Advisory Circular

NIGERIA CIVIL AVIATION AUTHORITY (NCAA)

NCAA-AC-AWS042

Subject:

AIRWORTHINESS DIRECTIVE MANAGEMENT PROCESS

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NOTE: This is a controlled and restricted publication. The latest revision of this publication is with the Directorate of Airworthiness Standards (DAWS) of the NCAA

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1.0 GENERAL

i The Nigerian Civil Aviation Authority Advisory Circulars (AC) contains information about standards, practices and procedures that the Authority has found to be acceptable for compliance with the associated Regulations.

ii Consideration will be given to other methods of compliance which may be presented to the Authority.

iii When new standards, practices or procedures are found to be acceptable they will be added to the appropriate AC.

2.0 PURPOSE

This advisory circular (AC) provides all aircraft operators with information and guidance for assistance in compliance to Nig. CARs Part 5 on mandatory continuing airworthiness information. The recommendations contained in this AC are one means, but not the only means, of complying with Part 5 requirements pertaining to Airworthiness Directives (AD). However, individual operations and needs should determine an operator's AD management process. When developing an AD management process, operators should consider its size, capabilities, resources, and equipment. The operator's AD management process should be documented in their Maintenance Control Manual (MCM) or Continuing Airworthiness Management Exposition (CAME).

3.0 REFERENCE

3.1 Part 5 of the Nigeria Civil Aviation Regulations.

3.3 FAA Advisory Circular AC 00-56

4.0 BACKGROUND

a. Nigerian Civil Aviation Authority (NCAA).

The NCAA authority regarding civil aircraft may be found generally in Civil Aviation Act. One of the ways the NCAA implements its authority is through Part 5.

b. AD Issuance.

The State of Design issues ADs when an unsafe condition is found to exist in a product and the condition is likely to exist or develop in other products of the same type design. ADs are used to notify aircraft owners and operators of unsafe conditions and the actions required to resolve those conditions.

NOTE:
To ensure continued airworthiness, concerns regarding ADs should be addressed in a logical and comprehensive manner. This can be accomplished by developing a robust AD management process, which should encapsulate all six elements discussed in detail below.

RECOMMENDED PROCEDURES FOR DEVELOPING AN AD MANAGEMENT PROCESS.

There are many distinct internal processes, controls, and actions necessary for AD compliance planning, implementation, and auditing. The following paragraphs describe common processes and practices for managing ADs.

The AD management process can be categorized into six elements:

- Planning;
- Support;
- Provisioning;
- Implementing;
- Recording; and
- Auditing.

5.0 PLANNING.

The planning element ensures awareness and assigns responsibility for AD requirements. The planning element may include a review of:
- The AD;
- Referenced documents;
- Engineering;
- Materials;
- Scheduling;
- Recordkeeping;
- Maintenance execution;
- Quality control (QC); and
- Quality assurance (QA).

a. AD Configuration Control Board (CCB).

An operator's planning element may include an AD CCB that has regular meetings (or equivalent) where action plans are reviewed, coordinated, and assigned. The CCB's action plan encompasses a complete overview of the AD management process. The plan should identify the details (i.e., who, what, when, where, and how) regarding effective AD compliance. These meetings may help ensure all affected departments of the operator are aware of their responsibilities and where acknowledgement of those responsibilities is recorded.

NOTE: Some operators may have fewer resources than others. Thus, a single individual or department may conduct AD planning functions.

b. AD Planning Meetings.

The operator may request/invite NCAA aviation safety inspectors (ASI) to the AD planning meeting. Thus, the operator may develop a process for notifying and inviting its principal inspector prior to AD planning meetings. When the operator brings forth issues, concerns, or clarification requests, the ASI serves as an observer

and a coordinator, and ensures that the appropriate NCAA and CAA of the State of Design is consulted and their recommendation/guidance is provided as feedback to the operator.

NOTE: Participation of an ASI is at the request of the operator. The ASI does not provide concurrence/approval of an operator's compliance decisions.

c. Identify Risks.
The planning element is an appropriate venue to determine what verification process may be needed to identify risk, which would ensure continued compliance with ADs. An effective planning element should determine if an AD is applicable to the operator. The planning element may also include a risk analysis that considers the conditions that could arise through implementation or configuration changes. These conditions, which could affect the probability of errors, may include:

- Operator's dynamics;
- ADs with a high risk of change;
- AD complexity (complex or workload-intensive ADs may create greater error rates and higher risks);
- Accessibility/location; and
- ADs with repetitive inspections.

d. AD Verification Process.

(1) Once these risks are analyzed, a possible AD verification process may be developed to include:

- Physical verification;
- Verification of records;
- Meeting criteria for inclusion into a sampling program; and
- A required one-time verification (i.e., no future verifications are required).

(2) An effective planning element should identify ADs that have the highest risk for potential alteration during normal maintenance. Once a risk assessment is accomplished, prioritized ADs should continually be verified through an operator-developed verification program.

e. NCAA Consultation.

The planning element should include consultation with the NCAA responsible for managing the AD if clarification is needed. This is also an opportune time to determine if the contemplated actions will comply with the AD.

f. Alternative Method of Compliance (AMOC) Policy.

