(4) The applicant must furnish the data required by the TSO to the original owner/installer of each article or multiple articles if furnished to one source (e.g., an operator, type certificate holder, or repair station).

The CAA of the country of manufacture must issue a Certificate of Airworthiness for Export to accompany each article as specified in § 21.502(c).

6-9. Denying a TSOA or LODA Application. If the ACO cannot find compliance, it must send the applicant a denial letter and return the complete data package. For LODA applications, the denial letter is sent to the manufacturer's CAA only. Refer to Appendix F to this order for more details. The ACO may adjust the format of the letter as needed, but must preserve the information from the sample. The ACO must not send LODA and TSOA denials to RGL.

6-10. Requesting Validations from Countries with which the United States has Bilateral Agreements.

a. Refer to the applicable Implementation Procedures of the bilateral agreement for procedures to request a validation on behalf of the applicant.

(1) The FAA is requesting the validation on behalf of the U.S. applicant.

(2) In most cases, the FAA must issue a TSOA to the applicant before the FAA can request a foreign validation.

(3) Include any FAA-approved deviations and supporting data in the request for validation. Coordinate new deviations (not previously requested from this CAA) before making the official validation request.

(4) Most bilateral agreements require the FAA to certify to the foreign CAA that the FAA has examined the article design and found it to meet the CAA's standard, not the FAA's.

b. The bilateral agreements and corresponding Implementation Procedures can be found at http://www.faa.gov/aircraft/air_cert/international/bilateral_agreements/baa_basa_listing.

Chapter 7. ACO Responsibilities for Deviations

7-1. What Is a Deviation? A deviation is any alternative method or criteria used to meet the performance criteria specified in the TSO, with compensating features that provide an ELOS, pursuant to the requirements of part 21.

7-2. When Does an Applicant Need a Deviation? The FAA requires the applicant to propose and get FAA approval for any deviation from the applicable TSO, regardless of the significance of the TSO criteria from which it wants to deviate. For example, the FAA requires an applicant to get a deviation approval even when it proposes to use a more recent version of an industry standard than the one referenced in the specific TSO.

7-3. How Does an Applicant Get Approval for a Deviation? To get FAA approval for a deviation, an applicant must show that compensating features or factors create an ELOS to the TSO performance requirement(s) from which it proposes to deviate.

7-4. Evaluating Deviation Requests. The ACO is responsible for evaluating requests for deviation from a TSO, pursuant to § 21.618. The ACO evaluates all requests to deviate from the TSO and submits to AIR-100 a recommendation to grant or deny the request.

Note 1: All TSO deviation requests must be submitted to AIR-100 for approval except deviations specifically delegated to the ACO managers in this order or in the TSO itself. Deviations previously approved by AIR-100 may not be re-used for new deviation requests.

Note 2: Refer to chapter 7, paragraph 4e of this order for deviation requests that AIR-100 has delegated to ACO managers.

a. Deviation Request Acknowledgement. ACOs must acknowledge requests for deviations.

b. Substantiating Data. The ACO ensures an applicant's deviation request includes substantiating data that specifically cover the compensating factors or features. The proposed TSO deviation must clearly establish an ELOS to the TSO requirement. The ACO may return the request when there are insufficient or no supporting data.

c. Recommendation to AIR-100. For deviations that have not been delegated to the ACO for approval/denial, the ACO evaluates the merit and validity of deviation requests.

(1) The ACO manager (or delegated position) must submit in writing a recommendation to AIR-100 to grant or deny the request. AIR-100 will accept electronic copies of the signed recommendation. The ACO manager (or delegated position) can send electronic copies to TSO-Deviations@faa.gov.

(2) The CAA for a LODA applicant does not have to send a recommendation to the ACO. If a LODA applicant's deviation request includes a recommendation from the CAA, the

ACO must still make its own finding and recommendation to AIR-100, independent of the CAA's recommendation.

d. Notification. ACOs notify an applicant of the decision to approve or deny its deviation request by doing one of the following:

(1) For TSOA applicants:

(a) Sending a copy of the letter from AIR-100 to the applicant,

(b) Asking AIR-100 to respond directly to the applicant with a copy to the ACO, or

(c) Writing the response to the applicant based on the AIR-100 response.

Note: For deviations delegated to the ACO for approval/denial, the ACO responds directly to the applicant with their decision.

(2) For LODA applicants:

(a) Sending a copy of the letter from AIR-100 to the applicant's CAA with a cover letter from the ACO,

(b) Asking AIR-100 to respond directly to the applicant's CAA with a copy to the ACO, or

(c) Writing the response to the applicant's CAA based on the AIR-100 response.

Note: In all cases, the ACO notifies the applicant's CAA, and the CAA notifies the applicant.

e. Deviations the ACO Grants Without AIR-100 Approval. The ACO may grant the following types of requests to deviate from a TSO standard without AIR-100 approval:

Note: The ACO must review and evaluate a deviation and either approve or deny a formal deviation request from the applicant. If the ACO approves the deviation request, it must document the approval in a letter to the applicant and reference it in the TSOA letter. If the ACO denies the deviation request, it must retain a copy of the denial correspondence as part of the TSO data. The letter to the applicant must include all applicable limitations and marking requirements. The deviation may only be applied to the specific TSOA(s) for which the applicant seeks approval to deviate.

(1) Use of a later version of RTCA/DO-160, *Environmental Conditions and Test Procedures for Airborne Equipment* (which has been recognized by the FAA in AC 21-16, *RTCA Document DO-160 versions D, E, F, and G, "Environmental Conditions and Test Procedures for Airborne Equipment"*) than the environmental test conditions specified in the

applicable TSO, provided the applicant uses the entire later version of the standard and not just a portion of it.

Note: If the TSO for electronic equipment contains an appendix with environmental test conditions and test procedures, or references an older industry standard for environmental test conditions other than RTCA/DO-160, it is acceptable to allow a deviation to use a version of RTCA/DO-160 recognized by the FAA in AC 21-16.

(2) Use of a later version of RTCA/DO-178, which has been recognized by the FAA in AC 20-115, *Airborne Software Assurance*, instead of the software design assurance standard specified in the applicable TSO, provided the applicant uses the entire later version of the standard and not just a portion of it.

Note: The ACO must coordinate with the applicant to obtain AIR-100 approval when requesting an alternative method, as defined in RTCA/DO-178B, section 12.3.

(3) Use of a later version of RTCA/DO-254 (which has been recognized by the FAA in AC 20-152, *RTCA, Inc., Document RTCA/DO-254, Design Assurance Guidance for Airborne Electronic Hardware*) than the hardware design assurance standard specified in the applicable TSO.

(4) Use of the latest version of RTCA/DO-200 (which has been recognized by the FAA in AC 20-153, *Acceptance of Aeronautical Data Processes and Associated Databases*) instead of the aeronautical data processing standard specified in the applicable TSO, provided the applicant uses the entire later version of the standard and not just a portion of it.

(5) Deviations to the TSO article-marking requirements to establish one TSO as the primary TSO for an article receiving multiple TSO approvals. In that case, the ACO must ensure that the applicant will:

(a) Mark the primary TSO number on the nameplate (marking each individual TSO number on the article's nameplate may be impractical).

(b) Mark the primary article permanently and legibly with a statement that the remaining TSO marking requirements are in the installation manual (IM), (e.g., "See Inst Mnl for Addtl TSO approvals and/or markings.").

(c) List the other TSOs (and marking requirements for each TSO) in the front section of the IM for the article's primary TSO.

(6) Deviations identified in Appendix H to this order.

