RA 5723 - Ageing Aircraft Audit

Rationale

The risk to airworthiness due to the ageing of aircraft in service is partly mitigated by Integrity Management in accordance with RA 5720, RA 5721 and RA 5722. However, the insidious nature of degradation and the interaction of apparently unrelated ageing processes are often found only by an additional rigorous periodic audit of trend data, procedures and the aircraft's physical condition. This whole process is known as an Ageing Aircraft Audit and it is achieved by observing the regulation and guidance in this Regulatory Article.

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Regulation 5723(1)

Ageing Aircraft Audit

5723(1) All UK military registered ►Air System◄ types **shall** be subjected to an Ageing Aircraft Audit (AAA), to give confidence that airworthiness risks are ►As Low As Reasonably Practicable (ALARP) and Tolerable,◄ as the fleet ages and regulatory requirements evolve.

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Ageing Aircraft Audit

1. The Type Airworthiness Authority (TAA) **should** initiate an independent AAA for each ageing aircraft fleet under their control 15 years after a type's declared In Service Date (ISD), or at the mid-point between the declared ISD and the initial planned Out of Service Date (OSD) whichever is soonest. Repeat audits **should** be conducted at 10-year intervals thereafter.

2. The AAA **should** cover the airworthiness and Integrity Management of the aircraft, giving particular consideration to ageing. TAAs **should** identify the areas to be covered by Structures, System and Propulsion Audits based on the safety consequences of potential failure and analysis of information from all available resources.

3. It **should** be clearly stated which aircraft areas or systems, if any, are to be excluded from the AAA and the rationale for their exclusion.

4. The AAA **should** include items managed by commodity Project Teams (PTs), where necessary. The aircraft PT **should** take primacy in the Audit, seeking commodity PT support as necessary.

5. A detailed, independent physical examination of the condition and husbandry standards of representative aircraft (and, where appropriate, sub-systems) from the fleet **should** be carried out.

6. Any audit activity **should** be completed and a report, to include recommendations, issued, within a 2-year period.

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Ageing Aircraft Audit

Background

7. Aircraft structure, aircraft systems and propulsion systems have to function as intended throughout the operational envelope of the aircraft, taking due account of the operating environment. The Design Organization (DO) makes assumptions about usage, loads and the threats to Structural, System and Propulsion Integrity during the design and certification process. The assurance of Integrity Management in these areas through life is covered by RA 5720, RA 5721 and RA 5722, respectively.

8. During the life of an aircraft, cumulative exposure to the threats to Integrity (such as overload, fatigue, environmental/accidental damage, absence of configuration control, or maintenance/supply errors), and the risk of them interacting, increase with time and usage. Additionally, calendar-based ageing mechanisms (such

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as the effects of environmental ageing and degradation) can compromise Integrity. The effects of ageing are not always comprehensively recognised or addressed by routine activities.

9. The AAA can be subdivided into Audits covering aircraft structure, aircraft systems and propulsion systems, each considering different failure modes and airworthiness consequences:

a. Structural Airworthiness can be compromised by unexpected structural degradation. This often occurs in-service due to interacting damage mechanisms that were either not anticipated or not taken into account in testing. Such interacting mechanisms may include the combined effects of fatigue with corrosion, disbonds, impact damage or multiple adjacent repairs. Furthermore, for high-life aircraft, fatigue cracks may nucleate and grow from multiple sites and then coalesce to form a single, critical crack earlier than would have been estimated using conventional crack growth analyses.

b. System Airworthiness can be compromised by systems failure rates which exceed those assumed in the Safety Case; the unexpected interaction of failed systems; and the undetected failure of critical or emergency systems.

c. Propulsion system failure can directly affect the airworthiness of the aircraft or the integrity of the engine. The manner in which the ageing effects manifest themselves is dependent on the material from which the components are manufactured and the threats to Propulsion Integrity to which the components have been exposed.

