Cross Border Transferability (XBT) Handbook

best practices to promote safety, simplification, and global harmonization in connection with changes of aircraft registration and nationality

Aviation Working Group

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AWG encourages comments to the Handbook, which will be reviewed and updated regularly.

As previously noted, this Handbook will be updated periodically to incorporate ongoing learning about XBT best practices and in response to user input. This log contains a list of the most significant revisions in each successive update and a link to a redlined copy showing all revisions from the prior version. Users are advised to consult this log periodically to assure that they are referencing the most current version of this Handbook (also available online on AWG's website).

Edition	Release date	Redline	Major changes & additions
2023.01	May 2023	N/A	N/A
2024.01	January 2024	here	Appendix I
2025.01	March 2025	~~here~~http://awg.aero/wp-content/uploads/2025/03/XBT-handbook-v.3-redline.pdf	~~Expansions~~Revision of ~~sections~~ 2.0 ~~(Overview of a typical XBT) and 3.3 (Issuance of ECofA); added contemplated Appendix F, G, and M checklists with hyperlinks in text~~
2025.02	September 2025	Add Link	Reference to RCX Reports (Introduction); Special Flight Permits (3.4 and Appendix D); Appendix M (Process-Oriented Workflows)

XBT HANDBOOK

As of ~~March~~September 2025

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FORWARD

By way of background, the Aviation Working Group (**AWG**)[1] was instrumental in advocating for the 39th Assembly of the International Civil Aviation Organization (**ICAO**) to approve the formation of the Cross Border Transferability Task Force (**XBT-TF**) in 2019. The XBT-TF made recommendations on simplification and global harmonization of the processes and documents used to accomplish a cross border transfer of aircraft registration and nationality (an **XBT**). The resulting guidance (**ICAO XBT Guidance**) is reflected in (i) revisions to the ICAO Airworthiness Manual (Doc. 9760); (ii) creation of a new ICAO Registration & Deregistration Manual (Doc. 10142); (iii) amendments to Annexes 6, 7 and 8; (iv) new guidance pertaining to maintenance on aircraft without registration; and (v) new guidance on baseline airworthiness criteria (in development).

This Handbook is intended to be a companion to, not a replacement or restatement of, the ICAO XBT Guidance with a view towards facilitating operationalization of the best practices outlined therein to promote XBT safety and efficiency through ~~process simplification~~a process-oriented approach and global and internal harmonization.

The XBT-TF observed that the regulatory framework, administrative processes, and documentation pertaining to XBTs had been developed when virtually all commercial aircraft[2] were purchased from their manufacturers directly by their operators who then retained ownership of and operational control over such aircraft for long periods of time. As a result, the responsibility for airworthiness oversight of an aircraft under the Chicago Convention[3] would reside with one jurisdiction[4] for most, or even all, of its useful life. XBTs were thus not common so variations in XBT processes and documentation did not present substantial safety or efficiency issues.

Deregulation of the global commercial aviation industry beginning in the 1980s changed this model in ways that greatly increased the volume of XBTs. First, deregulation incentivized commercial aircraft operators to take advantage of the substantial capital and operational efficiencies available through leasing, rather than owning, a portion of their fleets. The percentage of leased commercial aircraft

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[1] A glossary of defined terms, abbreviations and acronyms can be found at Appendix A.

[2] The ICAO XBT Guidance applies to all aircraft engaged in international air transport, including general aviation such as business jets. However, this Handbook concentrates on XBTs of large commercial aircraft arising at the end of a lease term (in accordance with its terms or pursuant to a default) where a change to the aircraft's nationality is necessitated because the successor operator will be in a new jurisdiction. This Handbook focuses on these XBTs because that set of circumstances typically involves virtually all potential XBT parties, as contrasted with, for example, an operator-to-operator lease, sublease or sale. That being said, the ICAO best practices encouraged herein would generally be applicable for an XBT of any aircraft under other XBT situations.

[3] Under the Article 13 of the Chicago Convention an aircraft in international service must be registered in a Contracting State. When a Contracting State places an aircraft on its register, it accepts responsibility to provide oversight assuring the aircraft's airworthiness subject to the terms of any applicable Article 83*bis* agreement.

[4] The Chicago Convention contemplates the change of an aircraft's registration, but an aircraft may only be on the register of one Contracting State at any time and can only be deregistered by such Contracting State.

has steadily increased and now represents approximately 50% of the global installed base. Aircraft leases typically have terms of seven to twelve years. At the end of a lease term (absent a renewal or extension) or in connection with a repossession following a lease default, the owner/lessor typically places the aircraft with, or sells it to, a new operator/lessee, often in a different jurisdiction thereby necessitating an XBT.

Second, deregulation's impetus to use aircraft assets more efficiently also led operators to lease their underutilized owned aircraft (or sublease their leased equipment) more frequently to other operators, again often in a different jurisdiction, for instance in connection with seasonal use. For instance, operator-owned aircraft are now more frequently leased among members of airline alliances or sold to new operators in connection with fleet management activities.[5]

According to a 2011 independent study by SGI Aviation commissioned by the AWG (**2011 SGI Study**), XBTs averaged 950 per annum between 2007 and 2009. Of those, 55% involved lessors and 45% were between aircraft operators. The installed base of large commercial aircraft has expanded significantly during the years since those covered by the 2011 SGI Study and the number of XBTs has grown accordingly.

The substantial increase in XBTs engendered by the financial and operational realities prompted by deregulation has made XBT process and documentation variations from jurisdiction-to-jurisdiction, and from XBT-to-XBT by a given jurisdiction, more burdensome on CAAs, lessors, and operators alike.

The 2011 SGI Study found that the substantial country-to-country variations in XBT processes, interpretations, nomenclature, and documentation in many particulars did not enhance safety and, in some cases, created potential for safety-related errors and misunderstandings, yet were creating delays, costs, and resource drains for all stakeholders, especially the importing CAA. The 2011 SGI Study estimated that, over a 20-year period, the cost of dissimilar but not safety-related regulatory requirements impacting XBTs might exceed USD 7 billion. This figure does not include funds expended by CAAs to administer such requirements and is likely to be significantly higher today due to inflation and the intervening growth in commercial airline traffic.

The complexity and lack of global harmonization of existing XBT processes and documentation would be well-justified if they led to better assurance of compliance with ICAO airworthiness standards, but the 2011 SGI Study concluded that this is not the case.[6] In fact, concerns have been raised that XBT process variability and

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[5] ICAO was visionary in recognizing that the increased prevalence of leasing had made clarification of Article 83*bis*, and adherence to its processes, more critical and convened an earlier task force to address those implications.

[6] This conclusion is analogous with the finding of a working paper submitted to the 2010 High Level Safety Conference that "many States require certificate holders to comply with similar obligations through sets of dissimilar requirements that increase the administrative and financial burden for certificate holders without any significant safety value. In addition, the multiplicity of requirements for Approved Maintenance and Training Organizations adds a significant burden to States and the industry." The working paper recommended "globally harmonized systems" of such requirements. See ICAO HLSC 2010-WP/9.

complexity is more apt to raise the probability of errors, incompleteness, and misinterpretations of aircraft records during an airworthiness assessment which, if true, has the potential to bear adversely on safety. Consequently, the recurring theme in the ICAO XBT Guidance and the commentary in this Handbook (and specifically section 5.1 and Appendix L̶M) is that fostering XBT process and document simplification and global harmonization will enhance safety and efficiency concurrently.

Against this background, Section 2.2.2(a) of the Registration Manual calls on States to be in a position "to keep pace with the dynamic nature of civil aviation" by continually adapting their applicable regulations. In the case of XBTs, the techniques of global and internal harmonization of XBT processes and documentation would be expected to enhance *safety* by a reduction of inadvertent process omissions or miscommunications. Most important, adoption of these techniques do not involve cutting corners on assessment of airworthiness or other substantive safety-related XBT steps and instead drive safety by avoiding miscommunications and accidental overlooking elements of safety-critical steps. A by-product of these techniques is the likely reduction of the personnel and financial resource burdens on CAAs, owners, and operators through the attendant process *efficiency* realized by minimizing the time during the XBT process cycle during which tasks such as reviewing aircraft records and conducting inspections are not being done at all (sometimes referred to as "dwell time" or "waiting time").

The XBT-TF mapped the XBT process in detail [see Appendix C] and identified bottlenecks and opportunities to reduce waiting time between XBT steps through simplification and harmonization. This Handbook intends to facilitate adoption of the XBT best practices cataloged in the ICAO XBT Guidance by providing supplemental commentary as well as model forms of checklists and change documents. AWG intends to identify specific opportunities for owners, operators, and specific jurisdictions to simplify and harmonize their XBT processes and documentation consistent with the XBT best practices articulated in the ICAO XBT Guidance.

On 7 December 2021, AWG released its "Statement on Cross Border Transferability of Aircraft Principles" [see Appendix B] which sets forth the guiding principles AWG recommends to facilitate XBTs while maximizing safety and efficiency. Such principles aim to encapsulate AWG's overriding objective with respect to XBTs, which is to seek alignment of international regulation, national law, and best practices with the realities of XBTs while at all times maintaining or improving the highest standards of safety through processes that both reduce regulatory overlap and duplication as well as promote consistency, accuracy and simplicity.

XBT processes have evolved rapidly and are likely to do so going forward. Accordingly, this Handbook is being published in an electronic format to accommodate regular updates to keep it current by promptly incorporating lessons learned and conveying best practices that address ambiguities or gaps revealed during experience with actual XBTs. Also, Appendices currently under development will be added as completed.

Since September 2023, AWG lessor members have submitted reports on recently completed XBTs (**RCX Reports**).   Many additions, clarifications and corrections in this Handbook reflect the information obtained from these real-time XBTs.

We look forward to working with CAAs and industry colleagues to continuously improve XBT safety outcomes through simplification and harmonization.

Jeffrey Wool
Secretary General
Aviation   Working   Group

1.0 1.0   ORGANIZATION OF THIS HANDBOOK

Increasingly, the most common XBT situation involves a non-operator owner/lessor whose lease with one operator/lessee is terminating, and the aircraft is transitioning to a new lease with an operator/lessee in a different jurisdiction. For simplicity, this Handbook presumes that each of the foregoing stakeholders acts independently in these roles, notwithstanding that, in practice, there are often overlaps or additional stakeholders. For example, an owner could also be an operator. All XBTs require involvement with an Exporting CAA and an Importing CAA, and in most cases a maintenance provider to which one or both CAAs have delegated tasks or functions and the owner/lessor and new operator/lessee have contracted to accomplish scheduled maintenance and necessary reconfigurations to conform to the new operator/lessee's fleet.

> **Unless the context requires otherwise, references to Sections or Appendices are to the sections and appendices of this Handbook. Section references underscored and highlighted in yellow are hyperlinks to the indicated sections but note that a return to the location of a hyperlink must be made manually.**

The Handbook is organized as follows:

The "Overview of a Typical XBT" [see section 2.0] section provides a high-level synopsis of the steps undertaken during an XBT, from start to finish.

The "Exporting CAA Actions: Deregistration and Export" [see section 3.0] section begins by highlighting the applicable ICAO XBT Guidance, and then examines how such guidance can be practically implemented during the deregistration and export phases. This section also discusses the applicability of the Cape Town Convention and the Geneva Convention to an XBT.

The "Importing CAA Actions: Registration and Airworthiness Assessment" [see section 4.0] section also begins by setting out the ICAO XBT Guidance on such processes and then reviews the requirements and best practices relating to submitting and processing a request to register and conducting an airworthiness assessment.

This section then examines the implications arising when an aircraft goes without registration for an extended period. The ICAO XBT Guidance encourages States to minimize the time between deregistration and a new registration during an XBT but recognizes that circumstances may necessitate a longer gap. On the recommendation of the XBT-TF, ICAO amended Annexes 7 and 8 to clarify that maintenance may be performed on aircraft without registration and has issued

guidance on the procedures to be followed when doing so [see section 4.4.1 and Appendix M].

Section 4.0 next expands on the ICAO XBT Guidance encouraging jurisdictions to reconsider any calendar age-based import restrictions in light of more current data delinking safety and aircraft age. The argument for substituting a data-driven assessment of initial airworthiness and using regulations and guidance for monitoring the condition of older aircraft is urged to be considered. This section points out that delegation and other XBT tools should reduce the resource strains which are also frequently cited as a policy justification for such import restrictions.

Pursuant to another XBT-TF recommendation, an ICAO working group is developing guidance on baseline airworthiness criteria and AWG anticipates supplementing section 4.0 with a discussion of that topic when such guidance is issued.

The "Tools to Simplify and Harmonize XBTs" [see section 5.0] section describes how advance planning and consultations, together with application of tools such as delegation of XBT tasks, use of common checklists, and harmonization of document forms, can minimize dwell time and thereby enhance safety. The next portions of this section cover use and acceptance of electronic documents and the XBT-TF's recommendation to develop a digital platform on which to conduct XBTs (either as a standalone application or as an element of a platform for aviation-based transactions of other types).

Finally, this Handbook has built, and will continue to build, a set of appendices and links to model documents, checklists, and other materials relevant to XBTs and the other covered subjects.

2.0 2.0   OVERVIEW OF TYPICAL XBTS

2.1   2.1 Base Case

As depicted in Appendix C[7], a flowchart prepared by the XBT-TF and incorporated into Section 6.1.5 of the Registration Manual, an XBT of an aircraft at the end of lease (whether in accordance with its terms or in connection with the exercise of remedies by the lessor or other creditor following a lease default) ordinarily consists of the following steps:

- Ascertainment by the Owner, relinquishing operator, new operator and engaged AMO(s) of the XBT requirements of the Exporting State and Importing State [although in many respects this step has the greatest impact on how efficiently an XBT proceeds, it is not reflected as a separate step in the Appendix C flowchart; however, its criticality and practices to realize the potential benefits from advance planning and consultations are described in section 5.3]
- Request to deregister by the Owner or prior operator (depending on the nature of the Exporting State's registry and the circumstances of lease termination) or by the holder of an IDERA [see section 3.1]
- Review of the request by the Exporting CAA [see section 3.2]
- If requested by the applicant, issuance by the Exporting CAA of an export certificate of airworthiness [see section 3.3]
- If requested by the applicant, issuance by the Exporting CAA of a special flight permit [see section 3.4]
- Deregistration of the aircraft by the Exporting CAA [see section 3.5]
- If necessary, physical exportation of the aircraft from its then location to another jurisdiction [see section 3.6]
- Issuance of a certificate of deregistration by, and other post-deregistration administrative actions of, the Exporting CAA (often accomplished separately but contemporaneously with, but not as a condition to, exportation) [see section 3.7]
- Application for registration by the Owner or New Operator (depending on the nature of the Importing CAA's registry) and review by the Importing CAA [see section 4.1]
- Registration of the aircraft by the Importing CAA, issuance of a certificate of registration, and completion of other post-registration administrative actions by the Importing CAA (often accomplished separately but contemporaneously with, but not as a condition to, issuance of the certificate of registration) [see section 4.2]
- Separately, but normally in parallel, an airworthiness assessment of the aircraft and issuance of a certificate of airworthiness by the Importing CAA [see section 4.3]

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[7] The items on the flowchart marked as "Denotes Current Process Which is Under Review" relate to then pending changes to the form of ECofA which have since been implemented. See discussion at Section 3.3.3 *(Revised ECofA form facilitates use).*

2.2

2.2 ~~2.2~~ Sequencing; Transition States

2.2.1. Sequencing

The indicated sequence of steps set forth in section 2.1 is not necessarily chronological. For example, in many instances an ECofA application to the Exporting State is made concurrently or even before an application for de-registration is submitted.   Likewise, registration and airworthiness certification applications made to the Importing State often occur while actions of the Exporting State are still in progress.

Data from actual XBTs completed by AWG members indicates that launching the exporting and importing steps on a more or less concurrent basis will expedite the XBT overall process by facilitating and encouraging real time consultations between and among the Exporting and Importing CAAs, the outgoing and incoming operators, and any CAMOs and MROs that are involved.

2.2.2. Transition States

A transfer of aircraft nationality from one jurisdiction to a "final" jurisdiction frequently includes a temporary registration in a Transition State.   For example:

- an aircraft is to be de-registered in connection with a repossession following a default before a new operator (and thus the new State of Registry) has been identified
- a new operator has been identified but is not prepared to accept the aircraft immediately following the expiration of a prior lease or repossession
- a new operator is identified and ready to accept the aircraft but such operator's State of Registry prefers or requires that the aircraft first has a certificate of airworthiness and/or ECofA from a State of Registry other than the initial Exporting State

The Transition State is thus an Importing State following de-registration by the first Exporting State and then becomes the Exporting State when the aircraft is transferred to the ultimate State of Registry.

When these situations arise it is important that at any given stage in the process the aircraft has a State of Registry so at all times there is a clear airworthiness regime against which any necessary preservation, restoration or alterations can be made (see section 4.2.2, including the discussion there of alternatives that in some cases would allow the ultimate State of Registry to accept the aircraft on its register on a contingent or other basis).

Jurisdictions commonly used as Transition States, in no particular order:

- *Austria* – has published very detailed and clear guidance on how it conducts XBTs so the process is reported to move smoothly and its ECofAs are well-regarded among other EASA countries; also has numerous Article 83bis agreements with other countries giving it familiarity with their airworthiness regimes
- *Ireland* – considered experienced and well-regarded
- *Malta* – growing XBT volume appears to be leading to increasingly efficient and well-regarded transition XBTs
- *Channel Islands Aircraft Registry (Guernsey; 2-REG)* – launched in 2013; a good description can be found here and on the 2-REG website
- *United States* – although not the fastest registration process, its airworthiness assessments and ECofAs are widely accepted
- *Others:* Bermuda, San Marino, Cayman Islands and Isle of Man

3.0 ~~3.0~~ 3.0 EXPORTING CAA ACTIONS: DEREGISTRATION AND EXPORT

3.1 ~~3.1~~ Request to deregister

ICAO XBT Guidance:

Registration Manual, Chapter 5 (*Deregistration of Aircraft*), Section 5.2.1 (*Request to deregister*)

Registration Manual, Appendix E (*Application Form to Deregister an Aircraft*) and Appendix F (*Checklist for Deregistration of Aircraft*)

An XBT begins with submission of an application to request deregistration of the applicable aircraft (sometimes styled as a request for cancellation of registration). Appendix E to the Registration Manual is an optional form of such an application but Section 5.2.1 of the Registration Manual notes that the information requested by any particular Exporting CAA may vary from one State to another. The party submitting a request should take care to use the applicable form and consult with the Exporting CAA to confirm how each item is to be answered and whether any backup will be required.

In the interest of simplification and global harmonization, a CAA should strongly consider adoption of the form in Appendix E to the Registration Manual, but in all events should assure that any differences are disclosed in its regulations and are called to the attention of an applicant during advance consultations (see section 5.3 and Appendix E).

3.2 ~~3.2~~ Processing the request to deregister

3.2.1 ~~3.2.1~~ Checklist of requirements

ICAO XBT Guidance:

Registration Manual, Appendix F (*Checklist for Deregistration of Aircraft*)

Appendix F to the Registration Manual is an indicative checklist of requirements to be fulfilled as conditions to deregistration, reflecting the most common set of requirements. For the reasons discussed in Section 5.1 (see section 5.1), CAAs are encouraged to adopt this checklist, supplemented as necessary to make clear any national requirements that differ from the international standard (see the examples mentioned in the footnotes to such Appendix F). A CAA should highlight in its published procedures for deregistration any documents or actions that (i) are in addition to those listed on the indicative checklist, (b) must be met using specific or unique forms, or (c) require significant lead time to arrange. Such jurisdiction-specific items should also be raised during the XBT advance planning and consultations recommended in section 5.3 and Appendix E.

A deregistration process based on the indicative checklist with any national deviations or special requirements clearly delineated and transparent to applicants would benefit the Exporting CAA and applicants by promoting consistency in processing XBTs from application-to-application and mitigate the risk of steps or items being overlooked or completed improperly even as personnel may change between XBTs. Section 5.1 explains why national deviations should nevertheless be reconsidered where feasible to realize greater global harmonization of XBT processes and procedures.

3.2.2 ~~3.2.2~~ Cape Town Convention considerations

ICAO XBT Guidance:

Registration Manual, Section 1.3 (*Convention on International Interests in Mobile Equipment and the Protocol to the Convention on international Interests in Mobile Equipment on Matters Specific to Aircraft Equipment*); Section 4.2 (*Irrevocable De-Registration and Export Request Authorization (IDERA) and Certified Designee Confirmation Letter (CDCL)*); and Chapter 5 (*Deregistration of Aircraft*), Section 5.1.3 (*Review of the request by the aircraft registration office*)

Additional Cape Town Convention Guidance:

Goode, Sir Roy. Official Commentary, Fifth Edition (2022), on the *Convention on International Interests in Mobile Equipment and Protocol Thereto on Matters Specific to Aircraft Objects* (**CTC Official Commentary**) includes reproductions of the Cape Town Convention (Appendix I) and the CTC Aircraft Protocol[78] (Appendix II). The CTC Official Commentary can be purchased at https://www.unidroit.org/wp-content/uploads/2024/04/OC-Aircraft-Revised-Fifth-Edition-2024-Order-Form.pdf

AWG Legal Advisory Panel, **Civil Aviation Authorities' Guide to the Cape Town Convention and Aircraft Protocol**, which can be found here: https://awg.aero/wp-content/uploads/2023/08/Civil-Aviation-Authorities-Guide-to-the-Cape-Town-Convention-and-Aircraft-Protocol-AWG.pdf

Several sections of the Registration Manual provide guidance on the deregistration process applicable to a CTC CAA. Section 1.3 of the Registration Manual provides a general overview of the Cape Town Convention. The additional reference materials noted above provide important additional guidance on the responsibilities of a CTC CAA to assure Cape Town Convention compliance. Appendix K is a compilation of CTC provisions relevant to XBTs.