7-5. Documenting Details of Deviation. ACOs instruct manufacturers to document the specific details of deviations granted in their manuals (i.e., IM or component maintenance manuals (CMM)). This includes any installation limitations or maintenance procedures required to ensure the article continues to meet the MPS of the TSO after installation. This is necessary to alert

installers to evaluate the article further for installation or operational limitations affected by the deviations. The ACO must:

a. Ensure manufacturers describe the details of any deviations and document any known functional differences resulting from a deviation.

b. Ensure the TSOA or LODA includes a reference to the deviations granted as noted in Appendices C and D to this order.

Chapter 8. ACO Responsibilities for Non-TSO Functions

8-1. Non-TSO Function (NTF). A non-TSO function is a function that is not covered by a TSO-approved MPS, 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 accepted on a non-interference basis, as part of a manufacturer's TSO submittal, and a TSO authorization issued for the article if the manufacturer demonstrates that it meets all of the following conditions:

a. The hosting article is eligible for TSO authorization and meets the applicable TSO performance requirements;

b. There is no applicable TSO for the non-TSO function;

c. The added non-TSO function does not affect or interfere with the hosting article's ability to meet its required MPS or violate any limitations on the article imposed by the hosting TSO; and

d. The hosting TSO article's environmental qualification, hardware and software design assurance levels adequately support the non-TSO function, as applicable.

Note 1: "Characteristics" or "features" added to enhance performance, usability or integrity of the TSO article are (1) inherent in the design of the TSO article, (2) have a direct bearing on the basic TSO operation, (3) are evaluated under the TSO approval, and (4) are not non-TSO function. Examples of "characteristics" or "features" might include: the capability to flipflop the "active" and "standby" frequencies of a communication or navigation radio, the capability to access facility information (such as, airport frequencies, runways, airport services available, etc.), built in test (BIT) and/or health monitoring capability, more waypoints/legs in a flight plan than the minimum required, and transmit power greater than the minimum required. Characteristics and features are associated with supporting the MPS of the TSO.

Note 2: The criticality of the non-TSO function must not exceed that of the hosting TSO article. If the integrated non-TSO function criticality is lower than the hosting TSO article, the manufacturer may choose to adopt the highest TSO-specified design assurance levels for all of the article's functions, or to employ proper partitioning techniques.

8-2. Project Planning Considerations. Since a TSO-approved MPS does not cover the integrated non-TSO function, the ACO will need adequate time to review the manufacturer's declared performance requirements to verify that the non-TSO function can reasonably be accommodated within the hosting TSO article. Manufacturers intending to integrate non-TSO functions in a proposed TSO article should plan accordingly and coordinate with their ACO at the earliest opportunity and well in advance of their TSO application to avoid potential delays to

their project. Use of a PSP should be encouraged to formalize and adapt integrated non-TSO function process steps to each manufacturer's internal TSO procedures. Each project specific certification plan should address any specific ACO test and validation requirements.

8-3. Manufacturer Data Submittal. Data submitted to the ACO to permit review of the non-TSO function should include, as a minimum, the following:

a. A clear definition of intended function and any anticipated operational credit that may be sought at the time of installation so that the manufacturer's justification for their proposed hazard classification of failure condition(s) can be evaluated.

b. The manufacturer's declared performance requirements. Where possible, the manufacturer is encouraged to adopt existing industry-accepted standards, e.g. RTCA, European Organization for Civil Aviation Equipment (EUROCAE), Society of Automotive Engineers (SAE), or Aeronautical Radio, Incorporated (ARINC).

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

d. Installation and operating instructions/limitations, including any instructions for continued airworthiness (ICA), for the non-TSO function(s) as applicable.

e. The manufacturer's verification that the hosting TSO article's software and hardware design assurance levels, including RTCA/DO-254 complex electronic hardware requirements in accordance with AC 20-152, *RTCA, Inc., Document RTCA/DO-254, Design Assurance Guidance for Airborne Electronic Hardware*, 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 chapter 8, paragraph 1c.

8-4. ACO Evaluation Criteria. If, following early coordination between the ACO and the manufacturer, it is determined that the non-TSO function is of a simple nature where the performance is easily understandable, ACO review of the manufacturer's declared performance requirements should simply become part of the normal TSO data application evaluation. However, the ACO should require a concurrent Type Certificate (TC) or Supplemental Type Certificate (STC) project evaluation if it is determined that the added non-TSO function(s):

a. Is complex and difficult to review and fully understand without a concurrent installation evaluation;

b. Has a high degree of system flight deck to pilot interface;

c. Are of a simple nature individually but combined in such a way or in sufficient quantities to meet the criteria of Chapter 8, paragraph 4a; or

d. Incorporates new or novel technology.

Note: If a TC/STC project is being accomplished at an ACO that is different than the ACO responsible for issuing the TSOA, then both offices should coordinate in the review of manufacturer's declared performance requirements.

8-5. Manufacturer Responsibilities. With ACO acceptance of the manufacturer data submitted in accordance with paragraph 8-3, the non-TSO function should be integrated and qualified using the manufacturer's existing configuration control and TSO qualification procedures. The manufacturer should incorporate the non-TSO function(s) data within the required TSO application data provided to the ACO, to include the results of the testing defined per chapter 8, paragraph 3c. The manufacturer should also ensure the results of any TC/STC installation performance testing that may have been required by chapter 8, paragraph 4 are also available for review by the TSOA-issuing ACO.

8-6. Non-TSO Function Acceptance and Installation Data. 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. Appendices A and C contain sample TSO Authorization letter wording for when a non-TSO function is included. It is essential to note that the TSO article and any integrated non-TSO function(s) are 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 approval for the TSO function, design acceptance on a non-interference basis for the non-TSO function, and production approval for the integrated article. This includes ACO acceptance of the manufacturer's statement of conformance for functional performance at the equipment level, hardware and software design assurance, and environmental qualification for the non-TSO function(s). However, because review of non-TSO function(s) 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, component maintenance manual, and/or operating manual to support the aircraft installation approval requirements:

a. A description of the non-TSO function(s), including key performance specifications, as well as software, hardware, environmental, etc., qualification levels.

b. Interface requirements for the non-TSO function(s) and applicable installation test procedures.

c. Installation and operating instructions/limitations, including any instructions for continued airworthiness (ICA), for the non-TSO function(s) as applicable. For example, equipment specifically designed for public or military aircraft use may have non-TSO functions that preclude the use of that equipment for civil aircraft.

d. For non-TSO function(s) that contribute to catastrophic or hazardous failure conditions on the aircraft, the manufacturer should also include a safety analysis of the non-TSO function(s) as implemented in the hosting TSO'd article. The safety analysis should identify the failure modes and effects of the non-TSO function(s) and the expected probability of the failure modes. The analysis should consider exposure times for latent failures, recommended maintenance checks, and the failure rates for the applicable components of the hosting TSO'd article.

Note: Integrated non-TSO function(s) contributing to major or lower failure conditions should be evaluated by the manufacturer using the same procedures that are applied to any TSO article contributing to major or lower failure conditions.

8-7. Design Change/Modification to a Non-TSO Function. Because the TSO article and any integrated non-TSO function(s) are inseparable, all subsequent design changes to the non-TSO function(s) must be treated identically to design changes made to a TSO function (reference 14 CFR § 21.611 and Order 8150.1B). When evaluating a proposed major design change to the TSO article or integrated non-TSO function, the ACO should work with the manufacturer to determine if an applicable TSO has become available for the non-TSO function since its initial approval. If a new TSO is available, the ACO must direct the manufacturer to adopt the new TSO MPS for the changed article as required by chapter 8, paragraph 1, 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 changed article 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 if a new non-TSO function is added to the article. When revising a non-TSO function or adding a new non-TSO function, the applicant will need to submit a request to the ACO for revision of the existing TSOA letter.

Chapter 9. Additional ACO Responsibilities

9-1. Incomplete TSO Articles or Multiple Function Articles. An incomplete TSO article is one that provides a major and independent function that is specified in the TSO. A multiple function article is an article for which more than one TSO have been approved by the TSOA. This will generally be a component of the overall system that has a standalone function. (Refer to AC 21-46.)

