

ETHIOPIAN CIVIL AVIATION AUTHORITY



**Return to Service (RTS) of Aircraft
from Storage**

**November 2020
Revision 02**

Return to Service of Aircraft from Storage

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APPROVAL

CIR. REF.: ECAA/DG/AIR/007/20A
Subject: Return to Service of Aircraft from Storage
Issue No.: 02
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Applicability: This Circular is applicable to all Aircraft Operators/owners who have aircraft placed in storage or prolonged 'parked' condition, and Approved Maintenance Organizations (AMOs).

This Advisory Circular contains guidance for Air Operators' Continuing Airworthiness Management Organizations (CAMOs) and Approved Maintenance Organizations (AMOs) to support the Return to Service (RTS) of aircraft that have been parked/stored due to the extraordinary situation resulting from the COVID-19 pandemic. This document is published to provide guidance that can be used by operators and approved maintenance organizations (AMOs) and all concerned to support the safe return to service of aircraft that have not flown for several weeks or months due to the special situation resulting from the COVID-19 pandemic. Its main purpose is to maintain the level of safety of the aircraft during the Return to Service activity.

Air Operators and AMOs must ensure that this document is copied to all members of their staff who need to take appropriate action or who may have an interest in the information (including any 'in-house' or contracted maintenance organizations and relevant outside contractors). Each air operator must ensure that each aircraft is returned to service properly with all airworthiness requirements being accomplished appropriately for safe operation.

This Circular is approved by the undersigned for use by all to whom the Circular applies.


Wossengetch Hunegnaw (Col.)
Approved by:
Director General



1. Purpose of these guidelines

This document provides guidance for Air Operators' Continuing Airworthiness Management Organizations (CAMOs) and Approved Maintenance Organizations (AMOs) to support the Return to Service (RTS) of aircraft that have been parked/stored due to the extraordinary situation resulting from the COVID-19 pandemic. The purpose of the guidelines is to maintain the level of safety of the aircraft during the Return to Service activity.

2. Introduction

Aviation operations have been affected heavily by the COVID-19 pandemic and an unprecedented number of aircraft that have been parked/stored. The lack of demand in air travel has caused severe financial pressure on air operators, as well as on their service.

Gradually, as travel restrictions are being lifted and as operators are preparing to resume passenger flights and demand increases, operators will need the aircraft that have been parked/stored and return them back to service. Due to the high number of aircraft involved and the limited supporting resources available to perform the work due to the COVID-19 crisis, organizations and personnel are expected to experience difficulties and increased risks.

Organization Management Systems play an essential role in identifying the hazards, developing control measures to mitigate the associated risks and thus in ensuring a safe Return to Service of all aircraft.

3. Analysis

The Return to Service activities include customized elements for each operator leading the activities that should start by conducting a robust analysis and developing a dedicated Return to Service process and plan. The analysis should include the identification of hazards stemming from past Return To Service experiences, the condition of the aircraft in their fleet and organizational aspects. In addition, it should be ensured that the existing hazards are reassessed, and new threats are identified by taking the pandemic into consideration. Subsequently, the resulting required mitigating actions and maintenance work have to be determined and accomplished in order to ensure that the risks are properly managed. Hence, these Return To Service activities by the Air Operators should be performed in close cooperation with the contracted AMO(s). During the actual accomplishment of maintenance work, the AMO(s) should provide feedback to the Air Operators on any defects found, to ensure in particular that the work order contains all necessary tasks.

3.1 Proactive identification of hazards

During the RTS process, the Air Operators, in consultation with the AMO(s), should consider, for instance, the following:

Starting point and status of each individual aircraft:

- What was the defect status and maintenance forecast of the aircraft prior to parking/storage?
- Were Type Certificate Holder (TCH) and other Design Holder (DH) storage procedures followed throughout the full parking/storage period?
- Was all work carried out by an appropriately rated AMO?

