Brunei Department of Civil Aviation

Negara Brunei Darussalam

www.mtic.gov.bn/dca

Brunei Aviation Requirements

BAR 8 – Part 26 General Requirements for Airworthiness – Volume 2 – Advisory Circulars

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Control of this Document

DC.1 Introduction

DC.1.1 Pursuant to Civil Aviation Order 2006 and the Civil Aviation Regulations 2006 and their subsequent amendments, the following requirements are hereby established for compliance by all persons concerned, the Director of Civil Aviation is empowered to adopt and amend Brunei Aviation Requirements. In accordance herewith, the following requirement is hereby established for compliance by all persons concerned. This requirement shall be known as BAR 8 – Part 26 General Requirements for Airworthiness – Volume 2 – Advisory Circulars and any reference to this title shall mean referring to the requirements to be met for civil aviation in Brunei Darussalam.

DC.2 Authority for this Requirement

DC.2.1 This BAR 8 – Part 26 General Requirements for Airworthiness – Volume 2 – Advisory Circulars is issued on the authority of the Director of Civil Aviation.

DC.3 Applicability

DC.3.1 This BAR 8 – Part 26 General Requirements for Airworthiness – Volume 2 – Advisory Circulars is applicable to the aviation industry of Brunei Darussalam.

DC.4 Scope

DC.4.1 BAR 8 Part 26 General Requirements for Airworthiness contains the basic requirements to be met for civil aviation in Brunei Darussalam, and shows compliance with ICAO Annexes.

DC.5 Definitions

DC.5.1 Terms not defined within this document shall have the meaning given to them in the relevant legal instruments or international legal instruments in which they appear, especially as they appear in the Convention and its Annexes.

ICAO Compliance Statement

ICAO compliance statement to BAR 8 Part 26 General Requirements for Airworthiness

(a) As a contracting State to ICAO, Brunei DCA has to ensure that it acts consistently with the obligations placed on the State of Brunei under the Convention on International Civil Aviation (Chicago Convention) of December 1944.

(b) This document is published in support of Brunei DCA's discretionary powers contained in the Civil Aviation Order 2006 and Part 3 of the Brunei Civil Aviation Regulations 2016 and includes requirements based on certain International Standards and Recommended Practices (SARPs) contained in Annexes to the Chicago Convention.

(c) It is the policy of Brunei DCA to have reference to this document when exercising the discretionary powers referred to above and, in particular, it will exercise those powers to ensure the effective implementation of any such requirements based on SARPs.

BAR AC-01 Maintenance Programme Guidance

1. Introduction

1.1. This Advisory Circular provides guidance for the development and submission for approval of an aircraft Maintenance Programme to the Brunei DCA

1.2. It is the responsibility of the Brunei DCA to ensure that aircraft on its register are effectively maintained in an airworthy condition. The Brunei DCA approval of the Maintenance Programme provides a mechanism to record minimum standards of airworthiness that the owner/operator must comply with.

1.3. An Approved Maintenance Programme (AMP) will be the source of all scheduled inspections, relevant controls and supporting data. The Maintenance Programme should always be active (subject to at least an annual review by the CAMO and amendment) and utilised which enables effective maintenance to be carried out in a logical, concise, clear and controllable manner.

1.4. Some of the subject material in this document may not be 'applicable' to a particular aircraft. This can only be confirmed by carrying out a detailed assessment as the aircraft may be affected by subsections of a larger section. Caution should be exercised before assuming that a subject or a subpart of this guidance is considered 'not applicable'.

2. References

ICAO Annex 6

ICAO Annex 8

ICAO Doc 9760

BAR 8, Part M, M.A.302

3. Application for approval

3.1. Initial application for approval of a Maintenance Programme should be made to the Brunei DCA on an AIR Form 981 requesting a formal application reference. Details to be provided should include:

(a) Owner/s or operator/s name, address and contact details

(b) Aircraft type and registration number

3.2. On receipt and acceptance of the application, the Brunei DCA will record the application and provide a unique reference number. All further correspondence and supporting documentation must make reference to the unique reference number.

4. Application Liaison

During the application process, the applicant should provide details to the Brunei DCA of a suitable person/s or Continuing Airworthiness Management Organisation (CAMO) who shall be responsible for the initial and subsequent development and control of the programme; this should include ensuring that the programme is suitably amended following regular and annual reviews.

5. Maintenance Programme Presentation

5.1. The applicant should review this guidance material, complete the AIR Form 981 application form and submit it together with the following:

(a) A draft maintenance programme

(b) Completed compliance document

(c) Additional supporting documentation in support of the application

(d) Payment of the appropriate application fee

Note: *The Maintenance Programme can be submitted in hard copy, or electronic format.*

5.2. The aircraft Maintenance Programme should contain a preface developed in line with the guidance of Appendix A. The objective of the preface is to record the process of controls and explanations of the Maintenance Programme contents.

5.3. Where the aircraft Maintenance Programme relies on other published documentation, references should be made to this documentation and, if requested, copies of this supporting documentation should be made available to the Brunei DCA.

5.4. The person/s or organisation nominated in paragraph 4 should have in place an appropriate subscription service to ensure any revisions made to the Maintenance Planning Document (MPD) or Chapter 5 inspection requirements are received for analysis to establish applicability and an effective inspection regime.

5.5. The manufacturer's Standard Maintenance Practices (SMP), also referred to as manufacturer's maintenance rules, describe the inspection philosophy of the manufacturer.

5.6. These must be included and should become part of the introduction section of the Maintenance Programme. Where the manufacturer has not adequately defined an SMP, the applicant should provide for acceptable standards derived from typical and relevant data. This material should be made available to the Brunei DCA.

5.7. The MP shall be produced in the English language in a format that is readily understandable to maintenance personnel.

6. Maintenance Programme Basis

6.1. The Maintenance Programme is usually based upon the MRB report, the TC holder's maintenance planning document or Chapter 5 of the maintenance manual (the manufacturer's recommended maintenance programme).

6.2. The structure and format of these maintenance recommendations may be rewritten by the person/s or approved organisation nominated in paragraph 4 to better suit the operation and thereby establish control of the maintenance programme.

6.3. For a newly type-certificated aircraft for which no previously approved maintenance programme exists it will be necessary for the owner or nominated CAMO to comprehensively appraise the manufacturer's recommendations (and the MRB report where applicable), together with other airworthiness information, in order to produce a realistic programme for approval.

6.4. In such circumstances it is important to continually monitor the effectiveness of the Maintenance Programme when limited operational/inspection data is available.

6.5. For existing aircraft types the operator can make comparisons with previously approved maintenance programmes; however it should not be assumed that a previously approved maintenance programme for one operator is automatically approved for another.

6.6. An evaluation should be made of the aircraft utilisation, flight hours, cycles/landings, equipment fit and, in particular, the experience of the owner or approved organisation when assessing an existing programme.

6.7. Where the authority considers the proposed Maintenance Programme as not acceptable in its current form, the authority should request appropriate changes such as additional maintenance tasks or de-escalation of check frequencies as necessary.

7. Applicability

7.1. It is acceptable to maintain more than one aircraft to the same Maintenance Programme. Typically one operator responsible for the Maintenance Programme would maintain several aircraft in an airworthy condition. The advantages of this would be: fleet optimisation, reliability data gathering and balancing scheduled maintenance tasks such as optimising engine life. In this case each individually registered aircraft would be listed on the programme under registration number.

7.2. If more than one aircraft of the same type is placed on a programme, a comparison check will be necessary. This will then be recorded in a supplemental section of the Maintenance Programme and utilised to identify the differences. Reference to the supplement must be clearly identified in the contents and introduction sections of the Maintenance Programme.

7.3. It is important if more than one aircraft is to be maintained to the same Maintenance Programme that the applicant liaises closely with the Brunei DCA in order to obtain an early agreement in principle prior to developing the actual Maintenance Programme.

8. Maintenance Programme Approval

8.1. The Brunei DCA will only indicate approval of a Maintenance Programme in writing quoting a unique reference number. This reference will normally be issued following a review and acceptance of the initial application. At this stage the approval is considered pending and is identified by the addition of a suffix ‘P’ to the allocated reference number.

8.2. On satisfactory completion of an investigation, the Brunei DCA will provide a formal approval letter that may include conditions and/or limitations. The approval reference should be incorporated in the front section of the Maintenance Programme including any correspondence associated with the Maintenance Programme.

9. Maintenance Programme Amendments

9.1. Amendments to the approved maintenance programme shall not be incorporated until approved by the Brunei DCA when satisfied with the content and applicability of all amendments. Applicable supporting information should be supplied to the Brunei DCA to assist in this process.

9.2. Application for amendment approval should be made using the AIR Form 981 submission form of this document.

(***Note:*** *Forms are available on the Brunei DCA website* www.mincom.gov.bn/dca*)*.

10. Regular and Annual Reviews

10.1. The maintenance programme should be reviewed annually by the CAMO or the owner. All supporting documents that have been referenced in the Maintenance Programme should be considered during the annual review.

10.2. For aircraft subject to reliability analysis, the Maintenance Programme review should be conducted at intervals commensurate with the reliability programme.

10.3. In order to meet the requirements of BAR 8, Part M It is the responsibility of the nominated person/organisation identified in para 4 to ensure that instructions for continued airworthiness with regard to mandatory and non-mandatory requirements, incorporated design changes (modifications and repairs) and any requirements deemed necessary by the Brunei DCA are evaluated for applicability. Once evaluated, suitable amendments to the Maintenance Programme must be developed and approved.

10.4. Regular and annual reviews of the maintenance Programme shall as a minimum include the following items:

(a) Applicable Mandatory Directives

(b) Applicable evaluations of reliability analysis

(c) Operational issues

(d) Maintenance findings

(e) Type Certificate holder's recommendations

(f) Revisions to the MRB report

(g) Revisions to Chapter 5 Maintenance Manual

(h) Applicable Supplemental Type Certificate Holders' revisions to instructions for continued airworthiness

(i) Aircraft utilisation (hours/cycles etc)

(j) Changes to aircraft operational utilisation (type of operation and climatic conditions)

(k) Review of aircraft and equipment life limits

(l) Review of Corrosion Prevention Control Programme (CPCP) tasks and findings

10.5. If the aircraft or its engines are not supported by a manufacturer's Reliability programme, because the aircraft is below a particular weight category, reviews of pilot reports (PIREPS), component removal, TBO, MEL usage, defect worksheets, MORs or ASRs for trends or patterns should be undertaken.

10.6. The person or organisation responsible for the Maintenance Programme should maintain records of all applicable continued airworthiness information. Following a review of this information, records should be maintained of technical justification supporting the amendment decisions for both inclusion and non-inclusion in the Maintenance Programme.

11. Human Performance

Consideration should be given to human performance, document format and user defined functions within the maintenance programme such as:

(a) Maintenance Planning:

Data required to effectively produce maintenance inputs including the arrangement of inspections in a manner that avoids conflict of inspection/maintenance activities, typically known as task orientation.

(b) Mandatory Inspection Tasks:

Ensuring maintenance planning personnel have clear visibility of such tasks preventing any unauthorised escalation.

(c) Required Reporting:

Tasks associated with reporting such as SSID are readily identified.

(d) Critical Task Controls:

Ensuring tasks that are critical in nature are planned and allocated in a segregated manner that prevents the possibility of multiple error maintenance.

(e) Maintenance Resource Planning:

Tasks requiring specialised tooling and or techniques are readily identified with reference to required resources.

12. Pre-Flight inspections

12.1. The Maintenance Programme should identify inspection tasks requiring a Certificate of Release to Service. Normally Pre-Flight inspection tasks do not require the issue of a Certificate of Release to Service. Pre-flight inspections can vary between aircraft manufacturers, therefore it is important when determining the content of a pre-flight inspection to consider whether the inspection tasks require a Certificate of Release to Service.

12.2. Pre-Flight inspection tasks should remain part of the Maintenance Programme in order to control their effectiveness.

12.3. A maintenance task requiring a release to service is normally identified by the aircraft manufacturer. Where this is not clear or is ambiguous, contact should be made with the Brunei DCA to establish when a particular maintenance task requires a Certificate of Release to Service.

13. Migrating Aircraft between Maintenance Programmes (Bridging)

13.1. When transferring an aircraft between Maintenance Programmes, the transfer should be carried out in a controlled manner which is also approved by the Brunei DCA.

13.2. A ‘bridging check’ should be determined and form the basis of the technical justification required by the Brunei DCA for their approval of the aircraft transfer.

13.3. A ‘bridging check’ is not in itself a maintenance package; it is the result of a detailed analysis of the transfer aircraft maintenance history in relation to the Maintenance Programme the aircraft is to be placed under. Typically there may be some maintenance activity at the time of transfer; the amount will clearly be influenced by the current maintenance status of the subject aircraft and to the extent the Maintenance Programme has been developed.