9-2. Military Avionics. This paragraph applies only to the FAA's approval of TSOs for military avionics for the U.S. Government. Many times the U.S. Government encounters unique issues when it seeks certification to civil standards of avionics with military functions. TSOs with military functions are coordinated through the FAA's Military Certification Office (MCO), ACE-100M.

a. Separate Functions. If a military piece of avionics performs a civilian function for which there is a TSO, the article may receive a TSO marking. However, if this article also performs one or more other functions that the FAA cannot approve for civilian use, the article and all associated documentation are also marked "For Military Use Only." The non-certifiable military function must not affect or interfere with the article's compliance with the TSO.

> **Example:** If a military piece of avionics performs a civilian Traffic Alert and Collision Avoidance System (TCAS) function and a separate non-certifiable military function in the same article, the article may receive a TSO marking for the civilian TCAS function, but must be marked "For Military Use Only" to ensure the other non-certifiable functions will not be used by non-military operators.

b. Deviations. If a military piece of avionics performs a civilian function for which there is a TSO, the article may receive a TSO marking. However, if this article is granted deviations in accordance with Chapter 7 of this order that could not be approved for civilian use, the article and all associated documentation are also marked "For Military Use Only." The article with the deviations must provide an ELOS to the TSO as required in § 21.618.

> **Example:** If a military piece of avionics performs a civilian Mode S transponder function, but requires TSO deviations for military features that would not be approved for civilian use, the article may receive a TSO marking for the civilian Mode S function, but must be marked "For Military Use Only" to ensure the other military features will never be used by non-military operators.

9-3. Design Changes: TSOA.

a. Minor Design Changes. The FAA permits TSOA holders to make minor design changes to their articles without further approval, pursuant to § 21.619(a).

(1) The FAA encourages the manufacturer and ACO to agree on what constitutes a minor change for a particular TSO article being manufactured and establish a process for minor design changes. Sometimes minor changes may require revalidation of certain TSO requirements, but not a "substantially complete investigation" pursuant to § 21.619(b).

(2) The ACO and manufacturer may use a PSP to formalize this agreement. AIR-100 and the MIDO must approve any PSP agreement, memorandum of understanding (MOU), or memorandum of agreement (MOA) to ensure standardization of what the FAA accepts as a minor change for a given TSO article. As with all TSO data, the agreement must include provisions for the manufacturer to maintain and submit to the FAA, on request, minor change substantiation data.

(3) Manufacturers of TSO articles substantiate and document all minor design changes. The ACO and manufacturer must agree on a timeframe for minor change data submittal. The ACO may ask TSOA holders to provide revised data or make it available, as agreed on with the ACO. The manufacturer must notify the ACO within the timeframe agreed on between them. The manufacturer's minor change notification letter must state that the new article complies with part 21, subpart O. The manufacturer can send this letter to the ACO by email.

(4) The ACO, as part of accepting minor changes, audits design change data submitted or the "notification of minor change" letter statement to ensure the change is a minor change as defined in § 21.619(a) before sending the manufacturer an acknowledgement for the acceptance of its data.

(5) If a minor design change submittal is not sufficiently or properly substantiated, the ACO must ask the manufacturer to provide more substantiation or other data necessary to justify its claim. This may include the manufacturer retesting the article to show compliance with the TSO standard.

b. Minor Design Changes the FAA Finds Major. If an ACO determines that a minor design change submittal is really a major design change as defined in 14 CFR 21.619(b) the ACO must:

(1) Immediately notify the manufacturer to stop marking and shipping any changed articles. The ACO must inform the manufacturer it must reapply for a new TSOA under the TSO currently in effect, as required in § 21.619(b). When the manufacturer obtains a new authorization, it may then re-label and ship articles.

(2) Notify the MIDO of the change in type or model number resulting from the major change and the potential for discrepancies in marking if the manufacturer has already manufactured and shipped some changed articles. The ACO should coordinate with the MIDO to identify any potential discrepancies.

c. Major Design Change.

(1) Requirements for new TSOA application. As stated in § 21.619(b), the FAA requires a new TSO application for all major design changes to TSO articles under a TSOA.

(2) When the applicable TSO is revised while an application is being evaluated:

(a) The applicant needs to demonstrate compliance only with the TSO in effect at the time of the original application, not the revised TSO.

(b) The ACO can give up to a 6-month relief period to applicants with pending applications provided the specific TSO being applied for contains provisions for doing so. If the applicant does not submit a complete application within this time, it must comply with the most recent TSO version.

Note: Some revised TSOs may contain a statement that the older version of the TSO will remain effective for a period of months after a revision becomes effective. During this time, the ACO may accept applications for either version of the TSO.

d. Design Changes To Articles With Multiple TSO Authorizations.

(1) Changes made to an article with multiple TSO authorizations are to be evaluated against each TSO on an individual basis. A design change that can be classified as major with respect to the article's conformance to one TSO is not required to be classified as a major change to the entire article. The ACO must agree with the applicant's substantiation that the design change is minor or has no effect to article's conformance to the other TSOs.

(2) The ACO must direct the applicant to submit a new TSOA application for the new type or model number(s) resulting from the major change per paragraph 9-3.c. If the ACO accepts the applicant's substantiation of the design change as minor with respect to the previously approved TSOs, these TSOs may be included at the previously approved revision levels on the new TSOA approval letter.

9-4. Design Changes: LODA. Design changes to articles that have been issued a LODA are subject to the requirements defined in the applicable bilateral agreement. Generally, when the CAA considers a design change minor, it is approved without any FAA involvement. Design changes the CAA considers major require the LODA holder to apply for a new LODA.

9-5. FAA-Imposed Design Change: TSOA and LODA. When an ACO decides it is necessary to impose a design change on an article to correct an unsafe condition or prevent the use of a noncompliant article, the ACO can:

a. Issue an AD against the article pursuant to 14 CFR 39.5.

b. Withdraw the TSOA or LODA. The ACO must limit the withdrawal to the article(s) in question.

(1) The ACO may withdraw the TSOA or LODA when:

(a) An unsafe condition exists.

(b) The article does not comply with the TSO.

(c) The article does not conform to the TSO-approved design.

(d) The manufacturer does not correct the noncompliance or nonconformance.

(2) The ACO:

(a) Coordinates the withdrawal with AIR-100.

(b) Sends a written notice of the withdrawal to the manufacturer.

(c) Notifies the MIDO of the withdrawal.

9-6. Administrative Activity After Issuance of TSOAs and LODAs.

a. Reporting TSO Authorizations. The ACO must report all new TSOAs, LODAs, and name or address changes to AIR-141, which updates the index of TSO manufacturers. This information must be sent via digitally signed email to rgl@faa.gov. Submittals to this email address must be in Microsoft Word.

b. Maintaining Records. The ACO must create and maintain complete and accurate records of the following for each TSOA and LODA:

(1) Authorizations and design approvals granted,

(2) Technical data,

(3) Design change approvals and service difficulty reports,

(4) Relevant service bulletins and ADs,

(5) Noncompliance actions, and

(6) Terminations related to each TSO application.

c. Keeping a Master File. The issuing ACO creates and maintains a master file. The file contains all data submitted by a TSOA/LODA manufacturer pertaining to its application and TSO approval or disapproval. If the ACO and TSOA holder have an agreement (a PSP, MOU, MOA, data retention, or other agreement) covering the master file, a TSOA/LODA holder may retain it. The agreement must have a clause requiring the TSOA holder to provide copies of records from the master file on request. The ACO must require the manufacturer to submit to the ACO, and keep for its records, one copy of the technical data specified in the "data

requirements" paragraph of the applicable TSO. When requested, the responsible ACO must give copies of the technical data to other ACOs and show in the transmittal letter which TSO applies. For LODA applications, if the United States has a bilateral agreement that allows for data retention, the LODA holder may retain the master file, provided it complies with the terms of that applicable bilateral agreement. The ACO must retain a copy of the LODA application letter, any applicable certifying statement by the foreign authority, and the LODA issuance letter.