The extent and nature of appropriate AD compliance documentation, and determining if an AMOC is required, should be considered during the planning element. The operator's AMOC policy should:

- Identify the specific requirements needed to obtain approval;

• When proposing an AMOC, consider making the proposal for global distribution;
• When requesting design approval holder (DAH) assistance in obtaining an AMOC, provide permission to allow the DAH to pursue a global AMOC if appropriate;
• Identify personnel and their role in the process;
• Have a concise process to ensure deviations from AD requirements do not occur, unless the deviations have been approved (i.e., an approved AMOC); and
• Ensure AD compliance is recorded only after an approved AMOC has been accomplished.

NOTE: AMOC proposals, which can be submitted at any time during the AD management process, must be processed through the NCAA. The AD identifies the responsible CAA of the state of design that approves/disapproves AMOC proposals.

g. Communication.

As part of an AD management process, it is recommended that operators/air operators develop a process to coordinate AD compliance matters with their local NCAA office. This process may reference a conflict resolution process for circumstances that need an immediate resolution. Before agreeing to such a process, the NCAA local office will ensure that the NCAA's role, as defined in the process, is consistent with NCAA policy.

h. Additional Areas of Consideration.

Some of the areas that an operator should consider during the planning element include the following:

(1) Careful review of the AD with particular focus on any unique aspects of the AD. Does it require specific parts or articles that require long lead times? Does it impact future inspection schedules?
(2) Determining any unique product or appliance aspects. Does the AD apply to the entire fleet or only particular products or appliances? Are there repairs or alterations on the product or appliance that might require an AMOC?
(3) Evaluating the method of compliance as annotated in the maintenance records (e.g., task cards, Engineering Orders (EO), engineering authorizations, etc.) to ensure AD requirements will be met.
(4) Determining whether to use physical markings to identify areas where an AD is in effect.
(5) Determining whether AD-referenced service instructions have already been accomplished. Also, determine if any deviations occurred from the service instructions, which would require an AMOC.
(6) Determining whether there should be changes to the Aircraft Maintenance Manual (AMM), an Illustrated Parts Catalog (IPC), or a Wiring Diagram Manual (WDM) to ensure continued compliance.

(7) Ensuring rotable spares and work performed in the shop are AD compliant and that noncompliant spares are not installed on compliant aircraft.

(8) Determining the need for training and specific labor skills (e.g., avionics, Nondestructive Testing (NDT), structures, etc.).

(9) Determining the restriction of AD accomplishment to site-specific locations.

(10) Determining the need for an enhanced perspective (i.e., a second set of eyes) at the point of implementation.

(11) Determining when and how audit plans will be impacted for ADs that call for segmented actions.

(12) Determining whether prototyping is needed and, if so, the persons or departments that will accomplish that process.

6.0 SUPPORT.

The support element may consist of engineering, provisioning material, configuration control, etc. Not all operators will have in-house engineering capabilities; however, they will have personnel responsible for coordinating and auditing technical documentation. Staff responsible for technical documentation may also be responsible for reviewing and evaluating information associated with an AD. The operators may also employ or use outside engineering staff.

NOTE: The term "engineering" is used as a generic reference to a department or individual that performs this function.

a. Establish the Method of Compliance. The operator's process should ensure that the AD method of compliance is concisely tracked and is included in maintenance records. Thus, the operator should use the support element to establish the method of compliance with each AD requirement.

b. Schedule Coordination. The support element regarding configuration control may involve confirmation of forecasts and schedules to accomplish the work of AD implementation. The schedule coordination should preclude changes to the direction that was determined (e.g., omissions or changes to task cards).

c. Organizational Structure. Depending on the operator's organizational structure, materials and scheduling/planning departments are responsible for ensuring the materials specified in the AD and engineering document are provided. Those departments should plan for adequate capacity and time to accomplish the AD requirement in appropriate work environments with the required maintenance personnel.

d. Deviations. During accomplishment of AD-mandated actions, it is sometimes necessary to use an AMOC to deviate from the provided work instructions. Deviations may be due to issues such as configuration differences, damage findings, oversized fastener requirements, material substitutions, or service instruction discrepancies. The operator should have a process in place, preferably during the planning phase of AD implementation, to support these alternative

processes/procedures. This process often involves an engineering department capable of collecting and addressing the necessary changes and then coordinating those changes with the DAH, NCAA and CAA of the State of Design, as required. In addition, having an engineering department as part of this process may identify potential fleet-wide compliance or safety concerns and allow industry-wide resolution.

e. Engineering Review. The operator's engineering review should include a side-by-side, paragraph-by-paragraph comparison of all AD requirements against any compliance actions developed by the operator. The engineering review should:

• Ensure that the operator's method of compliance conforms to each element of an AD; or

• Identify if an AMOC is needed.

NOTE: Obtaining direct input from the maintenance organization during the support element review of engineering-authorized documents can help operators eliminate a single-point failure risk.

f. Prototyping. If prototyping is needed, the AD management process should provide instructions to perform prototyping assistance and monitoring. Silent prototyping (i.e., witnessing a technician accomplish the instructions) is recommended.