Section 4.2.1 of the Registration Manual states that CTC CAAs must have procedures to allow the submission and recording of an IDERA in the CAA's

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[78] Note that the Registration Manual defines the CTC Aircraft Protocol only by way of the definition of the Irrevocable De-registration and Export Authorization (IDERA).

records. An IDERA identifies an authorized party who may also submit to the CTC CAA a CDCL transferring to a specified entity or person the right to deregister and export the aircraft covered by the IDERA. An IDERA and any related CDCL must be properly recorded if the CTC CAA's due diligence requirements specified in such Section are satisfied.

Upon submission of a request to deregister an aircraft, the CTC CAA "needs promptly to determine whether an IDERA and any related CDCL are recorded for the concerned aircraft" (Section 5.1.3.1 of the Registration Manual). The CTC CAA must search both its own registry as well as the Cape Town Convention International Registry (**CTC IR**) to determine whether an IDERA relating to the aircraft in question is outstanding. Any CAA (not just CTC CAAs) may establish a free account with the CTC IR and make searches at no charge. An applicant should conduct its own search of the CTC IR and call any IDERA or CDCL to the attention of the CTC CAA, but this would not relieve the CTC CAA of its primary responsibility for that determination.

Section 5.1.3.2 of the Registration Manual next provides that if an IDERA respecting the applicable aircraft is identified in such searches, the CTC "needs to confirm promptly that the applicant is the authorized party identified in the recorded IDERA or the certified designee identified in a related recorded CDCL, if any." The term "certified designee" is defined in the Glossary of the Registration Manual as "an entity or person named in a designation as the certified designee under an [IDERA]." A CTC CAA should publish in its regulations the basis on which it will make such confirmation (e.g., acceptable documentary evidence).

Articles IX(5), X(6), X(7), XI(8)(b) and XIII(3) of the CTC Aircraft Protocol set forth obligations applicable to CTC CAAs. Guidance on such obligations can be found in the CTC Official Commentary and, when released, the CAA guidance referred to in footnote 8.

Additional Cape Town Convention obligations relating to physical exportation of a deregistered aircraft are discussed in Section 3.6 (Exportation).

3.2.3 3.2.3 Geneva Convention considerations

ICAO XBT Guidance:

Registration Manual, Chapter 1 (*Overview of the Relevant International Treaties*), Section 1.2 (*Convention on International Recognition of Rights in Aircraft*); and Chapter 5 (*Deregistration of Aircraft*); and Chapter 5 (*Deregistration of Aircraft*), Section 5.1.4 (*Review of the request by the aircraft registration office*)

Section 1.2 of the Registration Manual provides background information on the Geneva Convention and Section 5.1.4 sets out guidance on the application of the Geneva Convention applicable to CAAs that are not CTC CAAs but whose jurisdiction is a party to the Geneva Convention.

3.3 ~~3.3~~ Issuance of export certificate of airworthiness (ECofA)

ICAO XBT Guidance:

Registration Manual, Chapter 5 *(Deregistration of Aircraft)*, Section 5.1.4 *(Export certificate of airworthiness)*

Airworthiness Manual, Part III, Chapter 6 *(Airworthiness Approval for Export),* including Attachments thereto and Part V, Chapter 7 *(Issuance of an Export Certificate of Airworthiness).*

3.3.1 ~~3.3.1~~ General

Applications for an ECofA are separate from the application process for deregistration. This is also the case regarding special flight permits discussed in the following section. Applicants for deregistration should file these applications with or before filing for deregistration (see discussion at Section 2.2.2 *(Sequencing)*).

The SARPs do not currently require an Exporting CAA to issue an ECoFA but Annex 8 of the Chicago Convention notes that:

> "Contracting States facilitate the change of aircraft onto the register of another State by the issue of an export certificate of airworthiness or similarly titled document. While not valid for the purpose of flight, such a document provides confirmation by the exporting State of a recent satisfactory review of the airworthiness status of the aircraft."

The final sentence is an important reminder to the Exporting CAA to carefully assess the results of their aircraft review. For that reason and the analysis in the following two subsections, CAAs are strongly encouraged to issue an ECofA when requested by an owner, an operator or another State. The AIRP has requested the XBT-TF to monitor use of ECofAs over the next few years and make a recommendation as to whether issuance of an ECofA should be made mandatory.

3.3.2 ~~3.3.2~~ ECofAs promote safety and efficiency

Data from XBTs completed by AWG members indicates a strong correlation between issuance of an ECofA and the smoothness of the applicable Importing CAA's registration and airworthiness assessment processes. Most Importing CAAs either require or strongly prefer having an ECofA as a data point in their airworthiness assessment of an aircraft. For example, in the case of a used aircraft proposed for importation and registration, EASA requires "a statement by the competent authority of the State where the

aircraft is, or was, registered reflecting the airworthiness status of the aircraft on its register at time of change."

3.3.3

3.3.4 ~~3.3.3~~ Revised ICAO ECofA form facilitates use

Historically, an impediment to an Exporting State's inclination to issue an ECofA was a previous requirement in the ICAO-recommended form of ECofA that called for an Exporting CAA to certify that the aircraft "is in compliance with [any] requirements of the importing State" or note exceptions. The ICAO XBT-TF concluded that this requirement was a legacy from when operators typically acquired aircraft directly from an OEM such that it was helpful for the Importing State to know that the aircraft complied with the airworthiness standards of its country of manufacture and was in a condition for safe operation when exported to its intended State of Registry. OEMs were in a good position to assist the CAA of the country of manufacture (acting as the Exporting State) to identify deviations from the airworthiness regime of the applicable Importing State.

Today, an Exporting CAA may not have familiarity with every other State's airworthiness regime, so this requirement no longer makes sense or provides useful and reliable information. Also, speedy and secure communications are now prevalent such that Exporting and Importing States can readily consult if there are questions.

Accordingly, this certification provision was approved for deletion in the 5th Edition of the Airworthiness Manual such that Part III, Section 6.1.2 of the Airworthiness Manual now states that (except as noted in the following paragraph) the Exporting CAA's undertaking in an ECofA is limited to confirmation that as of a given date the aircraft conforms to the Exporting State's approved type design and is in an acceptable airworthiness condition: "in effect, that if the aircraft were to remain on the aircraft register of the Exporting State, it would continue to qualify for the continuance of its Certificate of Airworthiness."

Note that the ICAO XBT Guidance permits an ECofA to address whether the aircraft complies with the requirements of an Importing CAA if the exporting and importing states have agreed to such an arrangement in a BASA.

3.3.5 ~~3.3.4~~ Dealing with ECofA exceptions

As outlined in subsection 3.1.1, an ECofA confirms that an aircraft complies with its approved type design and meets the airworthiness requirements of the Exporting State. In essence, it signifies that the aircraft would remain eligible for a CofA if it were to remain on the Exporting State's register. Although an ECofA is typically issued without exceptions, certain deviations, such as deferred maintenance defects, may be permitted under the Exporting State's airworthiness regulations. Some Importing States may prefer an ECofA without exceptions, but it is the responsibility of the Importing State to assess whether any listed exceptions constitute deviations from its own type design and airworthiness criteria.

If the Exporting and Importing States have agreed, through bilateral agreements or other means, that the ECofA attests compliance with the requirements of the Importing State instead of compliance with the requirements of the Exporting State, then the Importing State shall make available to the Exporting State any specific certification requirements they may have in place, in addition to those adopted or required by the Exporting State. With the agreement of the Importing State these may be listed as exceptions on the ECofA.

In general, unless there are definitive reasons why an aircraft would not be eligible for an Importing State CofA — such as the absence of a Type Certificate for the aircraft type, placement of the aircraft on the Importing State's register, even provisionally, should not be contingent upon immediate CofA eligibility. As outlined in subsection 4.2.2 (*Minimizing time between registrations*), prompt registration facilitates the aircraft's transition to an airworthy condition under the oversight of the Importing State.

3.3.6 ~~3.3.5~~ Post-deregistration issuance of ECofAs

Many jurisdictions take the position that an ECofA cannot be issued after the aircraft has been removed from the Exporting State's registry[89]. However, the SARPs do not appear to have any controlling prohibition against doing so. Nor does logic prevent issuance of the ECofA that speaks only "as of" the most recent pre-deregistration date on which the Exporting CAA would have been prepared to issue an ECofA.

This issue may be especially impactful when a deregistration is requested by the holder of an IDERA as such deregistration and related export are frequently sought on a time-sensitive basis precisely to preserve the aircraft's airworthiness condition from being compromised due to the financial condition of the operator.

The applicable language of Annex 8 states that an ECofA only "provides confirmation by the exporting State of a *recent* satisfactory review of the airworthiness status of the aircraft" (emphasis added) and does not speak to any later date, whether before or after deregistration. Thus, the better view is that an Exporting State can issue an ECofA after removal from its register so long as the certification is stated to be "as of" a date on which the aircraft was still on the State's register and thus subject to such State's oversight. This is a matter that should be considered when the XBT-TF is next reconvened.

~~3.3.6~~ 3.3.7 Adherence to ICAO XBT Guidance procedures for issuance

Strict adherence to the requirements of the ICAO XBT Guidance promotes global process harmonization which in turn prevents interruptions, misunderstanding and errors during the XBT process. This principle is acutely applicable to the ECofA process.

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[89] This issue also applies to issuance of special flight permits discussed in the following Section.

The ICAO XBT Guidance ~~clearly~~ supports the ~~notion~~principle that reviews conducted during the issuance of an ~~Export CofA~~ECofA should be limited to the specific airworthiness requirements that are directly relevant to the certificate's purpose. The guidance encourages a streamlined and focused approach to ensure that the ~~Export CofA~~ECofA process is efficient and effective. Imposing requirements or reviewing items that are not part of the standard criteria for an ~~Export CofA~~ECofA can lead to inefficiencies ~~and potential disputes between the exporting and importing authorities. Additionally, it ensures that the process remains focused on the key criteria necessary for the safe transfer of the aircraft.~~.

Part III, Chapter 6 of the Airworthiness Manual describes the procedures to be followed by an Exporting CAA in connection with the issuance of an export certificate of airworthiness. Attachment A to Chapter 6 (*Content of Application for an Export Certificate of Airworthiness*) is, by its terms, an "Example only" and notes that the application "must be accompanied by all necessary supporting documents." Attachment B to Chapter 6 of the Airworthiness Manual (*Guidance for Processing an Application for an Export Certificate of Airworthiness*) includes general guidance as well as checklists for processing and, if conducted, inspections.

Attachments A and B will be updated in the 5th Edition of the Airworthiness Manual to provide more specific guidance, but will still, by their terms, be examples only, and no further detail will be proposed for the supporting documents referenced in Attachment A. XBT ~~simplification and~~global harmonization would benefit from development of a specific form and format of such application and a comprehensive list of such supporting documents, including their form, format and any other specific process matters such as notarization. In the meantime, CAAs can enhance their own XBT processes by posting or otherwise making available to applicants (i) a set form of application with specifics as to necessary supporting documents and (ii) a detailed description of the process steps to be followed before issuance of an export certificate of airworthiness.

Although the Exporting State is not required to conduct an inspection as part of processing an application for an ECofA, the applicant should indicate the aircraft's location in its application so arrangements can be expedited should the Exporting State deem an inspection necessary. As this could possibly involve substantial lead times, the applicant and Exporting CAA should discuss whether an inspection will be required and, if so, agree on the associated logistics during their XBT consultations to assure meeting the desired deregistration timetable [see Appendix E; Appendix ~~I~~J notes countries where scheduling inspections may often involve particularly long lead times].

~~3.3.7~~ 3.3.8   CTC considerations

Even if an Exporting State's XBT procedures normally mandate issuance of an ECofA as a condition of exporting a de-registered aircraft, a State that is a party to the CTC may <u>not</u> condition deregistration or export on provision of an ECofA if the deregistration is at the request of an IDERA holder. This stipulation also applies to issuance of a special flight permit.

3.4   ~~3.4~~ Issuance of a special flight permit (SPF)

ICAO XBT Guidance:

<u>Airworthiness Manual</u>, Part III, Chapter 5 *(Approvals for Special Flights)*

Once an aircraft has been deregistered, the Exporting CAA no longer has authority to issue a special flight permit (SPF). The processes and procedures for issuance of ~~a special flight permit~~an SPF are set forth in the cited ICAO XBT Guidance. A **draft** discussion on SPF is also set forth in Appendix D [add link].

Particularly if the aircraft is to be ferried to a location in another jurisdiction for accomplishment of maintenance, repair or inspections required by the Exporting CAA, the Importing CAA, or a New Operator, the parties should assess whether and when any ~~flight permits~~SPFs may be needed and agree on the process, documentation, and timing for obtaining same (see section 5.3 and Appendix E).

Attachment A to Chapter 5 of the Airworthiness Manual *(Content of Application Form for a Special Flight Approval/Authorization Permit)* is, by its terms, an "Example only" and notes that the application "must be accompanied by all necessary supporting documents." Consideration should be given to development of a specific form and format of such applications and a comprehensive and specific list of necessary supporting documents, including their form, format and any other specific process matters such as notarization.

Note that issuance of a special flight permit may be granted even if the aircraft is not technically airworthy but is determined to be safe to fly, subject to any conditions and limitations that may be listed such as altitude and routing. This can be important in situations where a flight is required to relocate the aircraft to a place where defects can be remedied.

3.5 ~~3.5~~ Deregistration of the aircraft

ICAO SARP:

Annex 7, Sections 7.2 (*Register of Nationality, Common and Registration Marks*) and 9 (*Deregistration)*

ICAO XBT Guidance:

Registration Manual, Chapter 5 (*Deregistration*), Section 5.1.5

When all the foregoing matters have been dealt with satisfactorily, the aircraft should be ready for deregistration and completion by the Exporting CAA of the post-deregistration matters described in the following sections. Note that the deregistration itself can be completed before such post-deregistration items have been accomplished, though priority should be given to issuance of a certificate of deregistration.

3.6 ~~3.6~~ Exportation

Cape Town Convention Guidance:

CTC Official Commentary, Part 3 (*A Review of the Aircraft Protocol*), Paragraphs 3.31 to 3.38 (*De-registration and export and physical transfer*)

The exportation stage of an XBT is a separate and distinct process from deregistration. Although related, they are two separate processes and any concerns or issues relating to an exportation should not (and, in the case of a CTC CAA when a deregistration is requested pursuant to an IDERA, may not) delay the process of deregistration. In particular, see the second paragraph of Section 3.7.3.

An aircraft may not necessarily be physically in its State of Registry at the time of deregistration, especially when deregistration has occurred at the end of a lease term (for example, the aircraft may then be located at an AMO in a different jurisdiction) or in connection with a deregistration pursuant to an IDERA. As such, in order to minimize delays in the exportation process, the country in which the aircraft is located should be included in any coordination   efforts.

3.7 ~~3.7~~ Post-deregistration actions

3.7.1 ~~3.7.1~~ Issuance of certificate of deregistration by Exporting CAA

ICAO SARP:

Annex 7, Section 9 (*Deregistration)*

ICAO XBT Guidance:

Registration Manual: Sections 5.4 (*Export Certificate of Airworthiness)* and 5.5 (*Aircraft Deregistration)*

Section 5.5.1 of the Registration Manual requires the Exporting CAA to send a written confirmation to the applicant once a deregistration has taken place or issue a certificate of deregistration to the applicant.

A 2022 amendment to Annex 7 of the Chicago Convention established a certificate of deregistration with effect on and after 2 November 2023. An Exporting CAA is not required to issue a certificate of deregistration but if it does a replica of the form set forth in Figure 2 of Annex 7, Section 9 must be used, though the size of the form is at the discretion of the Exporting CAA. Section 5.5.2 of the Registration Manual includes the requirement for inclusion of an English translation if the original is issued in a different language.

Section 5.4.2 of the Registration Manual notes that the process of issuance of a certificate of deregistration is separate from the process of issuance of an export certificate of airworthiness and should be managed separately by the applicant and the Exporting CAA. Note that an Exporting State has authority to undertake other obligations under the Article 21 of the Chicago Convention, but the application process for a certificate of deregistration is also separate (see Section 2.1.5).

To advance the safety and efficiency benefits derived from harmonizing XBT processes and forms described in the Forward, CAAs are strongly encouraged to adopt the practice of issuing certificates of deregistration as soon as practicable. In its 24 August 2020 State Letter to Contracting States recommending adoption of the amendment, the ICAO Air Navigation Commission noted that:

> "inclusion of the certificate of deregistration in annex 7 would, inter alia:
>
> (a) harmonize the current practice and facilitate the change of an aircraft from one State to another. A number of States require proof of aircraft deregistration prior to registering it.

Currently the proof of deregistration is provided in a form of a notice or certificate from the former State of Registry. The information in such notice or certificate is not standardized and may be ambiguous, which may lead to delays in registration. The introduction of the certificate of deregistration would allow States to provide information in a consistent manner and avoid ambiguities; and

(b) be a useful tool to foster transparency and consistency in the exchange of aircraft ownership data between States, pursuant to article 21 of the Chicago Convention. There are several aircraft registration systems prevailing around the world. For some States, the basis of registration of aircraft is ownership, for others - operator. The certificate of deregistration would allow a speedy access to credible data concerning the ownership of aircraft."

The ICAO AIRP has requested its Working Group 1 to advise, after monitoring usefulness for several years following the effective date, whether States should be required to issue certificates of deregistration.

3.7.2 ~~3.7.2~~ Other post-deregistration actions by the Exporting CAA

Section 5.5.6 of the Registration Manual notes that the Exporting CAA must notify the appropriate regional monitoring agency (**RMA**) of the deregistration of an aircraft and summarizes the safety rationale for such requirement. Information about RMAs and RMA notification forms can be found in ICAO's *Manual of Operating Procedures and Practices for Regional Monitoring Agencies in Relation to the Use of a 300 m (1,000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive* (Doc 9937).

Section 5.5.7.1 of the Registration Manual reminds the Exporting CAA that its aircraft register must be updated to reflect a deregistration.

3.7.3 ~~3.7.3~~ Post-deregistration actions or undertakings by the owner/applicant

In the case of a deregistration where there is no IDERA, Section 5.5.3 of the Registration Manual requires that, <u>at the time of deregistration</u>, the applicant must (i) remove registration and nationality marks, identification plate, and the 24-bit aircraft address from the aircraft and (ii) return to the Exporting CAA the originals of the certificate of registration, certificate of airworthiness, noise certificate, and such additional documents as may be required by national law.

By contrast, when a deregistration has occurred at the request of an IDERA holder, Section 5.5.4 of the Registration Manual notes that the Exporting CAA may only require (as a condition to <u>export</u>, but not <u>deregistration</u>) an undertaking by the IDERA holder's authorized party (acting through its certified designee, if any) to take action "<u>within its power</u>" and only "<u>as soon</u>

<u>as practicable</u>" to accomplish the matters described in the preceding sentence, and once such an undertaking is provided, the aircraft may be physically exported by the IDERA holder.

4.0 ~~4.0~~ IMPORTING CAA ACTIONS: REGISTRATION & AIRWORTHINESS ASSESSMENT

4.1 ~~4.1~~ Application for registration

4.1.1 ~~4.1.1~~ Pre-application phase

ICAO XBT Guidance:

Registration Manual, Chapter 4 (*Registration of Aircraft*), Section 4.1.4 and Section 4.1.5 (*Pre-application phase*)

The process for registering an aircraft in a new jurisdiction in connection with an XBT is not materially different from a registration in connection with importation of a new aircraft being delivered from its manufacturer or a change of the Owner or operator without changing the State of Registry. However, until global XBT processes and documentation have been simplified and made more harmonized, parties to an XBT are well-advised "to study and seek clarity on registration and other requirements of an intended State of Registry" in advance of initiating the XBT process as recommended by Section 4.1.5.1 of the Registration Manual.

The Registration Manual suggests certain simplification and harmonization steps that can be taken by Importing CAAs (Section 4.1.5.2) and applicants for registration (Section 4.1.5.3). Because this guidance applies equally to the deregistration process, this Handbook consolidates applicable planning and consultation best practices in Section 5.3 (*Advance Planning and Consultation*), Appendix E, and the applicable checklists in the Appendices.

4.1.2 ~~4.1.2~~ Submission of registration application and supporting documents

ICAO XBT Guidance:

Registration Manual, Chapter 4 (*Registration of Aircraft*), Section 4.1.6 (*Submission of the Application*) and Appendix C (*Application Form for a Certificate of Registration*)

Section 4.1.6 of the Registration Manual provides a good overview of the application process and offers a recommended, but not required, form of application in its Appendix C. Adoption of the recommended application form is arguably one of the simplest global harmonization steps available to be taken by CAAs. A CAA that for whatever reason does not use the recommended application form should make certain its preferred alternative form is readily available and that applicants are made aware of it during consultations.