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- Have there been enough protective covers available for the entire fleet or has the AMO used alternate methods?
- Was there sufficient tooling and ground equipment available?
- Has the Airworthiness Certificate expired?
- What schedule maintenance tasks became overdue during the parking/storage period?
- What is the current Airworthiness Directive (AD) status?
- Does the post storage check content take into account new recommendations from the TCH?
- Have parts been robbed from the aircraft?
- Has any environmental or accidental damage occurred to the aircraft during parking/storage?
- Does the aircraft match its damage chart?
- What is the current aircraft deferred defects status (including MEL/CDL)?
- Is there any maintenance task previously carried forward?
- Is the status of the aircraft software updated to the latest version?
- Have cybersecurity checks been considered to ensure that no security breaches have occurred? (especially, in cases where staff have been working from home)

Further items to be considered:

- **Fuel condition:** have the TCH instructions on aircraft fuel and fuel system contamination and biocide treatment (if applicable) been used since parking/storage started?
- **Supply chain:**
 - (1) Will parts and materials be available as needed?
 - (2) Are the tools and other necessary equipment available at the AMOs?
 - (3) Have any parts expiry dates or calibration dates been compromised?
 - (4) Are proper supply chain agreements in place to ensure that the work can be performed as agreed?
 - (5) Have lessors and/or other aircraft/component owners been informed as needed?
- **Human resources:**
 - (1) Are the staff that need to work on the different stages of the process available?
 - (2) Is the availability of the required competences, qualifications and authorizations ensured?
 - (3) Will the current health and safety recommendations affect the way the staff work?
 - (4) Are human factors performance limitations considered?
 - (5) Are staff able to access the premises?
 - (6) Have the organizations taken the necessary steps to minimize the effect on the working practices and conditions due to the COVID-19 pandemic?
 - (7) Are the staff correctly briefed on the procedures required during

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the RTS work?

- **Information access and exchange:**

- (1) Is the required information regarding the aircraft accessible to all relevant staff and organizations involved?
- (2) Can the ICA be accessed as required?
- (3) Can staff communicate properly within the organization and between different organizations?
- (4) Do all parties have access to the required IT systems (to facilitate virtual meetings etc.)?

- **Procedures:**

- (1) Has the responsible air operator's maintenance control/CAMO provided necessary procedures and interface documents covering the Return to Service process?
- (2) Are they available and have the staff been briefed?
- (3) Does the staff understand their roles and reporting lines?

- **Combination of above elements:** Is the combination of multiple elements above considered with the determination of the level of risk for the RTS?

Cooperation and communication with external parties:

Are other organizations involved aware of the intentions of the Air Operators' CAMO and is the need clearly stated? In particular:

- **Type Certificate Holders (TCHs):** clarification of the instructions to be followed, additional support in the form of a non-technical objection or repair designs due to any damage that occurred on the aircraft during the parking/storage, additional instructions in case the parking/storage procedures were not complied with.
- **Flight operations department:** coordination with the Maintenance Control department/Continuing Airworthiness Monitoring Organization to identify inputs before the first revenue flight to determine if a maintenance check flight (test flight) is needed, discussion on the status of the deferred items and consequences for the flight crew. A maintenance check flight is required if the maintenance tasks to return the aircraft to service are not conclusive or there are some checks that need to be conducted in-flight. The coordination with the crew should also cover identification of special attention items that the flight crew should focus on during the first flight, such as possibility of discrepancies in speed and altitude indications and engine parameters. The coordination should also include special checks before flying Reduced Vertical Separation Minimum (RVSM) operations, Extended Diversion Time Operations (EDTO), Low Visibility operations.
- **Lessors and other equipment owners of the aircraft and its parts:** assess impact of decisions on existing commercial contractual agreements and if needed discuss possible solutions;
- **Any other service provided by any third party:** consider any additional input or need of coordination, for instance in relation with line maintenance support at any destination.

- **Ethiopian Civil Aviation Authority:** air operators should contact ECAA advance for any request such as Permits to Fly, Aircraft Maintenance Program variations, renewal of certificates of airworthiness, approval of procedures, or expiration of certifying staff licenses.