7.0 PROVISIONING.

a. Capabilities, Time, and Materials. The operator's materials and scheduling/planning departments should ensure that the materials specified in the AD and/or AMOC are procurable and available at the scheduled time for AD accomplishment. A provisioning element should also ensure adequate time and capabilities are sufficient to accomplish the AD in an appropriate work environment with the required maintenance personnel, tooling, and equipment.

b. Kitting. An operator may develop, or purchase from the Original Equipment Manufacturer (OEM)/DAH, a kit that consists of all the AD-required parts and materials. This process is referred to as kitting. The accuracy of the kit contents should be verified. Special attention should be made to ensure that part or material substitutions are only made with written approval from the appropriate NCAA and CAA of the State of Design.

c. AMOC Proposal. If AMOCs are required for parts or material substitutions, the AMOC proposal should be coordinated in a timely manner so that all provisions of the AD are in compliance by the due dates.

8.0 IMPLEMENTING.

The implementation element is the result of finalized actions involved in the planning, support, and provisioning elements. Operators are responsible for accomplishing AD work instructions in accordance with their procedures. This is the sole responsibility of the operator regardless with whom they make arrangements for performing AD work instructions.

9.0 RECORDING.

The recording element should include the option of archiving all planning, supporting, provisioning, and implementing element documentation, as well as validation audits.

a. Maintenance Records. Maintenance records establishing AD compliance must be maintained in accordance with regulatory requirements. Once a maintenance record is made showing AD compliance, the product must meet and continue to show compliance with required AD actions. The documents should include the compliance requirements listed below:

(1) Identification of the particular aircraft, aircraft engine, propeller, and appliance to which the AD is applicable.
(2) The AD number and effective date.
(3) The date and time (which may be expressed in hours, cycles, calendar time, etc.) when the required action was accomplished.
(4) If the requirement is recurring, record the specific action to be accomplished and when that specific action is due. This time may be expressed in hours, cycles, calendar date, etc.
(5) Regarding records for an AD, the "method of compliance" means a concise description of the action taken to comply with the requirements of the AD. If the AD, or its service instructions, permits the use of more than one method of compliance, the record must include a reference to the specific method of compliance used. When following service instructions, place emphasis on the embedded notes. If the operator uses an AMOC to comply with an AD, the method of compliance means a description of the AMOC and a copy of the NCAA and State of Design approval of the AMOC.

b. AD Record of Accomplishment.
Listing the current status of an AD or method of compliance should not be confused with an AD record of accomplishment. The AD record of accomplishment is a description of the work and the person who performed it on the product.

10.0 AUDITING.

The main objective of an operator's auditing element is to provide a comprehensive method for continued verification and validation of AD compliance.
a. Compliance Validation. An effective auditing element of the operator should have a concise method of auditing ADs for continued compliance. This method may range from periodic compliance validation to a sampling program. The auditing element should also have a written process and procedure with specific intervals identified.
b. Validation Checks. Validation checks are considered when there is a risk of altering mandated AD actions or when there are highly complicated requirements that cross many maintenance areas. Validation checks may include random sampling or physical validation.
c. Auditing Sub-elements. A comprehensive auditing element should include the following sub-elements:

(1) Audit Processing. A documented activity that assesses the effectiveness and efficiency of a series of related or sequential work activities.
(2) Audit Scheduling. A program that establishes a schedule of events to be performed during a set calendar period.

(3) Audit Preparation. A plan that considers the resources needed to perform an audit (e.g., source documents, personnel, facilities, and access of equipment).
(4) Audit Performance. A documented activity that determines whether the objective evidence of applicable AD management process elements are implemented and documented.
(5) Audit Results Process. A process that includes:
(a) A method to identify noncompliance and/or unsafe conditions that should result in immediate reporting and corrective measures to resolve noncompliance.
(b) Describing audit findings and how they were discovered. Results may be presented in terms of findings, concerns, observations, and recommendations.
(c) Analyzing evidence to determine the root cause(s) of the finding.
(d) Identifying planned corrective actions to take in response to the finding.
(e) Establishing a timeframe for putting corrective actions in place.

d. Documentation.
Documenting all decisions made during the AD management process is encouraged so that appropriate measures can be taken and processes can be improved in case any issues arise.

11.0 APPENDICES.

The following appendices are specific recommendations for air operators. Individual operations and needs should determine an air operator's AD management process. When developing an AD management process, all air operators should consider their size, capabilities, resources, and equipment. The recommendations contained in the following appendices are one mean, but not the only means, of complying with part 5 requirements pertaining to ADs.

- Appendix 1, Air Operator Compliance Planning.
- Appendix 2, Air Operator Reporting/Recordkeeping and Tracking Future Airworthiness Directive Compliance Requirements.
- Appendix 3, Air Operator Training.
- Appendix 4, Air Operator Prototyping.
- Appendix 5, Sampling Program and Physical Verification.

APPENDIX 1.

AIR OPERATOR COMPLIANCE PLANNING

1. COMPLIANCE PLANNING

Air operators are tasked with planning the implementation of Airworthiness Directive (AD)-mandated tasks. This requires translating the AD requirements into the air operator's method of compliance (e.g., work cards, engineering paperwork, etc). This process includes coordinating with the various departments responsible for maintenance personnel, maintenance planning, materials management, technical writing, technical publications, quality assurance (QA), training, and aircraft maintenance records. Compliance planning is all of the activities that may be required before accomplishing AD-mandated work instructions on the airframe, engine, or component. This appendix lists focus areas that need to be considered during the compliance planning process.