10. Sources of information may include design evidence, component criticality analysis, zonal hazard analysis, functional hazard analysis, functionally significant item analysis, system safety assessments, results of aircraft physical and husbandry inspections, functional surveys and failure and reliability data.

11. It may become increasingly difficult to support ageing aircraft, as the Original Equipment Manufacturers (OEMs) may not be able to support or supply an exact replacement for an item. Effective obsolescence management (see JSP 886 Vol 7), including changes in legislation or specifications (which alter or ban the use of specific materials, substances or processes), becomes increasingly important for ageing aircraft.

12. Additionally, over time there may be loss of corporate aircraft platform knowledge, loss of configuration control, changes in assumed usage, evolution of regulatory requirements and the accumulated effects of a number of otherwise minor integrity problems.

13. The AAA is therefore necessary to identify and manage ►the Airworthiness risks, as a fleet ages and regulatory requirements evolve, so that they are ALARP and Tolerable.◄ As a beneficial consequence, it can also help to optimise fleet availability and support costs.

Aim of AAA

14. An AAA provides assurance that the Structural Integrity, System Integrity and Propulsion Integrity, and hence the airworthiness risks, of a fleet's aircraft are being managed appropriately from the perspective of ageing. Therefore the aims of an AAA are to:

a. Conduct a periodic, independent assessment of the airworthiness of the fleet, with particular consideration to ageing.

b. Consider individually and collectively the Structural Integrity, System Integrity and Propulsion Integrity activities, often carried out in isolation, in order to assess the effectiveness of the fleet's airworthiness management.

c. Undertake an independent review of the continued applicability of procedures, management processes, assumptions and documentation that are in place to ensure airworthiness, integrity and functionality.

d. Undertake a detailed, independent physical examination of the condition of representative aircraft from the fleet, unless an equivalent examination is conducted routinely.

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e. Identify patterns or trends that suggest future airworthiness and integrity problems.

f. Identify significant risks to the airworthiness and integrity of the aircraft and to the achieving of its planned OSD.

Timing of AAA

15. The following points will need to be considered when deciding the timing of an AAA:

a. The '15 years after ISD' requirement is applicable to aircraft fleets which are acquired from new. Where fleets are acquired which have been previously owned or operated, then an AAA is to be undertaken at an earlier stage; advice may be sought from independent specialists, where contracted, and MAA-Cert-Div. In the case of the acquisition of a fleet which can already be regarded as ageing, an AAA is to be conducted before Main Gate approval is sought.

b. Fleets acquired under short-duration arrangements would not usually be expected to undertake an AAA, provided no member of the fleet is anticipated to exceed 50% of its cleared life (in any parameter) during MOD service. Advice may be sought from independent specialists, where contracted, and MAA-Cert-Div in deciding whether short-duration fleets are to be subjected to an AAA, and again this has to be before Main Gate approval is sought.

c. If the original planned OSD is to be extended, the mid-life point (for conducting the first AAA) is to be based upon the original OSD forecast when the Type Certificate or initial Release to Service was signed.

Use of comparable programmes

16. Some aircraft may have in place comparable programmes to AAAs that have been developed by OEMs, civil operators or foreign armed services, which might fulfil many requirements of an AAA.

17. Where the subject fleet is a civil derivative and is operated in a manner essentially similar to the civil role, a comparison may be conducted between the documentation produced to meet the civil continuing airworthiness requirements for ageing aircraft structure, aircraft systems and propulsion systems and the AAA regulation contained in this RA. The results of the comparison may reduce the amount of work needed to fulfil the AAA requirement.

18. In accepting other programmes as being suitable to meet the AAA requirement, TAAs have to satisfy themselves, through consultation with independent specialists and MAA-Cert-Div, that the programme meets the requirements of this RA. Requests for recognition of comparable programmes have to be submitted by the TAA for endorsement by MAA-Cert-Div at least 12 months prior to the audit becoming due.