d. Keeping Adequate TSO-Authorization Records. Each ACO (or the TSOA holder on the ACO's behalf, as allowed in paragraph 9-6.c of this order) must keep adequate records. Keeping proper records guarantees continued airworthiness support for TSO articles that remain in service but are no longer in production. When a TSOA holder goes out of business or no longer operates under the provisions of its TSOA, the ACO must instruct it to send the ACO copies of all required data, pursuant to § 21.616(f), and any other technical data deemed necessary. Under FAA Order 1350.14, paragraph 10.c the FAA may authorize destruction of TSOA records, and as the office of primary responsibility, the ACO has authority to dispose of technical data in accordance with the applicable records disposition schedule. However, pursuant to 14 CFR 21.613(b) the ACO must keep this data for as long as approved articles are in service.

e. Freedom of Information Act (FOIA) Requests. All technical data the FAA keeps may be subject to FOIA requests. ACOs must keep only information that is clearly relevant and necessary to support the TSOA.

f. Monitoring TSOA Holders. The ACO must control and monitor all manufacturers producing articles under a TSOA, including all holders of TSOAs previously issued pursuant to 14 CFR part 37. For U.S. TSOA holders with manufacturing facilities outside the United States, the ACO does this only under agreement with the responsible MIDO and after considering the "undue burden" to the FAA.

The ACO and MIDO must visit TSOA holders based on risk-based resource targeting in accordance with FAA Order 8120.23, *Certificate Management of Production Approval Holders*.

Appendix A. Acronyms and Definitions

1. Acronyms.

14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACO	Aircraft Certification Office
AD	Airworthiness Directive
AEH	Airborne Electronic Hardware
AIR-100	Design, Manufacturing, and Airworthiness Division
AIR-110	Certification Procedures Branch
AIR-112	Production Certification Section
AIR-141	Continued Operational Safety Policy Section
BASA	Bilateral Aviation Safety Agreement
CAA	Civil Aviation Authority
CMM	Component Maintenance Manual
CSTA	Chief Scientific and Technical Advisor
ELOS	Equivalent Level of Safety
FAA	Federal Aviation Administration
FOIA	Freedom of Information Act
ICAO	International Civil Aviation Organization
IM	Installation Manual
IPA	Implementation Procedures for Airworthiness
LODA	Letter of TSO Design Approval
MCO	Military Certification Office
MIDO	Manufacturing Inspection District Office
MISO	Manufacturing Inspection Satellite Office
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPS	Minimum Performance Standard
P/N	Part Number
PHAC	Plan for Hardware Accomplishment Summary
POC	Point of Contact
PSAC	Plan for Software Aspects of Certification
PSP	Partnership for Safety Plan
RGL	Regulatory Guidance Library
RTCA	RTCA, Inc.
SAE	SAE International
SOD	State of Design
SOM	State of Manufacture
TCAS	Traffic Alert and Collision Avoidance System
TIP	Technical Implementation Procedures
TSO	Technical Standard Order
TSOA	Technical Standard Order Authorization
ULD	Unit Load Device

2. Definitions and Terms.

a. Accepted Data. Data or analysis the FAA acknowledges and considers valid. The applicant may use accepted data to substantiate compliance with airworthiness regulations, but the FAA does not consider it *approved* data.

b. Aircraft Certification Office (ACO). A field branch of the FAA Aircraft Certification Service. It administers and secures compliance with agency regulations, programs, standards, and procedures governing the design approval of TSO articles. This includes any FAA Certification Office that administers applications.

c. Airworthiness Regulations. The regulations identified in Title 14 of the Code of Federal Regulations (14 CFR) parts 23, 25, 27, 29, 31, 33, and 35. These regulations contain standards for specific types of products.

d. Applicant. A person or organization seeking approval from the FAA.

e. Compliance. A successful showing that a design meets a set of requirements or standards.

f. Conformity. Determination that a manufactured article meets the approved design.

g. Design. All drawings and specifications that show the part's configuration and all information on dimensions, tolerances, materials, processes, and procedures necessary to define all part characteristics. A master drawing list is the summary of these drawings and specifications.

h. Guidance. Material the FAA publishes to assist an applicant in complying with regulatory requirements.

i. Letter of TSO Design Approval (LODA). A design approval the FAA issues only to a foreign manufacturer of an article that the FAA finds meets a specific TSO. A LODA is not a production approval and is not installation approval. Certain ACOs have responsibility for processing LODA applications submitted by the CAA of the country where a foreign manufacturer is located. These ACOs are responsible for issuing the LODA to the applicant's CAA. Refer to paragraph 2-3.b of this order for a more comprehensive definition of a LODA. For the current list of ACOs assigned LODA responsibilities, go to: https://my.faa.gov/content/dam/myfaa/org/linebusiness/avs/offices/air/div_dir/air40/job_aids/RolesJobAid.pdf.

j. Manufacturer (of an Article). A person who controls the design and quality of an article (refer to 14 CFR 21.601(b)(5)).

k. Modifier. The person to whom the FAA grants approval to implement an approved design change to a TSO article.

l. Part Number. A string of alphanumeric characters used to uniquely identify an article's configuration.

m. Process. A set of interrelated activities performed to produce a prescribed output or article.

n. Product. An aircraft, aircraft engine, or propeller (refer to 14 CFR 21.1(b)).

o. Quality System. An organizational structure with responsibilities, procedures, processes, and resources that implements a management function to determine and enforce quality principles. A quality system encompasses quality assurance and quality control.

p. Supplier. Any person or organization contracted to furnish aviation products, parts, appliances, components, materials, or services to the TSOA holder.

q. Test. A quantitative procedure to prove performance using stated objective criteria with pass/fail results.

r. Technical Standard Order Authorization (TSOA). An FAA design and production approval issued to a U.S. manufacturer of an article that the FAA finds meets a specific TSO. The appropriate ACO is responsible for issuing the TSOA to the applicant. The TSOA is not installation approval for the article. Refer to paragraph 2-3a of this order for a more comprehensive definition of TSOA.

Appendix B. Related Publications and How to Get Them

1. Title 14 of the Code of Federal Regulations (14 CFR). Order 14 CFR sections from the Superintendent of Documents, Government Printing Office, PO Box 37154, Pittsburgh, PA 15250-7954. Telephone: (202) 512-1800; fax: (202) 512-2250. Order online at **http://bookstore.gpo.gov/CFR**.

2. FAA Orders. View or download the following orders at **https://employees.faa.gov/tools_resources/orders_notices/** or **http://rgl.faa.gov/**. Use the latest version.

a. FAA Order 1350.14, *Records Management*.

b. FAA Order 2150.3, *FAA Compliance and Enforcement Program*.

c. FAA Order 8040.1, *Airworthiness Directives*.

d. FAA Order 8100.5, *Aircraft Certification Service Mission, Responsibilities, Relationships, and Programs.*

e. FAA Order 8120.23, *Certificate Management for Production Approval Holders,*

f. FAA Order 8110.54, *Instructions for Continued Airworthiness Responsibilities, Requirements, and Contents*.

g. FAA Order 8120.22, *Production Approval Procedures.*

h. FAA Order 8120.23, *Certificate Management of Production Approval Holders*.

i. FAA Order 8130.2, *Airworthiness Certification of Aircraft and Related Products*.

j. FAA Order 0000.1, *FAA Standard Subject Classification System.*

3. FAA Advisory Circulars (AC). View or download the following ACs at http://rgl.faa.gov/. Use the latest version.

a. AC 21-43, *Production Under 14 CFR Part 21, Subparts F, G, K, and O*.

b. AC 21-46, *Technical Standard Order Program*.

c. AC 21-50, *Installation of TSOA Articles and LODA Appliances.*

d. AC 21-23, *Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products Imported to the United States*.

e. AC 21-16, *RTCA Document DO-160 Versions D, E, F, and G "Environmental Conditions and Test Procedures for Airborne Equipment"*.