13.4. The transfer proposal to the Brunei DCA should detail the immediate maintenance activities, the duration of the transition encompassing the

scheduled maintenance activities, any variations including escalations to inspection periods.

13.5. Consideration should be given to reliability programmes and any significant changes in operation.

13.6. Records of any CPCP or SSID programme should form part of the transfer analysis.

13.7. In order to allow an aircraft to change operators in a timely manner it may be necessary to have an aircraft recorded against two maintenance programmes for a limited time. This is allowable, provided the circumstances and controls associated with the duplication and a suitable end date is clearly annotated and agreed by all parties including the Brunei DCA.

13.8. Aircraft records should make reference to the approved transfer arrangements quoting the Brunei DCA approval reference.

14. Maintenance Programme Content

14.1. The Maintenance Programme should be developed from the manufacturer's documents which may be chapter 5 of the maintenance manual or derived from an MSG process.

14.2. The Template at Appendix 'A' identifies subject material that should be considered in the schedule and preface sections of the Maintenance Programme. Completion of this Appendix should provide for visibility of compliance to the requirements of BARs.

*(**Note:** the template may also be available from the Brunei DCA website).*

14.3. Any repetitive instructions of continued airworthiness derived from modifications and repairs should also be incorporated into the approved Maintenance Programme.

14.4. For aircraft types where Certification Maintenance Requirements (CMR) tasks are identified as part of the Type Certification process, these tasks should be subject to separate procedures for escalation.

14.5. Visibility of mandatory tasks such as Certification Maintenance Requirements (CMR) and Failure Effect Categories (FEC) found within the MPG-3 logic flow path should be identified in the Maintenance Programme in order that these requirements are not the subject of un-authorised variations to the frequency of inspection (i.e. escalation).

14.6. Task frequencies should be clearly identified within the introductory parts of the Maintenance Programme from 'A' Check or 1st Flight of the day to major inspection periods/intervals.

14.7. The Maintenance Programme, where possible, should identify aircraft panel charts and aircraft Zones (Zoning).

14.8. Where a Supplemental Type Certificate (e.g. cabin interior) has established the configuration of the aircraft, the appropriate configuration inspection manual should be appropriately referred to for aircraft inspections effected by the configuration changes. These would typically be for gaining access and planning for task orientation.

15. Inspection standards

15.1. All significant terms and abbreviations used within the Programme/Schedule to define each maintenance task are those defined in accordance with the

Type Certificate holder's definitions, current BARs or, in the absence of formal definitions, those quoted in the airline industry standard World Airlines Technical Operations Glossary.

15.2. The inspection standards applied to individual task inspections must meet the requirements of the Type Certificate holder's recommended standards and practices. In the absence of specific manufacturer's guidance, refer to UK CAA CAP 562 Civil Aircraft Airworthiness Information and Procedures or FAA AC 43-13-1A Aircraft Inspection and Repair or other approved data, as appropriate.

15.3. The Maintenance Programme should include a paragraph describing in detail, mandatory items such as duplicate inspections (either at main base or at third party maintenance organisations that may be unfamiliar with the format of duplicate inspection philosophy). In addition, consideration should also be given to assessment of 'vital points and critical task inspections'.

16. Permitted variations to Maintenance periods

16.1. Periods prescribed by the Maintenance Programme may only be varied with the approval of the Brunei DCA or through a procedure developed in the maintenance programme and approved by the Brunei DCA.

16.2. It is the responsibility of the contracted approved Continued Airworthiness Management organisation to ensure that arrangements are effectively established to maintain the aircraft in accordance with the approved Maintenance Programme.

16.3. Unless specifically prohibited by an Airworthiness Directive or a manufacturer's requirement, and subject to approval by the Brunei DCA for inclusion in the Maintenance Programme, inspection periods may be varied in accordance with the 'Inspection Planning Tolerance – Extensions' (shown in Table 1 below).

Table 1

PERIOD	MAXIMUM VARIATION
Items Controlled by Flying Hours	
5000 flying hours or less	10%
More than 5000 Flying Hours	500 Flying Hours
Items Controlled by Calendar Time	
One year or less	The lesser of 10% or one month
More than 1 year but less than 3 years	2 months
More than 3 years	3 Months
Items controlled by cycles or landings	

500 cycles/landings or less	The lesser of 10% or 25 cycles/landings
More than 500 cycles/landings	The lesser of 10% or 500 cycles/landings

16.4. For items that are controlled by more than one limit i.e. flying hours and calendar time, the more restrictive limit will apply.

16.5. The extension periods in Table 1 above should be supported by appropriate technical justification. This should be established from a detailed review of the aircraft records, maintenance and operational history. It should also establish inspection requirements that cannot be subject to variation as per Table 1.

16.6. The period to the next required inspection shall be deemed to begin at the point prior to when the task/interval was extended. No extension may be taken towards the next required inspection.

17. Task cards

17.1. An important feature of Task cards is recognising their role in achieving the required maintenance standard.

17.2. Task Cards should be manageable, offer clear sections for correct certification (i.e. sign and stamp) and give clear instructions to maintenance personnel regarding tasks. This includes ensuring that references to other documents have been previously assessed and, if not applicable, the task is amended.

17.3. Where task cards contain actual maintenance instruction data, arrangements must be made to ensure appropriate document controls.

17.4. Critical task controls particularly regarding error maintenance can be effectively mitigated. Task cards can be formatted in such a manner that provides production maintenance planners appropriate indicators and data to make provisions for segregation, appropriate resources and task orientation.

18. Environmental

18.1. Fuel systems are susceptible to microbiological growth in hot humid conditions and increased water content when the aircraft sits on the ground in hot humid climates. Fuel system water sampling tasks and fuel tank structural inspection may need to take into account the likelihood of microbiological contamination and corrosion.

18.2. Consideration should be given to routinely monitoring aircraft utilisation and adverse weather conditions (i.e. salt laden atmosphere, high humidity, extreme heat etc). Consideration should include increasing maintenance inputs for cleaning, lubrication and inspection of protective finishes as an example.

18.3. There should be mitigations for the effects of operating aircraft on runways that have been categorised as rough surfaces. Manufacturer's recommendations such as service letters and maintenance requirements should be appropriately incorporated into the Maintenance Programme. Typical mitigations are increased lubrication frequencies of undercarriage components and fittings due to the possibility of increase in lubrication migration from bearing surfaces. Where published data is not available, guidance should be sought from the aircraft manufacturer.

19. Corrosion of aircraft structure

19.1. Corrosion Control programmes (CPCP) require specific controls, procedures and reporting protocols. The Maintenance Programme should provide details of specific requirements including clear instructions regarding the inspection tasks in order that production maintenance planning is able to resource the tasks appropriately.

19.2. Where the manufacturer makes no specific reference to corrosion control programmes, this should be taken into account when inspecting structure for condition. The assessment may require adjustment of maintenance programme periods. The application of corrosion inhibitors during maintenance may significantly improve the duration of the airframe.

20. Mandatory Requirements

20.1. The inclusion of repetitive Airworthiness Directives (AD) or Service Bulletins (SB) in the Maintenance Programme should be considered to reduce the use of the 'Out of Phase' task management functions.

20.2. Fatigue lives and mandatory life limits published by the manufacturer or by the Brunei DCA should be included in the Maintenance Programme.

20.3. Fuel Tank System Safety is now a feature for many aircraft types. Mandatory requirements are now published with compliance times. The rectification actions are complex, involving many disciplines. The Maintenance Programme should be amended accordingly ensuring that the appropriate continued airworthiness instructions are referred to.

21. Design Changes

21.1. Approved modifications or repairs incorporated on an aircraft may also have 'Instructions for Continued Airworthiness'. These should be assessed and included in the Maintenance Programme.

21.2. Significant structural changes may have an effect on structural programmes that may not have been finalised at the time of incorporation. This may be due to a fatigue damage assessment that only affects the fatigue lives from a total cycle/hour amount not yet achieved. In such circumstances it is important to ensure there is a marker in the maintenance programme.

This is to ensure that nearer the operation life when the fatigue effects take hold, material required to amend the structural programme is obtained from the Supplemental Type Certificate holder.

22. Special Operations

22.1. Special operational approvals granted by the Brunei DCA such as ETOPS, RVSM, AWOPS, PBN and MNPS etc may involve changes to maintenance inspection requirements, frequencies, or tasks introduced by modification to the aircraft.

22.2. In order to satisfy the approval process of special operations, the inspection tasks supporting the aircraft capability should be referenced.

23. Equipment Carriage

23.1. Part CAT, SPA, NCC or NCO detail mandatory equipment requirements for certain types of aircraft operation. With regard to the equipment fitted and in order to conform to Brunei DCA requirements, instructions for continued airworthiness should be incorporated into the Maintenance Programme.

23.2. Any other equipment carried should also have continued airworthiness instructions incorporated into the Maintenance Programme.

23.3. The 'installation modifications' of additional equipment should identify any required continued airworthiness inspections. These may be in the form of suitable vendor manuals. In the absence of such instructions suitable inspection techniques should be identified per paragraph 15.2.

24. Safety Equipment

24.1. Where the aircraft is required to carry safety equipment this should be checked for serviceability at regular intervals. The equipment manufacturer should specify overhaul and life limit periods.

24.2. The maintenance programme can make provision for fleet sampling of emergency equipment such as slide rafts. When sufficient operating aircraft allow for a fleet sampling programme, Brunei DCA agreement should be established for its introduction in line with information promulgated by the safety equipment manufacturer.

25. CVR/FDR

25.1. For each installed CVR/FDR, arrangements for data acquisition and verification of recorded data should be established with a recognised playback facility.

25.2. The type acceptance standards should be applied with regard to periods of testing and recorded data verification for each installed CVR/FDR.

25.3. Records should be maintained for a minimum period of 24 months for all testing undertaken.

25.4. Instructions from equipment manufacturers and continued airworthiness organisations shall be integrated as scheduled requirements of the Maintenance Programme.

25.5. UK CAA publication CAP 731 provides guidance on the serviceability and preservation of FDR and CVR readouts.

26. Battery capacity checks

Routine capacity checks should be carried out at periods specified in accordance with manufacturer's instructions, otherwise the following periods shall apply:

(a) Lead acid Battery – 3 months

(b) Ni-Cad Battery – 4 months

27. Weight and balance

27.1. An aircraft weighing schedule should be included into the Maintenance Programme.

Note: *Any permanent, non-operational role changes to the aircraft either by modification or repair that either adds or reduces weight needs to be assessed, calculated and, if necessary, the aircraft weight records including the Weight and Balance C of G Schedule amended.*

27.2. The aircraft should be weighed in accordance with the frequency and manner defined in BAR 6, and BAR 8, Part M and should be included within the approved maintenance programme.

28. Low Utilisation Maintenance Programmes (LUMP)

28.1. A maintenance-planning document (MPD) is produced by the manufacturer, which is based on an aircraft's "average" annual utilisation based on commercial/marketing criteria.

This is applied during type certification.

28.2. It is acknowledged that the annual utilisation of certain owners/operators is outside the range, which is termed "average" for that aircraft's operation.

28.3. Providing the annual utilisation declared by the owner/operator and included in the front of the maintenance programme is within the definition of the "average" (in other words what the aircraft was designed for) there is no need for a Low Utilisation Maintenance Programme (LUMP).

28.4. Where it is determined that the actual aircraft utilisation will be below the Type Certified utilisation, this should be considered as a design change. In such circumstances the Type Certificate holder may have developed a Low Utilisation Maintenance Programme that may be suitable for the specific operation and environment.

28.5. An operator proposing to use a Low Utilisation Maintenance Programme should have consulted the Type Certificate holder for technical support in developing their Maintenance Programme.

28.6. It is possible that 'Hard times' and component overhauls may be additional features.

28.7. A reliability programme will be less effective due to lack of statistical data and the MEL may need a review due to changes in the reliability of components.

28.8. Generally, the aircraft is assessed for exposure to risk of failures that are heavily dependent on:

(a) Flight Cycle / Flight Hours ratio

(b) Average sector length

(c) Operating environment

(d) Flight Hours vs. Airframe design life

(e) Structures and systems loading

(f) Reliability predictions

For an aircraft on a LUMP normal assessments of the above may prove inadequate. It is important that special consideration is given to these in view of compromises and associated factors of low utilisation.

28.9. Recommended lubrication tasks are based on average utilisation predictions therefore lubrication tasks triggered by Flight Cycles or Flight Hours will be less frequent on aircraft with low utilisation, allowing corrosion growth which could be accelerated in a harsh environment.

28.10. The owner/operator must consult the Type Certificate holder who may only provide feedback on world fleet reports; therefore the operator will need to add its own experience from its reliability programme to include its own specific experience.