> NOTE: The air operator may request/invite their NCAA principal inspector (PI), or his or her representative, to the AD planning meeting. When the air operator brings forth issues, concerns, or clarification requests, the aviation safety inspector (ASI) serves as a coordinator and ensures that the appropriate NCAA discipline and CAA of the State of Design is consulted, and its recommendations/guidance are provided as feedback to the air operator.

2. ACTIONS ACCOMPLISHED BEFORE RELEASE OF AN AD

Air operators often address safety related issues when the State of Design and Type Certificate Holders release a Airworthiness Directives All Operator Telex (AOT), alert Service Bulletins (SB), etc. Air operators should accomplish the following actions before the AD compliance due date.

a. Review for Deviations/Variations. Air operators should review previous documentation to capture any deviations/variations that occurred to support possible alternative method of compliance (AMOC) proposals. Any deviations/variations should be brought to the AD planning meeting for disposition.

b. Determine Compliance. If the air operator has accomplished a modification or inspection that is now subject to an AD, it should perform a thorough review of the documentation, records, and compliance plan to ensure that the work accomplished meets AD requirements. In some cases, reviewing compliance paperwork can determine compliance. However, it may be necessary to physically verify an aircraft to ensure the work was done in accordance with the AD requirements. In this case, it is important to identify the physical attributes that would indicate noncompliance, such as part installation, wire routing, and any possible deviations. This task is complex due to the use of Nig. CARs Part 5 practices while complying with the service instructions. Previous substitutions/deviations and configurations should be identified before AD issuance for consideration and application of AMOCs.

3. SINGLE POINT OF CONTACT (POC) FOR AN AD IMPLEMENTATION PLAN

a. AD Implementation Plan. Most air operators have a single POC responsible for AD status, planning, and compliance. Large operators normally employ an engineering department to perform this task. The engineering department is typically responsible for developing the air operator's AD implementation plan. Regardless of the air operator's departmental organization, there should be a well-defined department responsible for coordinating the AD implementation plan.

> NOTE: When the term "engineering" is used in these appendices, it is used as a generic reference to a department or individual that performs this function.

b. AD Applicability. The engineering department is responsible for defining an AD's applicability to the air operator's fleet or components, as well as developing the overall compliance plan, which may include instructions for continued airworthiness (ICA) and any other additional guidance that an air operator deems appropriate for its organization. This plan should include all requirements of AD-mandated actions.

c. Engineering Review. An engineering review should include the requirement for a side-by-side, paragraph-by-paragraph listing of all AD requirements and the associated air operator engineering documents.
d. Emergency ADs. The department responsible for ADs should be responsible for receiving and addressing any immediate adopted rules for the air operator per operations specification (OpSpec) paragraph A447, Emergency Airworthiness Directives (EAD) Notification Information.

4. AD COMPLIANCE COORDINATION

a. Process Participants. The AD management process ensures cross-functional awareness and responsibility to satisfy AD requirements. Participants may include individuals responsible for engineering, materials, scheduling, recordkeeping, maintenance, inspection, maintenance programs, publications, and QA/quality control (QC). Other operational departments, such as flight operations, may need to be included so they may understand the impact on their responsibilities.
b. AD Requirements Review. It is considered a best practice to hold an AD planning meeting or equivalent where predefined tasks are reviewed for action. This meeting helps ensure all affected departments are aware of their responsibilities, and action items are recorded. Specific AD requirements are reviewed at this meeting, with particular focus on any unique aspects of the AD. It is also during this meeting that the risk of compromising the continued compliance with the AD requirements should be discussed and appropriate mitigating action determined. This action may include physically marking the AD area or creating a process for AD verification. Other considerations might include:

- Previous accomplishment of service instructions issued before an AD's release.
- Existence of previous modifications that may prevent accomplishment (e.g., repairs or Supplemental Type Certificate (STC) modifications in the AD-affected area may affect compliance).

- Changes to manuals, e.g., Ilustrated Parts Catalog (IPC), Wiring Diagram Manual (WDM), minimum equipment list (MEL), Airplane Flight Manual (AFM), or other affected documents.
- Determining the need for specific labor classification/skills (e.g., avionics, structures, etc).
- Possible restriction of AD accomplishment to site-specific locations based on the need for specialized skills.
- Existence of delivered configurations not addressed in AD service instructions.

c. Prototyping the Documentation. Once air operators have produced their internal documentation to comply with AD requirements, they should consider prototyping the documentation with the first airframe, engine, or component to be accomplished. The air operator should consider performing silent prototyping. Determining whether prototyping the documentation is needed should happen during the planning process. This determination involves reviewing the paperwork, materials, and processes used to comply with the air operator's AD work document at the time of execution on the first aircraft, engine, or appliance to which the AD applies.

d. Reviewing Documentation and Action Items.
(1) Once the air operator finalized its compliance plan, it is considered a best practice to meet again to review the final documentation and ensure all action items are addressed. The meeting's purpose is to review:

- The compliance documents,
- Associated work cards,
- Tracking system set-up,
- Affected manual revisions,
- Required AMOCs,
- Planning schedule,
- Materials, and
- Continued compliance plan.

(2) On a regular basis the air operator should perform validation checks; which may range from sample validation required, as with structural repairs with low risk of altering AD requirements, to physical validation at lower level maintenance visits for ADs with a higher risk of not continuing to meet AD requirements. Any action items should be addressed prior to accomplishment on the first aircraft, engine, or component.