4. RTCA, Inc., Documents. Order RTCA/DO-160, RTCA/DO-178, RTCA/DO-200, and RTCA/DO-254 from RTCA, Inc., 1150 18th Street NW, Suite 910, Washington, DC 20036. Telephone: (202) 833-9339; fax: (202) 833-9434. Order online at **www.rtca.org**.

5. SAE International Documents. Order SAE Aerospace Standards from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Telephone: (724) 776-4970; fax: (724) 776-0790. Order online at **www.sae.org**.

Appendix C. Sample Letter of TSO Authorization (TSOA)

U.S. Department
of Transportation

**Federal Aviation
Administration**

{ACO}
{ACO address}

{Date}

{Name of applicant point of contact (POC)}
{POC's title}
{Name of company}
{Street address}
{City and zip code}

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

Subject: TSOA Application {*insert reference number}*

This is in reply to your letter of *{enter date of application}* requesting TSO authorization for your *{insert type of article}*. We accept your statement certifying that your article meets the requirements of TSO-C *{enter applicable TSO number}* and that you meet the requirements of Title 14 of the Code of Federal Regulations (14 CFR) part 21, subpart O.

{*Insert the following, if applicable, to include the integrated non-TSO function(s) specified.}* We also accept the data you submitted in support of the non-TSO functions listed in attachment 1 on a non-interference basis.

Effective this date, we authorize you to identify the following *{insert type of article}* with the marking requirements defined in 14 CFR 21.616(d) and in TSO-C *{enter applicable TSO number}*.

{Enter Part/Model} Number	*{Enter type of article}* Description
{List each part number (with open brackets to allow for minor changes) or model number. If both numbers are necessary, use two separate columns.}	*{Enter a basic description of article. Include major features that distinguish this part or model number from other part or model numbers on the list.}*

We consider your quality system, as defined in your quality control manual, *{insert revision level and date of manual}* satisfactory for production of this article at your *{enter location of*

applicant's manufacturing facility} facility. *{Enter name of applicant}* must furnish the following statement to the original owner or 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. Those installing this article either on or within a specific type or class of aircraft must determine that the aircraft installation conditions are within the TSO standards which include any accepted integrated non-TSO functions. TSO articles and any accepted integrated non-TSO function(s) must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR part 43 or the applicable airworthiness requirements. *{Add the following, when it applies; This is an incomplete system intended to provide the following functions: (List functions.)}*

{Include a summary statement, or reference the approved data provided with this TSOA letter to describe any approved deviations granted pursuant to 14 CFR 21.618.}

This TSO authorization, issued pursuant to 14 CFR 21.611, is effective until surrendered, withdrawn or otherwise terminated under the provisions of 14 CFR 21.613. With notice, we may withdraw this TSO authorization if articles are not in compliance with the applicable TSO performance standards pursuant to 14 CFR 21.2.

You must provide one copy or online access to data listed as a furnished data requirement in the TSO to the original owner/installer of each article or multiple articles if furnished to one source (e.g., an operator, type certificate holder, or repair station).

You must obtain FAA approval before making any changes to the location of your manufacturing facilities pursuant to 14 CFR 21.609(b).

Without further FAA approval, we do not allow a manufacturer to mark articles after it changes its company name, address, or ownership. You must notify the ACO and MIDO of name, address, or proposed ownership changes.

Pursuant to 14 CFR 21.614, a holder of a TSOA may not transfer it. If you wish to transfer it, you must request a transfer from the FAA.

Send to the office below any design change(s) for this TSO article as outlined in 14 CFR 21.619(a). You must notify us of minor design changes within *{enter agreed timeframe}*. Also, as recipient of this authorization, we require you to report any failure, malfunction, or defect relating to articles produced under this authorization pursuant to 14 CFR 21.3.

Please note that technical data the FAA retains may be subject to Freedom of Information Act (FOIA) requests. This office will notify you of any request(s) pertaining to your data and give you the opportunity to protect the data from public disclosure.

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

Sincerely,

{Name of ACO manager}
{Name of FAA ACO}

cc: AIR-112; *{insert routing symbol of responsible MIDO}*

Appendix D. Sample Letter of TSO Design Approval (LODA)

U.S. Department
of Transportation

**Federal Aviation
Administration**

{ACO}
{ACO address}

{Date}

{Name of Civil Aviation Authority (CAA) type certification contact}
{Contact title}
{Name of authority}
{Street address}
{City and mail code}
{Country}

Dear *{Mr. /Mrs. /Ms. name of CAA type certification contact}*:

Subject: LODA Application *{insert reference number}*

This is in reply to *{insert applicant's company name}* application dated *{insert date of letter}* for technical standard order (TSO) design approval. We acknowledge our receipt of {enter name of CAA} letter {insert reference number}, dated {insert letter date}, stating that the article complies with the requirements of TSO-C {insert number} and that {enter name of CAA} assumes responsibility for oversight of the production of the article. We accept *{enter name of CAA}* statement certifying, pursuant to Title 14 of the Code of Federal Regulations (14 CFR) 21.621, that the *{enter type of article}* listed below complies with the requirements of TSO-C *{insert number}* and 14 CFR part 21, subpart O. {*Insert the following, if applicable*} We consider the *{insert name of CAA}* certifying statement as certification of the validity of the integrated non-TSO data shown in attachment 1.

Based on the *{insert name of CAA}* certifying statement, we accept *{enter name of applicant}* TSO design approval to include the *{insert type of article}* listed below located at *{enter complete applicant address}*. {*Insert the following, if applicable:*} We also accept the data submitted in support of the non-TSO functions listed in attachment 1.}

{Enter Part/Model} Number
{List each part number (with open brackets to allow for minor change) or model number. If both numbers are necessary, use two separate columns.}

{Enter type of article} Description
{Enter a basic description of article. Include major features that distinguish this part or model number from other part or model numbers on the list.}

This letter of TSO design approval (LODA), together with the *{enter name of CAA}* certificate of airworthiness for export, authorizes *{enter name of applicant}* to identify *{enter type of article}* with the TSO marking requirements described in 14 CFR 45.15(b) and in TSO-C *{insert number}*. We issue the LODA in accordance with § 21.621 governing issuance of TSO design approval for import articles. Each item must be accompanied by a certificate of airworthiness for export issued by the *{enter name of CAA}* or a duly authorized designee/organization (14 CFR 21.502).

{Enter name of applicant} must furnish the following statement to the original owner or 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. Those installing this article either on or within a specific type or class of aircraft must determine that the aircraft installation conditions are within the TSO standards which include any accepted integrated non-TSO function standards. TSO articles and any accepted integrated non-TSO function(s) must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR part 43 or the applicable airworthiness requirements. *{Add the following, when it applies: This is an incomplete system intended to provide the following functions: (List functions.)}*

{Include a summary statement to describe any approved deviations granted under the provisions of 14 CFR 21.618}

This LODA, issued pursuant to § 21.621, is effective until surrendered, withdrawn, or otherwise terminated by the FAA under the provisions of 14 CFR 21.613. You, as the holder of this LODA, may not transfer it as stated in 14 CFR 21.614. The *{enter name of CAA}* airworthiness certification and production surveillance is essential in establishing and maintaining that this article meets TSO-C *{enter number}*. With notice, we may withdraw this LODA if we find articles are not in compliance with the applicable TSO pursuant to 14 CFR 21.2.