28.11. Low utilisation may lead to accumulation of moisture, reduced distribution of oil/grease and possible chemical breakdown of oil/grease. This could lead to increased internal corrosion of structures, power plants and components.

28.12. A LUMP should address the accumulation of moisture in cargo holds, door sills and require drains to be regularly checked. This is even more important in winter conditions. The lack of protective oil/grease on exposed surfaces i.e. landing gear oleos will increase corrosion growth.

28.13. Seal leakage is a common fault when aircraft sit around in cold conditions for long periods. Some hydraulic fluids, especially reclaimed fluids, would break down and separate, causing internal leaking of actuators when overheated or left for long periods.

28.14. Low distribution rates of oil/grease may lead to an increase in the predicted mechanical wear-out rate and corrosion of control cables and mechanical systems. Corrosion is accelerated in moist ground conditions and slower when aircraft are operating in dry cold atmospheres.

28.15. Fuselage insulation blankets will be prone to moisture accumulation requiring additional inspections as they are likely to accumulate large quantities of water on the ground due to humidity or inclement weather. If the insulation blankets are not sealed they will soak this water up causing corrosion and increase the aircraft's weight.

28.16. Structural areas may not be opened up and inspected for long periods of time as they normally would for servicing and therefore corrosion will progress undetected.

28.17. When structural areas are opened up inspection standards may need to be modified from General Visual to Detailed in order to identify known vulnerable areas.

28.18. Low Utilisation may affect electronic component reliability due to relatively long periods of power down. In a low voltage electronic system a small amount of resistance due to corrosion build up, possibly due to inactivity, could damage a sensitive system.

28.19. Built in Test Equipment (BITE) functionality may be affected, invalidating the statistical assumptions. Some BITE functions only take place on boot up of an electronic system and if this is not happening regularly there may be dormant failures which also means the systems are not checked and exercised on a regular basis.

28.20. Battery reliability may be significantly affected by loading profile changes; this includes implanted cells within equipment.

28.21. Exposure to corrosion will affect terminals, bond joints and plug breaks, so terminals and joints such as Engine Fire detection systems, which are particularly susceptible to break down from corrosion, and deposits should be considered.

28.22. Avionics systems work and function better when used regularly. If left for long periods of time they are susceptible to spurious interference.

28.23. Manometric elements in aircraft instrument systems may require additional maintenance due to moisture ingress and fungi contamination. Most instruments are ventilated on a regular basis during normal operation and

predominately remain free from contamination; this may not be the case for a low utilised aircraft.

29. Reliability

29.1. A Reliability Programme should feature in a Maintenance Programme under the following circumstances:

(a) The aircraft maintenance programme is based upon MSG-3 logic.

(b) The aircraft maintenance programme includes condition monitored components.

(c) The aircraft maintenance programme does not contain overhaul time periods for all significant system components.

(d) When specified by the manufacturer's maintenance planning document or MRB.

29.2. A Reliability Programme need not be developed in the following cases:

(a) The Maintenance Programme is based upon the MSG-1 or -2 logic but only contains hard time or on condition items.

(b) The aircraft is not above 5700Kgs MTOM or multi engine helicopter.

(c) The aircraft Maintenance Programme provides overhaul time periods for all significant system components.

Note: *for the purpose of this paragraph, a significant system is a system the failure of which could hazard aircraft safety.*

29.3. For approval the Brunei DCA will require access to all data used to prepare the reliability programme as submitted.

29.4. The objective of the Reliability Programme should be included in the Maintenance Programme detailing the prime elements of the programme. As a minimum it should include a statement to:

(a) Substantiate that the existing schedule of inspections is appropriate in maintaining the aircraft in an airworthy condition.

(b) Identify corrective action to any issues of reliability.

(c) Establish that system reliability conforms to applicable performance data promulgated by the aircraft manufacturer.

(d) Determine the optimum level of scheduled inspections.

(e) Determine the effectiveness of any amendment to the schedule of inspections.

29.5. The extent of the objectives should be directly related to the scope of the programme.

Its scope could vary from a component defect monitoring system for a small operator, to an integrated maintenance management programme for a large commercial operator. The manufacturer's maintenance planning documents may give guidance on the objectives and should be consulted in every case.

29.6. The type of information collected for analysis should be related to the objectives of the programme and should be such that it enables both an overall broad based assessment of the information to be made and also allow

for assessments to be made as to whether any reaction, both to trends and to individual events, is necessary. The following are examples of the normal prime sources:

(a) Pilots' Reports

(b) Technical Log

(c) Aircraft Maintenance Access Terminal / On-board Maintenance System readouts

(d) Maintenance Worksheets

(e) Workshop Reports

(f) Reports on Functional Checks

(g) Reports on Special Inspections

(h) Stores Issues/Reports

(i) Air Safety Reports

(j) Reports on Technical Delays and Incidents

(k) Other sources: ETOPS, RVSM, LVO (AWOPS)

29.7. Information and data collection sources of information should be listed and procedures for the transmission of information from the sources, together with the procedure for collecting and receiving it should be referred to. These procedures should reside with the organisation responsible for the continued airworthiness management of the aircraft and be reflected in their Maintenance Control Manual.

29.8. Reliability Programmes are dependent on sufficient data sampling. Fleet size is clearly a factor in data gathering. For small fleet sizes of fewer than 6 aircraft of the same type, the following should be considered:

(a) Complex reliability programmes could be inappropriate for a small fleet. It is recommended that such operators tailor their reliability programmes to suit the size and complexity of operation.

(b) One difficulty with a small fleet of aircraft consists in the amount of available data that can be processed: when this amount is too low, the calculation of alert level is very coarse. Therefore "alert levels" should be used carefully.

(c) An operator of a small fleet of aircraft, when establishing a reliability programme, should consider the following:

(1) The programme should focus on areas where a sufficient amount of data is likely to be processed.

(2) When the amount of available data is very limited, engineering judgement is a vital element. In the following examples, careful engineering analysis should be exercised before taking decisions.

(3) A "0" rate in the statistical calculation may possibly simply reveal that statistical data is missing, rather than no potential problem.

29.9. When alert levels are used, a single event may reach the alert level. Engineering judgement is necessary so as to discriminate an isolated incident

from an actual need for a corrective action. It is advisable in such circumstances to review other data sources such as other similar operational data to verify decisions made.

APPENDIX A

MAINTENANCE PROGRAMME PREFACE DOCUMENT

The purpose of the attached Maintenance Programmes Preface Document is to ensure that Maintenance Programmes submitted to the Brunei DCA for approval are standardised and include all Brunei DCA requirements.

The operator may modify the format of this document as necessary, but in all cases the content shall clearly show compliance with the requirement or shall be deleted if not applicable to the operator.

Compliance with the Maintenance Programme alone, does not obviate the need for the operator to ensure that at all times the aircraft and its equipment are maintained in an airworthy condition.

The Maintenance Programmes Preface Document contains 4 Individual Sections and an Appendix:

Section 1 Identifies the operator and the applicability of the programme. It also lists the Type Certifcate holder's documents from which it has been derived.

Section 2 Details the content of the Operator's Certification Statement.

Section 3 Defines the standards and practices to be applied in the Maintenance Programme

Section 4 Identified the Brunei DCA Maintenance, additional requirements

Appendix A sets out the Brunei DCA standard permitted variations to the maintenance periods that may be applied. Where the manufacturer or State of Design recommends permitted variations to the maintenance programme, the descision on which limits to apply should be made in consultation with the Brunei DCA

Note: *These variations are not to be confused with a task escalation programme*

Amendments to any part of the approved Maintenance Programme, shall be submitted to the Brunei DCA for approval in accordance with the procedures detailed in the operator's CAME. An example of a suitable maintenance programme amendment approval submission form is provided on the next page.

1. Maintenance Programme Approval Procedures

The Maintenance Programme should be submitted to Brunei DCA The approval process will be conducted and completed by the Airworthiness Section. When satisfied that the programme complies with Brunei DCA requirements, the Brunei DCA will issue a Maintenance Programme approval document.

MAINTENANCE PROGRAMME AMENDMENT APPROVAL SUBMISSION

Programme _____ Reference:

Issue No: _____ Aircraft Type: _____

Item	Action to be taken	Justification
1 Introduction page A	Replace with new page dated	Introduction of new check cycle
2 Introduction page B	Replace with new page dated	Introduction of Aircraft Registration .....
3 Page 45-Item E12	Replace with new page dated	Revision of forward and aft pressure bulkhead inspection requirements. In accordance with manufacturer's latest requirements

COMPLIANCE STATEMENT: This Maintenance Programme complies with the manufacturer's minimum maintenance and inspection requirements and the requirements of the Brunei DCA for the airframe, engines (on wing), systems and components except wherein previously or hereby Approved by the Brunei DCA

Signed: _____

Position: _____

Date: _____

Organisation: _____

The above requested amendments are approved,

Signed: _____ for the Brunei DCA

Date: _____

Maintenance Programme Preface

This Maintenance Programme is applicable to the following:

Aircraft Type/Model:.....

Engine(s) Type:.....

APU Type:.....

Propeller Type:.....

Registration(s).....

Operator's Name and Address

.....

.....

.....

.....

1.1. The periods and frequencies of the maintenance tasks and inspections in this Programme

Reference....., Issue Number....., Date.....

are based on an annual utilisation of ..... (flying hours). If the annual utilisation varies by more than 25% from that stated, the operator accepts that the Maintenance Programme shall be reviewed in order that any necessary adjustments to the maintenance tasks and periods may be made.

1.2. * This Maintenance Programme is derived from Maintenance Review Board Report:

Reference ..... / Issue No. ..... / Date .....

1.3. *This Maintenance Programme is based on the Type Certificate holder's maintenance recommendations (MPD, MPG or Maintenance Manual) as follows:

Manufacturer's Manual Reference:

Airframe .....

Engine .....

APU .....

Propeller .....

**Delete as applicable*

2. Operator's Certification Statement

In the preparation of this Maintenance Programme to meet the requirements of the Brunei DCA Regulations, the recommendations made by the airframe

constructors and engine and equipment manufacturers have been evaluated and, where appropriate, have been incorporated.

This Maintenance Programme lists the tasks and identifies the practices and procedures which form the basis for the scheduled maintenance of the aircraft listed in Paragraph 1. The operator undertakes to ensure that these aircraft will continue to be maintained in accordance with this programme.

The data contained in this programme will be reviewed for continued validity at least annually in the light of operating experience.

It is accepted that this programme does not prevent the necessity for complying with any new or amended regulation published by the Brunei DCA from time to time where these new or amended regulations may override elements of this programme.

It is understood that compliance with this programme does not discharge the operator from ensuring that the programme reflects the maintenance needs of the aircraft, such that continuing safe operation can be assured. It is further understood that the Brunei DCA reserves the right to suspend, vary or cancel approval of the Maintenance Programme if the Brunei DCA has evidence that requirements of the Maintenance Programme are not being followed or required standards of airworthiness are not being maintained.

Name: ..... Position: .....

Signed: .....

For and on behalf of operator: .....

Date: .....

Note: *The person signing this statement should be the nominated post holder for maintenance or equivalent.*

3. Standards and Practices

3.1. Flying Times

All periods in this Program quoted in 'hours flying' are to be calculated and recorded on a 'Take-Off to Touch-Down' basis.

3.2. Certification of Maintenance

The Certification of maintenance must comply with the Brunei Civil Aviation Order 2006 and Civil Aviation Regulations 2006 and the requirements specified in the Brunei DCA Approval Document relating to this Program.

3.3. Permitted Variations to Maintenance Periods

The periods prescribed by this Program may be varied subject to the conditions and limits contained in Appendix A.

3.4. Airworthiness Directives and Manufacturer's Service Information

The Brunei Aviation Requirements requires that aircraft must be maintained in accordance with all continuing airworthiness information. This information will originate from the Responsible Authority of the State of Manufacture in the form of Airworthiness Directives (or documents of comparable intent) and from the manufacturer in the form of Service Bulletins, Letters, Information Leaflets, etc. resulting from In-Service experience.

Compliance with the mandatory requirements of the Responsible Authority of the country of origin must be achieved unless this requirement is varied by Brunei DCA

Continuing Airworthiness and other Service Information must be continuously evaluated by the Operator or the contracted Maintenance Organisation and, where necessary, appropriate action must be taken to amend the Maintenance Program.

3.5. **Fatigue Lives and Mandatory Life Limitations**

Structural 'fatigue' lives published by the manufacturer or by the Brunei DCA are mandatory for aircraft on the register of Brunei Darussalam

All other life limitations classified as mandatory by the manufacturer must also be observed unless varied by the Brunei Aviation Requirements

3.6. **Maintenance Practices and Procedures**

The practices and procedures necessary to accomplish the requirements of this Program, or work resulting from its application, must adhere to the standards defined in:

(a) The Type Certificate Holders Overhaul and Repair Manuals

(b) Brunei DCA Requirements

3.7. **All Vital Points and Control Systems**

Whenever inspections are made or work is undertaken on vital points, flying or engine control systems, a detailed investigation must be made on completion of the task to ensure that all tools, rags or any other loose articles which could impede the free movement and safe operation of the system(s) have been removed and that the system(s) and installation in the aircraft zone are clean and unobstructed.