(3) It is considered a best practice to invite the NCAA to participate in the review meeting. This would help identify any regulatory issues that the air operator may have missed, as well as inform the NCAA of the air operator's overall compliance plan. NCAA participation in this or any other air operator meeting does not remove the air operator from the sole responsibility for compliance with the AD requirements and any applicable AMOCs.

NOTE: Participation of an ASI is at the request of the air operator. The ASI does not provide concurrence/approval of an air operator's compliance decisions.
e. AD Compliance Records. AD compliance records and the status of any applicable ADs are maintained in accordance with existing regulatory requirements. It is considered a best practice that any planning documentation, including applicable checklists, from AD meetings should be retained and should contain information on what decisions were made

during the AD management process. Any compliance validations should also be captured and retained.

5. AUTHORING AIR OPERATOR-SPECIFIC WORK CARDS FROM SERVICE INSTRUCTIONS. Service instructions mandated by ADs are often lengthy as they address multiple configurations. It is considered a best practice for an air operator to process the design approval holder (DAH) instructions into work cards specific to an air operator's maintenance program. By doing so, the air operator presents only pertinent information to the various departments responsible for taking action. It also allows the air operators to address specific internal requirements, such as Required Inspection Items (RII), Extended Operations (ETOPS), Reduced Vertical Separation Minimum (RVSM), and any AMOCs necessary for their fleet or equipment. Below are some considerations for authoring internal work cards:

- Indicate on the compliance documents/work cards that a technician is working on an AD-related task with no deviations or substitutions allowed.
- To help the technician distinguish between mandatory steps with no changes allowed versus performing accepted procedures, mark the mandatory steps that should not be changed.
- Identify work steps that require special signature and/or qualification requirements, such as ETOPS and RIIs.
- Provide a feedback process for technicians to use in the event the AD instructions cannot be accomplished (e.g., who to contact, what steps to take in the event a portion of the AD has been accomplished, but all work instructions cannot be completed, etc.).

6. 24/7 AMOC SUPPORT

a. After Business Hours. To avoid significant air transportation disruptions, there are occasions when an AMOC is urgently needed after normal business hours to support air operator compliance with an AD. The air operator should develop a methodology and process for handling issues that may require NCAA participation to resolve such an emergency.
b. 24/7 Support Process. While a 24/7 support process is available, it is not intended to be used for AMOCs to accommodate air operators that have failed to adequately plan for AD compliance.

7. SBs INCORPORATED BY REFERENCE INTO ADs.

This section discusses several best practices for SBs related to an AD. The State of Design or State of Registry issues an AD when it finds an unsafe condition exists in a product and the condition is likely to exist or develop in other products of the same type design. The intent of the action(s) specified in an AD is to detect, prevent, resolve, or eliminate the unsafe condition. Those actions can either be written directly into the regulatory portion ("body") of the AD, or another document, such as an SB, can be referenced in the AD's body. Compliance with an SB that is in an AD is mandatory.

a. Safety Intent and Configuration Description. An SB in an AD may contain paragraphs entitled "Safety Intent," and, for ADs that will change the configuration of a part, "Configuration Description." The intent of these paragraphs is to enhance and focus

awareness of the safety issue during the development and approval of the SB as well as during implementation and subsequent maintenance. The “Safety Intent” paragraph should explain the intended purpose of accomplishing the SB (i.e., prevent, resolve, or otherwise remove the unsafe condition). The paragraph should be a concise and clear statement of the specific technical objective of the instructions. If accomplishing the SB will change configuration, the AD should include a “Configuration Description” paragraph to provide a concise, high-level description of the design change that will result from accomplishing the instructions. The “Configuration Description” should be limited to the features that will prevent development or recurrence of the unsafe condition, after implementation of the configuration. The “Configuration Description” may guide, but cannot be the final determinant of, compliance with an AD.

b. Critical Task Differentiation. An SB may identify steps that have a direct effect on detecting, preventing, resolving, or eliminating the unsafe condition in an AD with “RC” (required for compliance). Any substitutions or changes to the RC steps will require an AMOC approval. Differentiating these steps from other tasks in an SB will improve an owner/operator’s understanding of crucial AD requirements and help provide consistent judgment in AD compliance.

APPENDIX 2.

AIR OPERATOR REPORTING/RECORDKEEPING AND TRACKING FUTURE AIRWORTHINESS DIRECTIVE COMPLIANCE REQUIREMENTS

1. PLACEHOLDER MAINTENANCE TASK. Air operators use various systems to track and schedule required maintenance tasks on their affected aircraft and components. For Airworthiness Directives (AD) with compliance requirements that are not due for many years, it is considered a best practice to create a placeholder maintenance task that tracks the AD's timeframe requirements. By initiating a placeholder record within the air operator's tracking system far in advance of any due tasks, the AD requirements will be captured and may prevent AD noncompliance due to exceeding a specification (e.g., hours, cycles, days, etc.).

2. REPORTING REQUIREMENTS. Air operators should consider any AD-mandated reporting requirements. It is considered a best practice to have a single department or individual responsible for collecting the necessary reports and submitting them to the NCAA and/or design approval holder (DAH) within the mandated timeframe, which may be expressed in hours, cycles, calendar time, etc.