Without further FAA approval, we do not allow *{enter name of applicant}* to mark articles if the company's name, address, or ownership changes. *{Enter name of applicant}* must notify the FAA through the *{enter name of CAA}* of proposed company name, address, or ownership changes.

Please note that technical data the FAA retains may be subject to Freedom of Information Act (FOIA) requests. This office will notify *{enter name of applicant}* of any request(s) pertaining to its data and give it the opportunity to protect the data from public disclosure.

If you have any questions, please feel free to have your staff contact *{insert name of ACO point of contact and phone number}*.

Sincerely,

{Name of ACO manager}
{Name of FAA ACO}

cc: AIR-112; *{insert routing symbol of responsible MIDO}*

Appendix E. Accepted Non-TSO Functions

Attachment 1 to *{enter reference number}*

We accept the data supporting the non-TSO functions listed below. **This TSO authorization is not an approval for the non-TSO function(s) or for installation.** The installer must apply for a separate installation approval so we can determine if the data are applicable and sufficient to show compliance with the airworthiness regulations for the product(s) where the article is installed.

{Enter the appropriate information into the table below:}

Non-TSO Function	Performance Standard	Documentation
P/N ABCD001		
Function #1	*DO-xxxE, Section XX*	*Report # 12xx45 Rev X*
Function #2	*SAE ASXXXB, Para 4*	*Report # 34xxx67 Rev X*
Function #3	*NAS XXXX, Rev xx*	*Doc # 56xx78xx Rev Y*
---	---	---
Model # ABCDEF		
Function #1	*XXXXX Rev x*	*Report XXXX Rev X*
Function #2	*SAE ASXXXB, Para 4*	*Report # 34xxx67 Rev X*
Function #3	*NAS XXXX, Rev xx*	*Doc # 56xx78xx Rev Y*
---	---	---

We accept the data supporting the non-TSO functions listed in the above table with the following conditions:

1. The non-TSO functions do not interfere with the article's compliance with the TSO.

2. *{Enter name of applicant}* controls the design and quality of the article, including the validity of the non-TSO functions' data listed in the table above.

3. *{Enter name of applicant}* evaluates design changes pursuant to §21.619 to ensure the article continues to comply with the TSO.

4. *{Enter name of applicant}* evaluates design changes to confirm the validity of the accepted non-TSO function's data. If the design change affects the validity of the data supporting the accepted non-TSO function (i.e., a change to intended function, not a bug fix or minor adjustment), you must obtain approval from the FAA before integrating the design change into your article design. If the design change does not affect the validity of the data supporting the accepted non-TSO function, you must report it when you report other minor design changes. If we accept the change, {enter name of applicant} must notify all recipients of the previous data of the change. If all of the previous recipients of the data cannot be identified, {enter name of applicant} must change the part number of the article. We require a new installation approval for an article with a new part number.

Appendix F. Sample Denial Letter for TSOA/LODA Application

U.S. Department
of Transportation

**Federal Aviation
Administration**

{ACO}
{ACO address}

{Date}

{Name of applicant point of contact (POC)}
{POC's title}
{Name of company}
{Street address}
{City and mail code}

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

Subject: *{TSOA}* or *{LODA}* Application *{insert reference number}*

This is in reply to your application letter of *{enter date}* requesting *{enter TSO authorization or letter of design approval, as applicable}* for your *{insert type of article}*. We are denying your request for a *{enter TSO authorization or letter of design approval, as applicable}* under TSO-C *{enter TSO number}.*

{In a few sentences provide an explanation for the denial of the TSOA/LODA request.}

Please note that technical data the FAA retains may be subject to Freedom of Information Act (FOIA) requests. This office will notify you of any request(s) pertaining to your data and give you the opportunity to protect the data from public disclosure.

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

Sincerely,

{Name of ACO manager}
{Name of FAA ACO}

cc: AIR-112; *{insert routing symbol of responsible MIDO}*

Appendix G. Format and Guidance for the Preparation of a TSO

Department of Transportation
Federal Aviation Administration
Aircraft Certification Service
Washington, DC

TSO-C{XXX}

Effective
Date: *{mm/dd/yy}*

Technical Standard Order

***{Note**: Use this template for all TSOs.**}** **Key:** Shaded areas may not be applicable to every TSO. Information in braces {italics} requires you to add data, provides guidance, or both. If a shaded area is applicable to your TSO, fill in the applicable information; if not, delete the shaded section from your TSO.*

Subject: *{Enter title of TSO article}*

1. **PURPOSE.** This technical standard order (TSO) is for manufacturers applying for a TSO authorization (TSOA) or letter of TSO design approval (LODA). In it, we (the Federal Aviation Administration, (FAA)) tell you what minimum performance standards (MPS) your *{insert type of equipment}* must meet for approval and identification with the applicable TSO marking.

2. APPLICABILITY. This TSO affects new applications submitted after its effective date. *{Select additional paragraphs if they apply:}*

a. {*For TSO revisions, use the following statement:}* TSO-C {*Previous Revision*} will also remain effective until {*insert date 18 months after publication date*}. After this date, we will no longer accept applications for TSO-C{*Previous Revision*}.

b. {*To allow the continued manufacture of previously approved articles, use the following statement:*} {*insert type of equipment*} approved under a previous TSOA may still be manufactured under the provisions of its original approval.

c. {*To stop the manufacture of previously approved articles, FAA staff must withdraw each approval previously issued by publishing a Federal Register notice. After we have withdrawn each approval, you can use the following statement:*} Effective {*enter date*} pursuant to Title 14 of the Code of Federal Regulations (14 CFR) 21.613(a), we are withdrawing each TSOA and LODA that lets the holder identify or mark {*insert type of equipment*} with {*insert applicable versions of TSO*}.

3. REQUIREMENTS. New models of {*insert type of equipment*} identified and manufactured on or after the effective date of this TSO must meet the requirements in {*insert the*

applicable statement: Appendix 1, if an FAA MPS is used, or cite the applicable SAE, RTCA, etc. document, name, title, date, etc., as modified by Appendix 1 of this TSO, when applicable.}

a. Functionality. This TSO's standards apply to equipment intended to *{state intended function, or refer to a standard or an appendix}.*

b. Failure Condition Classifications. {*Use either (1) through (3) or the alternate below it. The failure condition classification may need to be tailored for a specific failure condition, (e.g., unannunciated loss of function).*}

(1) Failure of the function defined in paragraph **3a** resulting in {*insert under what conditions as appropriate (e.g., misleading vertical guidance)*} is a {*insert appropriate classification: minor, major, or hazardous, catastrophic*} failure condition.

(2) Loss of the function defined in paragraph **3a** is a *{insert appropriate classification: minor, major, hazardous, catastrophic}* failure condition.

(3) Design the system to at least these failure condition classifications.

*{***Alternatively** *if the article could be designed for various failure condition classifications based on its intended use, then use the following paragraph:}*

b. There is no standard minimum failure condition classification for this TSO. The failure condition classification appropriate for the equipment will depend on the intended use of the equipment in a specific aircraft. Document the loss of function and malfunction failure condition classification for which the equipment is designed. {*The following statement may be used if you deem it applicable:*} Development to a lower Design Assurance Level may be justified for certain cases and accepted, but will lead to installation restrictions and must be documented in the installation and limitations manual defined in paragraph **5a** of this TSO.

c. Functional Qualification. *{Choose one of the following statements:}* Demonstrate the required functional performance under the test conditions specified in *{insert reference to section of MPS} {or,}* Demonstrate the required performance under the test conditions in appendix *{insert no.}* of this TSO.

d. Environmental Qualification. *{Choose one of the following statements:}* Demonstrate the required performance under the test conditions specified in *{insert reference to section of MPS}* using standard environmental conditions and test procedures appropriate for airborne equipment. You may use a different standard environmental condition and test procedure than {*insert reference to the RTCA/DO-160 version in the MPS*}, provided the standard is appropriate for the {*insert type of equipment*}*{or,}* Demonstrate the required performance under the test procedures in appendix *{insert no.}* of this TSO using standard environmental conditions and test procedures appropriate for airborne equipment.