Management of AAA: Coordination

19. The TAA may appoint an AAA Coordinator who is responsible for controlling the interfaces between the Audits and for coordinating the AAA results. A list of all Audits and the demarcation between them will be included in an AAA Coordination Document.

20. Some aircraft systems components include items considered to be structure (eg propellers and helicopter rotor blades). The TAA will decide under which Audit(s) these items are addressed.

21. Where Audit requirements to examine aircraft may lead to other systems being disturbed, these are to be identified in the AAA Coordination Document and their consideration planned within the overall work programme.

Management of AAA: Requirements

22. The potential size, complexity and cost of an AAA make careful planning and management essential. The following factors will be important in this consideration:

a. Each specialist area may be managed by an AAA Working Group comprising representatives from the aircraft PT, relevant commodity PTs, DO, maintenance organizations, OEMs and independent specialist airworthiness advisers.

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b. The TAA, in consultation with the AAA Coordinator, may appoint Project Officers who are responsible for specialist areas (eg structures, systems or propulsion) within the AAA.

c. An independent specialist airworthiness adviser, who is a Subject Matter Expert in an aircraft system, will usually be appointed by the TAA to cover each specialist area.

d. The adviser may also:

(1) Advise the PT on the scope of the AAA.

(2) Assess proposals for AAA activity on behalf of the PT.

(3) Conduct the AAA if contracted to do so.

(4) Assist the PT to interpret the outcomes of the AAA.

(5) Support the AAA Working Group.

e. The AAA will require a range of personnel with adequate technical knowledge of aircraft structure, aircraft systems and propulsion systems and of the safety assessment methods employed (such as Hazard Assessment, Failure Modes and Effects Analysis, Failure Modes Effects and Criticality Analysis (FMECA) and aircraft service history trend analysis). Extensive OEM data may be required.

f. The Audit team will need appropriate access to records and information, which may include DO/OEM data, in order to carry out the AAA.

23. The requirement to conduct an AAA and subsequent repeats will normally be reflected in the aircraft's Through Life Management Plan (TLMP) and relevant integrity strategy documents.

Management of AAA: Tasking

24. The AAA can be carried out by either the aircraft DO or another independent organization.

25. If the Audit is to be carried out by the DO or an organization which is already engaged in managing, maintaining or advising on the fleet's airworthiness, then additional measures are necessary to ensure that the independence of the AAA is not compromised. Accordingly, those personnel conducting, supervising and approving the Audit need to be separate from the chain of responsibility for those supporting the fleet's airworthiness.

26. In the case of sub-systems, the sub-system DO may be tasked separately to undertake audit activity as necessary. The TAA is responsible for selecting and tasking organizations that are competent and independent.

27. The DO/OEM may also:

a. Advise the PT on the scope of the AAA.

b. Provide records and data as required by the Audit Team.

c. Assist the PT to interpret the outcomes of the AAA.

d. Support the AAA Working Group.

Reporting

28. A final AAA Report, covering all Audits, will be produced and accepted before the AAA can be considered complete; the Report will include recommendations. Advisers, DOs and OEMs, where contracted, may assist the TAA to interpret the AAA report and findings. Additionally, generic aircraft airworthiness and cross-platform risks identified by the AAA are to be reported by the TAA to the appropriate Airworthiness Management Group.

Follow-up actions

29. The TAA will sentence the recommendations in the AAA Report and initiate appropriate follow-up action, ensuring that all identified hazards are ►ALARP and Tolerable.◄ The risks are to be managed via the TAA's Safety Management System. Progress against the recommendations and hazards is to be monitored by the Project

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Safety Working Group (PSWG) or Integrity Working Groups. The TAA may consider the benefits of producing a report on 'Lessons Identified' from the AAA activity.