If, as a result of the application of tasks associated with the programme, any part of either the main or any associated system is dismantled, isolated, adjusted, repaired or renewed, that part of the system(s) which has been disturbed shall be subjected to a duplicate inspection, with free movement, range, direction and tension checks.

4. Additional Brunei DCA Maintenance Requirements

4.1. **Aircraft Battery Capacity Checks**

Aircraft batteries shall be maintained in accordance with the manufacturer's recommendations. In the absence of any manufacturer's instructions the following periods apply.

(a) Lead acid Battery - not exceeding 3 months.

(b) Ni-Cad Battery - not exceeding 4 months.

4.2. **Emergency Equipment**

The required Emergency Equipment will be maintained to a programme based on the equipment manufacturer's recommendations. In addition, the following requirements are complied with in the Maintenance Programme:

(a) Emergency equipment is to be checked for correct complement, stowage, installation and expiry date(s) at suitable periods.

(b) First Aid Kit(s) contents are checked at periods not exceeding 12 months.

4.3. **Emergency Escape Provisions (as applicable)**

(1) Portable Valise Type Liferafts. At the appropriate Overhaul Period, 10% of all liferafts installed in fleets will be test inflated using system bottle and release mechanisms to the programme prescribed in the Maintenance Program.

(2) Door and Escape Chutes/Slides. Slides and shuts must be inflated and tested as least once every 36 months or prior to overhaul in accordance with MPD recommendations.

(3) Emergency Exits/Hatches. All emergency exits and hatches are functioned by both internal and external means at periods specified in this Maintenance Programme. In the absence of manufacturer's specific recommendations these occur at suitable periods not exceeding 6 months elapsed time.

4.4. **Flexible hoses**

Flexible hoses shall be inspected, overhauled or life limited in accordance with the manufacturer's recommendations.

In the absence of manufacturer's recommendations, hoses shall be subject to a programme of pressure testing at periods not exceeding 6 years from installation and 3 yearly thereafter, or in accordance with an alternative programme as agreed by the Brunei DCA

4.5. **Fuel/Oil System Contamination Checks**

Consumable fluids, gases etc. uplifted prior to flight will be of the correct specification, free from contamination, and correctly recorded.

Fuel system water drain checks are to be carried out in accordance with the manufacturer’s recommendations. In the absence of manufacturer’s recommendations, the frequency of water drain checks shall be approved by the Brunei DCA

4.6. **Pressure Vessels**

Oxygen/Nitrogen pressure vessels are to be overhauled or tested in accordance with manufacturer's recommendations. In the absence of any such recommendations, the periods specified in British Standard Institute Standard (BSI) BS5430 are applied.

4.7. **Seat Belts and Harnesses**

In the absence of manufacturer's recommendations, all installed seat belts and harnesses shall be subject to a programme of Detailed Visual Inspection at periods not exceeding 6 months.

4.8. **Maintenance Applicable To Specific Aircraft Operations**

The Maintenance Programme contains the necessary tasks required to ensure continued compliance with additional special authorisations/approvals:

(a) Automatic Approach and Automatic Landing CAT II/CAT III

(b) Minimum Navigation Performance Specifications (MNPS)

(c) Reduced Vertical Separation Minima (RVSM)

(d) Extended Range Operations with two-engined aircrafts (ETOPS)

(e) Performance Based Navigation (PBN)

(f) Offshore Operations

** Delete as applicable*

4.9. **Customer Furnished Equipment (CFE/VFE/BFE)**

The Maintenance Programme contains the necessary tasks required to ensure continued airworthiness of equipment specified or furnished by other than the constructor.

4.10. **Engine and APU Maintenance Programme**

For engine and APU's which are controlled by a Reliability Centred Maintenance and Condition Monitored Maintenance Programme, the process used to develop the off wing maintenance requirements and shop input work scopes is defined in the Maintenance Programme. For Engines and APU's controlled by a fixed Hot Section Inspection and Overhaul life these limits must be defined in the Maintenance Programme.

4.11. **Mode "S" Transponder ICAO 24 Bit Address**

The correct Mode "S" Transponder code must be confirmed using a field test set, at an appropriate maintenance opportunity, at least once every two years.

4.12. **Flight Recorder Systems**

The checks necessary to ensure Flight Data Recorder systems remain serviceable should be performed in accordance with the requirements of UK CAA, CAP 731, Chapter 7, or in accordance with an alternative programme as agreed by the Brunei DCA

4.13. **Cockpit Voice Recorder Systems**

The checks necessary to ensure Cockpit Voice Recorder systems remain serviceable should be performed in accordance with the requirements of UK CAA, CAP 731, Chapter 12, or in accordance with an alternative programme as agreed by the Brunei DCA

BAR AC-02 MMELs and MELs

1. Introduction

1.1. This Advisory Circular provides background information and guidance with regard to the development, submission and approval of an Operators Minimum Equipment List (MEL).

1.2. The Master Minimum Equipment List (MMEL) and associated MEL are alleviating documents. Their purpose is not to encourage the operation of aircraft with inoperative equipment. It is undesirable for aircraft to be dispatched with inoperative equipment and such operations are permitted only as a result of careful analysis of each item to ensure that an acceptable level of safety is maintained.

The MEL shall therefore be based on, but not less restrictive than, the relevant MMEL (if this exists) accepted by the Brunei DCA A fundamental consideration is that the continued operation of an aircraft in this condition should be minimized. An operator retains the option to refuse any alleviation, and may choose not to dispatch with a particular MEL item inoperative.

2. Reference Material

BAR 6, Part ORO.

UK CAA CAP 549

3. MMEL/MEL definition

3.1. While the MMEL is for an aircraft type, the MEL is tailored to the operator's specific aircraft and operating environment and may be dependent upon the specific equipment fitted, route structure, geographic location and locations where spares and maintenance capability are available etc.

The MMEL cannot address these individual variables. It is for this reason that an MMEL is not accepted by the Brunei DCA as a substitute for the MEL. It therefore falls on the operator to develop operational "(O)" procedures reflecting the operational requirements of BAR 6 and maintenance "(M)" procedures based on Type Certificate holder (TC) or Supplemental Type Certificate holder (STC) approved data. Documents issued by the Type Certificate holder, STC holder or Dispatch Deviations Guides, pre-approved maintenance and operational procedures etc, should also be reviewed during development of the MEL where these documents are available.

3.2. Glossary of terms

'As required by operating requirements' - The listed item of equipment is subject to certain provisions (restrictive or permissive) expressed in the applicable operational requirements.

'Approved by the Brunei DCA' – Documented by the Brunei DCA as suitable for the purpose intended.

'Calendar day' - A 24 hour period from midnight to midnight based on either UTC or local time, as selected by the operator.

'Day of discovery' - The calendar day that a malfunction was recorded in the aircraft maintenance record/log book.

'Dispatch deviation' guide - For large aircraft, these procedures are normally contained in a manufacturer's attachment to the MMEL, (e.g. sections 2 and 3

in Airbus and Dassault manuals) or through a Dispatch Deviation Procedure Guide (DDPG), or a Dispatch Deviation Guide (DDG). For some aircraft, where these documents may not be available from the manufacturer; generated MELs, which contain pre-approved maintenance and operational procedures, may be used.

'Equipment' – means item component function or system.

'Flight day' - means a 24 hour period (from midnight to midnight) either UTC or local time, as established by the operator, during which at least one flight is initiated for the affected aircraft.

'If installed' – means the listed item of equipment is either optional or is not required to be installed on all aircraft covered by the MMEL.

'Inoperative' - means in relation to an item, function, component or system, that the equipment item, function, component or system malfunctions to the extent that it does not accomplish its intended purpose or is not consistently functioning within its design operating limits or tolerances. Some systems have equipment that are designed to be fault tolerant and are monitored by digital computers which transmit fault messages to a centralised computer for the purpose of maintenance. The presence of this category of message does not necessarily mean that the system equipment is inoperative.

'MEL' - Abbreviation for Minimum Equipment List.

'MMEL' - Abbreviation for Master Minimum Equipment List.

'Rectification interval' – The limitation imposed with regard to the duration of operations with inoperative equipment.

4. Equipment included in the MEL

4.1. The MEL is a joint operations and maintenance document prepared by an operator to:

(a) Identify the minimum equipment and conditions for an aircraft to maintain an acceptable level of safety and to meet the operating rules for the type of operation.

(b) Define operational procedures necessary to deal with inoperative equipment and maintain an acceptable level of safety.

(c) Define maintenance procedures necessary to secure any inoperative equipment and maintain an acceptable level of safety.

4.2. Most aircraft are designed and certified with a significant amount of equipment redundancy, such that the airworthiness requirements are satisfied by a substantial margin. In addition, aircraft are generally fitted with equipment that is not required for safe operation under all operating conditions, e.g. instrument lighting in day VMC.

5. Development

5.1. The operator should develop its MEL and all subsequent amendments, as a joint operations and maintenance project, based on the current MMEL revision.

5.2. Except as noted above, the operator's MEL must be revised to reflect the most recent approved version of the MMEL or MMEL Supplement. Where a Dispatch Deviation Guide (DDG) or equivalent document is available; or where an MMEL revision does not affect a procedure, the period allowed for

amendment of the MEL is 60 days. Where a DDG or equivalent document is not available; or where the MMEL revision affects a procedure, the period allowed for amendment of the MEL is 120 days. This extended timeframe allows for the drafting and publication of any applicable procedures etc in order to comply with the revision to the MMEL.

5.3. The operator's MEL must reflect the current limitations in the applicable MMEL or MMEL Supplement. When a revision is issued to an MMEL or MMEL Supplement, the operator's MEL need not be revised if the change is less restrictive than the existing MEL; therefore if any changes to the MMEL are more restrictive than the operator's MEL, a revision will be required to the MEL.

6. Content

6.1. The MELs submitted for approval must contain the following as a minimum:

6.2. List of effective pages

A List of Effective Pages (LEP) must be used to ensure that each MEL is up-to-date. It must list the date of the last amendment for each page of the MEL. The date and revision status of each page of the MEL must correspond to that shown on the List of Effective Pages.

6.3. Table of contents

The Table of Contents page should list the section for each aircraft system using the ATA 100/2200 listing as found in the MMEL. Pages should be numbered with the ATA system number followed by the item number for that system (e.g., the page following 27-2-1 would be 27-2-2).

6.4. MEL preamble

The purpose of the MEL Preamble is to provide direction to company personnel on the philosophy and use of the MEL. Due to the various certification bases for the same aircraft type, it would also be advisable to include references to the documents that the MEL is derived from and is supported by. As an example the list would typically refer to the following publications:

(a) MMEL;

(b) MMEL Supplement;

(c) Cabin handbook;

(d) Flight Manual;

(e) Operations Manual;

(f) Continuing Airworthiness Management Exposition

6.5. Notes and definitions

Notes and Definitions are required to allow the user to interpret the MEL properly. Additions and deletions to the Notes and Definitions may be applied to the operator's MEL as required.

6.6. Operational and Maintenance procedures

6.6.1. These must reflect the requirements of BAR 6, Part CAT, NCC or NCO as applicable for Instruments and Equipment in the operating regulations.

6.6.2. Dispatch with inoperative items is often acceptable only with the creation of special operational or maintenance procedures.

6.6.3. Where the MMEL indicates dispatch with inoperative items as being acceptable, the operator must establish appropriate procedures to ensure an acceptable level of safety will be maintained. Procedures recommended by the Type Certificate holder or Supplemental Type Certificate holder in the form of dispatch deviation guides can be used as a source of information for developing Maintenance (M) and Operational (O) procedures; however the ultimate responsibility for providing acceptable procedures with the MEL rests with the operator.

6.6.4. The operator, when comparing the MEL against the MMEL, should ensure that where the (O) or (M) symbols appear, an operational or maintenance procedure has been developed that provides clear direction to the crew members and maintenance personnel of the action to be taken. This procedure should be included in the MEL or associated Operator's Manual.

6.6.5. The only exception is when the procedure is contained in another available document, e.g. in another part of the Operations Manual for "(O)" procedures or the Maintenance Manual for "(M)" procedures. In the latter cases, the MEL may refer to a section of the appropriate document; e.g.

(a) For cabin crew members, such as an Operations Manual or Cabin crew Manual.

(b) For Maintenance engineers, such as an Aircraft Maintenance Manual or CAME, etc.

