

20th TSO Workshop - Q&A Contribution

| Contributor /Corporation | Question | Authorities |
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| Astronautics Corporation of America | <p>(1) What is the current status of cybersecurity being placed on TSO products?</p> <p>ANAC: ANAC's closest regulatory approach to this topic is at the aircraft level, through the issuance of Special Conditions. From there, a flow-down process is applied to systems and items to ensure compliance with the requirements. The topic of new regulations within ANAC, specifically in the context of TSO, has not been under discussion. The standards RTCA DO-326, DO-355, DO-356, and ASTM F3532 remain applicable within the aforementioned framework.</p> <p>EASA: From EASA perspective, information security protection is addressed in a generic manner under Subpart A but could also be part of a specific ETSO standard. Under Subpart A, the applicant may elect to comply with AMC 20-42 (latest applicable revision) and provide a security assurance level (SAL) that is appropriate for the security risks identified to the article, according to the assumed intended installation. When a specific ETSO standard includes information security (or cybersecurity) requirements, then they become part of the standard, so these must be followed as described.</p> <p>FAA: Language to be added at the TSO-C0 regarding this topic.</p> <p>TCCA: TCCA adopts EASA ETSOs in its AWM 537 Index 2. Each ETSO standard includes Subpart A of EASA CS-ETSO. As a result, TCCA's corresponding CAN-TSO will follow the same requirements.</p> <p>UKCAA: UK CAA is aligned with the response provided by EASA</p> <p>TSOHWG conclude that despite the different certification solutions identified on this topic, we are harmonized.</p> | ALL |
| Collins Aerospace | <p>(2) Want to know more about Complex TSO's.</p> <p>TCCA: Need more details about the question. There is no definition of "complex" in Canadian regulatory framework.</p> | TCCA |
| Helipark T. A. e Manutenção Aeronáutica LTDA | <p>(3) Pode ser feita a instalação de componentes e peças com faróis, lâmpadas com base apenas no TSO? Is it acceptable to install components and parts with lights or headlamps based solely on TSO authorization?</p> <p>ANAC: TSO authorization alone does not constitute installation approval. A TSO confirms the article meets minimum performance standards, but the installation on a specific aircraft must also comply with type certification requirements.</p> <p>If the TSO article is already included in the aircraft Type Certificate (TC) and documented in the Aircraft Flight Manual or applicable certification basis, then it can be installed directly based on the TSO approval, since installation aspects have already been evaluated by the aircraft manufacturer.</p> <p>If it is not covered by the TC, an additional installation approval is required (e.g., field approval, Supplemental Type Certificate – STC, or equivalent), to verify compatibility, safety, and continued airworthiness in that specific aircraft configuration.</p> | ANAC |
| TR Airworthiness | <p>(4) Are there any technical or administrative evaluations applied before accepting a foreign TSO article for installation on a nationally certified product?</p> <p>EASA: The response to this will depend on the existence and kind of Bilateral Agreement / Technical Implementation Procedures (TIP) or Working Arrangement between the European Union (EU) and the specific country providing the TSO article to an EASA Member State product. As of today, EASA has established agreements with the FAA (USA), ANAC (Brazil) and TCCA (Canada) for <u>acceptance</u> of the authorisations from these countries with no involvement nor administrative issuance of an EASA authorisation. As a remark, in case of CAN-TSO</p> | EASA |

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| | <p>articles, the TIP Rev. 4 in place still requires the establishment of a Common TSO list for identifying the standards to which this automatic acceptance applies. In all other cases, EASA applies validation procedures to foreign TSOs that may include technical involvement as well as the need for issuance of the EASA ETSO authorisation. The level of involvement and applicable requirements will, again, depend on the specific Bilateral Agreement or Working Arrangement in place, if any. In case there is no agreement, the application is addressed as an initial ETSO application, submitted per EASA Part 21 applicable requirements. This scenario is subject to change over time as agreements evolve. For updated information on bilateral agreements between EU and other States, please access the following website: https://www.easa.europa.eu/en/document-library/bilateral-agreements. Please note that the response above is from the article perspective only, in terms of its recognition by EASA, but installation assessment should be applied in any case in accordance with aircraft/product requirements (for design approval of the article installation on the product). It is also relevant to add that, although it is often recognised as an important step towards final certification of a product, an (E)TSO authorisation is not mandatory, i.e., an applicant could also show compliance directly to the aircraft-level requirements without claiming for (E)TSOA credits.</p> | |