Section 4.1.6.3 of the Registration Manual lists numerous supporting documents that an applicant "<u>may</u> be required to submit" (emphasis added) along with a registration application. However, a given Importing CAA may require supporting documents not on such list and/or not require all the listed documents. In addition, although the list notes various documents to show "proof" or "evidence" of various things, States differ in what constitutes satisfactory documentation.   CAAs should provide applicants with a comprehensive list of required supporting documents and detailed guidance about relevant requirements regarding required or acceptable document formats, timing, sources, and certifications.   This is another area where global harmonization on the specifics of such documentation would simplify the XBT process and enhance safety outcomes.   In the meantime, these details should be carefully discussed and agreed as early as possible during consultations (see ==section 5.3== and ==Appendix E==, which will be regularly updated to promote harmonization regarding what documents should accompany a registration application in an XBT context and their form, content, source and means of validation (generally certifications and signatures of authorized parties today but potentially moving to blockchain validation in the future)).

4.1.3 ~~4.1.3~~ Document evaluation and assessment

ICAO XBT Guidance:

<u>Registration Manual</u>, Chapter 4 (*Registration of Aircraft*), Section 4.1.7 (*Document Evaluation and Assessment*) and ==Appendix D== (*Checklist for Registration of Aircraft*) and Section 4.1.8.1 (*Registration of Aircraft*)

Once the registration application and supporting documentation have been submitted, the Importing CAA will conduct a detailed examination and verification to ensure that all requirements of the applicable national laws and regulations have been met.

Section 4.1.7.1 of the Registration Manual suggests using a checklist for this purpose, consistent with the view of the XBT-TF that checklists facilitate making such evaluations complete and consistent.   Appendix D of the Registration Manual is an example of such a checklist but would need to be substantially supplemented by the Importing CAA to incorporate any additional national requirements.[9][10]   Creation and use of such a checklist would also promote XBT-to-XBT consistency by a given Importing CAA by serving as a repository of institutional knowledge and best practices regarding its own XBT process. The resulting completeness and consistency should promote safety outcomes as well as efficiency, especially if XBTs are

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[9][10] Note that items 6 and 7 in this checklist may be in error. Item 6 may have been intended to read "Has the aircraft serial number specified on the data plate been inspected to ensure accuracy" and Item may have been intended to read "Has the identification plate been inspected to ensure that it is inscribed with the nationality and registration marks and secured to the aircraft in a prominent position near the main entrance in accordance with the criteria of the State." AWG has requested ICAO to review this item in connection with the next update of the Registration Manual.

not regularly conducted in the particular jurisdiction or in any jurisdiction where the personnel conducting XBT reviews change from time to time. A checklist would also help identify steps that could benefit from being delegated to third parties (see section 5.4) or being noted during pre-XBT consultations (see section 5.3 and Appendix E).

4.2   ~~4.2~~ Registration of aircraft and related administrative actions

4.2.1   ~~4.2.1~~ General

ICAO XBT Guidance:

Registration Manual, Section 4.1.8 (*Registration of Aircraft*)

Section 4.1.8 of the Registration Manual describes the actions to be taken by the Importing CAA once it has determined that the registration application form and all required documents comply with applicable laws and regulations. These actions include, among other things, assigning nationality and registration marks to the aircraft, updating the aircraft register, issuing a certificate of registration to the applicant, and assignment of a new 24-bit aircraft address.

Each of these items is commented on in this Section of the Handbook, but parties should note that the order in which these and other related administrative actions by the Importing CAA are done may vary from State to State, so the relevant sequence and any actions to be taken, or documents to be provided, by the applicant or others should be identified, and responsibility for addressing each assigned, during the XBT the planning and consultation process (see section 5.3 and Appendix E).

4.2.2   ~~4.2.2~~ Minimizing time between registrations

ICAO XBT Guidance:

Registration Manual, Section 4.1.3

Section 4.1.3 of the Registration Manual emphasizes that the "registration process is separate from obtaining a certificate of airworthiness" and there are sound safety and administrative reasons for placing an aircraft on a register as promptly as possible.

For a variety of reasons, a time gap of some duration is likely to occur between deregistration and registration of an aircraft. For instance, a time gap of only a few minutes or hours may occur due to time zone differences or the time needed for an Importing CAA to execute its final registration procedures. A time gap of several days or longer may occur if the Exporting CAA is obligated to conclude deregistration before a new State of Registry has been identified or completed its assessment of the aircraft's registration application.

Even though the processes for registration and assessment of airworthiness are intended to be separate, some Importing CAAs will delay registration pending completion or substantial completion of its airworthiness assessment. An Importing CAA should resist delaying registration in such circumstances as the ICAO XBT Guidance notes that placing an aircraft on a

registry does not require or guarantee that the aircraft will be deemed airworthy. Further, an Importing CAA can address its concerns by issuing a temporary or provisional registration instead of delaying registration pending an airworthiness determination. A greater than nominal gap in the registration of an aircraft may create airworthiness issues, over and above impacts on the aircraft's value. As such, the gap should be limited as much as possible.

Depending on the circumstances for the deregistration and the cooperation between an exporting state and the importing state, there may be a window of time during an XBT in which an aircraft has been de-registered by the exporting State but not yet re-registered by the importing State. In such a scenario, the assessment of the airworthiness status of an aircraft without registration may be more complex and may create further difficulties for the issuance of the certificate of airworthiness because no State is responsible for such aircraft in accordance with the Chicago Convention and applicable Annexes. An aircraft cannot obtain a certificate of airworthiness without being registered, so an aircraft without registration cannot be operated and its maintenance needs are difficult to define and any maintenance performed will be more difficult to assess.

At the same time, an aircraft without registration face complications and delays securing confirmation of its airworthiness by the Importing CAA if the aircraft must be moved to accomplish necessary inspections, modifications, or repairs. As noted in Section 3.4, once the Exporting CAA has completed deregistration it can no longer issue special flight permits yet Section 4.1.5.4 of the Registration Manual observes that an applicant in the Importing State may need non-revenue special flights or authorizations to overfly or land in other States' territory in connection with the XBT. Delays associated with obtaining necessary approvals in these situations will result in "dwell time" which prevents or limits progressing completion of the XBT processes while adding costs without enhancing safety, and potentially compromising it.

These are important reasons for the parties to promote simplification and global harmonization of XBT processes and use the planning, consultation, delegation, and other tools outlined in Section 5 of this Handbook and the ICAO XBT Guidance.

4.2.3   4.2.3 Issuance of certificate of registration

ICAO XBT Guidance:

Registration Manual, Section 4.1.8.4 (*Certificate of registration*)

Section 4.1.8.4.1 of the Registration Manual states that a "certificate of registration, in wording and arrangement, shall be a replica of the certificate shown in Annex 7."

The form of certificate of registration in Annex 7 was revised effective 18 July 2022 with applicability as of 26 October 2023. The revision addressed a

concern arising from the growth of leasing and subleasing aircraft ~~because of deregulation of the commercial aviation industry~~ (see discussion in the Forward) as a result of which the "owner" of an aircraft ~~may not always be~~is increasingly less likely to its "operator" as had been the case prior to deregulation. ~~Many~~Also, many jurisdictions organize their registers by operator~~, often making~~ which can make it difficult to ascertain the owner of the applicable aircraft quickly. The new form may be adopted before the 2026 mandatory applicability date. Where an Owner is a trust, the applicable individual should be identified "as trustee" (e.g., "ABC Bank, as trustee").

Section 4.1.8.4 of the Registration Manual provides other important information and guidance with respect to certificates of registration.

4.2.4 ~~4.2.4~~ Assignment of the 24-bit aircraft address

ICAO XBT Guidance:

Registration Manual, Section 4.1.8.5 (*Assignment of the 24-bit aircraft address*)

Section 5.1.5.5 of the Registration Manual notes that "the new State of Registry is required to assign a new 24-bit aircraft address from its own allocation address block and the newly-assigned address must be entered into the aircraft's CNS equipment."

Section 4.1.8.5 of the Registration Manual provides detailed guidance regarding the issuance of a new 24-bit aircraft address (note that ICAO documents sometimes use "aircraft address" or "Mode S address" interchangeably with "24-bit aircraft address"). This Handbook cannot add to that guidance, but draws the attention of XBT parties to Section 4.1.8.5.3 of the Registration Manual which explains the safety risks associated with completing this task simultaneously with registration or with a minimal time gap because an XBT has been identified as the most commonly observed situation giving rise to an aircraft having an incorrect 24-bit aircraft address which "can jeopardize flight safety and undermine the effectiveness of CNS [communications, navigation and surveillance] systems."

4.2.5 ~~4.2.5~~ Notification to State of Design

ICAO XBT Guidance:

Registration Manual, Section 4.1.9 (*Notifying State of Design*)

Section 4.1.9 of the Registration Manual reminds an Importing CAA of its responsibility under Annex 8 "when it first enters on its register an aircraft of a particular type for which it is not the State of Design" to advise the State of Design that it has entered such an aircraft on its register. The Section explains why this is important for safety and continuing airworthiness.

4.3 ~~4.3~~ Airworthiness assessment

ICAO XBT Guidance:

Annex 8 (*Airworthiness of Aircraft*)

Registration Manual, Chapter 4 (*Registration of Aircraft*)

Airworthiness Manual, On 10 January 2023, ICAO advised that the internal processes for finalizing new XBT guidance material to be incorporated into the next revision of the 4th Edition of the Airworthiness Manual is ongoing. The XBT-related guidance is part of a substantial number of revisions and will manifest in numerous different sections of the Airworthiness Manual. When the full package of revisions is published, this section will be updated as necessary.

ICAO XBT Public Website, Airworthiness (icao.int)

ICAO Universal Safety Oversight Audit Programme (USAOP) Results, https://www.icao.int/safety/pages/usoap-results.aspx

SGI Aviation Study, "Economic Impact Assessment and Select Recommendations: Dissimilar Technical Regulatory Requirements Impacting Cross-Border Transfer of Aircraft" http://awg.aero/wp-content/uploads/2023/11/SGI-Aviation-2011-Study.pdf

Section 4.1.3 of the Registration Manual emphasizes that a "registration process is separate from obtaining a certificate of airworthiness." An Importing CAA will typically conduct these separate processes in parallel.

Section 2.1.2 of the Registration Manual notes that an aircraft's registration is the basis for determining the regulatory scheme under which the aircraft will be operated. This includes continuing airworthiness, but also establishes the criteria by which the Importing CAA will assess an aircraft's initial airworthiness condition under its regulations for purposes of issuing a certificate of airworthiness. Section 4.2.2 above discusses why this aspect of international safety regulation dictates that time between registrations should be minimized so that there is always a clear baseline regulatory scheme against which an aircraft's airworthiness can be assessed and to which it can be maintained. Section 4.2.2 lists several options that an Importing CAA can use in lieu of delaying registration while assessing an aircraft's initial airworthiness.

In case circumstances have caused an aircraft to be without registration for an extended period, Section 4.4.1 below discusses new ICAO XBT Guidance regarding the performance of maintenance while the situation persists and how an Importing State should evaluate such maintenance in connection with an XBT or a restoration

of the aircraft to its prior State of Registry. Section 4.4.2 below notes that ICAO is also currently developing baseline airworthiness criteria that may, among other things, mitigate the potential adverse consequences and regulatory burdens arising from prolonged time between registrations.[1011] The Airworthiness Manual sets out the steps and tasks which an Importing CAA should follow when determining whether there is satisfactory evidence that the aircraft complies with the design aspects of the Importing State's airworthiness requirements. It is beyond the scope of this Handbook to discuss the substantive aspects of such steps and tasks, especially as CAA personnel and authorized delegatees can be presumed to have full capability and expertise on such matters. Rather, this Handbook concentrates on ways to keep the airworthiness assessment process moving without avoidable delays (efficiency) while supporting thoroughness and consistency in each XBT airworthiness assessment (safety).

This Handbook posits that the process tools described in detail in Section 5.0 simultaneously advance both objectives. There are unlimited opportunities to apply these tools during aan XBT airworthiness assessment to minimize "dwell time." Examples include:

- *Advance Planning & Consultations* (see section 5.3 and Appendix E) – In most cases the need for an XBT is known by the Owner and/or the New Operator with ample lead time so advance scheduling of airworthiness steps, especially those that may necessity moving the aircraft or people traveling to the aircraft, can be arranged so that the aircraft or personnel can be available when needed. Consultations can also allow any documentation and equipment required to complete an assessment step can be ready in time and in the form and format best suited to avoid delays. This planning can also identify steps that might be better handled in whole or in part by delegation to third parties as described in the next item.

- *Delegation* (see section 5.4) – This tool may be underutilized because the Importing State has not yet established a structure that clearly articulates the extent and manner in which its CAA may delegate tasks and functions, even though the ICAO XBT Guidance observes that managed delegation is permissible for these purposes. Delegation can keep the airworthiness assessment moving along in many circumstances including, without limitation, when (i) the aircraft type under evaluation is new to the jurisdiction, (ii) the Importing CAA is not familiar with the airworthiness standards or oversight program of the exporting jurisdiction, or (iii) the Importing CAA is experiencing resource constraints for any reasons, such as an usually high volume of work (XBT or otherwise), the volume or condition of the aircraft's records, or the physical location of the aircraft.

[1011] This new guidance may also facilitate airworthiness assessments by a State of Registry or an Importing CAA following periods when airworthiness oversight has been purportedly conducted by a jurisdiction in which the aircraft was not properly registered in accordance with the Chicago Convention and the CAA of such jurisdiction is not acting pursuant to a valid Article 83*bis* agreement with the aircraft's proper State of Registry.

- *Remote Inspections and Audits* (<mark>see section 5.5</mark>) – Establishing procedures to permit Importing CAA personnel or delegatees to make inspections or record review and audits using authorized agents and technologies can reduce time lost to travel or occasioned by substantial time zone differences. Even if the Importing State prefers dispatching its own personnel to finalize these steps, a preliminary remote inspection or audit may narrow down or sharpen the focus of the visit or identify missing information or supporting data that will be required during the visit. Likewise, remote technologies can expedite follow up or confirming inquiries.

- *Checklists* (<mark>see section 5.6</mark>) – As noted above, this Handbook does not offer recommendations or advice on how to do the tasks involved in an airworthiness assessment. Rather, the objective is to make sure all tasks are accomplished and that through planning and consultation the resources and information needed to accomplish each task are available and reliable when the task is scheduled to be undertaken. Section 5.6 elaborates on how checklists can advance these goals throughout the XBT process, but an Importing CAA's airworthiness assessment is the most complex, and most important, XBT sub-process. Accordingly, both efficiency and safety outcomes will benefit from use of checklist tools.[11]using checklists.[12] The current version of the Airworthiness Manual lists steps to be included in an airworthiness assessment generally and provides certain related sample or indicative checklists. Pending revisions to the Airworthiness Manual (many of which in this area originated with the XBT-TF) will enhance these lists and checklists. Development and consistent use of checklists by a given CAA or CAMO will promote consistency of process outcomes and harmonization of such checklists globally would further simplify the XBT process.

- *Standardized and Harmonized Forms* (<mark>see section 5.7</mark>) – Section 5.6 discusses how XBT complexity and bottlenecks arise due to country-to-country differences in the forms and formats by which XBT applicants submit

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[11] An approachable but informative discussion of why checklists are valuable tools to improve outcomes in complex processes can be found The Checklist Manifesto: How to Get Things Done Right, by Atul Gawande (Picador, 2009). Chapter 2 of the book observes that use of checklists to improve outcomes in complex processes originated in the aviation field and two of the illustrative checklists in the book's appendices are from the aviation field ("Forward Cargo Door Emergency Checklist" and "Engine Failure During Flight Checklist") but other examples in the text and appendices relate to non-emergency processes. As stressed in this Handbook, a good checklist doesn't tell the professional how to accomplish a step, but merely assures that a step is not omitted, often precisely because the process has become routine to the professionals, but also when the professional is new to it.

[12] An approachable but informative discussion of why checklists are valuable tools to improve outcomes in complex processes can be found The Checklist Manifesto: How to Get Things Done Right, by Atul Gawande (Picador, 2009). Chapter 2 of the book observes that use of checklists to improve outcomes in complex processes originated in the aviation field and two of the illustrative checklists in the book's appendices are from the aviation field ("Forward Cargo Door Emergency Checklist" and "Engine Failure During Flight Checklist"). Other examples in the text and appendices relate to non-emergency processes. As stressed in this Handbook, a good checklist does not tell the professional how to accomplish a step, but merely assures that a step is not omitted, often precisely because the process has become so routine to a professional, but also when the professional is new to it.

information. This is acutely the case in the airworthiness assessment process. AWG will endeavor to investigate this problem as addressing it could be relatively straightforward and offer immediate efficiency and safety benefits for all XBT participants. A specific area to consider is the documentation of modifications and repairs so any subsequent Importing CAA can more easily and accurately evaluate them. Moreover, standardization and harmonization of forms and formats would greatly facilitate increased use and acceptance of electronic records, and lower the cost and complexity of implementation.

- *Use and Acceptance of Electronic Records* (see section 5.8) – Drawing on the excellent work of IATA, Section 5.7 describes the rationale for and how CAA and industry aviation players can continue moving towards use and acceptance of electronic records. The accuracy and reliability of XBT airworthiness assessments would benefit from greater confidence in the completeness, consistency of interpretation, accuracy and even the readability of records and certifications bearing on the airworthiness of an aircraft. As noted throughout this Handbook, standardization and harmonization of analog forms would have immediate benefits but also facilitate the move towards use and acceptance of electronic records.

4.4   4.4 Aircraft without registration

4.4.1   4.4.1 Maintenance of aircraft without registration

ICAO XBT Guidance:

Airworthiness Manual, Part III (*State of Registry*), Chapter 11 (*Maintenance on aircraft not under the responsibility of the contracting state issuing the Approved Maintenance organization (AMO) approval*).

On 10 January 2023, ICAO advised that the indicated new guidance for maintenance on aircraft without registration would be published on the ICAO airworthiness SharePoint website.   The full text of that guidance can be found here.

Notwithstanding the strong reasons to avoid or minimize an aircraft without registration outlined in subsection 4.2.2 (*Minimizing time between registrations*), the condition may nevertheless arise in various ways.   For instance, an aircraft may be de-registered before a new Importing State has been identified.   Another example is the case where an Owner, probably unwisely, has identified the new Importing State but the New Operator is not yet ready to accept the aircraft and the Owner seeks to avoid the cost of registering elsewhere in the meantime.

If no maintenance is conducted during a period of extended non-registration, an aircraft may be subject to conditions that risk a loss of conformity to its approved design and/or of its remaining in a condition for safe operation. However, the value in performing any maintenance in these circumstances must be balanced against the risk that such maintenance may not be recognized or approved by a subsequently proposed Importing CAA.   As such, performance of maintenance should be conducted in accordance with the new ICAO XBT Guidance referenced above or deferred until after a new registration for the aircraft has been secured.

4.4.2   4.4.2 Baseline airworthiness criteria

The XBT-TF recommended that guidance be developed to establish the baseline criteria for assessing the airworthiness of an aircraft.   This was to ensure consistency across all aspects of airworthiness (both initial and continuing airworthiness).   The ICAO Air Navigation Commission requested the AIRP to consider this recommendation and the AIRP, in turn, formed a special sub-group of its Working Group 1 to do a detailed review.   During the November 2022 plenary session of AIRP, the special sub-group reported and advised that development of such guidance would be beneficial and outlined issues to be dealt with therein.   AWG's representative on the AIRP has identified two designees to participate in that project.   When the project is concluded, this Handbook will be updated here to incorporate a description of   the   results.

4.5   4.5 Calendar age-based import and operation restrictions

ICAO XBT Guidance:

Airworthiness Manual [to come when revision published]

4.5.1   4.5.1 Background

A number of jurisdictions place restrictions or bans on importation and/or continued operation of demonstrably airworthy aircraft based solely on the number of years that the aircraft have been in service (such calendar age-based restrictions referred to herein as **CABRs**).

At the request of the XBT-TF, forty-three ICAO Contracting States that were understood by the XBT-TF to have CABRs were sent a questionnaire under ICAO State Letter AN 3/3.1-IND/17/15 dated 24 November 2017.   The questionnaire asked for confirmation of the existence of their CABRs, the policy rationales for them, and other information.   Twenty-five responses were received.   Nineteen States confirmed that they had CABRs[12][13] and six denied having them.[13][14]

The policy rationales given for imposition of CABRs were: (i) a belief that an aircraft's calendar age correlates with a meaningful decline in its safety; (ii) that the "wide variation in documentation practices makes reviewing the records of aircraft older than [the State's] age restriction(s) more resource intensive than can be justified"; (iii) that the State's airline industry would face challenges addressing the operator's obligations for continuing airworthiness of aircraft older than the age restriction(s); and (iv) concerns that older aircraft have greater environmental impacts (gas emissions and noise).

The number of years for a calendar age-based import restriction varies greatly from State to State, with 10 years thought to be the most restrictive and 25 years the least restrictive.   Certain countries differentiate the restrictions between commercial versus freighter, allowing importation of somewhat older aircraft intended for cargo service.   Six countries responding to the ICAO questionnaire do not allow operation of aircraft already on their registries beyond the age restriction(s), which has the practical effect of limiting aircraft 3 to 7 years younger from being attract for importation even though technically permitted.