Note: The use of RTCA/DO-160D (with Changes 1 and 2 only, without Change 3 incorporated) or earlier versions is generally not considered appropriate and will require substantiation via the deviation process as discussed in paragraph **3g** of this TSO.

e. Software Qualification. If the article includes software, develop the software according to RTCA, Inc., document RTCA/DO-178C, *Software Considerations in Airborne Systems and Equipment Certification*, dated December 13, 2011, including referenced supplements as applicable, to at least the software level consistent with the failure condition classification defined in paragraph **3b** of this TSO. You may also develop the software according to RTCA, Inc., document RTCA/DO-178B, dated December 1, 1992, if you follow the guidance in AC 20-115C, *Airborne Software Assurance*, dated July 19, 2013. {*The following statement may be used if you deem it applicable:*} Development to a lower Design Assurance Level may be justified for certain cases and accepted, but will lead to installation restrictions and must be documented in the installation and limitations manual defined in paragraph **5a** of this TSO.

f. Electronic Hardware Qualification. If the article includes complex custom airborne electronic hardware, then develop the component according to RTCA, Inc., Document RTCA/DO-254, *Design Assurance Guidance for Airborne Electronic Hardware*, to at least the design assurance level consistent with the failure condition classification defined in paragraph **3b** of this TSO. For custom airborne electronic hardware determined to be simple, RTCA/DO-254, paragraph 1.6 applies. {You must use this paragraph if the condition classification defined in paragraph 3.b of this TSO is major, hazardous, or catastrophic.} {The following statement may be used if you deem it applicable:} Development to a lower Design Assurance Level may be justified for certain cases and accepted, but will lead to installation restrictions and must be documented in the installation and limitations manual defined in paragraph **5a** of this TSO.

g. Deviations. We have provisions for using alternate or equivalent means of compliance with the criteria in the MPS of this TSO. If you invoke these provisions, you must show that your equipment maintains an equivalent level of safety. Apply for a deviation pursuant to 14 CFR 21.618.

{To allow ACOs to approve specific deviations to this TSO, use the following statement:} The following deviations have been determined to provide an equivalent level of safety (ELOS) for this TSO and may be granted by the appropriate ACO manager without further Design, Manufacturing, and Airworthiness Division (AIR-100) involvement.

{*List any deviations specific to this TSO that the ACO is authorized to grant*.}

4. **MARKING.**

a. Mark at least one major component permanently and legibly with all of the information in 14 CFR 45.15(b).

b. 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.

c. You may use electronic part marking to identify software or airborne electronic hardware components by embedding the identification within the hardware component itself (using

software) rather than marking it on the equipment nameplate. If electronic marking is used, it must be readily accessible without the use of special tools or equipment.

5. **APPLICATION DATA REQUIREMENTS.** You must give the FAA Aircraft Certification Office (ACO) manager responsible for your facility a statement of conformance, as specified in 14 CFR 21.603(a)(1) and one copy each of the following technical data to support your design and production approval. LODA applicants must submit the same data (excluding paragraph **5.g**) through their civil aviation authority.

a. Manuals containing the following:

(1) Operating instructions and article limitations sufficient to describe the equipment's operational capability.

(2) Detailed description of any deviations.

(3) Installation procedures and limitations sufficient to ensure that the *{insert type of equipment}*, when installed according to the installation or operational procedures, still meets this TSO's requirements. Limitations must identify any unique aspects of the installation. The limitations must also include a note with the following statement:

> "This article meets the minimum requirements of {insert the TSO number and revision letter}. Installation of this article requires separate approval."

(4) For each unique configuration of software and airborne electronic hardware, reference the following:

(a) Software part number, including revision and design assurance level,

(b) Airborne electronic hardware part number including revision and design assurance level, and

(c) Functional description.

(5) A summary of the test conditions used for environmental qualifications for each component of the article. For example, a form as described in RTCA/DO-160G, *Environmental Conditions and Test Procedures for Airborne Equipment*, Appendix A.

(6) Schematic drawings, wiring diagrams, and any other documentation necessary for installation of the *{insert type of equipment}*.

(7) By-part-number list of replaceable components that makes up the *{insert type of equipment}*. Include vendor part number cross-references, when applicable.

b. Instructions covering periodic maintenance, calibration, and repair, to ensure that the *{insert type of equipment.}* continues to meet the TSO approved design. Include recommended inspection intervals and service life, as appropriate.

c. If the article includes software: a plan for software aspects of certification (PSAC), software configuration index, and a software accomplishment summary.

d. If the article includes simple or complex custom airborne electronic hardware: a plan for hardware aspects of certification (PHAC), a hardware verification plan, top-level drawing, and hardware accomplishment summary (or similar document, as applicable).

e. A drawing depicting how the article will be marked with the information required by paragraph **4** of this TSO.

f. Identify functionality or performance contained in the article not evaluated under paragraph **3** of this TSO (defined as non-TSO functions). Non-TSO functions can be accepted in parallel with the TSOA. For those non-TSO functions to be accepted, you must declare these functions and include the following information with your TSO application:

(1) Description of the non-TSO function(s), such as performance specifications, failure condition classifications, software, hardware, and environmental qualification levels. Include a statement confirming that the non-TSO function(s) do not interfere with the article's compliance with the requirements of paragraph **3**.

(2) Installation procedures and limitations sufficient to ensure that the non-TSO function(s) meets the declared functions and performance specification(s) described in paragraph **5.f.(1)**.

(3) Instructions for continued performance applicable to the non-TSO function(s) described in paragraph **5.f.(1).**

(4) Interface requirements and applicable installation test procedures to ensure compliance with the non-TSO function(s) performance data defined in paragraph **5.f.(1).**

(5) Test plans, and analysis, as appropriate, to verify that the performance of the hosting TSO article is not affected by the non-TSO function(s).

(6) Test plans and analysis as appropriate, to verify that the function and performance of the non-TSO function(s) as described in paragraph **5.f.(1).**

g. The quality manual required by 14 CFR 21.608, including functional test specifications. The quality system must ensure that you will detect any change to the approved design that could adversely affect compliance with the TSO MPS and reject the article accordingly. Applicants who currently hold TSOAs must submit revisions to the existing quality manual as necessary (not required for LODA applicants).

h. A description of your organization as required by 14 CFR 21.605.

i. Material and process specifications list.

j. A list of all drawings and processes (including revision level) that define the article's design.

k. Manufacturer's TSO qualification report showing results of testing accomplished according to paragraph **3.c** of this TSO.

{*You can add to the above list any other documentation you think essential.}*

6. **MANUFACTURER DATA REQUIREMENTS.** Besides the data given directly to the responsible ACO, have the following technical data available for review by the responsible ACO: *{The following is a standard list of the generally applicable data. The applicability of each item will vary by TSO, and you may need to require other data.}*

Note: The following data for a LODA applicant may be made available for review through its CAA. Refer to the applicable bilateral agreement for specific details regarding access to this data.

a. Functional qualification specifications for qualifying each production article to ensure compliance with this TSO.

b. Article calibration procedures.

c. Schematic drawings.

d. Wiring diagrams.

e. Material and process specifications.

f. The results of the environmental qualification tests conducted according to paragraph **3d** of this TSO.

g. If the article includes software, the appropriate documentation defined in RTCA/DO 178B or RTCA/DO-178C specified in paragraph **3.e** of this TSO, including all data supporting the applicable objectives in RTCA/DO-178B, Annex A, *Process Objectives and Outputs by Software Level.*

h. If the article includes complex custom airborne electronic hardware, the appropriate hardware life-cycle data in combination with design assurance level, as defined in RTCA/DO-254, Appendix A, Table A-1. For simple custom airborne electronic hardware, the following data are required: test cases or procedures, test results, test coverage analysis, tool assessment and qualification data, and configuration management records, including problem reports. *{You must use this paragraph if the failure condition classification defined in paragraph **3.b** of this TSO is major, hazardous or catastrophic.}*

i. If the article contains non-TSO function(s), you must also make items **6.a** through **6.h** available as they pertain to the non-TSO function(s).