3. COLLECTING REPORTS. In order to help collecting reports, air operators should build the necessary reporting information into their work cards with specific means to submit that data to the department/individual responsible for reporting. It is considered a best practice to document and electronically submit this data to allow faster reporting.

APPENDIX 3.

AIR OPERATOR TRAINING

1. AIRWORTHINESS DIRECTIVE (AD) AWARENESS. It is considered a best practice that air operators consider AD training for both overall AD compliance policies and procedures, as well as AD-specific training. The air operator should develop recurrent AD awareness training to address the air operator's specific policies and procedures in regards to compliance with AD requirements. This training should include the awareness of strict compliance with written instructions and the need to propose an alternative method of compliance (AMOC) when a deviation is required. When the air operator determines that an AD's complexity may impact its implementation, the air operator should have a program in place where a risk analysis-based assessment is made to determine whether maintenance training is needed.

2. SKILL-SPECIFIC TRAINING. Training may also include skill-specific training for particular ADs. For example, an AD may require a new Nondestructive Testing (NDT) technique that requires training. In addition, the air operator may use personnel with specific training for particular tasks. For example, an air operator can use avionics-qualified technicians for wiring-related ADs. To measure the level of improvement regarding awareness and skills level of aviation personnel in wiring training, the air operator, its repair station personnel, and Original Equipment Manufacturer (OEM)/design approval holder (DAH) personnel should have an electrical wiring interconnection system (EWIS) training in place that is consistent with the 2007 Enhanced Airworthiness Program for Airplane Systems (EAPAS) rule.

APPENDIX 4.

AIR OPERATOR PROTOTYPING

1. IMPLEMENTATION DOCUMENTATION. Air operators should prototype their implementation documentation based on the results of the risk assessment performed during the compliance planning process. This will ensure the accuracy of the implementation document.

2. SILENT PROTOTYPING.

a. Purpose of Silent Prototyping. Air operators should also use silent prototyping, in which a technician tests the compliance document without verbal assistance from the author. This method can determine whether a technician can accomplish the instructions as written without the need for interpretation. Air operators may decide to only prototype their Airworthiness Directive (AD) compliance document on one aircraft, engine, or appliance at one location. However, if the tooling and techniques are complicated, it may be necessary to prototype the AD compliance document at each maintenance facility that will be asked to comply with the AD document. If there are work steps that must be complied with at a component level, it may be necessary to prototype the AD-mandated actions at the component shop performing the modification, as well as the installation effort at the aircraft level. As part of its AD compliance best practices, the air operator should invite its ASI to the AD on-airplane prototype. This allows the air operator to recognize that the ASIs will decide which prototype invitation they will respond to.

b. Silent Prototyping Process. Air operators should have or develop a prototyping process that allows them to develop and verify the documentation and accomplishment methods that can be used primarily to enhance implementation of complex or higher risk compliance procedures.

3. COMPLIANCE DOCUMENT ISSUE REPORTING. Some air operators may not have the organizational structure to support on-site prototyping of the AD-related documentation. If affected parties cannot be present for prototyping, there should be a process for the technician to document and report any issues with the compliance documents to the document author. The process should include a way the technician may resolve paperwork and compliance issues before the aircraft returns to service (RTS).

4. KITTING. An air operator may be able to purchase from the Original Equipment Manufacturer (OEM)/design approval holder (DAH) a kit that consists of all the AD-required parts and materials; this process is referred to as kitting. The accuracy of the kit contents should be verified through the prototyping process. The air operator may assemble the kit independently. In either case, the completeness and conformity of the kit contents should be verified and the air operator should consider evaluating the kit in the prototyping process. Special attention should be made to ensure that part or material substitutions are only made with written approval.

5. PROTOTYPING PROCESS ROLES AND RESPONSIBILITIES. While every air operator has a different organizational structure, the prototyping process should include the following roles and responsibilities:

a. Maintenance Personnel. Technicians read AD compliance documents and accomplish the work steps. If AD compliance documents or manuals being used do not support the physical requirements, the technician should document and resolve these issues before an aircraft RTS. This action can include:

- Work step sequencing,
- Verifying required materials,
- Tooling availability,
- Accessibility,
- Material substitutions not permitted by the provided documentation, or
- Any other issues that prevent compliance with the documentation as written.

b. Engineering Personnel.
(1) The author of the air operator's compliance document (or an authorized engineering representative) should be present during prototyping. If the air operator is not staffed with an engineering department, the person responsible for AD compliance documents should be present. The person's role is to collect all necessary changes to the compliance document as well as to the supporting manuals. The person should also document all of the necessary data to support any alternative method of compliance (AMOC). Engineering should propose and obtain approval for all AMOCs required to return the aircraft to service. This responsibility includes providing feedback to the OEM/DAH of any documentation issues, such as a mandated service instructions, Aircraft Maintenance Manual (AMM), component maintenance manual (CMM), etc.