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[12][13]   The State Letter included the CABRs understood by the XBT-TF to be in place in each country. Of the nineteen States acknowledging CABRs, 11 noted that their regulations differed in various extents from the information cited by ICAO.

[13][14]   Substantial anecdotal evidence strongly suggests that although most countries with CABRs explicitly publish their rules, others impose then on a de facto basis without formal publication, regulation, or acknowledgment.

The balance of this Section 4.5 discusses each of these policy concerns further and makes the case for States having blanket restrictions on registration and importation of aircraft based on calendar age to periodically review such restrictions taking into account ongoing technology improvements and available alternatives to address the cited safety, resource constraints and any other concerns and moving to an aircraft-by-aircraft, data-driven approach to airworthiness assessment and away from CABRs.

4.5.2 ~~4.5.2~~ Age and safety less correlated than in the past

Many still-existing CABR regulations justified by safety concerns about older aircraft were put in place more than 30 years ago when, in fact, data did show some correlation between calendar age and safety. However, new ICAO XBT Guidance to be included in Part III of the Airworthiness Manual will note that "[i]ncreasingly, aircraft now benefit from advanced technologies, and intervening developments in design, manufacturing and operation . . . which have substantially and progressively reversed the former understanding."

These conclusions were informed by a 2014 study conducted by MIT Professor John Hansman titled, "*Analysis of Impact of Aircraft Age on Safety for Air Transport Jet Airplanes.*" This study examined aircraft accidents occurring between 1959 and 2012 for commercial jet aircraft where aircraft age, accident records and operational histories were available. The full study can be found here.

The study demonstrates that safety and age are not correlated to a statistically significant level for aircraft with less than 27 years of service. Hansman noted that "[t]he analysis of the impact of aircraft age on safety does not support simple age-based restrictions as the most effective mechanism to maintain aviation safety." Rather, Hansman's work revealed that an aircraft's calendar age is less indicative of its physical condition than such factors as its cycles and hours of operation and other aspects of how and where the aircraft has been used.

Type and Design Approval Certificate holders publish instructions for continued airworthiness based on such factors rather than calendar age. However, an Importing State may be concerned about the applicable operator's resources or expertise in connection with accomplishing the applicable maintenance, inspection and other tasks in such instructions or whether the CAA's in-house resources have the capacity to provide adequate oversight of the operator's execution of such instructions. In such circumstances the Importing CAA could require the operator to retain and cover the costs of a qualified provider to handle the protocol requirements as a condition of issuance and ongoing validity of a certificate of airworthiness. See Section

The following is a full reprint of the text from an information paper submitted by AWG to the Second High-Level Safety Conference 2015 (HLSC 2015) Planning for Global Aviation Safety Improvement, titled *Analysis of Impact of Aircraft Age on Safety for Air Transport Jet Airplanes*[14][15] which is based on Professor Hansman's study with additional references cited. This paper was also brought to the attention of the XBT-TF.

"***Introduction***

"Modern commercial air transport jet aircraft are significant economic assets that can have an effective economic useful life of decades.   For the past two decades, the average age of the worldwide air transport jet fleet has been between 10 and 12 years old. However, the size of the fleet has grown substantially so that the population of airplanes with ages in excess of 20 years has continued to increase.

"Concerns regarding the safety of aging air transport jet aircraft, due to corrosion, fatigue, or widespread fatigue damage (WFD) rose following the dramatic in-flight explosive decompression of Aloha Airlines Flight 243 in 1988. At the time of the accident, the aircraft had 35,486 hours of flight time and 89,680 flight cycles.

"In the aftermath of this accident, a number of actions were taken to monitor and assure the airworthiness of older air transport aircraft. One of the key questions regarding aging aircraft was whether chronological ago or operational exposure (e.g., flight cycles or flight hours) were factors which created age-related risk such as corrosion or WFD for the aircraft. The Federal Aviation Administration (FAA) ultimately concluded through its research that chronological age was a better indicator of environmental damage, while operational exposure was a better indicator of fatigue damage, including WFD. Airworthiness could be assured with proper maintenance and identification of specific operational limits of validity (LOV) for aircraft structures where failure is potentially catastrophic. Once the LOV limits were reached the aircraft could remain airworthy if specific inspections, modifications, or replacements were performed. Depending on the particular component and the fatigue mechanism, the LOV could be defined in flight cycles or flight hours. In 2011 the FAA issued a number of regulatory amendments implementing WFD rules and the LOV approach. Similar rules are under development by the European Aviation Safety Agency (EASA) in Europe and are anticipated to be adopted by many other regulatory agencies

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[14][15] Microsoft Word - HLSC.2015.IP.025.2.1.en.doc (icao.int)

around the world.[15][16] In the early 1990's, regulatory agencies (including the FAA) required that operators of air transport jet aircraft incorporate an approved Corrosion Prevention and Control Program into their maintenance program.[16][17]

"Some States took alternative approaches to managing the exposure risk of aging aircraft by imposing both conventional maintenance requirements and chronological age limited under the assumption that newer aircraft were safer than older aircraft. In general, these limits were imposed on aircraft importation, and vary from 10 to 25 years.[17][18] The wide variation in limits indicates that such age-based import restrictions do not necessarily have a specific technical basis. If chronological age is not a valid indicator of increased safety risk, then imposing conservative age-based import restrictions reduce the population of available air transport aircraft and thereby increase the cost and reduce the access to air transportation for those States that impose such restrictions.

"*Discussion*

"The objective of the study commissioned by the AWG and conducted by Professor Hansman, MIT International Center for Air Transportation[18][19], was to investigate whether there is a valid basis for imposing operational or import restrictions on commercial air transport jet aircraft based on chronological age.

"An historical analysis was conducted of aircraft accidents occurring between 1959 and 2012 for commercial jet transport aircraft where accident records and aircraft age and operational histories were available. Due to data restrictions, the analysis used an aircraft-year based accident rate metric which assumes that each aircraft year of operation has the same risk exposure. The aircraft-year based accident rate was defined as the number of accidents which occurred divided by the total number of aircraft-years of exposure of the fleet. For the annual accident rate, this is just the number of accidents which occurred in a given year divided by the number of aircraft in the in-service fleet. When evaluating age effects, this would be the total number of accidents

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[15][16] Aging Airplane Program: Widespread Fatigue Damage Final Rules Federal Register Volume 75, Number 219, November 2010.

[16][17] FAA Aviation Rulemaking Advisory Committee, Transport Airplane and Engine Issue Area, Airworthiness Assurance Working Group, Task 1 – Corrosion Prevention and Control Program https://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/TAEaaT1-cpcp-11301992.pdf.

[17][18] Dissimilar Technical Regulatory Requirements Impacting Cross-Border Transfers of Aircraft (SGI Aviation, January 2011).

[18][19] Analysis of Impact of Aircraft Age on Safety for Air Transport Jet Airplanes, Professor R. John Hansman, MIT International Center for Air Transportation, October 2014, http://awg.aero/wp-content/uploads/2019/09/analysisofimpact.pdf.

of aircraft of a specific age divided by the total number of aircraft-years flown by aircraft of that age. The inverse of the aircraft-year based accident rate metric is the average number of years between accidents.

"The principal data source was the Flightglobal Ascend Online Database. The analysis was limited to commercial jet aircraft with a maximum take-off gross weight of more than 60,000 lbs. that were built and delivered by western manufacturers to commercial operators for commercial usage on the date of delivery. The analysis did not include aircraft types that had no recorded accidents. The analysis also did not include manufactured in the former Soviet Union or the CIS due to lack of comprehensive operational or accident data. The chronological age of an accident aircraft was defined as the difference between the year in which the accident occurred and the year in which the aircraft was built.

"Accidents were defined as events where the aircraft sustained substantial damage, became missing or completely inaccessible, as well as events where fatal or serious injury resulted from being in the airplane or direct contact with the airplane or its jet blast. Events resulting from hostile actions including sabotage, hijacking, terrorism, military action, stowaway events, and events with non-fatal injuries resulting from turbulence, loose objects or boarding were not included. Fatal accidents were defined as accidents which resulted in a fatal injury.

"*Findings*

"Between 1959 and 2012 there were 1,573 accidents of which 526 were fatal. Discounting 1959 when there were only 141 commercial jet aircraft in operation, the number of total accidents has varied between 12 and 54 per year and the number of fatal accidents has varied between 2 and 19 per year.

"Historical safety trends show a decline in accident rates. However, the level of safety and rate of safety improvement has not been uniform around the world. Both North America and Europe have experienced lower total and fatal accident rates than the worldwide average. Africa, Latin America and the Middle East have experienced higher accident rates.

"The data showed that 53 per cent of the fatal accidents and 47 per cent of the total accidents occurred for aircraft 8 years old or younger. Aircraft 20 years old or older accounted for only18 per cent of the fatal accidents and 22 per cent of the total accidents.

"The analysis then normalized the number of accidents for each age cohort with the operational exposure to determine the accident rate as a function of aircraft age. Because accidents are statistically

rare events and the exposure decreases for each age cohort, the confidence in the accident rate data decreases for the older age cohorts.

"The data found that for fatal accidents there is no impact of aircraft age up until 27 years of age. Between 28 and 32 years there is a rise in the accident rate, but this rise is lower than the 95 per cent confidence interval for the older aircraft cohorts and may be the result of sampling effects due to low exposure for these older aircraft. For all accidents the data found that there is no impact of aircraft age up until at least 18 years of age. There is a small increase in the 19- and 20-year-old cohorts but again these are within the 95 per cent confidence interval and may not be significant. Above 20 years of age the average accident rate for all accidents indicates a slightly increasing trend with age. The trend is generally consistent and by 26 years the accident rate has increased more than the 95 per cent confidence interval indicating a statistically significant increase in the total accident rate from the 18 year and younger baseline.

"The data found significant and striking differences in accident rates between world regions. In North America and Europe, the accident rates were low and there is no statistical correlation between aircraft age and the observed accident rate. The accident rate in North America is essentially flat up until 40 years of aircraft age. The European data is similar except for a few accidents for 32-year-old and 34-year-old aircraft, but these are not statistically significant due to the low exposure levels as indicated by the large 95 per cent confidence intervals for these years. By contrast, Africa and Latin America have higher accident rates even for the young aircraft cohorts. In Africa there does appear to be a statistically significant increase in the accident rates for aircraft over 20 years of age. This increase is what causes the worldwide total accident rate data to increase after 20 years of age. Latin America -shows increased volatility in accident rates after 20 years, but it is not clear if this is statistically significant. The Asia Pacific data show lower baseline accident rates than Africa or Latin America, but do show a slight increase in accident rates between 10 and 20 years of age. The Middle East data are between Asia Pacific and Latin America in terms of their baseline accident rate, but the data are variable with large confidence intervals, so it is difficult to make any strong conclusion from the Middle East data.

"In order to determine whether the increase in accident rates were age related or due to other issues like weaker infrastructure or regulatory oversight, the analysis looked at 385 accidents where the age of the aircraft at the time of the accident was 20 years of age or higher. The analysis used ICAO Commercial Aviation Safety

Team Aviation Occurrence Category Taxonomy[1920] with slight modifications to limit the classification to aircraft related factors. The results found that for the most severe fatal accidents only 18.2 per cent (19 accidents) were determined to be aircraft related. For all accidents a larger fraction of 29.6 per cent (114) accidents were determined to be aircraft related.

"Since safety concerns regarding aircraft age such as WFD would manifest as aircraft related occurrences, the relatively low fraction of these occurrences in the accidents of 20 plus year old aircraft indicates that aircraft age itself does not appear to be a key risk factor. In addition, if aircraft age is a significant risk factor for older aircraft, then those regions such as Africa where the accident rate increased for older aircraft should have a higher percentage of aircraft related occurrences than those regions such as North America where there is no increase in the accident rate with age. The data found the reverse was true, with only 22.9 per cent of the accidents in Africa caused by aircraft factors whereas 42.0 per cent of the accidents in North America were caused by aircraft factors. This leads to the conclusion that the elevated risk observed by older aircraft is not due to direct age effects but with other risk factors which correlate with aircraft age in these regions.

"*Conclusion*

"The analysis of the impact of aircraft age on safety does not support age-based restrictions as the most effective mechanism to maintain aviation safety. As an alternative, many States have rigorous processes to assure the continued airworthiness of older aircraft. The currently accepted practice in managing structural degradation effects is the LOV approach. The LOV is the number of total accumulated flight cycles or flight hours or both, for which it has been demonstrated that WFD is unlikely to occur in the aircraft structure; and that the inspections and other maintenance actions and procedures resulting from this demonstration and other elements of the fatigue and damage tolerance evaluation are sufficient to prevent catastrophic failure of the aircraft structure. When an aircraft reaches the LOV specified in the Airworthiness Limitations Section of the Instructions for Continued Airworthiness, in terms of either flight cycles or hours, it must be removed from service until the engineering data that support the structural maintenance program are reviewed. If it is demonstrated that widespread fatigue damage will not occur in the aircraft damage-tolerant structure the LOV can be extended."

[1920]   Aviation Occurrence Categories – Definitions and Usage Notes, https://www.icao.int/APAC/Meetings/2012_APRAST/OccurrenceCategoryDefinitions.pdf.

The foregoing analysis supports reconsideration of any CABRs which were originally justified by a presumed correlation between aircraft calendar age and safety.

4.5.3 4.5.3 Resource concerns

Overview.

The responses to the XBT-TF's questionnaires included interrelated concerns in connection with CAA resources when assessing the initial airworthiness of an XBT aircraft and with CAA and operator resources in connection with ongoing maintenance responsibilities of the operator and oversight responsibilities of the CAA while an older aircraft remains on its registry. Related concerns pertained to potential expertise of operators regarding maintenance of older aircraft.

Each of these concerns can be addressed through greater use of tools discussed in Section 5:

- Expanded use of delegation to individual or industry qualified providers is often the most effective and easily implemented tool to deal with structural or temporary CAA and operator resource limitations (see section 5.4.2). Section 5.4 discusses how drawing on the expertise of qualified providers can enhance safety along with efficiency.

  Incremental costs of delegation by a CAA can be charged to the applicant, Owner/Lessor, and/or an operator.

  Delegation by an Importing CAA is most often used in connection with record reviews and inspections required to assess initial airworthiness of an XBT aircraft. However, when the aircraft to be imported is subject to OEM or regulatory protocols regarding older aircraft, a State may be concerned about the applicable operator's resources or expertise in connection with accomplishing the applicable maintenance, inspection and other tasks or whether the CAA's in-house resources have the capacity to provide adequate oversight of the operator's execution of such protocols. In such circumstances the Importing CAA could require the operator to retain and cover the costs of a qualified provider to handle the protocol requirements as a condition of issuance and ongoing validity of a certificate of airworthiness.

  As noted in Section 5.4.2, where the flow of XBTs between two States is frequent, a BASA between them is, in practical effect, a delegation of those tasks covered in the agreement.

- Section 5.5 describes how remote inspections and audits, a particular form of delegation, can reduce time demands on CAA or delegatee staffing by, for example, enabling pre-work to make subsequent or follow-up

in-person inspections and audits more productive, thorough, and efficient.

- Checklists, whether those already provided in the Airworthiness Manual or developed internally, can further address resource constraints by recording a CAA's XBT institutional knowledge so new personnel can accelerate their learning curve about <u>what</u> needs to be done as opposed to <u>how</u> to do the tasks, which they already know (see section 5.6). Checklists also promote consistency by a given CAA from one XBT event to the next and thus enable applicants, especially repeat applicants, to anticipate what the CAA wants in terms of information, forms, and formats and when and who in the CAA's organization will require a given item. To the extent that XBT process checklists and underlying documentation can be harmonized more globally, these efficiency opportunities can be further enhanced.

- Responses to the ICAO questionnaire expressly noted that "wide variation in documentation practices makes reviewing the records of aircraft older than their age restriction(s) more resource intensive then can be justified." Although delegation can address this, the preferred solution would be standardizing and harmonizing as many XBT required records as possible. Section 5.7 outlines how use of <u>standardized XBT forms and formats</u> from the Registration Manual and the Airworthiness Manual or developed by CAAs or industry would expedite XBT processes while driving the consistency that leads to enhanced safety outcomes.

- Longer term, use and acceptance of <u>electronic records</u> (see section 5.8) can reduce XBT workload and streamline the airworthiness assessment process immediately. Further, algorithms, search functions, and even artificial intelligence could be used to isolate and identify a subset of an aircraft's operational and maintenance history records which need to be more closely investigated by personnel of the CAA or its delegatee. Adoption, use, and acceptance of electronic aircraft maintenance records would allow an Importing CAA to efficiently navigate a voluminous set of records while concentrating on the most crucial aspects of an aircraft's history.

4.5.4 ~~4.5.4~~ Environmental concerns

Some States have cited CABRs as a means of assuring compliance with environmental standards in Annex 16. Reducing the carbon footprint of the aviation industry is necessary and admirable but based on a cost/benefit analysis and overall circumstances, CABRs may be a questionable tool to do so.

First, the ICAO XBT Guidance endorses the principle that each aircraft should be assessed on its own specific compliance with prevailing airworthiness and other requirements. Application of CABRs risks rejection of an aircraft that is fully compliant with all environmental standards.

Second, all aircraft will ultimately reach their maximum useful lives and be decommissioned so the application of CABRs may at best only marginally accelerate the timing of that event but at a substantial cost to operators and passengers.

Third, unless a particular aircraft never finds a New Operator, the global reduction of emissions attributable to CABIRs is essentially nil.

Fourth, even if an otherwise useful and safe aircraft is forced to be decommissioned prematurely, an additional new aircraft would need to be built to meet the market demand. The net emissions improvement of the replacement aircraft versus the retired aircraft during the lost remainder of its useful life must be reduced by the environmental costs of manufacturing the new aircraft.

Fifth, the retirement of older aircraft is not the only tool available to the aviation industry to reduce its impact on the climate. For instance, a recent study from the University of Bristol found that modifications to air traffic control and aircraft operations could reduce the aviation industry's negative climate effects by up to 20% over the next five to 10 years. The study found that modifications to flight routing, which avoids climate-sensitive regions, and the adoption of "formation flight," in which two aircraft fly one behind the other, could cause a signification reduction to aviation's climate impact.[2021] Additionally, advances and investment in sustainable aviation fuel and meaningful, verifiable offset programs are additional tools from which the industry as a whole can reduce its overall net carbon footprint. An illustrative discussion of opportunities for the aviation industry to reduce its overall carbon footprint through other means can be found here.

Sixth, retirement of older aircraft based on detailed cost considerations may largely accomplish environmental objectives without CABRs. As noted in the December 21, 2024 issue of The Economist ("How retired aircraft find a second act"), operators "are constantly disposing of old aircraft and acquiring new ones. The reasons rarely have much—if anything—to do with airworthiness. . . . For an industry that operates on razor-thin margins and frequently stands accused of being environmentally unsustainable, it might seem extravagant not to wring every last mile out of a pricey asset. The case is in fact the opposite. The life and death of aircraft are determined by hard-nosed business calculations. The biggest factors in deciding to stop operating a particular type of aircraft are customer expectations, costs and accounting."

Thus, the arguments that CABRs will have a meaningful impact on actual net carbon emissions for aircraft should be carefully considered and based on data. Continuation or initiation of CABRs as an environmental compliance

[2021] https://www.thenationalnews.com/business/aviation/2022/09/04/aviation-industry-could-cut-climate-impact-by-20-in-five-years-study-shows/;
https://interestingengineering.com/transportation/2-small-changes-airplanes-could-reduce-impact.

tool should be balanced with fair consideration of externalities, the alternatives, and whether CABRs really make a difference.

5.0 5.0 TOOLS TO SIMPLIFY THE XBT PROCESS[2122]

ICAO XBT Guidance:

Registration Manual, Chapter 6 (*Cross-Border Transferability of Aircraft*)

5.1 5.1 Process consistency and global harmonization

5.1.1 5.1.1 Jurisdictional consistency

Data derived from AWG research on actual XBTs reveal that the process and criteria applied from one XBT to another in a given jurisdiction can vary. In these cases, applicants cannot depend on using prior experience to know how to submit a complete application.

Best practices to promote internal consistency include:

Provincial Consistency: some jurisdictions (e.g., China and India) register aircraft, or process XBTs, at a provincial level. Certain groups of jurisdictions (e.g., EASA) have general XBT processes and standards but variations from state to state within the group. These variations should be eliminated or, if supported by substantive factors applicable to such province or state, minimized while making all differences and additions transparent in their relevant application guidance materials.

Inspector Consistency: variation in inspection requirements should be minimized. Inspectors should endeavor to agree a single standard for all major steps. An agreed common standard should be published and any permitted differences of approach from such standard applied by any individual inspector should be fully disclosed in the relevant application guidance.

Transparency: in all the forgoing circumstances, the applicable changes and variations from a standard should be prominently noted in the jurisdiction's guidance materials, published on its website and related written materials and highlighted during planning consultations (see section 5.3).