7. **FURNISHED DATA REQUIREMENTS.**

a. When furnishing one or more articles manufactured under this TSO to one entity (such as an operator or repair station), provide one copy or online access to the data in paragraphs **5.a** and **5.b** of this TSO. *{We generally consider these data the minimums.}* Add any other data needed for the proper installation, certification, use, or continued compliance with the TSO, of the *{insert type of equipment}*.

b. If the article contains declared non-TSO function(s), include one copy of the data in paragraphs **5.f.(1)** through **5.f.(4).**

c. If the article contains software, include one copy of the OPR summary.

8. **HOW TO GET REFERENCED DOCUMENTS.** {*List the title, organization name and address for getting all referenced documents.*}

a. Order RTCA documents from RTCA, Inc., 1150 18th Street NW, Suite 910, Washington, DC 20036. Telephone: (202) 833-9339; fax: (202) 833-9434. You can also order copies online at www.rtca.org.

b. Order SAE documents from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Telephone: (724) 776-4970, fax: (724) 776-0790. You can also order copies online at www.sae.org.

c. Order copies of parts 21 and 45 {*add additional applicable parts*} from the Superintendent of Documents, Government Printing Office, PO Box 979050, St. Louis, MO 63197-9000. Telephone: (202) 512-1800, fax: (202) 512-2104. You can also order copies online at www.gpo.gov.

d. You can find a current list of TSOs and advisory circulars at http://rgl.faa.gov/. You will also find the TSO Index of Articles at the same site.

Susan J. M. Cabler
Acting Manager, Design, Manufacturing, &
Airworthiness Division
Aircraft Certification Service

Appendix H. Deviation Delegation Authority to ACO

1. Instructions for the Use of This Appendix. In addition to any specific technical standard orders (TSO) that allow the Aircraft Certification Office (ACO) to approve certain deviations specific to TSOs without Design, Manufacturing, and Airworthiness Division (AIR-100) involvement, this appendix identifies specific TSO deviations that AIR-100 has determined provide an equivalent level of safety (ELOS) for a specific TSO. The ACO is authorized to grant, without further AIR-100 involvement, an applicant's deviation request, provided that the request complies with the guidance in this appendix. All deviations must be documented in accordance with the requirements in chapter 7, paragraph 5 of this order.

2. List of Common Acceptable Deviations. This list is comprised of TSO deviations that have been repetitive in nature, reviewed by an ACO, and approved by AIR-100. When used as a tool to determine the equivalency of an individual deviation request, the following TSO deviations may be granted by the appropriate ACO manager. Once approved, the deviation must be filed with AIR-100 for review and recordkeeping purposes.

a. TSO-C39c: 9g *Transport Airplane Seats Certified by Static Testing* and TSO-C127a: *Rotorcraft, Transport Airplane, and Normal and Utility Airplane Seating Systems.*

It is acceptable to grant a deviation to the required method for determining the Seat Reference Point (SRP) defined in SAE/AS8049A Figure 1B with one of the SRP determination methods defined in SAE/AS8049B Figure 1B.

LIMITATION: The selected method from SAE/AS8049B Figure 1B must be documented and must be used consistently when evaluating all variations of the seat model or future changes to the seat model design.

b. TSO C39c: 9g *Transport Airplane Seats Certified by Static Testing* and TSO C127a: *Rotorcraft, Transport Airplane, and Normal and Utility Airplane Seating Systems.* For Type A and Type B Transport seats if an inflatable restraint is included it is acceptable to grant a deviation to the flammability requirements of the airbag material to meet flammability requirements of Title 14 of the Code of Federal Regulations (14 CFR) part 25, Appendix F, part I, paragraph (a)(iv) as recognized in multiple FAA special conditions.

Note: Inflatable restraints are a relatively new and novel technology used in commercial aviation. As such, the seat TSO MPS were not developed to specifically address this new technology. Therefore, the installation approval is still subject to the applicable special conditions and certification requirements.

c. TSO C90: *Cargo Pallets, Nets, and Containers (Unit Load Devices).*

Common deviation to C-90, C-90a, C-90b, and C-90d section (b)(2) requirement for weight marking to the nearest pound. It is acceptable to grant a deviation to the marking requirements to read the same as paragraph 4.a.(6) of TSO C-90d which reads: "The nominal weight of the article in the format: Weight:_____kg (_____lb)."

The 1-pound tolerance for weight marking of a unit load device (ULD) does not add safety. It is unnecessarily restrictive considering the large differences between the marked ULD weight and actual in-service ULD weight that may exist due to accumulated dirt, moisture, and other environmental effects.

Appendix I. Administrative Information

1. Distribution. Distribute this order to the Washington Headquarters branch levels of the Aircraft Certification Service and Flight Standards Service; to the branch levels of the regional aircraft certification directorates; to all Aircraft Certification Offices; to the regional Flight Standards Divisions, and to all Air Carrier, General Aviation, and Flight Standards District Offices; to the Federal Aviation Administration Academy and the Regulatory Support Division; and to all international field offices and international area offices. Also, distribute this order to all Manufacturing Inspection District Offices and Manufacturing Inspection Satellite Offices.

2. Suggestions for Improvements. Please forward all comments on deficiencies, clarifications, or improvements regarding the contents of this order to:

a. 9-AWA-AVS-AIR-DMO@faa.gov, or

b. Complete the form online at https://ksn2.faa.gov/avs/dfs/Pages/Home.aspx.

Your suggestions are welcome. FAA Form 1320-19, Directive Feedback Information, is located in Appendix I to this order for your convenience. If you require an immediate interpretation, please contact AIR-100 at (202) 267-1575; however, you should also complete FAA Form 1320-19 as a follow-up to the conversation.

3. Records Management. Refer to FAA Order 0000.1, *FAA Standard Subject Classification System*; FAA Order 1350.14, *Records Management*; or your office Records Management Officer (RMO)/Directives Management Officer (DMO) for guidance regarding retention or disposition of records.

4. Deviating From This Order. FAA engineering personnel must follow this order to ensure standardized approvals of TSO articles. AIR-100 coordinates and dispositions any proposals to deviate from this order. When FAA staff needs to use or base an approval on different guidance or alternative procedures, it substantiates and documents the need, gains concurrence from the appropriate supervisor, and sends the request to AIR-100 for concurrence.

Appendix J. FAA Form 1320-19, Directive Feedback Information

U.S. Department of Transportation
Federal Aviation Administration

Directive Feedback Information

Please submit any written comments or recommendations for improving this directive, or suggest new items or subjects to be added to it. Also, if you find an error, please tell us about it.

Subject: FAA Order 8150.1D

To: 9-AWA-AVS-AIR-DMO@faa.gov or
complete the form online at https://ksn2.faa.gov/avs/dfs/Pages/Home.aspx

(Please check all appropriate line items)

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:
(attach separate sheet if necessary)

☐ In a future change to this directive, please include coverage on the following subject *(briefly describe what you want added):*

☐ Other comments:

☐ I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____

FTS Telephone Number: _____ Routing Symbol: _____

FAA Form 1320-19 (10-98)