| <p>TR Airworthiness</p> | <p>(5) Is DOA certificate mandatory/required in TSO/ETSO process? Why is the proportional ETSO/TSO assessment changed?</p> <p>EASA: No, DOA capability is not mandatory, except for Auxiliary Power Units (APUs). For more information on this and on why EASA is proposing to change capability demonstration requirements, please refer to the presentation “Evolution of European TSO Authorization Process” shown in this TSO Workshop.</p> <p>FAA: For the FAA, a DOA certificate is not mandatory (nor is it available) for the TSO process. The FAA does allow for TSO holders to establish partnership for safety plans (PSPs). Partnership for Safety Plans provides the foundation from which the FAA and our applicants / holders can build mutual confidence, leadership, teamwork, efficient business practices, and maturing certification competencies. The PSP is a written agreement between the FAA and the applicant / holder that focuses on high level objectives such as open and effective communication, key principles including effective certification programs utilizing the Project Specific Certification Plan (PSCP), utilization of technical experts, issue resolution, continuous improvement, general expectations, and other agreements reached between the applicant / holder and the FAA that further the effectiveness and efficiency of the TSO process. The FAA has drafted AC 21-56, which will standardize this concept for TSOs.</p> | <p>EASA & FAA</p> |
| <p>Korea Institute of Aviation Safety Technology</p> | <p>(6) I understand that both the FAA and EASA have been taking risk-based approaches and applying different levels of involvement for TSO articles, especially in response to rapidly evolving technologies. So, I'd like to ask — are there any plans or thoughts on publishing international guidance materials that could help not only experienced manufacturers but also new entrants? This could include lessons learned, practical guidance for how to go through the TSO certification process, and maybe even procedures for how to handle failures or malfunctions of TSO articles — since those could have safety implications at a national or even international level.</p> <p>ANAC: At this moment, ANAC does not have plans to publish guidance material related to risk-based approaches or different levels of involvement in the TSO approval process. We recognize, however, the importance of supporting both experienced manufacturers and new entrants in understanding the certification pathway. In this regard, ANAC considers the TSO Workshop itself to be a valuable forum, where applicants can clarify questions and share lessons learned directly with authorities and industry peers. Independently of the workshop, applicants are always encouraged to consult their local authorities for specific information and clarification regarding risk assessment and the expected level of involvement in the certification of a given article.</p> <p>Regarding failures or malfunctions of TSO articles in service, ANAC addresses such situations through its continuing airworthiness processes and in coordination with other certification authorities whenever safety concerns with potential broader impact are identified. Depending on the nature of the issue, ANAC may take actions at the article level or involve operators and installers, since the safety implications may vary with the installation context.</p> | <p>ALL</p> |

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| | <p>ANAC remains committed to international cooperation and transparent communication in order to ensure a consistent and safe approach to the approval and oversight of TSO articles.</p> <p>EASA: EASA understands that the forum of the TSO Workshop already provides the opportunity for less experienced applicants to understand the process and clarify their questions. For instance, in this event, EASA is bringing (again) a presentation on the ETSO Workflow and Lessons Learned. At this point, no practical guidance is planned to be issued, although EASA is always communicating about any evolution planned to the system. In terms of procedures for how to handle failures or malfunctions of in-service TSO articles, although actions can be taken at the article level, it is key that the users (or installers) of the article(s) are involved since the consequences might differ depending on the installation. EASA will always coordinate internationally if uncovered issue(s) related to ETSO'd articles are found to potentially lead to unsafe condition(s). For the list of mandatory continuing airworthiness information, or other safety related information published by EASA, please access the EASA Safety Publications Tool: https://ad.easa.europa.eu/.</p> <p>FAA: The FAA has been collaborating with our bilateral partners for decades. More recently several authorities agreed to establish the TSO International Harmonization Working Group to share lessons learned, new technologies, challenges, compliance expectations, procedural and rulemaking strategies, etc.</p> <p>There are currently no plans to publish international guidance materials; however, in other areas, industry has proposed certification guides or tools that have been instrumental at establishing best practices, general guidance, etc. For example, the FAA's Guide to Product Certification (CPG) or the Enhanced Project Specific Certification Guide (ePSCP). https://www.faa.gov/sites/faa.gov/files/aircraft/air_cert/design_approvals/dah/cpi_guide.pdf</p> <p>If this was an interest of industry, the FAA would be supportive of these efforts.