5.1.2 5.1.2 Global harmonization

Section 6.1.5 of the Registration Manual observes that "in most cases the XBT process is not straightforward due to significant differences in States' requirements and associated processes." Section 6.2.1 of the Registration Manual goes on to say that "[u]ntil there is greater harmonization [of XBT requirements and processes], an applicant will need to know and comply with aircraft registration …, deregistration … and airworthiness requirements of

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[2122] Information on the benefits of process consistency, and internal and global harmonization and simplification generally can be found in Appendix LM.

both the exporting and importing States." As pointed out in the Forward to this Handbook, the 2011 SGI Study also found that the substantial country-to-country XBT variations in processes, interpretations, nomenclature, and documentation do not enhance safety (and, in some cases, create potential for safety-related errors and misunderstandings) yet cause delays, costs, and resource drains for all stakeholders, especially the Importing CAA.

This Handbook strongly concurs with the conclusion set forth in Section 6.2.1 of the Registrations Manual:

> "The complexity of [XBTs] is, to a large extent, attributable to the current variability in requirements and processes for registration and airworthiness assessments among the States, which evolved when [XBTs] were less common. Such differences may include import restrictions based on calendar age rather than data-based airworthiness criteria tied to type certification; ability to delegate tasks to qualified third parties and the degree to which completion of such tasks may be relied upon; extent to which the maintenance on aircraft while unregistered can be performed and then considered by an importing state; how modification and repair designs are to be validated; criteria for issuance, validation and acceptance of Type Certificates; necessity for a certificate of airworthiness; and acceptance of electronic records.

Best practices to promote global consistency include:

Document Consistency: TBD.

Consistency: TBD.

Transparency; Circular 95: in all the forgoing circumstances, the applicable changes and variations from a standard should be promptly noted in the jurisdiction's guidance materials published on its website and related written materials and disclosed during planning consultations (see section 5.3).

5.2 ~~5.2~~ Anticipating XBTs in deal documentation

Documentation for a finance or operating lease of, and/or a loan secured by, an aircraft will typically stipulate the required condition of the aircraft when returned to the lessor at the end of the lease term or to the lessor or lender upon repossession following a default under the lease or loan. On return the aircraft is likely to be sold to, and/or placed with, a New Operator in a new jurisdiction thereby necessitating an XBT.

Global variations in XBT processes and documentation present challenges to operators and their lessors and lenders in developing such contract provisions. A CAA can increase the chances of obtaining documents in its preferred form, format and sequence by harmonizing its XBT processes and required documentation with prevailing global best practices to the maximum extent possible. Especially where a State's processes and documentation deviate from global practices, Section 6.2.2 of the Registration Manual reminds states "to keep current all information in the Online Airworthiness Information Network to facilitate XBTs." Doing so will reduce the time required of a CAA's staff to process an XBT request while promoting consistent standards of airworthiness assessments even with personnel changeovers over time.

Even though the new jurisdiction is generally not known when the initial lease or loan documentation is being negotiated, the parties are strongly advised to agree on those records and other documents that are commonly needed to accomplish an XBT to be provided at the time of aircraft redelivery (including their respective contents, forms, and formats). If a new jurisdiction is identified prior to return of the aircraft, the lessor or lender should consult with the applicable CAA as to whether the records and other documents contemplated by the contract documents will suffice. If not, the current operator should be advised promptly so that appropriate adjustments can be made.

Section 6.2.2 of the Registration Manual states that "use of checklists of documents and actions required can assist the XBT process" and makes clear that in creating their own checklists "States may also consider industry-developed forms." AWG and IATA have jointly developed a transfer document checklist which includes the documents, data, and other information normally required by Importing States in connection with an XBT. The checklist has obtained wide acceptance in commercial aircraft lease transactions.

5.3   5.3 Advance planning and consultation

ICAO XBT Guidance:

Registration Manual, Chapter 4 (Registration of Aircraft), Section 4.1.5.1 (Pre-Application Process)

Registration Manual, Chapter 6 (Cross-Border Transferability of Aircraft), Section 6.2 (Information for an Applicant)

Planning and scheduling are XBT best practices for promoting efficiency through reduction of "dwell time" (that is, the time during a process when no progress is made while waiting for an input such as a missing document or an inspection that has not been anticipated or scheduled in advance) while enhancing safety by facilitating consistent, accurate application of the Importing CAA's airworthiness criteria.

Significant: the data from AWG lessor members' RCX Reports validates the proposition that advance planning and consultations are powerful practices that make XBTs run more smoothly, quickly and thoroughly, even when the XBT arises due to a default or other unanticipated circumstance. In turn, to the extent that the Exporting and Importing States have consistent and transparent XBT processes, standards and documentation, the planning and consultations themselves are more efficient and effective for all parties.

Section 6.2.2 of the Registration Manual observes that differences between States' XBT:

> "requirements and processes may be addressed through the consultation among all involved parties (e.g., States, operators, Owners, and any approved maintenance organizations) to ensure that they are all aware of their respective tasks and applicable requirements to complete the issuance of any export certificate of airworthiness, deregistration by the exporting state, registration, and issuance of a certificate of airworthiness by the importing State."

The planning and consultation practices described in this Section facilitate efficiency and safety by making sure the data and other inputs necessary to accomplish a given XBT task or step are complete, trustworthy, in the proper form and, most important, available when needed. At the same time, tasks or documents sometimes requested unnecessarily can be identified for elimination or streamlining.

Once it is likely that an XBT will be required in connection with the placement of the aircraft with a New Operator, the relevant parties will benefit from taking what should be a brief amount of time to make certain that each party has a clear understanding of (i) what documents and actions will be both needed by, and

required of, it; and (ii) <u>when</u> each item must be completed to keep the process moving steadily.

Prior to de-registration, the parties to be involved in the XBT should consult with each stakeholder on the anticipated steps. These consultations are normally organized by the Owner and, if known, in coordination with the next operator. Early engagement with the Importing CAA is urged particularly so that information regarding its airworthiness certification requirements to be readily available to all other relevant parties (e.g., whether the Importing State will require an export certificate of airworthiness or a certificate of deregistration from the Exporting CAA). In addition, it will allow for each stakeholder to clarify its requirements and resolve issues that may arise from the Importing CAA's regulations, practices, methods, or technology prior to deregistration.

The Owner typically maintains a schedule that tracks the completion or delay of XBT-related tasks. Periodic status consultations among the stakeholders should be scheduled to confirm that tasks are progressing as anticipated or agree actions for dealing with any that are lagging. The Owner should keep all parties updated on progress and spot problems or delays early to enable work-arounds or corrective actions.

An XBT pertaining to a commercial aircraft being returned by an operator to its non-operator lessor for placement with a New Operator in a different jurisdiction involves each of those parties together with the Exporting CAA, the Importing CAA, and any relevant AMO or CAMO. We first discuss the case where the new State of Registry has been identified.

The lessor's objective in the planning stage is to confirm that all documents, inspections, modifications or other actions necessary to complete the XBT have been correctly identified and articulated and, critically, what each person or organization will need (documents, licenses, permits, approvals, certifications) to deliver documents, and undertake and complete the tasks, for which it is responsible in a full and timely manner. Although an in-person or virtual meeting of all involved parties may be beneficial, the lessor can normally coordinate with each party on a serial basis.

The project scheduling should work backwards from the desired date on which the XBT is to be completed (registration of the aircraft in the new jurisdiction and issuance of a certificate of airworthiness) to determine when each milestone document or task will be required, who is responsible for it, and when steps necessary to achieve a timely result must be initiated.

There will be circumstances when a de-registration must occur prior to an importing State being identified. For example, when an IDERA is exercised, often the authorized designee will be focused on a timely deregistration to ensure the safety of its assets without necessarily having an Importing State identified. While this will inevitably lead to a "stateless aircraft" status, this is often the lesser harm than maintaining the registration in its current "hostile" jurisdiction. As such, if the Exporting State is party to the Cape Town Convention and its Aircraft Protocol, then it must deregister an aircraft immediately when requested to do so by the holder of

an IDERA regardless of whether an Importing State has not been identified or completed its importation process.

Appendices E, F and G are under construction and will consist of a compilation of subjects and questions that XBT parties should consider together to assure that each understands what the others will be expecting, from whom, when, and in what form in order to assure a complete and thorough airworthiness assessment while moving the overall registration and airworthiness assessment processes along smoothly and accurately.

Sample checklists outlining matters to be considered by an Owner or Lessor in anticipation of an XBT can be found here and a sample checklist for CAMOs on general XBT matters can be found here and one for physical reviews of the aircraft can be found here.

Appendix E is under development and will be a checklist that consolidates matters noted throughout this Handbook as being useful for XBT parties (Exporting and Importing CAAs, Owner/Lessor, outgoing and incoming Operators/Lessees) to consider in advance to facilitate smooth and accurate XBT transactions.

5.4   5.4 Delegation

ICAO XBT Guidance:

Registration Manual: Chapter 3 (*Organizational Structures),* Sections 3.3 (*Delegation of Functions and Activities)* and 3.4 (*Establishing and Using a Delegation Mechanism);* and Chapter 6, Section 6.3 (*Delegation of XBT Functions and Activities)*

Airworthiness Manual: Part II (*Airworthiness Organizational Structure and State Responsibilities),* Chapter 1 (*State Airworthiness Responsibilities),* Section 1.2 (*Discharge of State Responsibilities*)

5.4.1   5.4.1 Authority to Delegate

Section 3.3.1 of the Registration Manual confirms that States have always had authority under the Chicago Convention to "delegate functions and activities[22][23] related to aircraft registration, deregistration and XBT to another State, organization or individual" but had lacked clear guidance on what standards, criteria and processes should be used to assure discharge of the State's Convention obligations.   The new ICAO XBT Guidance addresses these matters.

Airworthiness Manual section II.1.2 provides that a State's regulatory system "should represent a well-balanced allocation of responsibility between the State and those persons or organizations conducting airworthiness related activities." Although both the Registration Manual and Airworthiness Manual contemplate delegation, the relevant guidance on how to establish the regulatory framework pursuant to which a CAA may avail itself of the option to delegate is concentrated in Registration Manual sections 3.3 and 3.4, while guidance specifically on use of delegation in connection with XBT functions and activities (that is, de-registration, registration, and issuance of a certificate of airworthiness and other necessary certifications and licenses to the New Operator) are discussed in the Registration Manual section 6.3.

Registration Manual section 3.3.3 notes that a State retains responsibility for aircraft on its register even though some or all oversight activities may have been delegated.   One exception to this is where all or part of a State of Registry's responsibilities have been transferred to the State of the Operator pursuant to an arrangement under Article *83bis* of the Convention. *See Manual on the Implementation of Article 83bis of the Convention on International Civil Aviation* (Doc 10059).

5.4.2   5.4.2 Reasons to delegate

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[22][23] In ICAO usage, a "function" is a role attributed to an organization or a section or division thereof and an "activity" is in the nature of a specific task which has a beginning and an end.

The airworthiness assessment process is required when adding to a register a newly manufactured aircraft or an aircraft previously registered in another jurisdiction. However, the latter situation typically involves more stakeholders, some of whom, such as the aircraft's former operator, may have no particular incentive to devote their resources to the XBT process. An XBT-related assessment also inevitably requires more time and resources for the Importing CAA to familiarize itself with the Exporting CAA's airworthiness scheme, and the aircraft's prior maintenance history and its current condition. Delegation to organizations or individuals who have experience with the airworthiness requirements of both the Importing State and the Exporting CAA can be expected to process all or the critical portions of these assessments more efficiently and, crucially, with enhanced reliability. For this reason, delegation of airworthiness assessment tasks should not in any way suggest that the Importing CAA's personnel lack capability, especially as respects its own airworthiness requirements. Rather, a delegatee having greater familiarity and experience with the Exporting CAA's approach may identify or provide insight into specific differences that should be considered and checked more closely, thus promoting safety outcomes. The Importing CAA retains ultimate responsibility for certification of the aircraft, but delegation provides an efficient means to overcome the potential strains on its human, technical or material resources. Whether it makes sense for the Importing CAA to delegate tasks in the context of a particular XBT will be a key factor in the XBT planning and scheduling exercise.

The XBT-TF noted that pairs of States that have a regular flow of XBTs between them have increasingly entered into bilateral aviation safety agreements (BASAs) or informal arrangements to realize the benefits of XBT simplification and harmonization. In those cases, the respective CAAs also tend to have significant institutional knowledge about each other's airworthiness and oversight practices and applicable XBT processes.

At the other extreme, States that encounter XBTs less frequently often cannot justify dedicating financial and personnel resources to handle XBTs promptly and efficiently as they arise. In those cases, process variation can be introduced from one XBT to another in the same State leading to both inefficiency and potential safety concerns, especially where the importing State's personnel are not familiar with the oversight procedures of an aircraft's prior State(s) of Registry. Accordingly, the Handbook intends to be useful in situations where the applicable Importing CAA conducting XBTs infrequently is less familiar with the airworthiness and oversight regimes of the prior State(s) of Registry or must for any reason task individuals who are not yet experienced with processing XBTs. However, in these circumstances the best solution is to delegate all or a portion of the necessary functions and activities to a third party.

Section 3.3.1 of the Registration Manual gives "one major reason" that a State might consider delegation ("absence of the necessary human, technical or material resources") and Section 6.3.2 of the Registration Manual gives numerous specific examples of tasks that might be considered for delegation in the XBT context. These reasons and examples should not be considered

exhaustive as virtually any XBT-related task may be delegated to the extent permitted under applicable national law.

The tasks to be delegated in a particular XBT are likely to vary based on the situation.   For example, a State that does not normally delegate tasks pertaining to airworthiness assessments may elect to do so when (i) facing an unusually large backlog of XBT requests, (ii) processing an aircraft with a particularly extensive accumulated set of records to be examined, or (iii)experiencing seasonal labor constraints due to illness or holiday scheduling.   A State should strongly consider delegating when it lacks familiarity with, or confidence in, the airworthiness regime(s) where the aircraft was previously registered. States that do not have a regular flow of XBTs may find it difficult to justify devoting the financial and personnel resources needed to maintain the capability to process an XBT on a reasonably expeditious basis.

Even States that have bilateral agreements establishing clear standards and responsibilities for XBTs between them may still experience resource constrains for various reasons. A State may choose to use a qualified designee to facilitate efficiency and safety if the designee's XBT workflow volume maintains its awareness of the current regulatory requirements of the two States involved in the XBT.

The XBT-TF recommended that CAAs use delegation to accomplish airworthiness due diligence on a data-driven basis instead of imposing calendar age-based import limitations or requiring repairs, inspections and maintenance that do not enhance safety yet are duplicative, time-consuming, or not yet called for under the aircraft's approved maintenance program.

Determining which tasks will be delegated to whom, along with agreeing a precise articulation of the timing and substance of the designee's outputs and who has financial responsibility for paying the designee, are matters that should be decided as early as possible. In general, it would be appropriate for the commercial parties to an XBT (typically the Owner) to assume the costs for delegated tasks that the CAA customarily performs internally, especially if the delegation is made at the request of the commercial parties to expedite completion of the XBT.

5.4.3 5.4.3 Establishing a delegation mechanism

For a CAA to have the option to delegate, the legislation governing the CAA must normally permit delegation and either include, or give the CAA internal authority to adopt, regulatory provisions establishing the requirements for, and the scope and ability to rely upon, delegation of tasks. Many CAAs, like the Civil Aviation Safety Authority of Australia, the Federal Aviation Administration, and Transport Canada, have established delegation processes that other CAAs may wish to use as a model for their delegation processes.

The following list of issues that a legislative/regulatory framework for establishing delegation authority should include those outlined in Section 3.4 of the Registration Manual.

A delegation mechanism will generally include regulations or processes that:

a)   assure adherence to any applicable conditions or limitations specified in the authorizing statutes or regulations;

b)   set forth the process and criteria (which may be general or vary by particular task or task type) for qualifying an individual or entity to be considered for particular tasks or functions, including technical and competency requirements and validation of the qualified delegatee's procedures;

c)   provide for oversight of a qualified delegatee (which may be accomplished by audits and/or by reference to comparable monitoring or certification done by ICAO or other satisfactory independent third parties) to confirm that it consistently adheres to its approved procedures and maintains continuing proficiency through ongoing training and/or sufficient relevant experience;

d)   establish the extent and form of documentation to be provided by a delegatee with respect to the applicable tasks and functions accomplished, including differentiation between development versus approval of data;

e)   make clear whether a qualified delegatee may issue approvals for, and on behalf of, the CAA or merely submit recommendations;

f)   suspend or revoke such a delegation, at any time and for any reason; and

g)   establish a code of conduct to ensure appropriate behaviour of such delegatee.

When acting for a State, a delegate is required to perform in a manner consistent with the policies and directives of that State. The authority of a delegate comes from the State's delegation regulations and is essentially the same as if the task were performed by the State itself. The State is responsible for the oversight of these delegates. Several States have already established delegation processes to complement their aviation activities.

5.4.4 5.4.4 Selecting a qualified delegatee

A CAA may identify potential delegatees through requests for proposals, recommendations from the other parties to the particular XBT, and in the ICAO register of Civil Aviation Safety Inspectors (See RM.App G.5 ("Civil Aviation Safety Inspection Tool") and related

guidance in the *Manual on the Competencies of Civil Aviation Safety Inspectors* (Doc 10070)).

Identified candidates would first be evaluated to confirm that they (a) satisfy all applicable requirements of the CAA's laws and regulations; (b) possesses all necessary licenses, permits and insurances necessary to perform the tasks to be assigned; (c) are proficient in communicating and writing clearly and concisely in English and the working language of the State; (d) have had adequate working experience with the relevant aircraft equipment (or a combination of education, professional license/accreditation and experience); (e) have knowledge of applicable ICAO and international airworthiness standards and best practices; and (f) have computer literacy in relevant software (for example, the programs on which records for the applicable aircraft are maintained). Other competencies may include such factors as judgment and decision-making, planning and organizing skills, client orientation, accountability, technological awareness, teamwork, tact, thoroughness and ability to maintain harmonious working relationships in a multicultural environment.

In making a final selection from among those who satisfy the foregoing basic criteria, the CAA should generally favor candidates that have had prior experience with the particular tasks to be delegated. Candidates with experience, especially recent, in executing such tasks in connection with prior XBTs between the same country pair can be particularly valuable.

Virtually all XBTs involve aircraft moving to a New Operator which normally entails various modifications to the aircraft. It is appropriate for the importing CAA to require that an applicant underwrite or share in the cost of delegated XBT tasks to the extent that such costs are not anticipated in the CAA's normal funding budget. Accordingly, for fairness and efficiency, CAAs should coordinate with the New Operator and, of different, the Owner to determine whether the maintenance organization performing such modifications is also suitable for handling other tasks to be delegated in connection with the XBT. An agreement on cost sharing for delegated XBT tasks should be considered during the recommended consultations discussed at Section 5.3 [see section 5.3].

Selection of a qualified delegatee for a particular assignment should include confirmation that the individual or entity is free of actual or perceived conflicts of interest. A delegatee may not verify its own work or that of its employer. Consideration may be given to obtaining the delegatee's acknowledgment and acceptance of the CAA's code of conduct [see reference to ICAO form in Appendix Hsee reference to ICAO form in Appendix I].

5.4.5 5.4.5 Delegations to CAMOs

[A discussion of this topic will appear in the next version of this Handbook.]

5.5 ~~5.5~~ Remote inspections and audits

Physical inspections of aircraft to be imported and examination of their records are typical elements of XBT airworthiness assessments. Scheduling on-site visits to accomplish these steps can be difficult, and a burdensome resource diversion and cost for CAAs that require such activities to be conducted only their employees. Certain CAAs, including the FAA, have mitigated these issues by establishing a network of qualified designated airworthiness representatives (**DARs**) throughout the world. They act as agents of FAA and can take action with legal effect. Following a similar approach, that is, using qualified agents, would address a prevalent cause of XBT process delay and avoidable loss of employee time and added expense endured by CAAs and the other XBT participants. Emerging technologies offer an alternative means of mitigating these problems. When aircraft were grounded and difficult to access due to quarantine and related considerations during the COVID-19 pandemic, greater use of remote technologies were used successfully to accomplish these types of oversight tasks. Qualified on-site personnel (who could used various camera technologies and telecommunications options to accomplish ARCs and tasks oversight tasks. This experience has prompted calls to increase the use of such remote technologies and techniques for inspections and record audits, which could include XBTs. Several joint regulatory and industry bodies are currently reviewing proposals for guidance that would make these technologies and techniques more readily useable to expedite XBT and other processes while consistently maintaining safety. AWG is involved in these discussions and this section will be updated if such guidance is released.

5.6   ~~5.6~~ Checklists

ICAO XBT Guidance:

<u>Registration Manual</u>: Chapter 6 (*Cross-Border Transferability of Aircraft*)

<u>Airworthiness Manual</u>: Part II (*Airworthiness Organizational Structure and State Responsibilities*), Chapter 1 (*State Airworthiness Responsibilities*), Section 1.2 (*Discharge of State Responsibilities*)

Simplification and harmonization promote XBT process <u>safety</u> outcomes in several ways. Even when the individuals accomplishing a process are well-trained, experienced professionals, that very familiarity can cause occasional oversights, especially in complicated processes where distractions, time pressures, and/or unanticipated interruptions are likely. Checklists also enable upgrading processes through incorporation of new elements (e.g., adding an inspection or confirmation of the accomplishment of a service bulletin to an airworthiness assessment review) or identifying ambiguities in instructions previously thought to be sufficiently clear.