6.6.6. It is not acceptable only to reference similar documents, as these documents may not be carried on board the aircraft and could be subject to misinterpretation. The objective is to provide personnel with clear, concise direction on how they are to proceed. Where the MMEL column 5 states "as required by Operating Requirements", this wording shall not appear in the MEL; rather a synopsis of the Regulation shall appear.

6.7. Operations Manual procedures

The operator must establish procedures in the Operations Manual for the use and guidance of crew members when using the MEL. The procedures must align with those in the CAME.

6.8. Non-safety related equipment

6.8.1. Non-safety related equipment includes those items related to the convenience, comfort, or entertainment of the passengers. They may include items such as galley equipment, movie equipment ash trays stereo equipment, and overhead reading lamps. Non-safety related equipment must not have an effect on the airworthiness or operation of the aircraft. This equipment does not require a rectification interval, and need not be listed in an operator's MEL, if it is not addressed in the MMEL. If an operator chooses to list this equipment in the MEL, it may be given a D category rectification interval provided any applicable exceptions to this rule are:

(a) Where non-safety related equipment serves a second function, such as movie equipment used for cabin safety briefings, operators must develop and include operational contingency procedures in the MEL in case of an equipment malfunction.

(b) Where non-safety related equipment is part of another aircraft system, for example the electrical system, procedures must be developed and included in the MEL for deactivating and securing the related equipment in the event that failure or malfunction of one system will not have a detrimental effect on other systems.

6.8.2. In these cases, the item must be listed in the MEL, with compensating provisions and deactivation instructions if applicable. The rectification interval will be dependent on the secondary function of the item and the extent of its effect on other systems.

6.9. Rectification interval categories

The maximum time an aircraft may be operated between the deferral of an inoperative item and its rectification must be specified in the MEL. The rectification interval categories are as follows:

Category A -No standard interval is specified, however, items in this category shall be rectified in accordance with the conditions stated in the MMEL. Whenever the time interval is specified in calendar days, it shall start at 00:01 on the calendar day following the day of discovery.

Category B -Items in this category shall be rectified within three consecutive calendar days, excluding the day of discovery.

Category C -Items in this category shall be rectified within 10 consecutive calendar days, excluding the day of discovery.

Category D - Items in this category shall be rectified within 120 consecutive calendar days, excluding the day of discovery.

6.10. Process compliance

Airworthiness and operational personnel should ensure that operators establish and implement a sound programme that satisfies the Brunei DCA that ongoing surveillance ensures compliance with approved procedures.

6.11. Deferral of items

Procedures for the deferral of MEL items should be included as part of the operator's Continuing Airworthiness Management Exposition (CAME). The operator should ensure that these procedures in the CAME are referenced or copied in the MEL and/or Operations Manual.

6.12. Requirements

These procedures comprise a method for:

(a) Deferral and/or rectification of inoperative equipment

(b) Placarding requirements as per the MEL

(c) Dispatching of aircraft with deferred MEL items

(d) Using a remote deferral system

(e) Controlling categorised times

(f) Training of company personnel who are responsible for MEL compliance procedures

6.13. Review of deferred items

The operator should establish procedures for their Maintenance and Flight operations Departments to periodically review the deferred items, in order to ensure that any accumulation of deferred items neither conflict with each other nor present an unacceptable increase in flight or cabin crew workload. Notwithstanding the categorisation of item rectification intervals, it should be the aim of each MEL document holder to ensure that inoperative items are repaired as quickly as possible.

7. Application for approval

The applicant must submit a completed Minimum Equipment List (MEL) compliance document to the Brunei DCA (refer to Appendix A of this document) and copies of the following in support of their application for approval of the MEL:

(a) Current approved version of the Master Minimum equipment list (MMEL) which can be obtained from the manufacturer or foreign national authority as applicable.

*(**Note:** may not be required if a current copy of the MMEL was submitted at the time of Type Acceptance and is currently available and up to date)*

(b) Copy of the Dispatch Deviation Guide, or approved Maintenance and Operational procedures that support the development of the MEL *(if requested).*

(c) Two copies of the MEL for approval and accompanying documents.

*(**Note:** Unless copies are submitted in electronic format, whereby one copy will suffice)*

(d) Current approved Aircraft Flight Manual

*(**Note:** may not be required if a current copy of the Aircraft Flight Manual was submitted at the time of Type Acceptance and is currently available and up to date)*

8. Approval

The Brunei DCA is responsible for approving the MEL of all operators operating under a BAR 6 AOC. The operator must ensure that they use the latest version of the appropriate MMEL to develop their MEL. The latest supplements can be obtained from the Type Certificate Holder, who normally provides MMELs along with a revision service, on a commercial basis.

Therefore whenever it is intended to make use of an MEL, this must be approved by the Brunei DCA. The MMEL is available from the Type Certificate Holder' however the Type Certificate Holder may not be the original aircraft manufacturer.

9. Further guidance

Further guidance and information can be obtained from the following publications:

*(**Note:** When reviewing other National Authority guidance material, Brunei DCA requirements must be considered and complied with)*

(a) EASA technical guidance leaflet TGL 26 which can be obtained from the following web link: http://www.easa.eu.int/certification/flight-standards/OEB-supporting-documents.php

(b) FAA Flight standards information management system (FSIMS) http://fsims.faa.gov/PICResults.aspx?mode=Publication&doctype=MMEL

(c) TCCA technical procedure TP9155 http://www.tc.gc.ca/eng/civilaviation/publications/tp9155-menu-5179.htm

(d) UK CAA CAP 549 (available from www.caa.co.uk)

APPENDIX A COMPLIANCE DOCUMENT

Minimum Equipment List (MEL) Approval Submission Aircraft Type:……		
Item	**Action to be Taken**	**Justification**
COMPLIANCE STATEMENT: This MEL complies with the Brunei Civil Aviation Regulations 2006 and BAR 6 and is no less restrictive than the applicable approved State of Design MMEL*/Supplement (*delete as appropriate)		
Signed:……..	Print Name:……	Position:……..
Date:……	Operator:……	
To the Operator: Once accepted by the Brunei DCA this amendment should be published, dated and numbered as shown above.		

For Brunei DCA Use only:

AIRWORTHINESS INSPECTOR	**FLIGHT OPERATIONS INSPECTOR**
1.Technical Review is completed in accordance with Brunei DCA Procedure E005	2. Flight Operations Review is completed. Operationally and Technically Acceptable
Signed:……..	Signed:……
Date:……	Date:……
Print Name:……	Print Name:……
State of Design MMEL/Supp Ref:	
Version/Issue/Rev No:	3. Completed compliance document returned to the operator:
Date:	……..(initials)……(date)
	4. Ops Man amendment received and incorporated:
MEL Ref:	……..(initials)……(date)
Version/Issue/Rev No:	

Date:		

BAR AC-03 Human Factors in Airworthiness

1. Introduction

This Advisory Circular provides guidance on Human Factors requirements and training for personnel with Approved Maintenance Organisations. It is intended to support BAR 8, Part 145 and BAR 8, Part M.

The guidance is based on best practice such as BAR 8 Part 145, AMC and Guidance material.

The Fuel Tank Safety topic is included to address FAA SFAR No 88 – "Fuel Tank System Fault Tolerance Evaluation Requirements", as a result of catastrophic loss of aircraft due to fuel tank explosions and JAA TGL 47.

The EWIS (Electrical Interconnection Wiring System aspects are introduced as investigations of aeroplane accidents (including the midair explosion of a B747 and the crash of an MD11) and later examinations of different aeroplanes types have identified safety concerns associated with aeroplane aging wiring systems that could potentially result in an unsafe condition.

2. Related Material

UK CAA CAP 716: Human Factors in Maintenance.

3. Definitions

CDCCL: Critical Design Configuration Control Limitation. A component identified by a TC/STC holder that may affect fuel tank safety. FAA SFAR 88 and JAA TGL.

EWIS: Electrical Wiring Interconnection System. – Any system wire or connector or module/ terminal block, but not an LRU as defined by EASA AMC 20-21, 20-22 and AMC20-23, and FAA AC 25-27A.

'Human Factors' means principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration of human performance.

'Human Performance' means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

4. Human Factors in Organisations

4.1. All staff should be able to demonstrate an understanding of human factors and human performance issues in relation with their job function and be trained in accordance with the guidelines stated in Para 3.2 and Appendix A of this guidance.

4.2. Human Factors elements in Maintenance

In respect to the understanding of the application of human factors and human performance issues, all Approved maintenance organisation personnel should have received an initial and continuation human factors training. This should concern to a minimum:

(a) Post-holders, managers, supervisors;

(b) Certifying staff, support staff and mechanics;

(c) Technical support personnel such as planners, engineers, technical record staff;

(d) Quality control/assurance staff;

(e) Specialised services staff;

(f) Human factors staff/human factors trainers;

(g) Store department staff, purchasing department staff;

(h) Ground equipment operators.

4.3. Initial human factors training should cover all the topics of the training syllabus specified in Appendix A either as a dedicated course or else integrated within other training. The syllabus may be adjusted to reflect the particular nature of the organisation. The syllabus may also be adjusted to meet the particular nature of work for each function within the organisation. For example:

(a) small organisations not working in shifts may cover in less depth subjects related to teamwork and communication;

(b) planners may cover in more depth the scheduling and planning objective of the syllabus and in less depth the objective of developing skills for shift working.

All personnel, including personnel being recruited from any other organisation should receive initial human factors training compliant with the organisation's training standards prior to commencing actual job function, unless their competence assessment justifies that there is no need for such training. Newly directly employed personnel working under direct supervision may receive training within 6 months after joining the maintenance organisation.

4.4. The purpose of human factors continuation training is primarily to ensure that staff remain current in terms of human factors and also to collect feedback on human factors issues. Consideration should be given to the possibility that such training has the involvement of the quality department. There should be a procedure to ensure that feedback is formally passed from the trainers to the quality department to initiate action where necessary.

Human factors continuation training should be of an appropriate duration in each two year period in relation to relevant quality audit findings and other internal/external sources of information on human errors in maintenance available to the organisation.

4.5. Human factors training may be conducted by the maintenance organisation itself, or independent trainers, or any training organisations acceptable to the Brunei DCA

4.6. The human factors training procedures should be specified in the Maintenance Procedures Manual.

5. Continuation Training

5.1. Continuation training is a two way process to ensure that certifying staff remain current in terms of procedures, human factors and technical knowledge and that the organisation receives feedback on the adequacy of its procedures and maintenance instructions. Due to the interactive nature of this training, consideration should be given to the possibility that such training has the involvement of the quality department to ensure that feedback is actioned. Alternatively, there should be a procedure to ensure that feedback is formally passed from the training department to the quality department to initiate action.

5.2. Recurrent Human Factors training should cover changes in relevant requirements such as BAR 8, changes in organisation procedures and the modification standard of the products being maintained plus human factor issues identified from any internal or external analysis of incidents.

It should also address instances where staff failed to follow procedures and the reasons why particular procedures are not always followed.

In many cases the continuation training will reinforce the need to follow procedures and ensure that incomplete or incorrect procedures are identified to the company in order that they can be corrected. This does not preclude the possible need to carry out a quality audit of such procedures.

5.3. The Recurrent Human Factors training should be of sufficient duration in each 2 year period to meet the intent of BAR 8, Part 145.A.30 and 145.A.35, and may be split into a number of separate elements.

It should keep certifying staff and other employees updated in terms of relevant technology, procedures and human factors issues which means it is one part of ensuring quality.

Therefore sufficient duration should be related to relevant quality audit findings and other internal/external sources of information available to the organisation on human errors in maintenance.

This means that in the case of an organisation that maintains aircraft with few relevant quality audit findings, continuation training could be limited to days rather than weeks, whereas a similar organisation with a number of relevant quality audit findings, such training may take place over several weeks.

For an organisation that maintains aircraft components, the duration of continuation training would follow the same philosophy but should be scaled down to reflect the more limited nature of the activity. For example certifying staff who release hydraulic pumps may only require a few hours of continuation training whereas those who release turbine engine may only require a few days of such training.

The content of continuation training should be related to relevant quality audit findings and it is recommended that such training is reviewed at least once in every 24 month period.

5.4. The method of training is intended to be a flexible process and could, for example, include an Approved Training organisation continuation training course, aeronautical college courses, internal short duration courses, seminars, etc.

The elements, general content and length of such training should be specified in the approved maintenance organisation exposition unless such training is undertaken by an organisation approved under BAR 1, Part 147 when such details may be specified under the approval and cross referenced in the maintenance procedures manual.

5.5. The programme for continuation training should list all certifying staff and support staff and when training will take place, the elements of such training and an indication that it was carried out reasonably on time as planned. Such information should subsequently be transferred to the certifying staff and support staff training records.