</p> <p>From a training perspective, the FAA does have external training available through the FAA's Academy https://av-info.faa.gov/DsgReg/sections.aspx and other presentations available on the web - https://www.faa.gov/aircraft/air_cert/design_approvals/dah/tso101</p> <p>https://www.faa.gov/aircraft/air_cert/design_approvals/dah/tdsa_data</p> <p>TCCA: The CAN-TSO design approval process is contained in division III of Subpart 21 of Part V of Canadian Aviation Regulations (CAR) (CAR 521). We always encourage every applicant to contact and communicate with us at the very beginning of the process, and they will be guided through the process. TCCA is also in the process of issuing guidance material in the form of an Advisory Circular (AC 521-003).</p> <p>UKCAA: The LOI applied to UKTSOA projects is defined within Part 21, notably the AMC 2 to requirement 21.B.100(b). LOI is dependent on several factors, including the complexity, novelty, criticality of the application along with the performance of the Applicant on previous TSOA projects (including whether they are a new Applicant to UK CAA). LOI can be modified during the course of a project (LOI adaption as defined within the aforementioned AMC), both in terms of increased involvement and decreased involvement. It is critical as part of an initial UKTSOA Certification application that UK CAA and the Applicant discuss LOI early on during the programme.</p> | |
| Boeing DAS | <p>(7) I will be interested in hearing more about TSO applicability to NIE (esp. EFB)</p> <p>ANAC: Some equipment, such as NVG and GPUs, can be considered NIE having a TSO associated with it. The TSO approval can be used as it is used to installed equipment.</p> <p>EASA: From a regulatory perspective, the “EASA Updates” presentation should have clarified the ETSO applicability to NIE. In fact, EASA applies the ETSO authorization process for both parts and non-installed equipment (NIE) and has been discontinuing the term appliance when related to ETSOs. The EASA NPA related to Certification and continuing airworthiness of non-installed equipment (NIE) is the NPA 2025-02. For submitting your comments to it, please access: https://www.easa.europa.eu/en/document-library/notices-of-proposed-amendment/npa-2025-02.</p> | ALL |

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| | <p>FAA: The FAA has a TSO for unit load devices (C90) can be considered NIE under the EASA description. If the FAA were to publish a TSO for equipment that falls under the definition of NIE, those articles would be treated the same as any other TSO article.</p> <p>TCCA: TCCA is evaluating changing the terms appliances and parts to articles, as AWM 537 contains standards incorporated from EASA and from FAA (therefore contains the same TSOs standards for articles that may or may not be installed).</p> <p>UKCAA: Following the response from EASA, UK rulemaking will review and consider EASA NPA 2025-02 and the UK approach is likely to be harmonized with EASA.</p> | |
| V3 Flight Safety | <p>(8) Quais são as principais preocupações de segurança que as agências identificam na integração de Inteligência Artificial em sistemas aeronáuticos críticos (e.g., navegação, manutenção preditiva, apoio à decisão da tripulação), e como os requisitos de certificação estão sendo adaptados para endereçar a complexidade desses algoritmos?</p> <p><i>What are the main safety concerns identified by regulatory agencies regarding the integration of Artificial Intelligence into critical aeronautical systems (e.g., navigation, predictive maintenance, crew decision support), and how are certification requirements being adapted to address the complexity of these algorithms?</i></p> <p>ANAC: Regulatory agencies have emphasized core concerns regarding the integration of Artificial Intelligence into critical aeronautical systems. At the heart of the issue lies the "black box" nature of learning algorithms and the difficulty of applying traditional verification and validation methods. Unlike conventional software, where performance derives from a deterministic design, AI systems achieve results through learning. Neural networks remain opaque in their internal logic, making their decisions difficult to explain or predict.</p> <p>This scenario amplifies the risk of unintended behaviors, linked to stability, generalization capacity, and the handling of out-of-distribution data. Added to this are challenges of accountability and transparency, especially when such systems take on autonomous control functions, in critical domains — like navigation and crew decision support — these factors can directly affect operational safety.</p> <p>To address this complexity, the FAA has set out seven guiding principles. Notably, these include an incremental approach to implementation and a distinction between "learned" (static) AI and "learning" (dynamic) AI. EASA, in turn, has advanced the traditional V-model into a "W-shaped" process, introducing additional stages tailored to the lifecycle of learning systems.</p> <p>The evolving regulatory pathway rests on two complementary pillars: (a) maintaining consistency with the established aviation certification ecosystem preserving rigorous safety standards, and (b) enabling controlled innovation, with initial deployment in lower-criticality applications and progressive maturation of assurance methods. International harmonization of these mechanisms is expected, as well as publication of industry standards supporting them, laying the foundation for the safe advancement of AI in aviation.