For these reasons, the ICAO XBT Guidance and this Handbook encourage global adoption of checklists and transparency from CAAs regarding deviations from, or differing forms or nomenclature to be used in connection with particular items on, a widely adopted checklist. Section 6.2.2. of the Registration Manual advises that "use of checklists of documents and actions required can assist the XBT process" and that States can "consider industry-developed checklists and forms." Examples of checklists and forms can be found in Appendices C to F of the Registration Manual and as attachments to numerous Chapters of the Airworthiness Manual.

A checklist that has already made headway in simplifying XBTs can be found in Appendix D which is a checklist of documents to be delivered to the Owner on its return from an operator. The checklist was designed to include documents commonly required by Importing CAAs in connection with an XBT. This checklist has achieved wide adoption in the global leasing industry and is reviewed and revised from time to time to account for changes in regulations and reflect field experiences. States should strongly consider using Appendix D as a baseline for their own published XBT document requirements, including adoption of the naming, numbering, formatting (i.e., physical placement of each item of information on a given form) and document groupings. Wherever possible, harmonization of terminology and use of globally accepted interpretation standards is advisable. To the extent that a State needs different items, those deviations should be published in the ICAO Circular 95 database.

Such harmonization of XBT documents will promote safety through common usage of terms and interpretations of information critical to an Importing CAA's process of familiarizing itself with the history and current condition of the applicable aircraft

while reducing the time and personnel needed by an Importing CAA and its qualified designees to process the XBT.

~~Appendix H~~Appendix I includes ~~list of the~~ checklists pertaining to the XBT process that can be found in the ICAO XBT Guidance.

5.7 ~~5.7~~ Electronic records and documentation

ICAO XBT Guidance:

Airworthiness Manual: Part III (*State of Registry*), Chapter 7 (*Air Operator's Continuing Airworthiness Responsibilities*), Section 7.8 (*Aircraft Maintenance*) [**AM.III.7.8**] and Attachment B (*Guidance for Acceptance of Electronic Aircraft Maintenance Records and Continuing Airworthiness Records*) [**AM.III.7.Attach B**]

Working Paper 6 for Airworthiness Panel Fourth Meeting 2016, (*Electronic Aircraft Maintenance Records ~~(EAMR)~~*) [**AIRP/4-WP/6**]

IATA *"Guidance Material for the Implementation of Paperless Aircraft Operations in Technical Operations"*, Release 1, November 2017. **[IATA EAMR Guidance]**

Other Useful Reference Materials:

Annex I (PART-M) to Commission Regulation (EU) No. 1321/20141

FAA Airworthiness Circular *"Electronic Signatures, Electronic Recordkeeping, and Electronic Manuals Records"*

5.7.1 Paperless processes enhance safety

Extensive literature supports the proposition that use of electronic records and other documentation rather than paper-based systems enhances process outcomes, including safety criteria, for a variety of reasons. For example, use of paperless systems in the medical field has reduced errors previously attributable to illegible handwriting, incomplete records, access to records and difficulty cross-checking critical facts:

> A study conducted by the Carnegie Mellon University Living Analytics Research Centre added that enhanced EHR [electronic health record] adoption has accounted for a 27 percent reduction in aggregated patient safety events, with a 30 percent decline in negative medication events and a 25 percent decrease in complications regarding tests, treatments or procedures. One specific meaningful use principle, computerized provider order entry adoption, resulted in a 14 percent drop in events that ended in unfavorable reactions to a patient, while electronic documentation lowered "near miss" situations by almost a third."[24]

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[24] http://www.exscribe.com/orthopedic-e-news/meaningful-use/ehrs-shown-to-improve-patient-safety-and-reduce-medical-errors.

Studies such as these show that, in safety-critical industries, standardization and process simplification promote consistency, transparency, and accountability, which, in turn, enhances safety outcomes. At the same time, adoption of paperless systems itself promotes and supports standardization and process simplification. Moving the industry from reliance on hard copies to storing, maintaining, and using electronic records and documentation would reduce or eliminate redundancy inefficiencies and increase confidence in XBT airworthiness assessments and integration processes. Wider adoption of electronic records using compatible systems, common data fields and a limited number of formats would address language, legibility, record completeness and other current difficulties encountered during XBTs

5.7.2 ICAO ~~XBT~~ Guidance ~~endorses~~encourages electronic records and documentation

In 2017, ICAO published revisions to various sections of Annex 6 (*Operation of Aircraft*) and Annex 8 (*Airworthiness of Aircraft*) to confirm that operators of various types of aircraft equipment and AMOs may discharge their record keeping obligations using electronic aircraft maintenance records (**EAMRs**). ICAO's endorsement of EAMRs was subject to the general requirement of obtaining "CAA acceptance of the granularity of the content and the form of what constitutes an aircraft record in general, and, thus an EAMR in particular." To facilitate CAA acceptance of EAMRs, **AM.III.7.Attach B** was added "to provide States with common criteria in establishing National regulations for acceptance and usage of EAMR."

AM.III.7.Attach B includes extensive guidance setting out the benefits of enabling operators to use electronic rather than paper-based record systems, including the conclusion that "paper-based practice capabilities are challenged and limited in supporting real time accurate and complete records when faced with the increase of information amount and complexity associated with modern aircraft operation and maintenance."

AM.III.7.8.1.5 ~~notes~~makes clear that electronic records are permissible, noting that "Annex 6, Part I, 8.4.4 and Part III, Section II, 6.4.4 provide that continuing airworthiness records be kept in a form and format that ensures readability, security and integrity of the records at all times. The form and format of the records may include, for example, paper records, film records, **electronic records** or any combination of these." [*emphasis added*]

AM.III.7.8.2.2 provides that the "form, format and content of the continuing airworthiness records for an aircraft should be acceptable to the State of Registry" but goes on to note that operators "should be eligible to implement an electronic continuing airworthiness record system to generate, process, store and archive continuing airworthiness records for their aircraft subject to acceptance of the State of Registry."

The provision then encourages States to "consider the applicable State legislation regarding electronic records generally and the criteria set out in AM.III.7.Attach B~~.~~"

 and lists in ~~AM.III.7.Attach B includes extensive guidance setting out the benefits of enabling operators to use electronic rather than paper-based record systems, including the conclusion that "accepted paper-based practice capabilities are challenged and limited in supporting real time accurate and complete records when faced with the increase of information amount and complexity associated with modern aircraft operation and maintenance."~~

~~The attachment goes on to outline in~~ detail the considerations to be taken into account when formulating the legislation and regulations governing EAMR systems.

Annex I (PART-M) to Commission Regulation (EU) No 1321/20141 and the FAA Airworthiness Circular "Electronic Signatures, Electronic Recordkeeping, and Electronic Manuals Records" can serve as a starting point for the authority and guidance on the use of electronic documentation by CAAs.

5.7.3 Industry moving rapidly to EAMRs

~~Motivated by the safety and efficiency benefits of paperless operations summarized below, over~~Over the last decade the global aviation industry has ~~been transitioning~~transitioned rapidly towards ~~paperless operations including~~EAMRs for "aircraft maintenance activities, parts supply and logistics, as well as the transfer of assets" [see IATA EAMR Guidance, p. 1.] Indeed, the ultimate transition to paperless records is considered virtually inevitable:

> There are aviation industry imperatives that will drive organizations to implementing paperless operations. OEMs for example are already delivering paperless capable aircraft (B787, A350, etc.) and are moving to paperless channels for the provision of approved support data (Manuals, ADs, SBs, MPD updates, Repair Approvals, etc.). . . . So, it's not a matter of "if" but "when" paperless operations will be the only option and legacy paper-based systems will not be acceptable. [see IATA EAMR Guidance, p. 5.]

Individual operators have numerous options for particular electronic recordkeeping systems so an industry group organized by Airlines for America (formerly Air Transport Association of America) has developed Spec 2500 which established standards to assure that paperless records can be transferred from one operator's system to another's. In particular, Spec 2500:

> . . . provides an industry standard for exchanging Aircraft records in standardized electronic formats. It is intended to be used by

[25] XML stands for "extensible markup language" ~~and more~~. More information can be found here and in a form of the same article which appeared in the July-August 2000 edition of the Harvard

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operators who are buying or selling aircraft, or lessors and lessees during a lease return, or by Aircraft or Engine Manufacturers at Initial Delivery. This revision includes an electronic CRATE which is designed to carry various documents and data about the aircraft, engine, or components, as well as the definitions, business rules and XML Schema for the following data sets:

- AD status
- Repair damage status
- Last done/next due maintenance status
- Installed Component Status (including LLPs, Time Controlled Parts, etc.)
- Service Bulletin / Modification / STC Status
- Aircraft / Engine / Major Component Status

Spec 2500 can be ordered here. Operators and lessors seeking detailed guidance on how to adopt or enhance their use of EAMRs should refer to the IATA Guidance Materials which can be purchased [here].

COVID-19 accelerated the advancement of electronic documents in the industry. The use of electronic documents during the pandemic was the key to enabling faster, more efficient and less expensive return to service for aircraft while maintaining the highest levels of safety.

5.7.4 "Repackaging" and "Wet Ink" duplication

CAA acceptance of EAMRs

Recognizing this industry trend towards adoption and exchange of EAMRs and the reality that full realization of the potential safety and cost efficiency benefits depends upon CAA acceptance of paperless records. Many CAAs doMany if not most CAAs already accept EAMRs but a challenge to realization of the full safety and efficiency benefits of EAMRs and other documentation is "acceptance by regulators worldwide." [See IATA EAMR Guidance, p. 2.] - Moreover some

When acting as the Importing CAA in an XBT, some CAAs willthat accept EAMRs but require them to be printed before review or will only provide transfers and authorizations in hard copy form. As elaborated upon below, this has the unfortunate prospect of introducing greater opportunity for errors and oversights and thus potential safety concerns as well asreportedly also require the XBT applicant to "re-package" the EAMRs into paper form. Similarly, although CAAs are increasingly accepting electronic signatuire (e.g., Docusign), many still require "wet ink hard copies" of such things as bills of sale and lease agreements. These antiquated policies undermine the benefits of paperless processes, cause avoidable inefficiencies, as well as

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and in a form of the same article which appeared in the July-August 2000 edition of the Harvard Business Review.

(including CAA resource drains and costs.), and most important increase the potential for safety issues.

In 2017, ICAO published revisions to various sections of Annex 6 (*Operation of Aircraft*) and Annex 8 (*Airworthiness of Aircraft*) in each case to confirm that operators of various types of aircraft equipment and AMOs may discharge their record keeping obligations by use of EAMRs. ICAO's endorsement of EAMRs was subject to the general requirement of obtaining "CAA acceptance of the granularity of the content and the form of what constitutes an aircraft record in general, and, thus an EAMR in particular." To facilitate CAA acceptance of EAMRs, **AM.III.7.Attach B** was added "to provide States with common criteria in establishing National regulations for acceptance and usage of EAMR."

Beyond EAMRs, industry and CAA use and acceptance of paperless certifications and other documents relating to XBTs and other matters would drive process simplifications and thus further enhance cost efficiencies and safety. The building blocks for these further simplifications and efficiencies, however, is digitization.

> Use of electronic records in the medical field has reduced errors previously attributable to illegible handwriting, incomplete records, access to records and difficulty cross-checking various drug-interactions:
>
> A study conducted by the Carnegie Mellon University Living Analytics Research Centre added that enhanced EHR [electronic health record] adoption has accounted for a 27 percent reduction in aggregated patient safety events, with a 30 percent decline in negative medication events and a 25 percent decrease in complications regarding tests, treatments or procedures. One specific meaningful use principle, computerized provider order entry adoption, resulted in a 14 percent drop in events that ended in unfavorable reactions to a patient, while electronic documentation lowered "near miss" situations by almost a third."[24]

Studies such as these show that, in safety-critical industries, standardization and simplification promote consistency, transparency, and accountability, which, in turn, enhances safety outcomes. A powerful building block for the creation of a standardized XBT process is to leverage electronic tools. Moving the industry from reliance on hard copies to storing, maintaining, and using electronic records will reduce barriers to entry, eliminate redundancy inefficiencies, and create confidence in the XBT process. Wider adoption of electronic records using compatible systems, common data fields and a limited number of formats would address language, legibility, record completeness and other current difficulties encountered during cross-border changes of aircraft registration and nationality.

Annex I (PART-M) to Commission Regulation (EU) No 1321/20141 and the FAA Airworthiness Circular "Electronic Signatures, Electronic Recordkeeping, and

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[24] http://www.exscribe.com/orthopedic-e-news/meaningful-use/ehrs-shown-to-improve-patient-safety-and-reduce-medical-errors.

~~Electronic Manuals Records" can serve as a starting point for the authority and guidance on the use of electronic~~ ~~records by CAAs.~~

5.8   ~~5.8~~ Standardized and harmonized forms

While digitalization is the first step towards a greater efficiency in the XBT process, electronic records on their own are not sufficient to minimize error ~~and oversight. Industry members often attribute lags in the registration process as stemming from Importing CAAs insisting that an applicant "re-package" the EAMRs into a particular paper form.   Such "re-packaging" does not alter the underlying information but creates delays and process dwell time. As such,~~. digitization must be coupled with standardized forms and formats. Industry adopted forms and formats will allow the Importing CAAs and Exporting CAAs to:

1.   quickly identify issues which do not conform to the standard practice;

2.   establish a baseline for acceptance;

3.   develop expertise based on such baseline, which will decrease the dependency on delegation; and

4.   more accurately identify resources required for the review process.

Section 3.1 of Attachment B to AM.III.7 observes the "basis of any electronic record and its related electronic signature identity management system is trust." Resistance to full acceptance EAMRs often stems from a failure to trust the content or source of the information. Harmonized forms would resolve these issues for CAAs by establishing an industry accepted baseline which would create confidence in the information captured, whether in paper or electronic format. In addition, an external validator could be engaged to legitimatize the data [see Electronic Platforms].

Incident Clearance Statement

The purpose of the incident clearance statement (ICS) is to remove the focus from whether or not an aircraft/engine/part has been subjected to an accident or incident and instead declare that the aircraft/engine/part has been deemed acceptable   for   continued   use.
Two document templates have been designed, one to cater for aircraft, the other for engines. These documents are intended to act as an industry acceptable common standard having relevance for the requirements of the commercial aviation industry.

- Aircraft Incident Clearance Statement (pdf)

- Engine Incident Clearance Statement (pdf)

5.9   5.9 Electronic platforms

The pinnacle of electronic records will be achieved through electronic platforms which will allow the necessary stakeholders to store, view, change, manipulate, authorize, and accept aircraft documents for the XBT process. Already, there are many different forms of platforms which are commercially viable and reliable. While not all industry stakeholders will have the necessary infrastructure and resources to accommodate electronic platforms, as with any technology, as adoption levels increase, the cost of entry will decrease.

ICAO, by means of the XBT-TF, is developing a centralized web-based platform which will focus on (1) information and guidance for the Owner and (2) features which will enable the XBT process to be conducted electronically. The aim of this tool is to:

1.   enhance the efficiency of the XBT process;

2.   involve and Handbook all parties through the steps in the XBT process and list their respective responsibilities; and

3.   permit the listing, sharing, status, and, in due course, the provision of, information and material required by the XBT process.

This platform will put the onus on the Owner to initiate the process, which will allow the Importing CAAs and Exporting CAAs to rely more heavily on the resources and expertise of the Owner.

In addition to the above noted platforms, private industry is also working independently to improve data transferability. For example:

(i) AMOS is currently developing an export framework to allow data to be transferred more easily to the onboarding lessee.

(ii) Blockaviation[25][26] [27]is creating a central, standardised global registry for aircraft records, which plans to make these records searchable and retrievable across various platforms from a single interface. Their aim is to

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[25] https://www.aeroinside.com/15639/interview-with-john-roberts-from-blockaviation

https://www.forbes.com/sites/martinrivers/2021/11/10/how-blockchain-technology-can-revolutionize-commercial-aircraft-trading/?sh=67b4c666e532.

[26] https://www.aeroinside.com/15639/interview-with-john-roberts-from-blockaviation

https://www.forbes.com/sites/martinrivers/2021/11/10/how-blockchain-technology-can-revolutionize-commercial-aircraft-trading/?sh=67b4c666e532.

[27]   https://www.aeroinside.com/15639/interview-with-john-roberts-from-blockaviation

https://www.forbes.com/sites/martinrivers/2021/11/10/how-blockchain-technology-can-revolutionize-commercial-aircraft-trading/?sh=67b4c666e532.

replace paper aircraft documents with a digital logbook that's remotely accessed and continually updated. As discussed above, much of the resistance to the acceptance of full electronic records stem from trust issues. Blockaviation addresses these trust issues through blockchain technology which creates a secure network. By ensuring that there is an audit trail behind each electronic record, any increased risk of fraud relating to electronic records versus paper records is eliminated. The focus of systems such as Blockaviation will likely be on new aircraft, given that OEMs are starting to ensure that new aircraft are equipped with Spec 2500 compliant digital records. Through time, and early adopters such as SMBC and Aircastle, the volume of trusted, standardized, electronic records should be able to ensure that such format is the default of all electronic records. The next piece to its development will be on ensuring that established industry governance can be maintained.

(ii)   Given the importance of the issue of electronic records to XBT, Honeywell formed a working group to discuss the change process. As a result, Honeywell's GoDirect Trade integrated its aircraft record generation into its digital blockchain ledger, such that the actual form data is stored "on chain." The advantage of this system is that it will enable a user to rebuild missing documents by inputting the part number and serial number into the system.

5.10 ~~5.10~~ Recognition of prior CAA certifications

The ICAO XBT Guidance clearly supports the notion that reviews conducted during the issuance of an Export CofA should be limited to the specific airworthiness requirements that are directly relevant to the certificate's purpose. The guidance encourages a streamlined and focused approach to ensure that the Export CofA process is efficient and effective. Imposing requirements or reviewing items that are not part of the standard criteria for an Export CofA can lead to inefficiencies and potential disputes between the exporting and importing authorities. Additionally, it ensures that the process remains focused on the key criteria necessary for the safe transfer of the aircraft.

The ICAO XBT Guidance highlights the importance of both the exporting and importing authorities fulfilling their responsibilities with due diligence. Strict adherence to established procedures for the ECofA and the import process is crucial. Any deviation by either party from these procedures can cause significant delays, add unnecessary costs, and create confusion. Such actions disrupt the standardised processes designed to facilitate the international transfer of aircraft and ensure consistent safety and compliance.

The impact of these deviations goes beyond procedural issues; they can affect the aircraft's operational readiness, lead to financial burdens due to prolonged grounding or additional inspections, and strain relationships between regulatory bodies in different countries. Upholding the integrity and efficiency of the XBT process requires that all parties respect these established procedures.

Examples of issues arising from authorities reviewing items that are not part of the XBT process contemplated by the ICAO XBT Guidance include:

- Requiring documentation on a full "back-to-birth basis
- Not accepting digital records (See Section 5.7)
- Requiring changes to cosmetic conditions of the aircraft unrelated to safety or airworthiness
- Insisting on implementation of all manufacturer's service bulletin recommendations, even when not mandated by the Exporting CAA
- Reviewing or requiring the owner/operator to provide extended warranties, service contracts, or other commercial terms unrelated to the aircraft's airworthiness
- Incorrectly stating that the aircraft complies with the Importing CAA's type certificate requirements when it does not (Note that the new ICAO XBT Guidance eliminates the previous requirement that an ECofA opine as to the aircraft's compliance with the Importing CAA's type certificate requirements.)
- Using the ECofA as a de facto "open items" list, which can delay the acceptance of the ECofA by the Importing CAA or result in the provision of incorrect information about the type certification basis

~~5.11~~ 5.11 Harmonization of certain airworthiness elements

[TO COME: DISCUSSION OF RECOMMENDATIONS FROM 2011 SGI STUDY]

5.12 ~~5.12~~ Artificial intelligence

[TO COME]

5.13 ~~5.13~~ Post-XBT briefings

[TO COME]

6.0 ~~6.0~~ SPECIAL SITUATIONS

6.1 ~~6.1~~ Importing State not know at time of deregistration & export

[TO COME]

6.2 ~~6.2~~ Exporting State does not issue ECofAs but Importing State requires one

[TO COME]

APPENDIX A

GLOSSARY

2011 SGI Study: has the meaning set forth in the Forward to this Handbook.

83*bis* Manual: means the ICAO *Manual on the implementation of Article 83 bis of the Convention on International Civil Aviation* (Doc 10059), First Edition, 2017.

Aircraft: means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Aircraft objects: under Article I, para. 2 (c) of the CTC Aircraft Protocol, airframes, aircraft engines and helicopter.

Aircraft Registration Office: means the term used when referring to the office or individual responsible for the registration and deregistration of an aircraft in accordance with the Chicago Convention.

Airworthiness Manual: means the ICAO *Airworthiness Manual* (Doc 9760), Fourth Edition, 2020, together with the amendments thereto expected to be published by ICAO during 2023 and which will be incorporated into the Fifth Edition but may be relied upon from the date of publication.

Airworthy: means the status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.

AMO: means a certified airworthiness maintenance organization.

Aviation Inspector Manual: means the ICAO *Manual on the Competencies of Civil Aviation Safety Inspectors* (Doc 10070), First Edition, 2016.

CABRs: has the meaning set forth in Section 4.5.