6. Training Records

6.1. The following minimum information as applicable should be kept on record in respect of each staff and support staff:

(a) Name

(b) Date of Birth

(c) Basic Training

(d) Type Training

(e) Continuation Training

(f) Experience

(g) Qualifications relevant to the authorisation

(h) Scope of the authorisation

(i) Date of first issue of the authorisation

(j) If appropriate – expiry date of the authorisation

(k) Identification Number of the authorisation

6.2. The record may be kept in any format but should be controlled by the organisation's quality department. This does not mean that the quality department should run the record system.

6.3. Persons authorised to access the system should be maintained at a minimum to ensure that records cannot be altered in an unauthorised manner or that such confidential records become accessible to unauthorised persons.

6.4. The Brunei DCA is an authorised person when investigating the records system for initial and continued approval or when the Brunei DCA has cause to doubt the competence of a particular person.

7. Fuel Tank Safety and EWIS

Additional training in fuel tank safety and Electrical Wiring Interconnection Systems (EWIS) for aircraft greater than 5700kg (when relevant) as well as associated inspection standards and maintenance procedures should be required for maintenance organisations' technical personnel, especially technical personnel involved in the compliance of CDCCL and EWIS tasks.

I

APPENDIX A

Example Training Syllabus for Initial Human Factors Training

The training syllabus below identifies the topics and subtopics that should be addressed during the human factors training.

1. The Approved Maintenance Organisation may combine, divide, change the order of any subject of the syllabus to suit its own needs, as long as all subjects are covered to a level of detail appropriate to the organisation and its personnel.
2. Some of the topics may be covered in separate training (health and safety, management, supervisory skills, etc.) in which case duplication of training is not necessary.
3. Where possible, practical illustrations and examples should be used, especially accident and incident reports.

   Topics should be related to existing legislation, where relevant. Topics should be related to existing guidance/ advisory material, where relevant (e.g. ICAO HF Digests and Training Manual).
4. Topics should be related to maintenance engineering where possible; too much unrelated theory should be avoided.

   (a) General / Introduction to human factors
      (1) Need to address human factors
      (2) Statistics
      (3) Incidents

   (b) Safety Culture / Organisational factors

   (c) Human Error
      (1) Error models and theories
      (2) Types of errors in maintenance tasks
      (3) Violations
      (4) Implications of errors
      (5) Avoiding and managing errors
      (6) Human reliability

   (d) Human performance & limitations
      (1) Vision
      (2) Hearing
      (3) Information-processing
      (4) Attention and perception
      (5) Situational awareness
      (6) Memory
      (7) Claustrophobia and physical access
      (8) Motivation

(9) Fitness/Health

(10) Stress

(11) Workload management

(12) Fatigue

(13) Alcohol, medication, drugs

(14) Physical work

(15) Repetitive tasks / complacency

(e) Environment

(1) Peer pressure

(2) Stressors

(3) Time pressure and deadlines

(4) Workload

(5) Shift Work

(6) Noise and fumes

(7) Illumination

(8) Climate and temperature

(9) Motion and vibration

(10) Complex systems

(11) Hazards in the workplace

(12) Lack of manpower

(13) Distractions and interruptions

(f) Procedures, information, tools and practices

(1) Visual Inspection

(2) Work logging and recording

(3) Procedure – practice / mismatch / norms

(4) Technical documentation – access and quality

(g) Communication

(1) Shift / Task handover

(2) Dissemination of information

(3) Cultural differences

(h) Teamwork

(1) Responsibility

(2) Management, supervision and leadership

(3) Decision making

(i) Professionalism and integrity

(1) Keeping up to date; currency

(2) Error provoking behaviour

(3) Assertiveness

(j) Organisation's HF program

(1) Reporting errors

(2) Disciplinary policy

(3) Error investigation

(4) Action to address problems

(5) Feedback

APPENDIX B

Fuel Tank Safety Training

This Appendix includes general instructions for providing training on Fuel Tank Safety issues.

1. Effectivity:

Large aeroplanes (FAR 25, JAR 25, CS-25) certified after 1 January 1958 with a maximum type certified passenger capacity of 30 or more or a maximum certified payload capacity of 7500 lbs (3402 kg) cargo or more, and

2. Affected organisations:

(a) Approved maintenance organisations involved in the maintenance of aeroplanes specified in paragraph A) and fuel system components installed on such aeroplanes when the maintenance data are affected by CDCCL (Critical Design Configuration Control Limitation Item).

(b) The Brunei DCA responsible for the oversight of the Approved Maintenance organisations approved in accordance with BAR 8, Part 145, and BAR 8, Part M, Subpart G.

3. Persons from affected organisations who should receive training:

Phase 1 training only:

(a) The group of persons representing the maintenance management structure of the organisation, the quality manager and the staff required to quality monitor the organisation.

(b) Personnel of the Brunei DCA responsible for the oversight of approved maintenance organisations.

Phase 1 + Phase 2 + Continuation training:

(a) Personnel of the approved maintenance organisation required to plan, perform, supervise, inspect and certify the maintenance of aircraft and fuel system components specified in paragraph 1).

4. General requirements of the training courses

Phase 1 – Awareness

The training should be carried out before the person starts to work without supervision but not later than 6 months after joining the organisation. The persons who have already attended the Level 1 Familiarisation course is already in compliance with Phase 1.

Type: Should be an awareness course with the principal elements of the subject. It may take the form of a training bulletin, or other self study or informative session. Signature of the reader is required to ensure that the person has passed the training.

Level: It should be a course at the level of familiarisation with the principal elements of the subject.

Objectives: The trainee should, after the completion of the training:

(i) Be familiar with the basic elements of the fuel tank safety issues.

(ii) Be able to give a simple description of the historical background and the elements requiring a safety consideration, using common words and showing examples of non conformities.

(iii) Be able to use typical terms.

Content: The course should include:

(i) a short background showing examples of FTS accidents or incidents,

(ii) the description of concept of fuel tank safety and CDCCL,

(iii) some examples of manufacturers documents showing CDCCL items,

(iv) typical examples of FTS defects,

(v) some examples of TC holders repair data

(vi) some examples of maintenance instructions for inspection.

Phase 2– Detailed training Brunei DCA

A flexible period may be allowed by the to allow organisations to set the necessary courses and impart the training to the personnel, taking into account the organisation's training schemes/means/practices. This flexible period should not extend beyond 31 December 2016.

The persons who have already attended the Level 2 Detailed training course from an Approved Maintenance Organisation or from an Approved Training Organisation are already in compliance with Phase 2 with the exception of continuation training.

Staff should have received Phase 2 training by 31 December 2016 or within 12 months of joining the organization, whichever comes later.

Type: Should be a more indepth internal or external course. It should not take the form of a training bulletin, or other self study. An examination should be required at the end, which should be in the form of a multi choice question, and the pass mark of the examination should be 75%.

Level It should be a detailed course on the theoretical and practical elements of the subject. The training may be made either:

(i) In appropriate facilities containing examples of components, systems and parts affected by Fuel Tank Safety (FTS) issues. The use of films, pictures and practical examples on FTS is recommended; or

(i) By attending a distance course (e-learning or computer based training) including a video film when such video meets the intent of the objectives and content here below. An e-learning or computer based training should meet the following criteria:

- A continuous evaluation process should ensure the effectiveness of the training and its relevance;
- Some questions at intermediate steps of the training should be proposed to ensure that the trainee is authorized to move to the next step;

– The content and results of examinations should be recorded;
– Access to an instructor in person or at distance should be possible in case support is needed.

A duration of 8 hours for phase 2 is an acceptable compliance.

When the course is provided in a classroom, the instructor should be very familiar with the data in Objectives and Guidelines. To be familiar, an instructor should have attended himself a similar course in a classroom and made additionally some lecture of related subjects.

Objectives: The attendant should, after the completion of the training:

(i) Have knowledge of the history of events related to fuel tank safety issues and the theoretical and practical elements of the subject, have an overview of the FAA regulations known as SFAR (Special FAR) 88 of the FAA and of JAA Temporary Guidance Leaflet TGL 47, be able to give a detailed description of the concept of fuel tank system ALI (including Critical Design Configuration Control Limitations CDCCL, and using theoretical fundamentals and specific examples;

(ii) Have the capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner;

Have knowledge on how the above items affect the aircraft;

Be able to identify the components or parts or the aircraft subject to FTS from the manufacturer's documentation,

(iii) be able to plan the action or apply a Service Bulletin and an Airworthiness Directive.

Content: Following the guidelines described in paragraph 5) below.

Continuation training

The organisation should ensure that the continuation training is required in each two years period. The syllabus of the training programme referred to in the MOE or Continuing Airworthiness Exposition (CAME) should include the additional syllabus for this continuation training.

The continuation training may be combined with the phase 2 training in a classroom or at distance.

The continuing training should be updated when new instruction are issued which are related to the material, tools, documentation and manufacturer's or Brunei DCA's directives.

5. Guidelines for preparing the content of Phase 2 courses

The following guidelines should be taken into consideration when the phase 2 training programme are being established:

(a) understanding of the background and the concept of fuel tank safety,

(b) how the mechanics can recognise, interpret and handle the improvements in the instruction for continuing airworthiness that

have been made or are being made regarding the fuel tank system maintenance,

(c) awareness of any hazards especially when working on the fuel system, and when the Flammability Reduction System using nitrogen is installed.

Paragraphs a), b), and c) above should be introduced in the training programme addressing the following issues:

(d) The theoretical background behind the risk of fuel tank safety: the explosions of mixtures of fuel and air, the behaviour of those mixtures in an aviation environment, the effects of temperature and pressure, energy needed for ignition etc, the 'fire triangle', Explain 2 concepts to prevent explosions:

(i) ignition source prevention and

(ii) flammability reduction,

(e) The major accidents related to fuel tank systems, the accident investigations and their conclusions,

(f) SFAR 88 of the FAA and JAA Interim Policy INT POL 25/12: ignition prevention program initiatives and goals, to identify unsafe conditions and to correct them, to systematically improve fuel tank maintenance),

(g) Explain the briefly concepts that are being used: the results of SFAR 88 of the FAA and JAA INT/POL 25/12: modifications, airworthiness limitations items and CDCCL,

(h) Where relevant information can be found and how to use and interpret this information in the instructions for continuing airworthiness (aircraft maintenance manuals, component maintenance manuals, Service Bulletins…)

(i) Fuel Tank Safety during maintenance: fuel tank entry and exit procedures, clean working environment, what is meant by configuration control, wire separation, bonding of components etc,

(j) Flammability reduction systems (FRS) when installed: reason for their presence, their effects, the hazards of a FRS using nitrogen for maintenance, safety precautions in maintenance/working with a FRS,

(k) Recording maintenance actions, recording measures and results of inspections.

(l) The training should include a representative number of examples of defects and the associated repairs as required by the TC / STC holders maintenance data.

6. Approval of training

For Brunei DCA approved maintenance organisations, the approval of the initial and continuation training programme and the content of the examination can be achieved by the change to the Maintenance Organisation Exposition (MOE). The necessary changes to the MOE to meet the content of this guidance should be made and implemented at the time requested by the Brunei DCA.

BAR AC-04 Maintenance Error Management Systems

1. Introduction

This Advisory Circular provides Brunei DCA and the Industry of Brunei Darussalam with guidance on the implementation of Maintenance Error Management Systems within their organisations.

2. References

BAR 8, Part 145; 145.A.60.

UK CAA CAP 716: Human Factors in Maintenance.

3. General

3.1. There can be no argument that a maintenance error has the potential to create an unsafe condition on an aircraft. It is recognised that human beings, who are an important and key part of the aircraft maintenance regime, are not infallible. The possibility of a maintenance error is dependent upon a number of factors, including the way in which individual's carry out their work. The probability and consequences of maintenance error are however largely unpredictable. Their effects may be noticed immediately or may sit as a latent threat until a much later date, possibly coming to light only after the failure of another system or component exposes the weakness the error has created.

3.2. It is important for maintenance personnel at all levels to be aware of the potential for error that exists. This can be achieved by better understanding the limitations of human performance and managing the circumstances that may lead to errors being made. Whilst the aim must be to prevent such errors being made in the first place, it is essential that organisations, and the individuals within, learn from the actual events or close calls that may arise from errors being made. This is a key element of an organisational safety management system (SMS).

3.3. For the purpose of this guidance a maintenance error is considered to have occurred when the maintenance system, including the human element, fails to perform in the manner expected in order to achieve its safety objectives. A pictorial representation of the 'maintenance system' is shown below.

3.4. This Guidance circular addresses the concept of maintenance error management systems through the identification and investigation of maintenance related errors. It also lays out the Brunei DCA's expectations as to how such information should be collated and shared so that aviation safety may be improved through the collective experience of the industry. It is important to examine not just ***what*** happened but, more importantly, ***why*** it happened in order to determine the root causes and allow us to identify a strategy that reduces, or ideally eliminates it from occurring again.