3.2 Reactive identification of hazards (data collection from the AMO and analysis)

It is important that any information related to defects, findings and conditions found by the AMO on aircraft while preparing it for Return To Service and which can be reasonably assumed to be linked with parking/storage is collected. This includes any finding that can be connected to a fleet of aircraft being stored in the same or similar condition, as same aircraft types stored at the same time and same environment are expected to behave in the same way. This data should be submitted to the Air Operator to enable the content of the Return To Service work order to be defined and/or to make any improvements to the work order. Some findings may also need to be communicated to the TCH and to the Authority as required.

Where possible, when aircraft have been stored in similar conditions, the Air Operator may elect to perform sample inspections to gather information to verify the condition of the fleet.

Post Return to Service, the Air Operators/AMOs should follow serviceability trend analysis and decide if maintenance procedures need to be amended, e.g. daily check, weekly check.

3.3 Examples of occurrences related to prolonged parking/storage with a serious impact on airworthiness

- Sticking / high friction of valves in engine bleed air system leading to pneumatic system issues during flight (e.g., bleed air loss, in one particular case this led to an in-flight shut down).
- Erroneous air data information including contaminated/blocked pitot-static systems and Angle of Attack (AOA) vanes failure.
- Fuel system contamination caused by non-adapted water drainage intervals or lack of available biocide.
- Emergency batteries, post parking or storage procedures, not at the expected state of charge.
- Depletion of aircraft parking brake accumulator pressure leading to damaged aircraft in ground incident.
- Wildlife nesting in the aircraft/engines while parked/stored, including insects, birds and rodents.

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4. Examples of hazards, mitigating strategies and best practices

A timely analysis of the process to be followed to return a significant number of aircraft to service will lead to the identification of hazards and related risks for which mitigating strategies can be defined in advance. The number and level of risks will vary between organizations. EASA together with industry representatives identified a list of hazards along with associated potential mitigating strategies. This document also contains examples of general best practices. Both can be found in the Appendices 1 and 2.

5. Conclusions

The purpose of this Guideline is to raise awareness of possible hazards and suggest possible mitigating strategies to the risks associated to aircraft Return to Service after parking/storage. However, a dedicated risk management is required to be applied by the relevant organizations, proportionate and taking into account their particular situation and activities. This customized safety risk management should identify the novel hazards, assess the related risks and determine appropriate mitigating measures. Once the analysis has been conducted, air operators must establish and maintain appropriate cooperation and communication with all concerning organizations and the Authority in order to allow all parties to plan ahead and to ensure a proper and controlled process to return all concerning aircraft back to service.

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Appendix 1: Examples of hazards and mitigating strategies related to parked/stored aircraft returning to service

Potential Hazards	Mitigating strategies to be considered by Air Operators and AMOs
<p>1. Lack of current knowledge and skills</p>	<p>The significant reduction in traffic due to the pandemic means that most aviation professionals are not performing their normal tasks, sometimes not at all or at a substantially reduced frequency. Therefore, the following is to be considered:</p> <ul style="list-style-type: none"> • Awareness of skills and knowledge degradation: <ul style="list-style-type: none"> ○ Identify the procedures that these staff need to know before they re-start to work. ○ Identify which skills and persons are most at risk, and provide tailored training as much as reasonably possible. ○ Assess the actual competence and determine training needs, before staff can re-start to work. ○ Assign all-time-available supervisors to support staff regaining their currency. ○ Review of and training on common maintenance errors. • Briefing of staff, including management, on the importance of policy principles, including ‘just culture’ and the expectation to apply this in case of mishaps. • Preparation of training for staff, including management, customized to meet the needs of the organization and addressing the current situation. It should include all relevant aspects, such as, but not limited to: <ul style="list-style-type: none"> ○ Relevant procedures and their changes, covering the essential elements, intentions and application of procedures. ○ The need to apply procedures correctly, including MEL / walk around inspection /technical Log. ○ The need to consider and apply Quality & Safety policy, Human Factors and Human Performance limitations, such as stress/fatigue management and assertiveness, occurrence reporting, etc.. • Introduce pre-shift briefings to update personnel of recent and on-going changes, and group briefings on return to service, with focus on difficulties with procedures, work instructions and availability of