Scope of AAA

30. Careful scoping of the AAA is essential. This is to ensure that Audit activities are integrated in order to properly address all aspects and avoid nugatory work. The Audit will include, but need not be limited to:

a. Issues revealed by any earlier AAAs on the fleet.

b. Complexity of the platform to be audited: generally, greater complexity requires more detailed planning and scoping.

c. Potential for collaboration with other users.

d. Equipment managed by organizations external to the TAA, eg commodity PTs.

e. Effect of fleet size, roles and mini-fleets: ensure that the AAA accounts for differences in roles and marks.

f. Availability and veracity of usage data.

g. Configuration control methods.

h. Known or perceived manufacture, repair or supply errors.

i. The completion and effectiveness of sampling programmes, for whole aircraft or components, whether non-destructive or destructive. Note that destructive sampling and forensic examination is not a mandated element of AAA per se, but the need for it may become apparent during an AAA.

j. In respect of the independent physical examination of the aircraft condition and husbandry standards, independence may be achieved through the examination being undertaken by experienced aircraft engineering personnel from appropriate trades who are familiar with military aircraft engineering practices but not currently employed on-type. If existing continuing airworthiness processes, already incorporated into fleet procedures, eg Baseline Military Airworthiness Review, are used to support compliance, care is to be taken that their scope is expanded as necessary in order to meet that required of an AAA. This physical examination is mandated, in order to:

(1) Check that the actual condition of the fleet matches the official record.

(2) Detect hidden faults and those masked by poor husbandry.

(3) Provide assurance that standards of husbandry, maintenance and, ultimately, airworthiness are acceptable.

(4) Check the condition of interconnections. A final Interconnectivity Condition Survey report is to contain recommendations about further sampling, including destructive sampling where appropriate. For further guidance, see Reference j.

k. An assessment of the adequacy of PT procedures and maintenance policies for, but not limited to, the following:

(1) Fault arisings, trends and reports.

(2) Sampling.

(3) Technical Instructions, Service Bulletins and Airworthiness Directives.

(4) Management of DO/OEM advice.

(5) Other user evidence.

(6) Retention of airworthiness documentation.

(7) Maintenance schedule review, maintenance programme review or equivalent.

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(8) Obsolescence management strategy and plans in accordance with JSP 886 Vol 7.

(9) Usage Monitoring.

(10) Supplementary Inspection Programmes.

(11) The Aircraft Document Set (ADS).

(12) Those items categorised 'on condition' that may not otherwise be routinely considered.

l. A review of the Hazard Log and Risk Register entries of any status, whether open, approved, managed or closed.

m. A review of the Limitation and Acceptable Deferred Fault Logs for a representative selection of aircraft from the fleet to check their significance, validity, safety, quantity and potential interaction.

n. The effectiveness of the Depth Maintenance programme in rectifying Limitations and Acceptable Deferred Faults.

o. The effectiveness of maintenance schedule reviews to ensure that technical documentation is up to date and consistent.

p. The use of new techniques and technologies to capture Ageing Aircraft issues across all maintenance levels.

q. The existence, effectiveness and findings of any other ageing aircraft programmes (such as those conducted under civilian regulations) which are applicable to the fleet. Such programmes may be of particular relevance to fleets based upon civil aircraft.

r. Proximity to OSD: if nearing the OSD then the extent of the AAA will be set using a risk-based approach, while taking into account the possibility of OSD extension (see RA 5725).

s. Continued validity of Life Extension Programme evidence where applicable (see RA 5724).

t. A review of assumptions used in generating lives and inspection schedules, including monitoring and management of changes in operational conditions and usage.

31. The scope for the structural, systems and propulsion aspects of the AAA may be proposed by the respective AAA or Integrity Working Groups and is to be agreed by the TAA. Advisers, DOs and OEMs, where contracted, may advise the PT on the scope of the AAA.

32. Emerging findings are to be reviewed periodically by the appropriate Working Group. Working Groups may report progress to the TAA, refine the scope of the Audit using a risk-based approach and raise issues arising from an AAA to the appropriate aircraft PSWG.