4. The Need

4.1. In today's operating environment, organisations are expected to have in place an effective SMS to manage the hazards and risks that are inherent in any operation.

Whilst the scale and size of the SMS will vary according to the complexity and scale of an organisation's activities every company should develop safety improvement strategies to support its SMS system and policies. However, in order to do so it must have information about the issues to target. It is

important therefore to have knowledge of the changing hazards, risks and any failures in the company's system or working practices in order that changes can be managed or remedial action put in place.

4.2. BAR 8, Part 145.A.60 places an obligation on maintenance organisations to "establish an internal occurrence reporting system". The purpose of such a system is to enable the collection and evaluation of information regarding events which have resulted, or may have resulted, in an unsafe condition that affects flight safety. There are equivalent reporting requirements in the other Brunei DCA Airworthiness Requirements, e.g. BAR 8, Part M.

4.3. The internal occurrence reporting procedures under BAR 8, Part 145.A.60 shall seek to identify adverse trends, the corrective actions taken to contain an unsafe situation or to be taken by the organisation to address deficiencies and include evaluation of all known relevant information relating to such occurrences and a method to circulate the information as necessary.

This clearly suggest that, notwithstanding the need to formally report occurrences to the various agencies, the organisation is expected to carry out internal investigations, not only against an individual occurrence but looking for possible correlation between events and any underlying trends.

4.4. The reporting of occurrences is essential to the improvement of air safety by ensuring that relevant information on safety is reported, collected, stored, protected and disseminated.

4.5. The issue of maintenance error is included in the scope of these occurrence reports, including instances of non-compliance or significant errors in compliance with required maintenance procedures.

4.6. The collation of incident data will be managed through the Brunei Occurrence Reporting System. In the longer term, this will enable Brunei DCA to have greater visibility about safety data in Brunei and the key risks and threats.

4.7. BAR 8, Part 145.A.65 further requires an organisation to establish a safety and quality policy for the organisation. This should extend into the development and publication of working procedures which take account of human factors principles and human performance.

This is very much focused upon the need to avoid putting the individual into a situation where they are pressurised, whether real or perceived, into working outside of the published requirements. However, the requirements also focus upon encouraging personnel to report maintenance related errors/incidents and for the company to analyse previous experiences of maintenance errors.

5. Maintenance Error Management Systems

5.1. As noted above, a Maintenance Error Management System (MEMS) should be an inherent element of any organisation's SMS. It partially satisfies the intent of BAR 8, Part 145.A.60 for internal reporting systems, although there will still be reportable technical failures that are not attributable to maintenance error.

More importantly, MEMS creates a means of identifying areas of weakness for the organisation to address. The organisation should also seek to promote and cascade out safety guidance to its staff on how to prevent such errors and to promulgate the potential pitfalls that led to the event. These should somehow be captured and offered to the wider community so that everyone can learn from the collective experience that accumulates, not the one

company alone. These systems, and the information that they provide will form an important element of Brunei's State Safety Programme.

5.2. The Brunei DCA wants industry to provide an environment and underpinning culture whereby maintenance errors may be openly reported by staff and investigated objectively in order that the contributing factors and root causes of such errors can be addressed. The organisation's MEMS system should complement the existing systems for reporting occurrences under the Brunei DCA Occurrence Reporting scheme by looking at the error events in greater detail, the associated underlying circumstances and the root causes with the intention of identifying appropriate corrective actions that are appropriate and effective.

5.3. Maintenance errors with serious consequences such as accidents or incidents are often routinely investigated by bodies external to the organisation, such as the Accidents Investigators (NTSB, UK AAIB, BEA in France). However, such involvement should not prevent the organisation itself carrying out a MEMS investigation into an occurrence. There will inevitably be actions which should be looked at and addressed whilst the external investigation proceeds. Whilst there may be an overlap between the functions of the investigation the company must remember that it has to investigate and address the shortfall that resulted in the event.

5.4. Operationally significant events (e.g. technical delays, cancellations, etc) may not be legally required to be reported externally but are frequently investigated by organisations, albeit only to apportion responsibility for the event, and to track its consequences rather than specifically to determine cause. Below these levels are events without operational significance (e.g. the omission of an oil filler cap which, by chance, is noticed and corrected before flight), which may rarely be investigated.

Many of these, whilst relatively insignificant on their own, are examples of where the system has failed but, due perhaps to chance, the failure has been caught. These should not be ignored.

5.5. In order to gain a better understanding of the problems and the contributory factors, including human factors and performance, company procedures and maintenance manual errors which contribute to such occurrences it is necessary to investigate these before they possibly contribute to or cause an incident or accident in the future.

6. MEMS Policy

6.1. The concept of MEMS and the associated investigative techniques have been around in Europe since 2002. The principles were originally proven and incorporated into the requirements of JAR-145 in 2002. However, with the advent of SMS and its wider application across all of an organisation's functional areas, it is important that an organisation's MEMS policy and procedures be revisited, as with any procedure, to ensure that it remains fit for purpose.

Organisations that do not have a MEMS process should look to establish one within the provisions of their SMS. Those organisations that already have a MEMS process should look at it to see if it is adequately identifying the underlying root cause and whether suitable corrective actions are being taken and the success of those actions monitored.

6.2. Prevailing industry best practice over the last ten years has shown that a MEMS should contain the following elements:

(a) A cascade of policy from the organisation's Safety Policy and SMS that clearly establishes MEMS;

(b) Demonstrable corporate commitment with management roles and responsibilities for MEMS clearly defined;

(c) Clearly identified aims and objectives of the MEMS programme;

(d) Corporate encouragement of uninhibited reporting and participation by individuals;

(e) Establishment of a just culture, with clear guidance on disciplinary policies and the associated boundaries identified and published;

(f) Identification and publication of the events that will typically trigger error investigations;

(g) An event investigation process which results in the establishment of root cause;

(h) Investigators selected and trained, including where appropriate training in investigative tools such as MEDA (Maintenance Error Decision Aid);

(i) MEMS overview education for staff, and more in-depth training for maintenance staff where necessary;

(j) Appropriate action to address root cause and the associated safety concerns based on investigation findings, including monitoring of its effectiveness;

(k) Feedback of results to workforce, including where appropriate use of examples during continuation training;

(l) Feedback from the continuation training into the organisation's Quality system;

(m) Analysis of the collective data within the organisation showing contributing factor trends and frequencies.

6.3. The aim of the scheme is to identify the factors contributing to incidents, and to make the organisation's system and working practices resistant to similar errors. Whilst not essential to the success of MEMS, it is recommended that for large organisations that a computerised database be used for storage and to assist in the analysis of the collated MEMS data. This would enable the full potential of such a system to be utilised in managing errors.

6.4. The human element includes technicians, engineers, planners, managers, storekeepers – in fact any person contributing to the maintenance process. The foregoing definition differs from that of a human error as it demands consideration of the system failings (e.g. inadequate staffing, organisational factors, tooling availability, ambiguous manuals etc.) as well as the error committed by a person.

7. MEMS – Organisational Procedures

7.1. An organisation should put supporting procedures in place to deliver its MEMS policy.

These should set out the reporting and MEMS management processes as well as outlining how the organisation intends to carry out investigations, compile reports and feed any findings back into the organisation's SMS and management system.

7.2. A maintenance error should be reported through the company's internal system and, if meeting the reporting criteria, also submitted as an Occurrence Report to the Brunei DCA order to comply with the Brunei Civil Aviation Order 2006.

7.3. The extent of the investigation will depend upon the nature of the event, the size and the complexity of the organisation (e.g. multi-site, complex procedures, shift working). Small organisations may employ a relatively simple investigative process but should endeavour to use independent staff to carry out the investigation. Larger organisations may wish to use a more formal process with trained investigators and a tool, such as MEDA, to help to manage the investigation and ensure that it uses an appropriate degree of rigour.

7.4. Where an occurrence reported via MEMS indicates an unpremeditated or inadvertent lapse by an employee, as described below, the Brunei DCA would expect the employer to act reasonably. It is important that the organisation accepts that free and full reporting is the primary aim in order to establish *why* the event happened by studying the contributory factors that led to the incident, and that every effort should be made to avoid action that may inhibit reporting. This is why the establishment of a just culture is essential.

7.5. In the context of error management it is considered that an unpremeditated or inadvertent lapse should not incur any punitive action, but a breach of any expected professional conduct may do so. It is also important to realise that, until the investigation is complete, the individual may not be solely to blame as systemic factors or procedural failures may be a contributory factor.

7.6. As a guideline, individuals should not attract punitive action unless:

(a) the act was intended to cause deliberate harm or damage;

(b) the person concerned does not have a constructive attitude towards complying with safe operating procedures;

(c) the person concerned knowingly violated company or regulatory procedures that were readily available, workable, intelligible and correct;

(d) the person concerned has been involved previously in similar lapses;

(e) the person concerned has attempted to hide their lapse or part in a mishap;

(f) the act was the result of a substantial disregard for safety.

"Substantial disregard", for this purpose, means:

(1) In the case of a certification authorisation holder (e.g. licensed engineer or Certifying Staff but also applicable to base maintenance support and other authorised staff) the act or failure to act was a substantial deviation from the degree of care, judgement and responsibility reasonably expected of such a person.

(2) In the case of a person holding no maintenance certification responsibility, the act or failure to act was a substantial deviation from the degree of care and diligence expected of a reasonable person in those circumstances.

(g) it can be proven that the person knowingly reported for work in an altered mental or physical state rendering the individual unfit for safe duty.

7.6.1. The degree of culpability would vary depending on any mitigating circumstances that are identified as a result of the MEMS investigation. It follows that any action taken by the organisation would also be on a sliding scale varying from corrective measures such as retraining through to dismissal of the individual.

7.7. In the case of incidents investigated via MEMS, irrespective of whether or not such incidents were brought to the knowledge of the Brunei DCA, the Brunei DCA expects an organisation to address the problems which contributed to these incidents. The organisation should, where possible, implement appropriate measures to prevent the problem from re-occurring, or alternatively monitor future occurrences, according to the degree of risk and likelihood of re-occurrence. A supporting database is useful in these circumstances in helping to assess the frequency of occurrence and any associated trends.

7.8. The Brunei DCA would expect that identified safety issues would be acted upon. There may be immediate actions required to address an unsafe situation with longer term actions following on from the results of the investigation. If the Brunei DCA becomes aware, by whatever means, that a significant safety problem existed and was not being addressed, it reserves the right to take appropriate action.

Note: *The statement by an organisation that an incident is undergoing, or has undergone, a MEMS investigation, without any additional information provided to explain why the incident occurred, would not normally be an adequate basis for a MOR closure.*

8. Brunei DCA Action

8.1. The Brunei DCA will be checking, as part of its approved organisation oversight process, that an organisation's internal occurrence reporting and investigation process is functioning as described in the procedures approved by the Brunei DCA and in line with the objectives of the programme. The Brunei DCA audit may involve the review of MEMS investigations such that the foregoing can be satisfied. However, the Brunei DCA makes the following assurances that it will:

(a) subject to item b) below not disclose the name of the person submitting the MEMS report, nor of a person to whom it relates, nor pass on a MEMS report to a third party, unless required to do so by law or unless the person(s) concerned authorises such disclosure.

(b) take all reasonable steps possible to avoid disclosing the identity of the reporter or of those individuals involved in the occurrence, should any follow-up action arising from a MEMS report be taken.

(c) not, as its policy, institute criminal proceedings in respect of unpremeditated or inadvertent breaches of the law or requirements, which come to its attention only because they have been reported under the MEMS scheme, except in cases involving dereliction of duty amounting to gross negligence or recklessness. Such an assurance is similar to that provided under the MOR scheme.

8.2. As examples of what the Brunei DCA might require, as evidence that an organisation has a working MEMS programme in accordance with BAR 8, Part 145; Part 145.A.60(b), an inspector may ask to see the following documents and evidence, and in order to satisfy himself, he may wish to speak to individual members of staff at any level within the organisation:

(a) A copy of the company's safety and disciplinary policy and determine that staff are aware of this policy, and believe that it will be, and has been, applied fairly;

(b) The procedure describing the company's process for reporting and investigating incidents and errors, and the types of occurrences that would normally be investigated;

(c) Evidence that occurrences meeting the criteria detailed above have been reported, and to assure himself that occurrences are not frequently going unreported;

(d) Evidence that occurrences meeting the criteria detailed above have been investigated, and to assure himself that occurrences are being, and have been, fairly investigated. It is hoped that an organisation would cooperate with a surveyor in putting him in touch with individuals who have been party to investigations, but only with the agreement of the individuals concerned;

(e) Within a large company, evidence that MEMS investigators had received appropriate training;

(f) Evidence that the organisation had acted, or was acting, upon results of MEMS investigations, based on risk assessment. This may mean that no action had been taken if a risk assessment has deemed that the causes were unlikely, in isolation or in combination, to result in a hazardous event in the future. A surveyor would expect to see evidence of action(s) to prevent root causes, and/or to mitigate the effects of error where appropriate;

(g) Evidence of feedback to the workforce, on both occurrences and their investigation, and remedial action taken, would also be expected.