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	<p>resources.</p> <ul style="list-style-type: none"> • Prepare leaflets and communicate key messages on a regular base. • Establish a proper communication channel for retrieving support from specialists. • Prepare checklists to support (inexperienced and recently hired) staff in performing their job again after idleness, when relevant.
<p>2. Lack of sufficient staff</p>	<ul style="list-style-type: none"> • Realistic manpower planning, including: <ul style="list-style-type: none"> ○ Number of staff available, considering specific competences, qualifications and authorizations that are required. ○ As tasks may take longer due to the restrictions caused by the COVID crisis, this should be considered in all stages of the planning and the work process. ○ The time to be allocated for tasks may have to be adapted as a reduced tempo can be expected due to reduced skills such as additional time to allow for increased inspections, more cross-checking, etc., while at the same time ensuring the safety culture. ○ Location and environment to perform the work. • Nominate adequate deputies for the essential activities to ensure continuity.
<p>3. Lack of required parts and materials</p>	<p>Establish a pro-active supply chain management.</p> <ul style="list-style-type: none"> • Ensure the continued availability of parts and materials, including the proper condition and certification. • Ensure the continued availability of services, e.g., NDT, boroscope, component maintenance, avionics service. • Consider the continued availability of suppliers and subcontractors and their possibility to ensure continued on time delivery and consider that alternative sources will have to be found. <ul style="list-style-type: none"> ○ For the case parts, materials and services have to be purchased from alternate sources, ensure that purchasing and receiving inspection procedures and the awareness and application by staff are adapted to the increased risk of receiving substandard deliveries. ○ Reinforced attention for unapproved parts and parts with ambiguous historical and technical status is important, when reverting to alternative sources.

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	<ul style="list-style-type: none"> • If required spares are removed from serviceable aircraft, ensure the correct procedures are followed and that the status of the cannibalized aircraft are properly recorded and monitored.
<p>4. Lack of appropriate procedures and TCH instructions</p>	<ul style="list-style-type: none"> • Ensure that current TCH maintenance instructions are available, in particular related to parking/storage. • Contact the TCH when instructions are not clear, complete or correct and request proper support and instructions. • Contact the aircraft/engine TCH to decide if additional maintenance tasks are required based on parking /storage duration. • Adapt or include, and timely implement procedures that consider long term parking and storage, including e.g.: <ul style="list-style-type: none"> ○ Long term storage based on TCH instructions, in-service information and considering varying parking/storage and environmental conditions (e.g. humidity, salt, dust, hail, severe winds, etc.). ○ Post-storage process to Return to service; how to determine what is needed to prepare the aircraft back to service. • Inform the TC holder of any findings raised as a result of the parking/storage period.
<p>5. Procedures and/or instructions are not followed</p>	<ul style="list-style-type: none"> • Ensure that management and staff have received update and awareness training focused on the pandemic consequences: <ul style="list-style-type: none"> ○ Explain the essential elements, rationale, intentions of the concerning procedures. ○ The need to follow procedures correctly. ○ The need to consider and apply Quality & Safety policy, Human Factors and Human Performance limitations, such as stress/fatigue management and assertiveness, occurrence reporting, etc.. • Promote and monitor application of above training elements and encourage staff to remain assertive. <ul style="list-style-type: none"> ○ Reporting of occurrences should include the above training elements, e.g. high time pressure, incorrect procedure. • Ensure that procedures, instructions, work cards are clear, correct, complete and validated. • Ensure that required and appropriate resources (qualified staff, work order, work cards,