Scope: Ageing Aircraft Structural Audit

33. For the definition of Structure, see RA 5720(1). The recommendations within MASAAG Paper 104 are to be referred to when setting the scope of the Structural Audit (MASAAG Paper 104 is available from MAA-Cert-Div). In addition to the general AAA requirements, the Structural Audit will include, but need not be limited to:

a. Effectiveness and currency of Structural Integrity Strategy Document and Plans.

b. Adequacy of all published structural information for the type design, including:

(1) Currency, completeness and accuracy of static loads and fatigue qualification documents, such as the Static and Fatigue Type Records.

(2) Existence of an appropriately derived list of Structurally Significant Items (SSIs) or equivalent.

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c. Relevance, currency and results of structural monitoring and Individual Aircraft Tracking, including any fatigue budgeting decisions and implementation.

d. In-service structural arisings and recovery programmes:

(1) Effectiveness of response.

(2) Extent and adequacy of trend identification and monitoring.

e. Existence and effectiveness of the Structural Examination Programme (SEP), and confirmation that all SSIs are included in the SEP.

f. Structural configuration management process, including:

(1) Existence, adequacy, use and effectiveness of structural configuration control databases and records of repair.

(2) Assessment of through-life airworthiness of repairs (eg their static strength and fatigue clearance). Confirm and consider the effects on strength, repair lives and inspection intervals of: environmental degradation, changes in aircraft usage severity, life extension, repair proximity and repair interaction.

g. Consider the need for a Repair Assessment Programme. See MASAAG Paper 106 (MASAAG Paper 106 is available from MAA-Cert-Div).

h. Existence and adequacy of a comprehensive Environmental Damage Prevention and Control Programme in accordance with RA 5720(3).

i. Each type's susceptibility to Widespread Fatigue Damage and the existence of programmes for corrective action.

j. Effective validation of assumptions used in generating structural lives and inspection schedules, such as:

(1) Operational Loads Measurement, Operational Data Recording and Manual Data Recording Exercise programmes.

(2) Statement of Operating Intent and Usage reviews.

(3) Destructive sampling and forensic examination.

(4) Assessment of Structural Integrity implications of the actual standards of maintenance and husbandry.

(5) Supplementary Structural Inspection Programmes.

k. The overall rationalisation of maintenance schedules to accommodate each of the items detailed at sub-paragraphs a to j above.

l. Structural Hazard Log and Risk Register:

(1) Effectiveness of process for management of structural risks.

(2) Continued validity of hazard mitigation assumptions, including inspections.

(3) Review of all entries, whether open, approved, managed or closed.

Scope: Ageing Aircraft System Audit

34. The System Audit will cover systems, assemblies, parts and interconnections that are affected by ageing and are critical to airworthiness, for example:

a. Emergency systems and systems with a critical function.

b. Mechanical systems: flight control, fuel, hydraulic, cooling, pneumatic, landing gear, environmental control, air services, ice and rain protection, water injection, oxygen, nitrogen, water/waste, target towing, arrester, equipment and furnishings, propeller gearbox and pitch control systems.

c. Avionic systems: primary and secondary radars, data buses, electro-optics, photographic, defensive aids, navigation aids, communications, data links, electronic warfare, identification, traffic collision and avoidance, air traffic management aids, electrical power generation and distribution, weapon control

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and release, air data, displays, prognostics and health management, mission planning, flight control, and all wiring interconnections and connectors.

d. Electronic systems including Complex Electronic Hardware.

e. Secondary Power System.