</p> <p>EASA: From EASA perspective, today there is no standardised guidance linked to the CS-ETSO for use when artificial intelligence is applied. On the other hand, it is recognised by EASA that neither EUROCAE ED-12C / RTCA-DO-178C at software-level nor EUROCAR ED-79B / SAE ARP-4754B at system-level are appropriate to address the regulatory concerns when applying AI to the development. EASA has established a Concept Paper, now in Issue 2, that represents the current EASA guidance material to be applied depending on the use of AI (limited to Levels 1 & 2 machine learning applications, up to IDAL C, with no online learning processes involved). For more information, please refer to https://www.easa.europa.eu/en/document-library/general-publications/easa-artificial-intelligence-concept-paper-issue-2. EASA is actively participating in EUROCAE WG-114 / SAE G-34 committees for establishing an industry consensus standard that could also be recognised in the future. For the time being, if an ETSO applicant wishes to apply an AI technique, it is important to make sure that its use is bounded by the limitations accepted by EASA at this moment (refer to the Concept Paper referenced above) and that EASA is made aware as soon as possible, since this will require deeper discussions to allow for the use of the appropriate guidance when comparing to CS-ETSO Subpart A requirements.</p> <p>FAA / TCCA / UKCAA: this topic will be addressed on Day 2 Technical Session Part 3 and will be part of ongoing harmonization discussions.</p> | ALL |

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| <p>Directorate General of Civil Aviation (DGCA), India</p> | <p>(9) For TSO design project, does applicant require to have Design Organization approval (DOA or ADOA)?</p> <p>(10) Whether Alternative procedure to Design Organization Approval (ADOA) is prerequisite for Demonstration of Capability by Technical Standard Order (TSO) applicant?</p> <p>ANAC: In the Brazilian system, there is no equivalent to the Alternative Procedure to Design Organisation Approval (ADOA). Therefore, an ADOA is not a prerequisite for applicants seeking a TSO authorisation with ANAC.</p> <p>EASA: In terms of design capability demonstration to EASA, the alternative procedures to Design Organisation Approval (ADOA or APDOA) is currently indeed a prerequisite for all ETSO authorisations, except for APUs, whose applicant needs to have a DOA. In the future, the design capability demonstration requirement is planned to be changed to a Declared Design Organisation (DDO), keeping the exception to the APUs, as presented in the topic “Evolution of European TSO Authorization Process” in this TSO Workshop. A DOA is planned to be an optional possibility, with some privileges, as further detailed in the presentation provided. For foreign applications, these must be made in accordance with any applicable Bilateral Agreement or Working Arrangement. If these are missing, the application will be considered as a new ETSO application under EASA Part 21 and the organisational requirements, including not only the design capability but also production capability demonstration, will apply.</p> <p>FAA: No. The FAA does not have ADOA requirements for TSO applicants.</p> <p>TCCA: An applicant to a CAN-TSO Design approval (DA) must demonstrate its technical capability (CAR 521.102). There is no procedures per say to be approved. Remember that a CAN-TSO DA is design approval only.</p> <p>UKCAA: Within the UK System, the Organisation applying for a UKTSOA must either hold a valid ADOA (thus having approved alternative procedures to DOA) or a Part 21 Subpart J DOA with privilege to apply for UKTSOAs. For applicants for TSO’s related to APUs, the applicant must have a Part 21 Subpart J Approval. The ADOA or DOA must also hold a valid POA within their own Organisation or must establish a valid POA Agreement with another competent Organisation holding a POA with the correct scope.</p> | <p>ALL</p> |
| <p>United Airlines</p> | <p>(11) Will we see new official guidance for oblique seats and the shoulder belt possibly riding up on the ATD neck during testing? When can we expect free-flail guidance to be published?</p> <p>EASA: an ad-hoc industry working group has met regulators (EASA, FAA and UKCAA) at EASA premises the 27/August and 28/August to progress on the subject. Outlines of possible guidance have been discussed and drafting is currently ongoing. Tentatively in 2 months’ time could be consolidated.</p> <p>When can we expect free-flail guidance to be published? “Free-flail” is contemplated in FAA’s AC25.562-1B_Change2 draft.</p> <p>FAA: Regarding oblique seats and shoulder belt interaction with ATD clavical/neck area: A working group has been established to address the shoulder harness neck issue.</p> <p>Regarding unrestrained upper torso flail, the installation of Front Row seats installed with large setbacks with no objects within the headpath and no upper torso restraints is discouraged. SAIB 2023-08, Promotion of Safety Enhancing Features for Certain Transport Passenger Seat Configuration, 01 Aug 2023 applies. Change 2 to AC 25.562-1b is in work.</p> | <p>FAA & EASA</p> |
| <p>Tecplas</p> | <p>(12) I would like to learn more about the commercialization of TSO-approved articles. We are currently undergoing the TSO certification process, and our next step is to bring the product to market. Could you provide some guidance on how the commercialization phase typically works?</p> <p>ANAC: Commercial aspects related to the introduction of a TSO-approved article into the market are not directly overseen by ANAC. The authority’s role is limited to the certification and</p> | <p>ALL</p> |