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	<p>maintenance data, parts & materials, tools & equipment, support and supervision) are available when staff have to perform their tasks.</p> <ul style="list-style-type: none"> • Introduce pre-shift briefings to update personnel of recent and on-going changes, and group briefings on the return to service of aircraft, with focus on difficulties with procedures, work instructions, availability of resources. • Ensure accurate administration of the work performed; proper sign-off of tasks after verification, in particular for critical maintenance tasks. • Prepare dedicated checklists (for novel and complicated tasks) to support (inexperienced and recently hired) staff in performing their job again after idleness, when relevant. • Provide a proper communication channel for staff to be able to consult allocated specialists. • Consider implementing a dedicated audit programme for aircraft in storage to ensure (by sampling) that required tasks are planned and actually accomplished.
<p>6. Lack of appropriate tools and equipment</p>	<ul style="list-style-type: none"> • Establish a pro-active management to ensure the availability of special tools & equipment, in particular when hired. The owner may not be able to deliver. • Ensure that sufficient proper protective equipment and materials are available and used, e.g., covers, caps, blankets. • When alternatives have to be used, ensure that: <ul style="list-style-type: none"> ○ They do not compromise the state or condition of the aircraft/engine. ○ The appropriate control procedure is followed. ○ A proper administration is kept. • Ensure that all protective equipment and materials have been removed at the end of the parking/storage period. <ul style="list-style-type: none"> ○ Ensure the Return to Service work order includes the removal of alternative protective equipment and materials, e.g. tape used to cover pitot/static ports, tape to seal doors and panels, and plastic foil to protect engine inlet cowling. ○ Ensure proper cleaning when applicable, e.g. removal of tape residue. • Report cases where proper protective equipment and materials have not been applied.
<p>7. Unsuitable environmental</p>	<ul style="list-style-type: none"> • Monitor and adjust procedures and work packages for environmental / weather conditions at the various

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parking/storage conditions	<p>locations.</p> <ul style="list-style-type: none">• Contact the aircraft/engine TCH for dedicated instruction and support in order to decide if additional adapted maintenance tasks are required based on the parking/storage duration and location.• Consider newly amended TCH instructions and whether additional protection is needed (e.g., protective coating of engine inlets and leading edges, seat cover and cushion removal due to mould).• Procedures may need to be developed based on the parking/storage conditions at various locations.• Plan work orders during the parking/storage period, considering above procedures and instructions.• Ensure that the environmental conditions and actual parking/storage accomplishment are reviewed during the preparation process prior to returning aircraft back to service and consider the need for additional adapted maintenance tasks to:<ul style="list-style-type: none">○ Remove alternative protective equipment and material.○ Remove possible insect/bird nests and rodents.○ Conduct analysis for fuel contamination.○ Ensure the continued function of the lower fuselage drain system and check for ingress of water in lower zones.• Inform the TC holder of any findings raised as a result of the parking/storage of aircraft at various locations.
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Appendix 2: Examples of best practices related to parked/stored aircraft returning to service

Best Practices

1. Continuing airworthiness status and work planning/control

Sufficient time should be allocated by CAMOs/AMOs in all stages of the planning and maintenance process as a reduced tempo of operations can be expected due to reduced skills, additional time to allow for increased inspections, cross-checking, etc., while at the same time ensuring the safety culture.

- The Air Operator to assess the airworthiness status of the aircraft after parking/storage and prepare the work package for the AMO(s).
- The AMO to plan work considering the need for additional communication, support, inspections and verifications.
- Remote access to various IT tools/systems; ensure the integrity of connected tools/systems, that no illegal software has been installed or connected to the aircraft and that no illegal aircraft system access or modification has taken place during parking/storage.
- Consider cleaning and disinfection of the aircraft. Is a well-defined aircraft disinfection process in place, considering guidelines set by authorities (airworthiness, public health, environment) and/or TC holders and is it communicated to subcontractors and contractors (e.g. at line stations)?
- Consider conducting a sampling program of the fleet to assess the overall condition of the aircraft and prepare the RTS work.
- Contact the aircraft/engine TCH to decide whether additional maintenance tasks are required based on parking/storage duration.
- Assess the need to perform a supplemental physical aircraft inspection and ground test preferably with inputs from the TCH.
- Assess the need to perform a maintenance check flight.
- Take into account additional constraints at remote locations, e.g. concerning staff, environment, tools, equipment and parts.
- Consider the examples of paragraph 3.3 concerning occurrences related to prolonged parking/storage with a serious impact on airworthiness.
- Consider the need for additional maintenance tasks:
 - Perform a specific inspection to determine whether the parking/storage instructions have been complied with. If not take proper action.
 - Remove alternative protective equipment, e.g., tape used to cover pitot/static ports or to seal doors and panels.
 - Check whether Circuit Breakers have been left in open status without a proper identification label and/or relevant tech log entry.
 - Ensure the continued function of the lower fuselage drain system and check for any ingress of water in lower zones.
 - Check the correct function of draining valves installed on pitot-static