35. In addition to the general AAA requirements, the System Audit will include, but need not be limited to:

a. Systems whose failure could affect another system (whether or not the latter had also failed) and hence adversely affect airworthiness.

b. Installed combustible materials and flammability especially insulation materials and non metallic cladding.

c. Existence of any evidence from thermal mapping in the platform safety case.

d. Obsolescence issues affecting components within electronic control systems.

e. Whether the memory in any programmable devices is still reliable and appropriate for the task.

f. Whether the system protection from lightning strikes, High Intensity Radiated Fields (HIRF) and Electromagnetic Compatibility (EMC) is still acceptable, with no degradation in grounding or cable shielding.

g. Whether product software development tools (including rigs), knowledge, training programmes and skilled software engineers are still in place to upgrade software if needed.

h. Appropriateness of design assumptions and certification basis, supported by evidence, which together underpin the integrity of each aircraft system.

i. The TLMP and integrity strategy regarding:

(1) The effectiveness of solutions to previous recommendations.

(2) The adequate planning and recording of future activities.

j. The existence, adequacy, use and effectiveness of the systems configuration control process including all usage history, life consumption, modifications, repairs and concessions.

k. The changes in operational conditions and usage during the life of the aircraft and how the differences have been, and plan to be, monitored and managed.

l. Effectiveness and currency of System Integrity Strategy Document and Plans.

36. Expendable stores, Air Launched Weapons and carry-on items are not covered by this regulation. Information on certification and release can be sought from the responsible PT or from the Defence Ordnance Safety Group.

Scope: Ageing Aircraft Propulsion Audit

37. For the definition of Propulsion System, see MAA02. The Propulsion Audit will cover independent audit of the aircraft engine(s), engine control systems, engine casing, functional and physical aircraft/engine and propeller/engine interfaces (including fuel and oil system interfaces, electrical harnesses and thrust reverse system where not considered under the scope of the System or Structural Audits) and Auxiliary Power Unit.

38. In addition to the general AAA requirements, the Propulsion Audit will include, but need not be limited to:

a. A Propulsion Integrity Management review.

(1) Assess the effectiveness of solutions to previous safety-related recommendations, to include but not be limited to OEM advice, or observations from previous audits or safety reviews.

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(2) Assess the adequacy of planning and recording of Integrity Management activities against Propulsion Integrity requirements, and their inclusion in the platform level Safety Management Plan.

b. A documentation review. Confirm that all technical documents, including but not limited to the following, are up to date and consistent with each other and the ADS:

(1) Operating Conditions and Limitations, Engine Operating Conditions.

(2) Engine Technical Certificate, Type Approval Certificate or equivalent.

(3) Life Management Plan.

(4) Engine operating instructions.

(5) Maintenance manuals.

(6) Technical Instructions.

c. A review of propulsion configuration control processes.

(1) Check the existence, adequacy, use and effectiveness of usage and life consumption data.

(2) Establish if there is a process in place for managing component repairs if conducted outside DO approval.

(3) Assess the effectiveness of the process for managing concessions.

(4) Assess the extent and adequacy of scrap procedures (to ensure that all scrap items are removed from service).

(5) Assess the process for managing cannibalisation and its adequacy, in terms of configuration management.

(6) Evaluate the quality and accuracy of electronic component tracking systems.

d. An assessment of product usage.

(1) Check that the product is being used as intended by the latest endorsed operating conditions, including operational and environmental conditions.

(2) Confirm that the PT has reviewed and checked that all the assumptions made during initial product qualification are still valid, including aircraft to engine loads, off takes, engine bay clearances, vibration levels, thermals and intake effects, as appropriate. DO access may be required and will need to be arranged accordingly.

(3) Confirm that there is an adequate and working process in place to ensure that any modifications to the aircraft or systems, which could influence the engine (including electrical changes that may have an impact on EMC capabilities), are brought to the attention of the OEM.

e. A maintenance policy review.

(1) Review of on-condition-based maintenance policy, including physical inspection of items not normally inspected, eg aircraft/engine and propeller/engine interface components, electrical harnesses, casings, etc.

(2) Confirm that the maintenance periodicity for each module and system has been verified and deemed appropriate by the engine DO following in-service findings and has demonstrated reliability.

(3) Review of Scheduled Servicing Policy.

(4) Review of procedures that ensure that all maintenance facilities are working to current maintenance practices that are given in the manual.

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f. A review of component lifing policy.