(2) Subsequent to prototyping, engineering or the responsible person should hold a debrief meeting with all of the participants in the prototyping process. The purpose of this meeting is to review the corrections, clarifications, or significant changes needed to AD compliance documents and to ensure that there is a clear understanding of any action items as a result of the prototyping process. Engineering or the responsible person should then revise AD compliance documents as needed so that future compliance efforts are correct. If the changes are significant, re-prototyping may be necessary.
c. Air Operator Inspection Personnel. Air operator inspectors may participate to ensure that the air operator's inspection process requirements are included in AD compliance documents and to perform any AD-mandated inspection requirements, such as Nondestructive Testing (NDT). Like the technician, the inspector should document and resolve any issues before an aircraft RTS. This action can include: • NDT tooling set up, • NDT techniques, • Tooling availability, • Accessibility, or • Any other issues that prevent compliance with the documents as written.

6. FEEDBACK FROM PROTOTYPING. Air operators should perform a prototype as soon as possible after an AD is issued. Any changes identified as a result of prototyping can be implemented quickly across the industry. For example, if a fitting is being fabricated incorrectly and cannot be installed, it may be necessary for the OEM/DAH to produce redesigned parts with an extensive lead time. If prototyping happens late in the compliance window, there may be operational impact and a reduction of safety for the traveling public.

7. OUT-BRIEFING. The air operator defines in their manual the person responsible for conducting the out-brief meetings. The out-brief meeting should be used to address any issues found during the prototyping process, such as corrections, clarification, and significant changes. The meeting may produce a list of action items, action item owners,

and estimated completion dates for the action items prior to AD implementation. This action would help ensure that there is a complete understanding by all participants regarding future actions necessary to bring documents into compliance with the necessary physical work steps, correct any documentation errors, and/or obtain any necessary AMOCs.

8. SUPPORT SYSTEM. While executing AD-mandatory work steps, there are different circumstances that arise that may require technical support. Air operators should have a support system in place to respond to immediate technical concerns and the need for AMOCs. By having a support system in place, technicians will have the guidance needed to accomplish a task.

APPENDIX 5.

SAMPLING PROGRAM AND PHYSICAL VERIFICATION

1. SAMPLING PROGRAM. A sampling program is an effective method of monitoring Airworthiness Directives (AD) for continued compliance. A sampling (i.e., AD re-verification) program would use a process audit procedure that utilizes an air operator's existing audit and reliability elements of their Continuing Analysis and Surveillance System (CASS) program. This would allow the air operator to monitor AD compliance during specified maintenance intervals (typically at B-Check or C-Check inspection intervals). A sampling program should verify that an unintentional alteration has not occurred and ensure that the air operator's CASS audit sampling program verifies that ADs are evaluated, accomplished, and tracked. This appendix, as seen in Figure 1, Airworthiness Directive Compliance Physical Verification Flow Chart, and Figure 2, Instructions For Airworthiness Directive Compliance Physical Verification Analysis, of this advisory circular (AC) outlines an AD sampling program.

2. SAFETY MANAGEMENT SYSTEM (SMS). Each new AD should be evaluated for risk of future noncompliance using SMS principles as applicable. Air operators validate that risk assessments, upon implementing each new AD, should include developing and implementing preventative measures to eliminate and/or reduce the severity and/or frequency of possible AD alteration. a. Practical risk management should include a program to ensure that potential hazards that could result from implementing a new AD are identified and controlled.

b. A safety assurance program should be implemented by the air operator to evaluate the continued effectiveness of implemented control strategies. There should also be a program implemented that supports the identification of new potential hazards.

3. AT-RISK TASK. ADs identified in a sampling program that require verification should be assigned an inspection task on a representative number of aircraft, or the entire fleet, through the normal maintenance inspection intervals (e.g., B-Check or C-Check). The sampling program results should be incorporated in an air operator's maintenance and inspection program. The air operator's CASS program is responsible for:

- Measuring the performance and effectiveness of its inspection program and the program covering other maintenance, preventive maintenance, and alterations.
- Correcting any deficiencies in those programs, regardless of whether the air operator or another person carries out those programs.

4. NEWSWORTHY COMPLIANCE ISSUES. Air operators that are members of industry associations should consider using established processes for compliance issues that may be widespread and newsworthy. An established process may be seen in the Air Transport Association of America's (ATA) Specification 111 or similar processes developed by other associations. Air operators may need to coordinate with associations, regulatory authorities, and OEMs/DAHs to resolve compliance issues.