Cape Town Convention: means collectively, the *Convention on International Interests in Mobile Equipment*, and the *Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Aircraft Objects*, each concluded in Cape Town, South Africa, on November 16, 2001, together with all regulations and procedures issued in connection therewith, and all other rules, amendments, supplements, modifications, and revisions thereto, as in effect under the laws of the applicable jurisdiction.

CDCL: means a certified designee confirmation letter, a document submitted by the authorized party identified in an IDERA that transfers the right to deregister and export the aircraft covered by the related IDERA and is intended to have the same meaning in this Handbook as the meaning set forth in Section 4.2.1 of the Registration Manual.

Chicago Convention: means the *Convention on International Civil Aviation*, concluded in Chicago, United States of America, on December 7, 1944.

Continuing airworthiness: means the set of processes by which an aircraft, engine, propeller or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life.

COSCAPs: means the Cooperative Development of Operational Safety and Continuing Airworthiness Programmes, through which ICAO facilitates assistants to ICAO Member States which have challenges in providing safety oversight and resolving their safety deficiencies due to insufficient financial, technical and/or qualified human resources.

CTC Aircraft Protocol: means the *Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Aircraft Objects*, each concluded in Cape Town, South Africa, on November 16, 2001, and in the case of any particular jurisdiction, including its declarations.[2728]

CTC CAA: means the CAA of a jurisdiction that is a party to the Cape Town Convention and which has made a declaration under Article XXX(1) of the CTC Aircraft Protocol.

CTC IR: means the international registry established under the Cape Town Convention (see Section 3.2.2).

CTC Official Commentary: means the Official Commentary on the Cape Town Convention on International Interests in Mobile Equipment and Protocol thereto on Matters Specific to Aircraft Equipment, Fifth Edition, by Professor Sir Roy Goode.

dwell time: the time during a process when no progress is made while waiting for an input such as a missing document or an inspection that has not been anticipated or scheduled in advance. See discussion in the Forward to this Handbook.

EAMR: means electronic aircraft maintenance records.

ECofA: means export certificate of airworthiness.

Ex-Operator: means an exiting aircraft operator.

Exporting CAA: means an exporting aviation authority.

GASOS: means the Global Aviation Safety Oversight System, being a voluntary ICAO assessment programme for safety oversight organizations and Accident Investigation Organizations.

[2728] Such term to have the same meaning as used in the definition of Irrevocable De-registration and Export Authorisation (IDERA) in the Registration Manual.

Geneva Convention: means the Convention on International Recognition of Rights in Aircraft signed in Geneva on June 19, 1948 (see Section 3.2.4 of this Handbook).

IATA EAMR Guidance: has the meaning set forth in Section 5.7 under "ICAO XBT Guidance".

ICAO XBT Guidance: has the meaning given to it in the Forward and includes Airworthiness Manual and/or the Registration Manual, as the context dictates.

Importing CAA: means an importing aviation authority.

International Registry: means the international registry created pursuant to the CTC Aircraft Protocol.

Irrevocable De-registration and Export Authorisation or **IDERA:** means a document contemplated by the CTC Aircraft Protocol that may be provided by an aircraft operator (or other person in whose name an aircraft is registered) to the owner of an aircraft or a creditor having a secured interest in the aircraft which authorizes such owner or creditor (or a certified designee of either) to apply for deregistration and export of the aircraft and, if the aircraft is registered in a jurisdiction.

New Operator: means a new aircraft operator.

Owner: means an aircraft owner.

Registration Manual: means the ICAO *Manual on Registration and Deregistration of Aircraft* (Doc 10142), First Edition, 2022.

RCX Reports: means the monthly reports submitted by AWG lessor members relating to XBTs completed in the preceding month (see discussion at page 4 of the Handbook).

SPF: means a special flight permit. See Section 3.4 and Appendix D.

State of Registry: means the State in which the Aircraft is registered in accordance with the Chicago Convention.

State Party to the Aircraft Protocol: means a State which has ratified the CTC Aircraft Protocol and made a declaration, its pursuant to its Article XXX(1), that it will apply Article XIII of the CTC Aircraft Protocol.

XBT: means cross-border change of aircraft registration and nationality.

XBT–TF: means the Cross-border Transferability Task Force formed pursuant to the 39th ICAO General Assembly.

Abbreviations and Acronyms

AD	airworthiness directive
AIRP	ICAO Airworthiness Panel
AWG	Aviation Working Group
BASA	bi-lateral aviation safety agreement
CAA	state civil aviation authority
CABRs	calendar-based import and operational restrictions
CAMO	continuing airworthiness maintenance organization
EAMR	electronic aircraft maintenance records
EASA	European Union Aviation Safety Agency or its successor entity
FAA	Federal Aviation Agency or its successor entity
IATA	International Air Transport Association or its successor entity
ICAO	International Civil Aviation Organization or its successor entity
MP	maintenance provider
MPD	maintenance planning document
MRO	maintenance, repair and overhaul
OEM	original equipment manufacturer
RMA	regional monitoring agency (see section 3.7.2)
RSOOs	regional safety oversight organizations
RTS	"return to service" of an aircraft, including asset preservation aspects
SARP	ICAO Standards and Recommended Practices
SB	service bulletin

APPENDIX B

AWG STATEMENT OF PRINCIPLES

STATEMENT ON CROSS BORDER TRANSFERABILITY OF AIRCRAFT PRINCIPLES

RELEASE DATE: 7 DECEMBER 2021

(i)   This document (this **document)** comprises a statement on guiding principles (the **principles,** and, each, a **principle)** which the Aviation Working Group **(AWG)** recommends in order to facilitate the `cross-border transfer' of aircraft while maximizing safety and efficiency. That safety objective reflects and reinforces the first principle of aviation. That efficiency objective seeks to ensure resources are focused on safety-related activities.

(ii)   A cross-border transfer (an **XBT)** is a change of nationality registration of the aircraft in accordance with the framework established by international aviation law (Chicago Convention of 1944) and the law of the States where the aircraft was registered **(exporting State)** and will be registered **(importing State).**

(iii)   This statement of principles has been prepared by AWG as an elective guidance tool.[2829] It is designed for use by, and benefit of, regulators, leasing companies, and airlines.

(iv)   Where this document is referred to, including in correspondence or legal documentation, that reference should be to the **AWG statement on cross border transferability of aircraft principles, released 7 December 2021,** or, in short, the **AWG XBT principles, 7.12.21.** If this document is amended, an updated reference will be included.

(v)   The principles are as follows:

Principle 1:   Use of prevailing best practices

An XBT should be effected in accordance with prevailing best practices, as reflected in leading guidance materials. That means, in a coordinated manner, the guidance materials produced by the International Civil Aviation Organization **(ICAO)** and the AWG practitioners' Handbook, including their respective commentary, forms and checklists.

[2829] This document is not intended to, and should not be construed as, representing the policies, positions or views of, nor an agreement among or binding upon, the Aviation Working Group's members, or any of them, either as a general matter or with regard to any specific circumstance.

Given the nature of aviation, all such practices should be global. Specific national practice deviations should be limited, explicitly justified, predictably and consistently applied, and transparent.

Principle 2: Use of standardized and simplified procedure⁻

An XBT should be effected in accordance with standardized and simplified procedures. Studies have shown that in safety-critical industries standardization and simplification promote consistency, transparency, and accountability, which, in turn, enhances safety outcomes.

Specific national procedure deviations should be limited, explicitly justified, predictably and consistently applied, and transparent.

Principle -3. Harmonization to avoid non-safety-related inefficiency

An XBT should involve procedures harmonized between the exporting State and importing State to avoid duplication and regulatory overlap, which adds substantial time and costs to the system without enhancing safety outcomes. That includes unnecessary or out-of-sequence inspections, modifications, and repairs. Following principles 1 and 2 minimizes the risk and effects of such duplication and overlap.

Direct, active, and structured communication among the importing State, the exporting State, and the other parties involved in an XBT further reduces such risks and effects.

Principle 4: Expeditious and digitized procedures

An XBT should be effected with maximal expedition, meaning the minimum time required by safety objectives. Such expedition reduces regulatory and industrial resources used, and thus the costs to, the air transport sector, allowing those resources to focus on safety-related activities.

All XBT procedures susceptible to digitization, and the overall XBT process itself, should be digitized.

Principle 5: Use and recognition of electronic records

Aircraft maintenance and other records should be kept in electronic formats, and regulators should accept such electronic records without requiring duplicative paper records. Such electronic records enhance transparency, safety, and security, in addition to supporting global sustainability objectives.

Such records should be kept in standardized formats to maximize interchangeability between operators. Protocols should be developed to permit non-operator stakeholders, such as regulators and lessors, real-time access to aircraft electronic maintenance records (though not operators' commercial or propriety data).

Principle 6: Use of task delegation

The use of delegation to qualified third parties in an XBT should be encouraged, and national regulation should facilitate and recognize such delegation.

Delegation allows resources and expertise to be pooled and maximized, minimizes regulatory costs, and prevents avoidable delay. It is important in addressing resource constraints, whether structural, most commonly but not exclusively in States with few XBTs, or situational, in States with many. Main areas of delegation include import due diligence and ongoing maintenance and airworthiness oversight.

Determinations and certifications made by qualified airworthiness organizations and individuals should be given *prima facie* acceptance, subject to non-duplicative oversight and audit.

National regulation should facilitate and recognize such delegation.

Principle 7:   Data-based import criteria

In an XBT, import criteria should be based on conformity of the aircraft to OEM-derived data applicable to the aircraft type design, rather than restrictions based on aircraft calendar age. Studies have shown that the former, not the latter, correlates to safety for aircraft up to at least 27 years.

States should reconsider existing calendar age-based import restrictions given such studies and improvements in materials and oversight capabilities since initial promulgation of such restrictions. Delegations, encouraged by principle 6, will help address any resource or expertise issues arising in connection with the import or regulation of older aircraft.

Principle 8:   Minimizing time of non-registration

The time between the de-registration of an aircraft from the exporting State and its re-registration by an importing State should be minimized. That minimizes the costs arising where an unregistered aircraft has no assessable standard of airworthiness.[2930] Regulatory coordination, encouraged by principle 3, will help minimize that time.

This principle 8 may not be used to limit or otherwise affect the automaticity of IDERA-based de-registration under the Cape Town Convention, which, where applicable, is a binding international law obligation.

   (vi)   AWG may issue revisions to this statement and/or supplemental materials to aid in or facilitate its use, interpretation, or application.

[2930] ICAO XBT Guidance (1) notes that placing an aircraft on a registry does not require or guarantee that the aircraft will be deemed airworthy and (2) suggests temporary or provisional registration as alternatives to delaying registration pending an airworthiness determination.

APPENDIX C

XBT-TF FLOWCHART OF A TYPICAL XBT

The following chart may also be found in Section 6.2 of the Registration Manual (*Cross-Border Transferability Process).*

Information in an oval represents a start or end point of the XBT process

An arrow shows a relationship between the shapes

Information in diamond indicates that a decision needs to be followed to proceed with the next step

Information in a rectangle represents a process or action to be taken
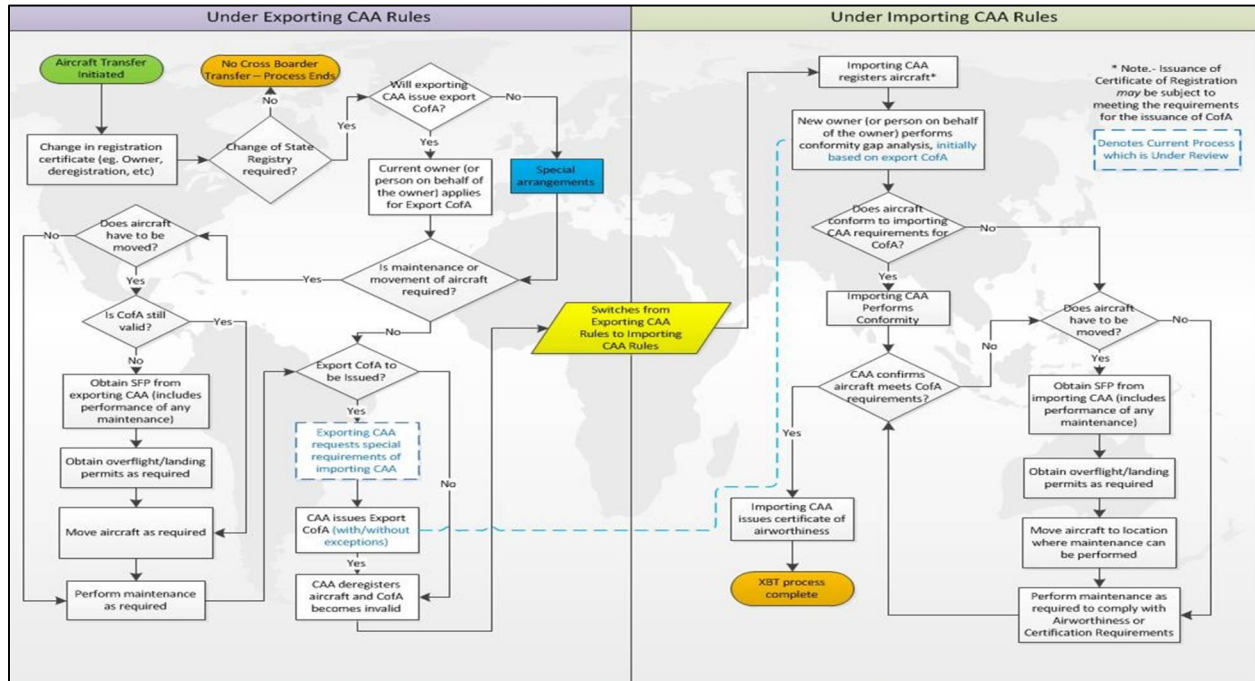
APPENDIX D

~~RESERVED FOR FUTURE USE~~SPECIAL FLIGHT PERMITS DISCUSSION

Summary:

Under the Chicago Convention and ICAO Doc 8335 (Alexey), special flight permits (**SFPs**) are generally issued by the State of Registry. If an aircraft has been de-registered and thus lacks a State of Registry, the former State of Registry or the State of the Operator may issue an SFP if mutually agreed and with appropriate safeguards. The Convention does not explicitly prohibit this, but it requires State consent and oversight to ensure airworthiness and safety.

1. Chicago Convention Framework

The Chicago Convention (1944) does not use the exact term "special flight permit," but the relevant provisions are interpreted through ICAO guidance materials and State practice:

- Article 31: Requires that all aircraft engaged in international navigation be provided with a valid Certificate of Airworthiness issued or rendered valid by the State of Registry.

- Annex 8 (*Airworthiness of Aircraft*): Introduces the concept of airworthiness standards, including non-standard airworthiness approvals like ferry permits (or SFPs), particularly in cases where aircraft are not fully compliant with airworthiness standards.

- Annex 6 (*Operation of Aircraft*) and Annex 7 (*Aircraft Nationality and Registration Marks*) both assume that the aircraft has a registered nationality — *i.e.*, a State of Registry.

Thus, per ICAO conventions, an SFP is typically the responsibility of the State of Registry.

2. Role of ICAO Doc 8335 (Alexey Reference)

ICAO Doc 8335 – Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (often associated with "Alexey" in practice or training contexts) provides procedural guidance. Key points:

- States may issue Special Flight Permits when aircraft are temporarily unairworthy but safe to fly (e.g., for repositioning or maintenance).

- The State of Registry (or the State that had issued the original airworthiness certificate) is primarily responsible.

- If deregistration has occurred, the issuing State must ensure compliance with Annex 8 safety standards and coordinate with any State whose airspace will be used.

3. Problem of No State of Registry

If an aircraft is de-registered and therefore lacks a State of Registry, the following issues arise:

- It technically lacks legal nationality under Annex 7, and thus no automatic ICAO-recognized oversight authority exists.

- Article 18 of the Chicago Convention prohibits dual registration but is silent on the implications of deregistration until new registration occurs.

4. Who Can Issue the SFP if No Registry Exists?

While the Chicago Convention does not explicitly authorize a State to issue an SFP after deregistration, in practice:

- The former State of Registry may issue a non-standard SFP, especially for purposes like export or ferry flights, if done under bilateral agreement or under national law.

- The State of the Operator (as defined under Annex 6) may also be involved, particularly if the operator is based there and the aircraft is being moved for maintenance, delivery, or disposal.

- In both cases, issuance is subject to State discretion and coordination with other overflown States.

Example:

- Under U.S. FAA regulations, the FAA may issue a Special Flight Authorization under FAR 21.197 for unregistered aircraft under specific conditions.

- EASA similarly may allow special permits for aircraft not registered in EASA member states, usually in coordination with the last State of Registry.

5. Legal Constraints and Safety Requirements

Although not explicitly forbidden, the issuance of an SFP by a non-registry State must:

- Be done in the interest of safety and public order;

- Ensure that airworthiness is not compromised (Annex 8);

- Be coordinated with ICAO member States whose airspace is used (Chicago Convention, Article 5 & 6).

6. Conclusion

There is no express prohibition in the Chicago Convention preventing the former State of Registry or State of the Operator from issuing an SPF for a de-registered aircraft. However, such issuance must:

- Be justified under national laws;

- Adhere to ICAO standards (especially Annex 8);

- Be coordinated with affected States.

Such situations often fall into "grey zones" of international air law, resolved through State practice and bilateral agreements, not explicit ICAO provisions.

APPENDIX E

ADVANCE PLANNING AND CONSULTATION CONSIDERATIONS

NOTE: This Appendix is under development and will be a checklist that consolidates matters noted in the Handbook text as being useful for XBT parties (Exporting and Importing CAAs, Owner/Lessor, outgoing and incoming Operators/Lessees) to consider in advance to facilitate smooth and accurate XBT transactions.

Lessor Considerations:

If a Transition State is to be the first Importing State, check whether the proposed Transition State has capacity, especially if there are unusual circumstances prevailing. E.g., when aircraft were coming out of Russia after the imposition of sanction in 2022, commonly used Transition States such as Austria had substantial volume resulting in backlogs.

Applications for export certificates of airworthiness (and special flight permits that are known to be needed or might be needed) should be filed as early as possible. Current ICAO XBT Guidance does not specify in detail what supporting documentation may be required, so applicants confirm with the applicable Exporting State what must accompany these applications.

APPENDIX F

RESERVED FOR FUTURE USE

APPENDIX G

LESSOR/OWNER XBT CHECKLIST

http://awg.aero/wp-content/uploads/2025/03/Example-of-OwnerLessor-XBT-checklist.pdf

APPENDIX H

CAMO CHECKLIST

RESERVED FOR FUTURE USE

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CAMO ARC Checklist template

http://awg.aero/wp-content/uploads/2025/09/CAMO-ARC-Check-List-Template.pdf

CAMO ARC Check List Physical Review Template

http://awg.aero/wp-content/uploads/2025/09/CAMO-ARC-Check-List-Physical-Review-Template.pdf

APPENDIX I

~~RESERVED FOR FUTURE USE~~COUNTRY SPECIFIC ITEMS OF INTEREST

State	Acting As	Notes
France		
	Exporting State	Receipt of export CofA can vary from 1 to 4 weeks from time of application
	Importing State	
	Transition State	
Oman		
=	Exporting State	Receipt of export CofA requires minimum of 4 weeks from time of application
	Importing State	=
	Transition State	=
Turkey		
=	Exporting State	=
	Importing State	Requires 5-7 business days to provide CofA, CoR
		Hesitant to carry out inspection prior to de-registration
	Transition State	=

APPENDIX J

INDEX TO FORMS IN ICAO XBT GUIDANCE

Deregistration

- **Application to Deregister an Aircraft**

- **Checklist for Processing an Application for Deregistration of Aircraft**

- **Certificate of De-Registration (effective 11/23; initially optional but likely to become required in due course)**

- **Export Certificate of Airworthiness (deletes requirement that Exporting State assess airworthiness under Importing State regulations)**

Registration

- **Application Form for a Certificate of Registration**

- **Checklist for Processing an Application for Registration of Aircraft**

- **Certificate of Registration (adds requirement to identify aircraft owner even in jurisdictions that use operator-based registries; 11/26 effective date)**

- **Application Form for a Special Flight Approval**

Airworthiness Assessment

- **Certificate of Airworthiness (adds reference to List of nationality marks, national emblems and common marks)**

- **Release Certificate**

Delegation

- **Code of Conduct for Designees**

- **Conflict of Interest/Disclosure Form**

[Link-to-previous setting changed from off in original to on in modified.].

APPENDIX K

COUNTRY SPECIFIC ITEMS OF INTEREST

State	Acting As	Notes
France		
	Exporting State	Receipt of export CofA can vary from 1 to 4 weeks from time of application
	Importing State	
	Transition State	
Oman		
-	Exporting State	Receipt of export CofA requires minimum of 4 weeks from time of application
	Importing State	-
	Transition State	-
Turkey		
-	Exporting State	-
	Importing State	Requires 5-7 business days to provide CofA, CoR
		Hesitant to carry out inspection prior to de-registration
	Transition State	-

APPENDIX K~~APPENDIX L~~

EXAMPLES OF DELEGATION LEGISLATION & REGULATIONS

Civil Aviation Safety Authority of Australia, provides a list of delegates authorized to provide airworthiness services to the general public (https://www.casa.gov.au/licences-and-certification/standard-page/airworthiness-delegate-search).

The FAA of the United States has a delegate program for routine certification tasks (https://www.faa.gov/other_visit/aviation_industry/delegates_delegations/about/#q1).