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| | <p>continued airworthiness of the article itself, ensuring compliance with the applicable regulatory requirements.</p> <p>That said, it is important to highlight that the commercialization phase is a critical step that should be carefully studied by the company in advance of certification. This includes assessing both the domestic and international markets, taking into consideration regulatory aspects and also the opportunities provided by bilateral agreements established between authorities.</p> <p>It is also essential that any commercialization agreements respect the approved design and production definitions. Furthermore, since a TSO authorisation does not constitute installation approval, the agreement between the TSO holder and the installer should ensure the availability of installation data, proper change management, and adequate support in case of in-service issues.</p> <p>EASA: It is not the responsibility of the Certification Authority to verify or oversee how an (E)TSO-authorized article is commercialised. However, it is important to emphasise that any commercialisation agreements must fully respect the approved design and production definitions.</p> <p>Moreover, since an (E)TSO authorisation does not constitute installation approval, it is expected that the agreement between the (E)TSO holder and the installer addresses key aspects such as the availability of necessary installation data, proper change management, and appropriate support in the event of occurrences.</p> <p>FAA: The FAA does not get involved in the sale or commercialization of FAA TSO approved articles. These are business decisions for which the FAA has no jurisdiction.</p> <p>For reference, the FAA's TSOs generally reference industry consensus standards lead through standards bodies such as RTCA, ASTM, and SAE. Other industry associations such as AIA, GAMA, or AEA may provide assistance or guidance in this matter.</p> <p>TCCA: TCCA as a regulatory authority does not deal with commercialization aspects.</p> <p>UKCAA: UK CAA does not provide guidance on commercial concerns. Holders of a UKTSOA must maintain the conditions as defined within Part 21 Subpart O once the UKTSOA is issued and this would need to be maintained once the article is present in any market until the Authorisation is either revoked or surrendered.</p> | |
| Embraer S.A. | <p>(13) Particular interest in the recommended update of TSO-C113 based on CMTS TST report 25.1322 (Interpretation differences in addressing Flight Crew Alerting 25.1322).</p> <p>ANAC: Future reviews of the TSO C113b will be conducted by the respective Civil Aviation Authorities. Nevertheless, compliance to 25.1322 is at the airplane installation level.</p> <p>EASA: The CMT (Certification Management Team) authorities do plan to review the Technical Standard Orders (TSOs) related to the use of red/yellow/amber for potential conflicts with aircraft level requirements of regulation 25.1322 and recommend updates, through the CMT Task Specific Team (TST) formed to address issues with regard to interpretation differences in addressing Flight Crew Alerting per 25.1322. However, final adoption to changes to these (E)TSOs may first require a revision of the MOPS standard (in case of (E)TSO-C113b, it is the SAE AS8034C). Even if the change is restricted to the (E)TSO content itself, this might require some further processing time, hard to predict at this stage. Nevertheless, regarding this topic, it is important to emphasise that requirements related to installation will always take precedence to the (E)TSO standards. (E)TSO standards are meant to be generic across multiple product domains, but not always their requirements are fully adapted to cover any potential installation. In order to alert about potential issues related to the Flight Crew Alerting topic, a presentation from the FAA was already brought to the 2023 TSO Workshop in Denver, United States.</p> <p>Note: taking the particular interest raised in the question, regarding TSO-C113, please note that the current EASA version (ETSO-C113b) does not contain the wording that could be considered problematic related to the use of a red 'X' to denote a failure of display or parameters.</p> <p>FAA: The FAA is in the process of revising TSO-C113b. The revision will include updates related to alerting and the CMTS TST 25.1322 reports.</p> | <p>ALL</p> |

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| | <p>TCCA: TCCA will adopt FAA TSO when revised. Installer is always responsible for ensuring compliance with AWM 525.1322.</p> <p>UKCAA: UK CAA are in agreement with EASA and has UKTSO-C113b.</p> | |
| Embraer S.A. | <p>(14) In cases of new developments and aeronautical certifications, is it necessary to use the component with the most recent TSO? Can a component with an older TSO version be used?</p> <p>ANAC: For new type-certification projects, such as a new aircraft, it is not mandatory to use the most recent TSO version for components. However, when it comes to TSO articles themselves, current regulations require that the latest applicable TSO version be applied.</p> <p>There may be specific cases where system compatibility or other technical considerations require the use of a component with a more recent TSO version, but this is dictated by operational or integration needs rather than by regulatory requirements. ANAC evaluates compliance based on the applicable TSO version for the article in question.</p> <p>EASA: This question brings us to two different perspectives.