(1) Check that the Life Management Plan, Service Management Plan or Engineering Plan is the most up to date version issued by the OEM.

(2) Verify that current life and usage monitoring systems are fit for purpose.

(3) Assess the adequacy of, and process for, managing life critical parts, including life extensions if applicable.

(4) Review possible changes in operating conditions and usage and identify potential effects.

(5) Ascertain if the PT has checked and confirmed with the DO/OEM that the assumptions made in deriving component lives are still valid for current operations. Confirm that all parts that have failed in service and hazarded safe flight have been provided with mitigation to prevent the failure re-occurring.

(6) Verify that all lifed parts have their lives tracked.

g. Identification of significant airworthiness and integrity issues. Assessment of current and projected risks to OSD, including but not limited to the following:

(1) A review of fleet operational statistics including accidents, incidents, in-flight shut down rates, engine rejections, aborted take-offs, performance, etc, to identify any worsening trends or patterns and age-related faults.

(2) Review engine strip and build data to identify any worsening trends or patterns and age-related faults.

(3) Consider significant safety events since previous AAA or safety review to identify any age-related faults.

(4) A review of Hazard Log and Risk Register entries and status, whether open, approved, managed or closed. OEM hazard analysis (eg FMECA, hazard reports) is to be reviewed and checked for consistency against the PT Hazard Log.

(5) A review of the output of any sampling activities that have taken place since the previous audit to assess whether any changes are needed in lifing or maintenance policies.

(6) Consider potential risks, including issues and solutions that can be gained from other world-wide operators of the same or similar products.

(7) Where events or risks have been closed on the grounds of maintenance activity, confirm that the activity has prevented any re-occurrences of the finding.

(8) A review of Defect Investigations (including all MOD F760) since previous AAA or safety review.

(9) Carry out a review of PT management of Service Instructions (Technical) (SI(T)s) from conception through to fleet satisfaction. Review a representative sample of SI(T)s in detail.

(10) Carry out a review of PT management of Airworthiness Directives and Service Bulletins.

h. A physical examination.

(1) Based on analysis of propulsion system repair and overhaul reports, target examination on high-life, less frequently examined and on-condition components, which have been used in a similar manner to the rest of the fleet. The examination will concentrate on component deterioration with any resulting recommendations highlighted to the TAA accordingly. Once stripped, engine build standards may be compared

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against the ADS parts list. The additional guidance at Para 14d, in respect of equivalent inspections, is to be noted.

(2) Review of general maintenance and husbandry standards.

i. If applicable, an Electronic Engine Control System review, including but not limited to the following:

(1) Assessment of obsolescence issues affecting components within the electronic control systems.

(2) Confirm that the memory in any programmable devices is still reliable and whether there is a need to refresh these devices.

(3) Confirm that the protection from lightning strikes, HIRF and EMC threats is still acceptable, with no degradation in cable shielding or product grounding.

(4) Confirm whether product software development tools (including rigs), knowledge and skilled software engineers are still available to upgrade software if needed.

References

39. Additional related guidance is available in the following publications, available from MAA Cert S-and-ADS:

a. JSP 886 Vol 7 – The Defence Logistics Support Chain Manual (Integrated Logistic Support).

b. JSP 520 – Ordnance, Munitions and Explosives Safety Management System.

c. RA 5720 – Structural Integrity Management.

d. RA 5721 – System Integrity Management.

e. RA 5722 – Propulsion Integrity Management.

f. RA 5724 – Life Extension Programme.

g. RA 5725 – Out of Service Date Extension.

h. MASAAG Paper 104 – Ageing Aircraft Structural Audit.

i. MASAAG Paper 106 – Repair Assessment Programme.

j. AAPWG Paper 005 – Aircraft Interconnect Systems Condition Survey.

k. AP 101A-0206-1 Flexible Wire Cables in Aircraft Control Systems.

l. AP 101A-0200-1 Corrosion Manual.

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