Transport Canada has processes for the delegation of functions For Design Approval Representatives (https://www.tc.gc.ca/eng/civilaviation/certification/guidance-505-505-001-917.htm#2_1) and Airworthiness Control System for a Delegated Organization (Aircraft Certification) (https://www.tc.gc.ca/eng/civilaviation/opssvs/managementservices-referencecentre-acs-500-505-002-484.htm).

APPENDIX M

CTC PROVISIONS IMPACTING AN XBT

APPENDIX L~~APPENDIX N~~

~~HOW PROCESS SIMPLIFICATION AND HARMONIZATION PROMOTES~~ PROCESS-ORIENTED WORKFLOWS AND IMPROVEMENT METHODOLOGIES PROMOTE SAFETY & EFFICIENCY

Introduction

In today's complex organizational environment, the difference between success and failure often lies not in the capabilities of individual performers, but in the systematic approach to work itself. The transition from ad-hoc, personality-dependent operations to structured, process-oriented workflows represents one of the most significant transformations organizations can undertake. This discussion examines the fundamental principles of process-oriented thinking and explores proven methodologies for continuous improvement, with particular emphasis on how standardized processes enhance safety and consistency, especially in episodic or variable-staffing scenarios.

Understanding Process-Oriented Workflows

The Foundation of Process Thinking

A process-oriented approach views work as a series of interconnected activities that transform inputs into desired outputs. Rather than focusing solely on individual performance or departmental silos, this perspective emphasizes the systematic flow of work through an organization. As noted by the American Society for Quality, "Six Sigma views all work as processes that can be defined, measured, analyzed, improved, and controlled." This fundamental principle applies across all organizational functions, from manufacturing operations to service delivery and administrative tasks.

The shift from task-oriented to process-oriented thinking represents a paradigm change. Traditional task-oriented approaches often rely heavily on individual expertise, institutional memory, and informal knowledge transfer. While these elements remain valuable, they create vulnerabilities when key personnel are unavailable, when processes are performed infrequently, or when new team members must quickly become proficient.

Process-oriented workflows, by contrast, create explicit knowledge structures that capture not only what needs to be done, but how it should be done, in what sequence, with what resources, and to what standards. This systematic approach provides several critical advantages:

Predictability and Reliability: When work follows established processes, outcomes become more predictable. Variations in performance typically stem from process design issues rather than random fluctuations, making improvement efforts more focused and effective.

Knowledge Preservation: Documented processes capture organizational learning and prevent the loss of critical knowledge when experienced personnel leave or move to different roles.

Scalability: Well-designed processes can be replicated across different teams, locations, or time periods without requiring extensive retraining or customization.

Continuous Improvement Foundation: Standardized processes provide the baseline necessary for meaningful measurement and improvement efforts.

Process Design Principles

Effective process design requires careful attention to several key principles. First, processes must be designed with the end user in mind, whether that user is an external customer or an internal colleague. This customer-centric approach ensures that process steps add value rather than merely consuming resources.

Second, successful processes balance standardization with necessary flexibility. While consistency is crucial, processes must accommodate legitimate variations in context, resources, or requirements. The goal is "flexible standardization" rather than rigid uniformity.

Third, effective processes incorporate feedback mechanisms that enable continuous learning and adjustment. These feedback loops can be formal (scheduled reviews, performance metrics) or informal (user observations, exception reports), but they must be systematic rather than sporadic.

Process Improvement Methodologies

Six Sigma: Statistical Rigor in Process Improvement

Six Sigma represents one of the most influential process improvement methodologies, emphasizing data-driven decision-making and statistical analysis to minimize process variation and defects. Developed in 1986 by Motorola engineer Bill Smith, it uses data-driven benchmarks to evaluate and optimize processes. The methodology's name refers to the statistical goal of achieving no more than 3.4 defects per million opportunities, representing near-perfect performance.

The Six Sigma approach follows a structured methodology known as DMAIC (Define, Measure, Analyze, Improve, Control):

Define: Clearly articulate the problem, establish project scope, and identify customer requirements. This phase ensures that improvement efforts address genuine problems rather than symptoms or perceived issues.

Measure: Establish baseline performance metrics and data collection systems. This phase often reveals that organizations lack adequate measurement systems, leading to improved data infrastructure as a secondary benefit.

Analyze: Use statistical tools to identify root causes of process variation and defects. This analysis phase distinguishes Six Sigma from simpler problem-solving approaches by emphasizing empirical evidence over assumptions.

Improve: Develop and implement solutions based on the analysis findings. Solutions are typically piloted and validated before full-scale implementation.

Control: Establish monitoring systems and procedures to sustain improvements over time. This phase recognizes that improvements often decay without systematic reinforcement.

Six Sigma's strength lies in its statistical rigor and comprehensive approach to process improvement. However, its complexity can make it challenging to implement in smaller organizations or for less complex processes. The methodology works best when applied to processes with sufficient volume and complexity to justify the analytical investment required.

Kaizen: Continuous Improvement Through Small Steps

Kaizen, derived from Japanese words meaning "change for good," represents a fundamentally different approach to process improvement. Kaizen is a Japanese word that combines the ideas of "change" and "goodness," which translates to "improve for the better." Rather than focusing on large-scale, dramatic changes, Kaizen emphasizes continuous, incremental improvements made by those closest to the work.

The Kaizen philosophy rests on several key principles:

Employee Involvement: Those who perform the work daily are best positioned to identify improvement opportunities. Kaizen actively solicits and implements suggestions from frontline employees.

Small, Continuous Changes: Rather than waiting for major improvement initiatives, Kaizen encourages ongoing small improvements that accumulate over time.

Waste Elimination: Kaizen aims to eliminate waste in all systems of an organization through improving standardized activities and processes. This includes waste of time, materials, motion, and effort.

Standardization: Improvements are standardized and documented to prevent regression and enable further improvement.

Kaizen events, typically spanning one to five days, bring together cross-functional teams to focus intensively on specific improvement opportunities. These events generally span from 1 to 5 days and involve key process participants focusing on solving a narrowly scoped process improvement opportunity. These structured

events can generate significant improvements while building improvement capabilities within the organization.

The combination of Kaizen with Six Sigma creates a powerful improvement framework. By understanding the basics of Kaizen, practitioners can integrate this method into their overall Six Sigma efforts. While Six Sigma provides the analytical rigor for complex problems, Kaizen ensures that improvement becomes part of the organizational culture rather than an occasional project.

Lean Methodology: Eliminating Waste and Maximizing Value

Lean methodology, originally developed in manufacturing but now applied across industries, focuses on identifying and eliminating waste while maximizing customer value. Other process improvement methods like Six Sigma work to minimize the amount of defects, while TQM works to decrease inefficiencies. Lean identifies eight types of waste: overproduction, waiting, transportation, inappropriate processing, unnecessary inventory, unnecessary motion, defects, and unused employee creativity.

The Lean approach emphasizes value stream mapping, which visualizes the flow of materials and information required to deliver products or services to customers. This mapping process often reveals significant opportunities for improvement that are invisible when processes are viewed in isolation.

Key Lean principles include:

Value Definition: Clearly defining value from the customer's perspective ensures that process improvements focus on activities that customers are willing to support.

Value Stream Identification: Mapping the complete flow of value-creating activities reveals waste and improvement opportunities.

Flow Creation: Eliminating barriers to smooth work flow reduces cycle times and improves responsiveness.

Pull Systems: Rather than pushing work through processes based on schedules, pull systems respond to actual customer demand.

Perfection Pursuit: Lean views perfection as an aspiration that drives continuous improvement efforts.

Document Standardization: Creating Consistent Information Architecture

Document standardization often receives less attention than other process improvement tools, but it plays a crucial role in process effectiveness. Standardized documentation ensures that process information is consistently formatted, easily accessible, and regularly maintained.

Effective document standards typically address:

Format Consistency: Standard templates, headers, and organization schemes make documents easier to navigate and understand.

Version Control: Clear versioning procedures prevent confusion about which document version is current and authorized.

Review and Approval Processes: Systematic review procedures ensure that documents remain accurate and current.

Access and Distribution: Clear procedures for document access ensure that users can find and use current information when needed.

Training Integration: Documents should be designed to support training and onboarding activities, not merely serve as reference materials.

Document standardization becomes particularly important in episodic processes where users may not interact with procedures regularly. Well-designed documents can serve as job aids that guide infrequent users through complex procedures without requiring extensive memorization or training.

The Power of Checklists in Process Management

Checklists as Cognitive Tools

The humble checklist represents one of the most powerful yet underutilized process improvement tools. Dr. Atul Gawande's groundbreaking work, "The Checklist Manifesto," demonstrates how simple checklists can dramatically improve performance in complex, high-stakes environments. This article by bestselling author and surgeon Atul Gawande illustrates the complexity of intensive care and profiles Peter Pronovost, the Johns Hopkins intensivist and safety leader whose efforts to standardize safety practices led to remarkable reductions in ICU harm in Michigan hospitals.

Checklists serve multiple cognitive functions:

Memory Support: Even experts can forget critical steps, particularly in stressful or infrequent situations. Checklists provide external memory support that prevents omissions.

Communication Tool: Checklists can facilitate communication among team members by creating shared awareness of process status and requirements.

Training Aid: Well-designed checklists help new team members learn processes more quickly and accurately.

Quality Assurance: Checklists provide a systematic method for verifying that all required steps have been completed correctly.

Types of Checklists

Different situations require different types of checklists:

Read-Do Checklists: Users read each item and perform the action immediately. These work well for simple, sequential procedures.

Do-Confirm Checklists: Users perform work from memory and use the checklist to verify completion. These are appropriate when users have expertise but need verification support.

Communication Checklists: These facilitate information sharing among team members, particularly during handoffs or shift changes.

Emergency Checklists: Designed for high-stress situations where cognitive resources may be compromised, these checklists emphasize simplicity and clarity.

Checklist Design Principles

Effective checklists require careful design attention. Gawande's research led them to develop a 19-question, 2-minute Surgical Safety Checklist, demonstrating that even complex procedures can be supported by concise, well-designed checklists. Key design principles include:

Brevity: Checklists should focus on critical items that are most likely to be forgotten or omitted. Comprehensive task lists differ from checklists in purpose and design.

Clarity: Each item should be unambiguous and actionable. Vague or interpretive items reduce checklist effectiveness.

Logical Flow: Items should follow the natural sequence of work to minimize cognitive burden.

Pause Points: "You have to identify the moments ... a 'before-takeoff' checklist," says Gawande. Effective checklists identify natural pause points where verification makes sense.

Testing and Refinement: Checklists should be tested in realistic conditions and refined based on user feedback and performance data.

Safety and Consistency Benefits

Process Standardization and Safety

The relationship between process standardization and safety is particularly evident in high-risk industries such as healthcare, aviation, and chemical processing. In these environments, process deviations can have catastrophic consequences, making standardization a critical safety tool.

Standardized processes enhance safety through several mechanisms:

Error Reduction: By eliminating unnecessary variations in how work is performed, standardized processes reduce opportunities for errors. When everyone follows the same procedure, the likelihood of mistakes decreases significantly.

Hazard Identification: Standardized processes make it easier to identify and address potential hazards. When processes vary significantly, hazard analysis becomes more complex and less reliable.

Training Effectiveness: Standardized processes enable more effective safety training because all personnel learn the same procedures and safety protocols.

Incident Investigation: When incidents occur, standardized processes provide a clear baseline for investigation and corrective action development.

Emergency Response: In crisis situations, standardized procedures enable faster, more coordinated responses because all personnel understand their roles and responsibilities.

Consistency in Episodic Processes

Episodic processes—those performed infrequently or irregularly—present particular challenges for maintaining consistency and safety. These processes are often critical (annual budget development, emergency response, major system upgrades) but may be performed so infrequently that personnel lose familiarity with procedures.

Standardized processes address episodic process challenges in several ways:

Reduced Learning Curve: When processes are well-documented and standardized, personnel can quickly refresh their understanding without extensive retraining.

Minimized Skill Decay: Clear procedures help personnel maintain competency even when they don't regularly perform specific tasks.

Cross-Training Feasibility: Standardized processes make it easier to cross-train personnel, reducing dependence on specific individuals.

Knowledge Transfer: When personnel change roles or leave the organization, standardized processes facilitate knowledge transfer to their replacements.

Variable Staffing Scenarios

Organizations increasingly face situations where different people must perform the same processes due to staffing changes, workload variations, or organizational restructuring. In these variable staffing scenarios, process standardization becomes critical for maintaining performance and safety.

Benefits of standardization in variable staffing include:

Reduced Training Time: New personnel can become proficient more quickly when processes are clearly documented and standardized.

Performance Predictability: Managers can better predict performance outcomes regardless of who performs the work.

Quality Consistency: Standardized processes help ensure that quality remains consistent even when performed by different individuals with varying experience levels.

Reduced Supervision Requirements: When processes are well-standardized, less experienced personnel require less intensive supervision.

Implementation Strategies

Organizational Readiness Assessment

Before implementing process improvement initiatives, organizations should assess their readiness for change. This assessment should examine:

Leadership Commitment: Process improvement requires sustained leadership support, particularly during the challenging early phases of implementation.

Cultural Factors: Organizations with cultures that value innovation, learning, and collaboration are better positioned for process improvement success.

Resource Availability: Process improvement requires investment in training, tools, and time. Organizations should realistically assess available resources.

Change Capacity: Organizations already managing multiple change initiatives may need to sequence process improvement efforts carefully.

Measurement Infrastructure: Effective process improvement requires good measurement systems. Organizations may need to invest in data collection and analysis capabilities.

Pilot Implementation Approach

Successful process improvement typically begins with pilot implementations that test approaches on a smaller scale before organization-wide deployment. Effective pilot programs:

Select Appropriate Processes: Pilot processes should be important enough to generate meaningful results but not so critical that failure would cause significant problems.

Define Success Metrics: Clear metrics help evaluate pilot success and guide scaling decisions.

Engage Stakeholders: Pilot participants should include both process performers and process customers to ensure comprehensive feedback.

Document Lessons Learned: Systematic documentation of pilot experiences guides larger-scale implementation efforts.

Plan for Scaling: Pilot programs should be designed with eventual scaling in mind, avoiding approaches that work only in limited contexts.

Training and Development

Process improvement capabilities require systematic development. Training programs should address:

Methodology Training: Personnel need to understand process improvement methodologies and tools appropriate to their roles.

Application Skills: Training should include hands-on application opportunities, not just theoretical knowledge.

Change Management: Process improvement often requires significant changes in how people work, making change management skills essential.

Measurement and Analysis: Data-driven process improvement requires analytical skills that may need development.

Facilitation Skills: Many process improvement efforts involve team-based activities that require effective facilitation.

Sustaining Improvements

Perhaps the greatest challenge in process improvement is sustaining improvements over time. Without systematic reinforcement, improved processes often revert to previous states. Sustainability strategies include:

Ongoing Measurement: Continuous monitoring helps identify when processes begin to drift from standards.

Regular Reviews: Systematic process reviews help identify improvement opportunities and address emerging issues.

Recognition Systems: Recognizing and celebrating process improvement successes helps maintain momentum and engagement.

Integration with Performance Management: Process improvement goals should be integrated into individual and team performance expectations.

Continuous Learning: Organizations should treat process improvement as an ongoing learning opportunity rather than a one-time project.

Case Studies and Evidence

Healthcare Applications

Healthcare provides compelling examples of process improvement impact. The surgical safety checklist developed by Gawande and colleagues demonstrates remarkable results. Surgery has become an integral part of global health care, with an estimated 234 million operations performed yearly. Surgical complications are common and often preventable. Implementation of standardized checklists significantly reduced surgical complications and mortality rates across multiple hospitals and countries.

Peter Pronovost's work in intensive care units similarly demonstrates the power of standardized processes. By implementing simple checklists for central line insertion, ICUs achieved dramatic reductions in bloodstream infections, saving thousands of lives and millions of dollars in healthcare costs.

Manufacturing Excellence

Manufacturing industries have long led process improvement efforts, with companies like Toyota pioneering many of the methods now used across industries. Toyota's Production System combines Lean principles with Kaizen culture to achieve remarkable quality and efficiency levels. The company's approach to standardized work includes detailed documentation of best practices, continuous improvement processes, and extensive employee involvement in process development.

Service Industry Applications

Service industries increasingly apply process improvement methodologies originally developed for manufacturing. Financial services companies use Six Sigma to reduce processing errors and cycle times. Hospitality companies apply Lean principles to improve customer service processes. Government agencies use process improvement to enhance citizen services while reducing costs.

Conclusion

The transformation from ad-hoc, personality-dependent operations to systematic, process-oriented workflows represents one of the most powerful changes organizations can make. Through methodologies like Six Sigma, Kaizen, Lean, document standardization, and checklist implementation, organizations can achieve remarkable improvements in safety, consistency, and performance.

The benefits of process-oriented approaches become particularly evident in challenging scenarios: episodic processes that occur infrequently, variable staffing situations where different people must perform the same work, and high-risk environments where errors can have serious consequences. In these situations, well-designed processes serve as organizational memory, training tools, and safety

nets that enable consistent performance regardless of individual experience or environmental pressures.

However, successful process improvement requires more than simply adopting proven methodologies. Organizations must carefully assess their readiness for change, invest in appropriate training and development, implement pilot programs to test approaches, and create systems for sustaining improvements over time. The goal is not merely to improve individual processes, but to create a culture of continuous improvement that drives ongoing organizational excellence.

The evidence from healthcare, manufacturing, and service industries demonstrates that organizations committed to process improvement can achieve remarkable results. From surgical safety checklists that save lives to manufacturing systems that eliminate waste while improving quality, process-oriented approaches have proven their value across diverse contexts and applications.

As organizations face increasing complexity, rapid change, and higher performance expectations, the ability to systematically improve processes becomes ever more critical. Those that master process improvement methodologies will be better positioned to adapt, excel, and thrive in an increasingly demanding environment.

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Additional Resources

American Society for Quality (ASQ). Six Sigma Resources. Available at: https://asq.org/quality-resources/six-sigma

Institute for Healthcare Quality Improvement. Surgical Safety Checklist Resources. Available at: https://www.ihi.org

Lean Enterprise Institute. Lean Thinking and Practice. Available at: https://www.lean.org

Project Management Institute. Process Improvement Resources. Available at: https://www.pmi.org

The W. Edwards Deming Institute. Quality and Process Improvement. Available at: https://deming.org

~~APPENDIX O~~

~~RESERVED FOR FUTURE USE~~

~~DRAFT~~EXPECTED ICAO ~~XBT~~ GUIDANCE ON CALENDAR AGE-BASED IMPORT ~~RESTRICTIONS~~REQUIREMENTS

To the extent consistent with safety, States generally desire to support import and use of aircraft regardless of their calendar age so long as compliance with airworthiness requirements can be satisfactorily shown. A number of States place calendar age restrictions on importation of demonstrably airworthy aircraft, but few of these States, if any, require airworthy aircraft already on their registers to be permanently removed from service upon reaching a specified calendar age.

Calendar age-based import restrictions were put in place at a time when data were understood as showing some correlation between calendar age and safety. Increasingly, aircraft now benefit from advanced technologies, and intervening developments in design, manufacturing and operation. These improvements have substantially and progressively reversed the former understanding. See "Analysis of Impact of Aircraft Age on Safety for Air Transport Jet Airplanes" by MIT Professor R. John Hansman (2014)[~~30~~31]. Type and Design Approval Certificate holders publish instructions for continued airworthiness based on criteria such as flight hours and flight cycles in addition to calendar thresholds in order to ensure continuing airworthiness.

Calendar age-based import restrictions have also been prompted by resource concerns rather than a presumed correlation between calendar age and safety. For instance, it may not be reasonable for a State that receives requests for older aircraft importations infrequently to devote the personnel and budget resources necessary to review the records associated with confirming the airworthiness of an older aircraft at the time of proposed registration. especially when aircraft of the particular type or age have not been previously represented in the State's registered fleet. Similar staffing and funding concerns may apply to providing effective ongoing safety oversight of older aircraft. There may also be questions as to whether a proposed operator could have resource, expertise or cost constraints in connection with executing the [applicable Aircraft Instrumentation Research Program aging aircraft protocols] and other elements of the maintenance program for an older aircraft after importation.

State-related concerns may be addressed through the delegation mechanism outlined in Chapter 2 of the Aircraft Registration manual, in which case the State may wish to coordinate with the applicant and/or the proposed operator so they may contract to have the necessary record review or oversight accomplished by qualified providers whose certification and documentation are acceptable to the State. Concerns regarding an operator's resources or expertise can be addressed by requiring it to use qualified providers to perform applicable on-going tasks which would be readily auditable for oversight purposes.

Calendar age-based restrictions have also been cited as a means of assuring compliance with noise certification standards in Annex 16 as required by Annex 6, ~~Pari~~Part I, 6.13; Par II, 2.49; and Part III, 4.6. In light of intervening technology

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[~~30~~31] http://awg.aero/project/cross-border-transferability/.

advances, States are encouraged to rely instead on the processes outlined in Part III, Chapter 3 ("Aircraft Noise Certification") of the Airworthiness Manual (Doc 9760). This can be accomplished by engaging (or requiring the importing party to engage) an acceptable qualified provider under the delegation mechanism in <mark>Section   5.4</mark>.

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