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<ul style="list-style-type: none">○ pressure lines.○ Check bacterial contamination in the potable water system.○ Conduct fuel analysis for contamination.○ Evaluate condition emergency batteries.○ Remove possible wildlife nests, such as insects, birds, rodents.
<ul style="list-style-type: none">• Consider proper balancing of work and required resources.• The Return to Service work package should consider previous aspects and ensure the aircraft continuing airworthiness and the serviceability of operational and emergency equipment.
<p>2. Recordkeeping</p> <ul style="list-style-type: none">• Ensure clear records (what has been done and what still needs to be done and when) and timely administration of records.• Ensure that IT systems are up to date, e.g. software status and that continuing airworthiness and maintenance records are entered.
<p>3. Quality & safety policy, promotion and management</p> <p>Due to the COVID-19 pandemic and consequently the many uncommon circumstances induced by it, significant changes with respect to financial, operational, organizational, social and human aspects can be expected. Limited financial and staffing resources and re-allocation of task and activities will increase uncertainty, work pressure, fatigue and eventual lack of motivation. This consequently will have an influence on the performance of many activities and consequently this should be acknowledged by senior management and carefully addressed during daily management.</p> <ul style="list-style-type: none">• Accountable managers and senior management are aware of and take their responsibilities with respect to continuous compliance with the regulations and the culture and attitude needed to achieve this. Whenever required resources and environment are not available and appropriate, concerning tasks must not be commenced and performed.• Ensure a proper (adapted) quality and safety policy, which is implemented, actively promoted and will not be compromised. Promote and ensure a just culture environment whereby making employees sufficiently assertive to communicate and report concerning degraded safety levels without the fear of reprisal. Increased vigilance is necessary in all activities since protective barriers can be weakened by the COVID-19 crisis.• Communication of safety issues should be promoted.• Risk assessments developed before the pandemic may no longer be adequate due to the changes driven by the pandemic and may need to be re-visited.• Ensure COVID social distancing rules are respected and that the use of Personal Protective Equipment does not prevent staff from working safely.• Consider in advance what tasks/activities may be affected by health recommendations and consider them in the planning.• Ensure that Human Factors principles and Human Performance limitations are consciously considered and counter measures planned and applied.

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- Consider the potential hazards and mitigating measures addressed in Appendix 1 and control and monitor the actions deemed necessary.

4. Monitoring of the RTS process and continuing airworthiness of the fleet

- Adapt auditing and monitoring to cover the current situation, including e.g.:
 - remote and on-desk audits; and
 - continuous monitoring and analyses of hazards, risks, findings, occurrences, quality and safety performance.
 - review and validate the actual configuration the aircraft hardware and software, since the aircraft may have been exposed to removal of parts (e.g. aircraft cannibalization) and to software obsolescence /expiry during the parking/storage period.

5. Changes, novelties and alternative processes

- Remind all staff to report problems or previously unknown situations and information.
- Assign people to assess the changing circumstances, analyze the impact on systems, processes, behaviour and aircraft safety.
- Determine the necessary measures, actions and conditions and manage them, considering social and human behaviour.
- Communicate to staff the novel and alternative processes and the decisions taken and explain them.

REFERENCE MATERIAL:

EASA

Return to service of aircraft after storage:

Guidelines in relation to the COVID-19 pandemic

20.11.2020