</p> <p>From the article perspective, for a new application, the most recent (E)TSO revision, applicable at the time of the application, must be used.</p> <p>However, old designs that use older (E)TSO revisions may still exist (and may still be manufactured), so they are still considered approved, unless their authorisations are surrendered, revoked or withdrawn by any other means.</p> <p>From an aircraft installation perspective, it is important to assess whether an older revision of an (E)TSO remains relevant for crediting against applicable certification and operational requirements at the aircraft level. Some Advisory Circulars (ACs) or Acceptable Means of Compliance (AMCs), for example, may reference a specific (E)TSO revision. Similarly, certain operational requirements may do the same. Therefore, the final determination ultimately depends on the specific installation case.</p> <p>FAA: No, it is not necessary to use an article manufactured to the latest version of the TSO.</p> <p>Articles produced under a previous version of a TSO may still be used for new installations if the installation evaluation finds that the article meets the airworthiness requirements for that particular installation/aircraft.</p> <p>TCCA: Certification of an article against a CAN-TSO can only be obtained against a version effective at the time of application. However, upon installation, assessment needs to be made if an older version still meets the requirements of the product it is installed on, or the appropriate operational requirements as the case may be. It is possible that an older version may be suitable.</p> <p>UKCAA: The applicability of a particular TSO revision is dependent on the type of change being performed to an existing, certified article and for new applications, the Amdt of CS-UKTSO that is in force at that time. For instance, only minor changes to existing UKTSOAs can continue to use the certification basis agreed at the time of the initial Authorisation. For major changes, a new UKTSOA must be issued and the certification basis must comply with the latest revision of the standard per CS-UKTSO. For all new applications, similarly, they must demonstrate compliance to the latest revision of the standard. For UKTSOs issued at previous revisions of a standard and no change is proposed to be performed, that UKTSOA will continue to be valid up until the point the Authorised is revoked or surrendered.</p> | ALL |
| Panasonic Avionics Corporation | <p>(15) Process of Seat Supplier and OEM</p> <p>This topic will be addressed at Day 2 Technical Sessions Part 2 of the TSO Workshop.</p> <p>ANAC: The seats TSO qualified by the FAA system, and by the EASA system (ETSO) are automatically accepted in Brazil as TSO. However, it is necessary to review technical data (for example Test Proposals, Test Results, high speed videos) to find compliance with requirements applicable to a specific aircraft.</p> | ALL |

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| | <p>EASA: This is a complex topic to answer in just a few words. We recommend taking it as a side ad-hoc discussion, with focused discussions on more specific questions. Nevertheless, this is one of the topics brought to the agenda of the TSO Workshop already.</p> <p>FAA: AC 21-49 Gaining Approval of Seats with Integrated Electronic Components, 2011 provides guidance on integration of IFE components onto TSO C127X seats. AIR100-12-120-105 acknowledges AIR6448 as an acceptable consensus standard to follow. A revision of AIR100-12-120-105 to acknowledge ARP6448B in lieu of AIR6448 is in work.</p> <p>UKCAA: UK CAA advises discussion between the OEM (interpreted as 'the installer') and the Seat Supplier and any specific questions relating to the Article to be asked separately where specific assistance may be provided.</p> | |
| Embraer S.A. | <p>(16) How can disagreements between the TSO holder and the aircraft manufacturer be resolved regarding the procedures and means of compliance adopted in a TSO report from the supplier that has already been approved by the primary certification authority?</p> <p>ANAC: Disagreements between a TSO holder and an aircraft manufacturer regarding procedures or means of compliance in a TSO report are primarily a matter between the parties involved. ANAC's role is to ensure regulatory compliance and maintain safety standards. It is important to note that the data approved as part of the TSO represent the minimum performance requirements for the article's functionalities, but do not guarantee eligibility for installation on any aircraft. The TSO certification process requires the article manufacturer to provide a data package sufficient to allow verification of aircraft applicable requirements. However, due to the variability of aircraft and systems where the article may be installed, the specific data requirements can differ. These differences should be agreed upon between the integrator and the TSO holder. The TSO holder must also ensure that any minor design changes are promptly communicated to the installer or integrator so that these changes are properly addressed and assessed against requirements. Additional design information is not required unless agreed upon by both parties.</p> <p>While ANAC can provide technical clarifications if needed, it does not mediate commercial or contractual disputes between the TSO holder and the aircraft manufacturer.