FIGURE 1. AIRWORTHINESS DIRECTIVE COMPLIANCE PHYSICAL VERIFICATION FLOW CHART

AD Compliance Physical Verification Analysis

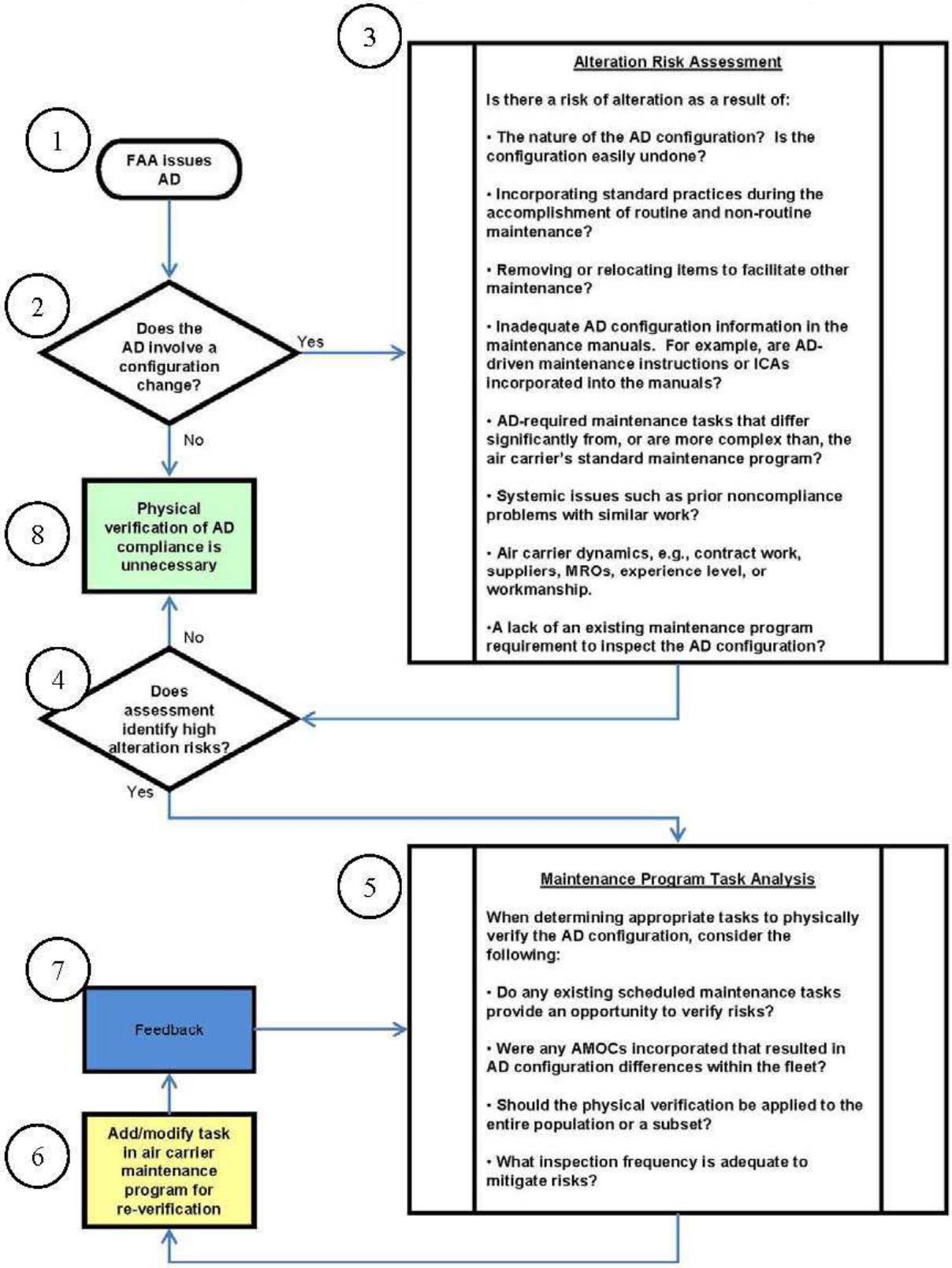

FIGURE 2. INSTRUCTIONS FOR AIRWORTHINESS DIRECTIVE COMPLIANCE PHYSICAL VERIFICATION ANALYSIS

1	Preparation: FAA issued Airworthiness Directive (AD).	Initiate analysis for newly issued ADs. This process may also be applied to previously accomplished Service Bulletins (SB) or ADs with known concerns.	Go to Step 2
2	Decision: Does the AD involve a Configuration change?	If the AD involves a configuration change, an alteration risk assessment should be performed. If the AD does not involve a configuration change, a physical verification maintenance task is unnecessary.	Yes, go to Step 3 No, go to Step 8
3	Assessment: Alteration Risk Assessment	Air carriers should develop their own risk-based assessment process to determine if the AD configuration under consideration exhibits a high risk of alteration through the course of normal maintenance. The analysis should be comprehensive enough to include, but not be limited to, the elements listed in the flow chart.	Go to Step 4
4	Decision: Does the assessment identify high alteration risks?	Has the risk assessment identified high risks of altering the AD configuration, resulting in AD noncompliance? If yes, a maintenance program task analysis should be performed to identify the appropriate tasks to mitigate the identified risks. If no, a physical verification of the AD configuration is unnecessary.	Yes, go to Step 5 No, go to Step 8
5	Analysis: Maintenance Program Task Analysis.	The air carrier should perform an analysis to identify maintenance tasks that would mitigate identified risks to continued AD compliance. The analysis should be based on an air carrier's experience, operator systems, and the alteration risk, with consideration for, but not limited to, the items listed in the flow chart.	Go to Step 6
6	Outcome: Maintenance task added to air carrier's maintenance inspection program.	The alteration risk assessment has determined a need to add tasks to the maintenance program to physically verify AD compliance in regard to identified risks. The maintenance program task analysis has identified the appropriate tasks to mitigate identified risks.	
7	Feedback.	The air carrier may include a feedback element to its AD compliance physical verification program. Events such as physical verification task results, maintenance	

		program changes, or regulatory changes may trigger a re-evaluation of the analysis that was performed in Step 5. The design of the feedback element would depend on the air carrier's organization and resources.	
8	Outcome: Physical verification of AD compliance is unnecessary.	The lack of a configuration change, or the alteration risk assessment of a configuration change, has determined that a physical verification of AD compliance is unnecessary.	