</p> <p>FAA: Coordination and agreements are between an aircraft manufacturer and their supplier (e.g., TSO holder). The TSO application is evaluated in accordance with the TSO minimum performance standards and may or may not be sufficient for showing compliance with the applicable airworthiness requirements for the product.</p> <p>Early coordination between the installer (TC / STC holder) is necessary to ensure that data developed during the TSO process (and associated means of compliances) will be appropriate for compliance requirements to install the article.</p> <p>Other suggestions for industry:</p> <ol style="list-style-type: none"> 1) Concurrent project work for both the TSO holder for their changes and the installer. 2) Concur with detailed agreements - often these agreements also relate to individual PSPs that these companies also have with the FAA. Sharing information relative to where PSPs may be different (or similar) are important. What might be "typical" for one company may not be "typical" for another. For example, specific means of compliances may vary slightly. 3) Recognizing where there is needed involvement from the installer when compliance activities are performed as part of TSO compliance activities to ensure that the TC/STC holder is participating upfront and consistent compliance methods are used. <p>TCCA: If the requirements of the TSO are sufficient and adequate to address some of the requirements at the aircraft level, compliance with those requirements should not be disputed by the certifying authority. If the certification authority of the aircraft (product on which the TSO article is installed) is different from the certification authority of the TSO article, this depends on the bilateral agreement between the two authorities. If authorities accept each other's TSOs, then means of compliance for the original article certification do not need to be reviewed. However, it is always possible that at installation, some additional requirements may be required that were not part of the original TSO, and the installer may require to see data or MoC used. An Issue paper will be developed.</p> | ANAC, FAA & TCCA |

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| <p>United Airlines</p> | <p>(17) Will we see new official guidance for oblique seats and the shoulder belt possibly riding up on the ATD neck during testing? When can we expect free-flail guidance to be published?</p> <p>EASA: an ad-hoc industry working group has met regulators (EASA and FAA) at EASA premises the 27/August and 28/August to progress on the subject. Outlines of possible guidance have been discussed and drafting is currently ongoing. Tentatively in 2 months' time could be consolidated.</p> <p>"Free-flail" is contemplated in FAA's AC25.562-1B_Change2 draft.</p> <p>FAA: The FAA is promoting voluntary adoption of installing safety enhancing features such as airbags and shoulder harnesses for owners and operators of transport aircraft for seating configurations with large setbacks with lap belt only restraints at the next available opportunity. (SAIB 2023-08, Promotion of Safety Enhancing Features for Certain Transport Passenger Seat Configuration, 01 Aug 2023) Change 2 to AC 25.562-1b is in work.</p> | <p>FAA & EASA</p> |
| <p>Collins Aerospace</p> | <p>(18) Why does it take so long to generate a TSO?</p> <p>ANAC: ANAC adopts FAA TSO standards, and we do not issue TSOs.</p> <p>EASA: Generating a Technical Standard Order (TSO) is a complex and time-consuming process due to its two-phased approach involving both industry collaboration and governmental rulemaking. The process is designed to ensure a high degree of safety, standardization, and consensus.</p> <p>Phase 1: Industry Standardization</p> <p>The initial and often longest phase involves the development of a Minimum Operational Performance Standard (MOPS) by an industry standardization body. Organizations such as EUROCAE, RTCA, and SAE International form working groups composed of technical experts from various aviation stakeholders, including manufacturers, airlines, and regulators. These committees operate under strict, consensus-based procedures to ensure all participants have an opportunity to provide input and reach an agreement. The process includes multiple rounds of drafting, review, and revision, which can take a significant amount of time, sometimes years, to complete. This thorough approach is crucial for developing a robust standard that is technically sound and widely accepted by the industry.</p> <p>Phase 2: Rulemaking</p> <p>Once the industry standard is finalized, the relevant aviation authority begins its own rulemaking process. This phase involves:</p> <ul style="list-style-type: none"> * Assessment of Public Interest: The authority evaluates whether the new standard is necessary to enhance safety or promote interoperability and efficiency in the public interest. * Leveraging Industry Expertise: The authority leverages the work of the industry bodies, which significantly reduces the time and resources required for in-house development. * Public Consultation: The proposed TSO (or equivalent to other authorities) is often subject to a period of public consultation, allowing additional stakeholders to comment and provide feedback. * Issuance with Differences: The authority may not agree entirely with the industry-proposed MOPS and may issue the TSO with differences, which can be of a form of a change to the MOPS or additional requirements. <p>Sometimes, this process can also involve coordination among different authorities. Therefore, that is why the entire process, from initial industry working group formation to final TSO publication, can be lengthy. However, it is important to note that a TSO is not the only path for a new article to be approved for use on a product. An article can also be certified as part of the product certification process, which may be more suitable for unique or non-standardized components.</p> <p>FAA: A TSO typically begins with work being done by industry consensus organizations such as SAE, ASTM, RTCA, etc. to develop the standard(s). For the FAA, we evaluate the standard and may require modifications to the MPS, as defined by the proposed TSO. Once drafted, the TSO</p> | <p>ALL</p> |

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| | <p>requires coordination both internally (within Aircraft Certification, legal, etc.) and externally (public, our bilateral partners, and depending on the nature of the policy / TSO / document, also with the Department of Transportation). Consistent with section 5.b of OMB Circular A-119, while there is a preference to use voluntary consensus standards, it does not preclude the Agency from participating in the development of or using standards that are not developed by a voluntary consensus standards</p> <p>body. See FAA Order 8000.376 for further information regarding the FAA's development and use of voluntary consensus standards.</p> <p>Developing new rules, policies, and guidance involves a complex, iterative process of consultation and review to ensure comprehensive coverage of all safety aspects and technical considerations.</p> <p>TCCA: TSOs are typically based on consensus standards that take long to develop, due to the many factors involved in making the right decision in adopting standards that will actually offer a benefit to both applicants and certification authorities upon installation. Requirements of the TSO need to be suitable and as complete as possible in order to derive the most benefit of the TSO program upon installation.</p> <p>UK CAA: concur with the other NAA responses.</p> | |
| Safran Aerosystems Evacuation | (19) Status of TSO-C0? | FAA |
| Mid-Continent Instruments and Avionics | <p>(20) Status of TSO-C0? Planned harmonization for other authorities to accept C0?</p> <p>ANAC: ANAC will adopt TSO-C0 when it is released.</p> <p>EASA: EASA expects to discuss the TSO-C0 content as part of TSOHWG for harmonization purposes.</p> <p>FAA: The DRAFT TSO-C0 will be ready for FAA internal review/comment the 4th Qtr, 2025. Subsequently it will go through the public comment process for input and consideration.</p> <p>For reference, the FAA is making progress in drafting and defining requirements for TSO-C0. In the process of drafting TSO-C0, the FAA has coordinated with EASA on their planned changes to ETSO Subpart A and is committed to early coordination with all of our bilateral partners while drafting TSO-C0 to ensure continued acceptance of reciprocal acceptance and our bilateral agreements.</p> <p>We anticipate being able to share further developments within the coming months.</p> <p>TCCA: TCCA will adopt TSO-C0 when it is released, since it will apply to each FAA TSO that we already adopt. However, for already existing versions of TSOs that do not have text calling out TSO-C0, we need to add some /text requirements in AWM 537 to explain that TSO-C0 needs to be complied with in addition to the MPS of the specific TSO.</p> <p>UK CAA: as a bilateral partner with FAA, continues to follow the development of TSO-C0 and looks forward to discussing the proposals as the content evolves.</p> | FAA & ALL |
| Dunlop Aircraft Tyres Limited | <p>(21) Has EASA made any progress toward accepting UKTSOAs without validation, and would the introduction of dedicated UKTSOs (separate from the UK CAAs republished ETSOs) help or hinder broader bilateral acceptance of UKTSOAs with EASA or other NAAs?</p> <p>EASA and UK CAA:</p> <p>The question has two separate elements:</p> <ul style="list-style-type: none"> On the theme of dedicated UKTSOs, the UK CAA's position is to harmonise regulatory standards. In the unanticipated event of divergence, the Certification Oversight Board / NAA liaison meeting exists to review and discuss any differences in case of amendment to existing agreements. Regarding any progress toward accepting UKTSOAs without validation, UK CAA and EASA have dedicated meetings at the TSO working level on collaboration and seeking | UK CAA & EASA |

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| | <p>efficiency. We remain focused on better ways of working and steps have been agreed to trial concurrent validation with complex projects and seek streamlining for an agreed list of TSOs. This communication and effective collaboration will create opportunities to further explore any amendments to our existing bilateral agreement that will be eventually rediscussed in the future as part of a broader political/commercial agreement between UK and European Union.</p> | |
| Transport Canada Civil Aviation (TCCA) | <p>(22) What is ANAC's bilateral status with other authorities on the reciprocal acceptance of TSO approvals?</p> | <p>ANAC</p> |
| | <p>ANAC: Reciprocal acceptance of TSO approvals is already established in ANAC agreements with FAA, EASA, TCCA and UKCAA.</p> | |
| Boeing | <p>(23) What's the boundary for an OEM to take credit of a TSO in an ATC/STC/TC?</p> | <p>FAA, ANAC, EASA & UK CAA</p> |
| | <p>All authorities: Credit of a TSO can vary according to parameters such as the level of complexity, integration and interfaces of an equipment or system. Installation requirements also need to be verified against TSO qualifications.</p> | |