8.3. For a small organisation, the surveyor would expect evidence as described above, but on a less structured basis.

8.4. If an organisation has no evidence to offer in the form of reported and investigated occurrences, the surveyor may wish to talk to staff to assure himself or herself that there have been no such occurrences, as opposed to occurrences going unreported and un-investigated. The surveyor would respect staff confidences in seeking such evidence.

9. Further Information

9.1. Maintenance Organisations requiring further information or advice on how to establish a Maintenance Error Management System should contact the Brunei DCA Airworthiness Section.

BAR AC-05 Quality Systems in Airworthiness

1. Introduction

1.1. Organisations seeking an approval, should develop, document, implement, and maintain a Quality (Safety) Management System with appropriate internal quality assurance (QA) procedures. Quality Management System, Quality Assurance and Quality Control are explained in the definition section (section 3) of this Guidance Material.

1.2. The QA process complements that of safety assurance, with each having requirements for analysis, documentation, auditing and management reviews to assure that certain performance criteria are met. While safety assurance specifically monitors the effectiveness of safety risk controls, QA typically focuses on the organisation's compliance with regulatory requirements.

1.3. The complementary relationship between safety assurance and QA allows for the integration of certain supporting processes. Therefore, a QMS should be seen as an integral part of the application, management and maintenance of a Safety Management System (SMS), see BAR 19.

1.4. The fundamental objectives of both SMS and QMS may be summarised as:

(a) Consistency

(b) Error/threat reduction

1.5. This Advisory Circular provides guidance on essential elements of a basic Quality Management System (QMS).

2. References

ICAO Doc 9859 Edition 3 – Safety Management Manual Chapter 2.9, Table 5-1.

3. Definitions

3.1. The following key terms and phrases are defined to ensure a standard interpretation and understanding of the QMS and internal QA procedures.

Concern

A concern is a derived conclusion, supported by objective evidence that may become a Finding. A concern may generate a Preventive Action.

Controls

Controls are management and operational techniques, activities and procedures that monitor the satisfactory performance of the organisation's operating processes and procedures.

Evidence

Evidence is a documented statement of fact that is based on observations, measurements, or tests that can be verified in a physical way, e.g. copies of documents or parts of documents, images showing the issue, signed file note or statement of circumstances, etc.

Finding

A finding is a conclusion, supported by objective evidence that demonstrates non-compliance with a specific procedure, requirement or standard. A finding will generate a Corrective or Preventive Action.

Inspection

An inspection is the act of observing, measuring, testing, or gauging one or more characteristics of a particular event or action. This is to ensure that correct procedures and requirements are followed during the accomplishment of that event, or action.

Quality control (QC)

QC are procedures to ensure a manufactured product or service complies to a defined set of quality criteria, or meets the requirements of the client or end-user.

Quality Assurance (QA)

QA ensures a number of products or services meet consistently the specified requirements.

Quality Management System (QMS)

The quality management system is the glue that bonds all the following together:

(a) The organizational structure

(b) The procedures

(c) The processes

(d) The resources

All needed to implement a successful quality management system.

Root cause

The root cause is the underlying organisational or technical system cause, or causes, of any finding or concern.

4. Components of a Quality Management System

4.1. The following summarises the main elements needed for a QMS to be developed where required under the BARs. There are many similarities with the content and structure of a safety management system. Wherever possible the systems should be integrated, see BAR 19 for comparison.

4.2. The relationship between SMS and QMS, as described by ICAO, is provided in
Table 1.

Table 1: Summary comparison of QMS and SMS

QMS	SMS
Quality	Safety
Quality assurance	Safety assurance
Quality control	Hazard identification and risk control
Quality culture	Safety culture
Compliance with requirements	Acceptable level of safety performance
Prescriptive	Performance-based
Standards and specifications	Organizational and human factors
Reactive greater than Proactive	Proactive greater than Predictive

Source: ICAO Doc 9859 (edition 3) Safety Management Manual Table 5-1

4.2.1. Quality policy

A clear statement of the organisation's policy, management principles and intentions, for a continuous process of improvement to the safety performance.

4.2.2. Roles and responsibilities

Defined in writing for all personnel; and a process for ensuring that everyone is aware of their responsibilities.

4.2.3. Non-compliance, error or deviation

Proactive - an initial hazard identification process; a reporting scheme; and assessments conducted at regular intervals, and whenever changes are planned.

Reactive - collating information from failed or unsafe condition/error reports and accident and incident reports, and ensuring that the requirements of relevant BARs are met.

4.2.4. Rectification and mitigation

A method for the analysis of risks and deciding how these will be mitigated and ensuring implementation, communication and feedback to staff.

4.2.5. Monitoring and evaluation

Conducting reviews or audits of the organisation's processes, and applying conventional QA principles, ensuring that remedial actions have been implemented as planned and that the organisation's systems remain effective and relevant to the operation. Reports made to the Accountable Manager to enable management review.

4.2.6. Objectives for improvement

Planning the quality objectives, and choosing effective methods for quality performance measurement.

4.2.7. Documentation

Documenting all the QMS processes - either as a component of existing manuals or in a separate QMS manual. Include a description of each component of the system and describe the interrelationships between each of these components; and co-ordination with external service providers and contactors, if necessary. Detailed local procedures in other documents can be cross-referenced, so the QMS manual is likely to be thin.

Documenting the regulations, standards and exemptions by which the organisation is regulated.

Training provisions for all staff,including QMS training. The components of the Quality Management System form a continuous cycle of improvement. In terms of Plan, Do, Check, Act.

BAR AC-06 Accountable Managers

1. Introduction

Organisations holding an Approval under BARs are generally required to have an Accountable Manager who has corporate authority and responsibility for ensuring that the activities conducted under the Approval are performed to the standard required. The title of such a person may vary from BAR to BAR but, essentially the role is common to all approved organisations. The key responsibilities outlined in this guidance must be discharged within any approved organisation by a clearly identified person.

Where the terms "Aerodrome Certificate Holder" and "Aerodrome Manager" are used in BAR 14 and related material, they should be considered as equivalent to Accountable Manager.

The nomination of a person as Accountable Manager within a BAR Approved Organisation requires specific approval by the Brunei DCA who are responsible for the oversight of that organisational approval. This document provides guidance on the role of the Accountable Manager and the qualifications and qualities required to be acceptable to act in that role.

2. Key Responsibilities and Experience

The exact nature of the Accountable Manager's responsibilities will vary with the size and type of the organisation and so will the experience required to fulfil the post. However there are several particular areas of responsibility which will apply to the role in any organisation. These are described below; they are not exhaustive, but represent key areas of responsibility for the postholder.

2.1. Corporate Authority

The Accountable Manager should occupy an appropriately senior position within the organisation in order to be able to direct its activities but need not be the person who sets overall company policy or objectives. By their CV and the Terms of Reference for the Accountable Manager's position, the nominee must be able to demonstrate the ability to direct the activities of the organisation for which he is responsible.

The term "corporate authority" is used to establish the seniority of the Accountable Manager's position within the organisation and the sort of managerial positions that might possess the required level of authority.

It is not necessary for the position to be the "controlling mind" of the organisation. It is possible for an Accountable Manager to be answerable to and directed by another person or persons, yet retain the appropriate level of authority to ensure that activities are financed adequately and carried out to an acceptable standard.

Appropriate previous experience in a senior management position, preferably within the aviation industry, is a prerequisite for any large organisation, but a lack of such experience in a small organisation need not necessarily disqualify a person from holding the post. In this case the nominee should be able to demonstrate an understanding of sound management principles.

Where a single organisation holds more than one approval, the Accountable Manager should normally have final authority over all activities conducted under the BAR approvals.

2.2. Financial Authority

The Accountable Manager should not only control an allocated budget but also be instrumental in determining what size that budget should be.

A nominee for this post should therefore be able to demonstrate that they are responsible for determining the level of financing appropriate to the proposed activities and resource levels of the organisation and that they have an appropriate level of autonomy in disbursing the funds allocated as a result. The nominee should be able to demonstrate an understanding of the budgetary process and the ability to ensure that all required resources and management tools are available to support the organisation and to ensure that adequate safety standards are maintained.

In very small organisations, the Accountable Manager will probably have control over the disbursement of company funds.

In larger organisations the Accountable Manager might only have control over a budget allocated by a board of directors; however to meet the requirements of "financial authority" they should have been instrumental in determining the size of the budget and its disbursement.

In very large organisations, where there might be a controlling group with a main board directing subsidiary boards at company level, the layers of corporate management can make it difficult to determine the focus of financial control, but the same test of authority applies, i.e. does the nominated Accountable Manager have appropriate control of the size of their budget and the disbursement of funds allocated to the organisation that they manage?

2.3. Human Resource Management

The management structure itself, including the appointment of those nominated postholders where required by BARs, will normally be the responsibility of the Accountable Manager. The Accountable Manager therefore needs the ability to set up an appropriate management structure, using suitable technically-qualified persons with an adequate knowledge of the standards required by the regulatory authority. He or she must also be able to justify the scale and scope of the proposed management structure and the divisions of responsibilities within it.

An organisation cannot function effectively unless it is adequately staffed. Personnel are needed in sufficient numbers and with the competencies and skills for the jobs they are required to perform, and training will be required to ensure that these are enhanced where necessary and then maintained. The Accountable Manager should normally have overall responsibility for all these human resources matters.

2.4. Safety Management System (SMS)

Any nominee should be able to demonstrate a commitment to the management of safety and a sound knowledge of SMS principles and practices where such a system operates, or is required to operate, within the organisation for which they are responsible.

The nominee should be able demonstrate the importance attached to the management of safety by giving examples of where it applies within the organisation for which they are responsible. Where a SMS has been, or will be, implemented within the organisation in accordance with BAR 19, the nominee should be able to demonstrate knowledge of the principles and

practices as they apply within the organisation including, in particular, their own role.

2.5. Quality System

The Approval may require the establishment of a quality system to support management of the organisation and to monitor compliance both with BARs and with those standards specified by the operator to ensure a safe operation of a product. As the person with ultimate responsibility for meeting the required standards, the Accountable Manager plays an important part in any quality system. He or she is therefore expected to play a central and influential role in the establishment and operation of the organisation's quality system, if required.

Where there is no requirement to establish a formal quality system, the application of quality assurance principles will still be important to the effective management of the organisation, in particular safety management.

A nominee should be able to demonstrate a sound knowledge of quality principles and practices and how those principles and practices are applied within their own organisation including, in particular, knowledge of their own role. Consequently, the nominee should be able to demonstrate a sound knowledge of the regulatory material as it applies to the scope, purpose and function of the quality system within the organisation and particularly their role within it. They should additionally be able to demonstrate an ability to manage quality control or quality assurance functions and to respond to quality assurance input.

2.6. Standards

The Accountable Manager is the manager with ultimate responsibility for operational standards and compliance with the relevant regulations.

Specifically, the Accountable Manager is accountable to the regulatory authority for activities conducted under the terms of the BAR Approval. In practice, technical specialists, appointed to other subordinate managerial roles, may provide the level of regulatory and technical knowledge needed to ensure compliance on a day-to-day basis.

The nominee should be able to demonstrate a basic understanding of the standards required of the organisation for which they will be responsible. This will include a basic understanding of the applicability of the regulatory documents that apply to the organisation and an appropriate level of knowledge of their content and purpose. In particular, the nominee should be able to demonstrate knowledge and understanding of the requirements related to the appointment of those persons within the organisation with designated responsibilities for standards under the relevant requirements, including nominated postholders or their equivalents. Any nominee for the position of Accountable Manager should be able to evaluate the qualities and qualifications required for those persons within the organisation with designated responsibilities for standards.

2.7. Check List

A questionnaire or checklist which can serve as a filter for potential candidates for the role of Accountable Manager is given in the Appendix to this guidance document.

3. Approval of nominee

The nomination of a person as Accountable Manager of an organisation requires approval by the Brunei DCA. Evaluation of the suitability of a nominee will be made against the criteria above.

The organisation putting forward a nominee as Accountable Manager should consult the assigned Brunei DCA inspector at an early stage, providing the fullest information regarding the nominee's fulfilment of these criteria. It is advisable that approval is gained before contractual arrangements concerning employment are concluded with the nominee.

There may be instances where the nominee does not meet fully every aspect of the criteria listed. Nevertheless, where the candidate substantially fulfils the main requirements, the deficit may be remedied by training or managed experience.

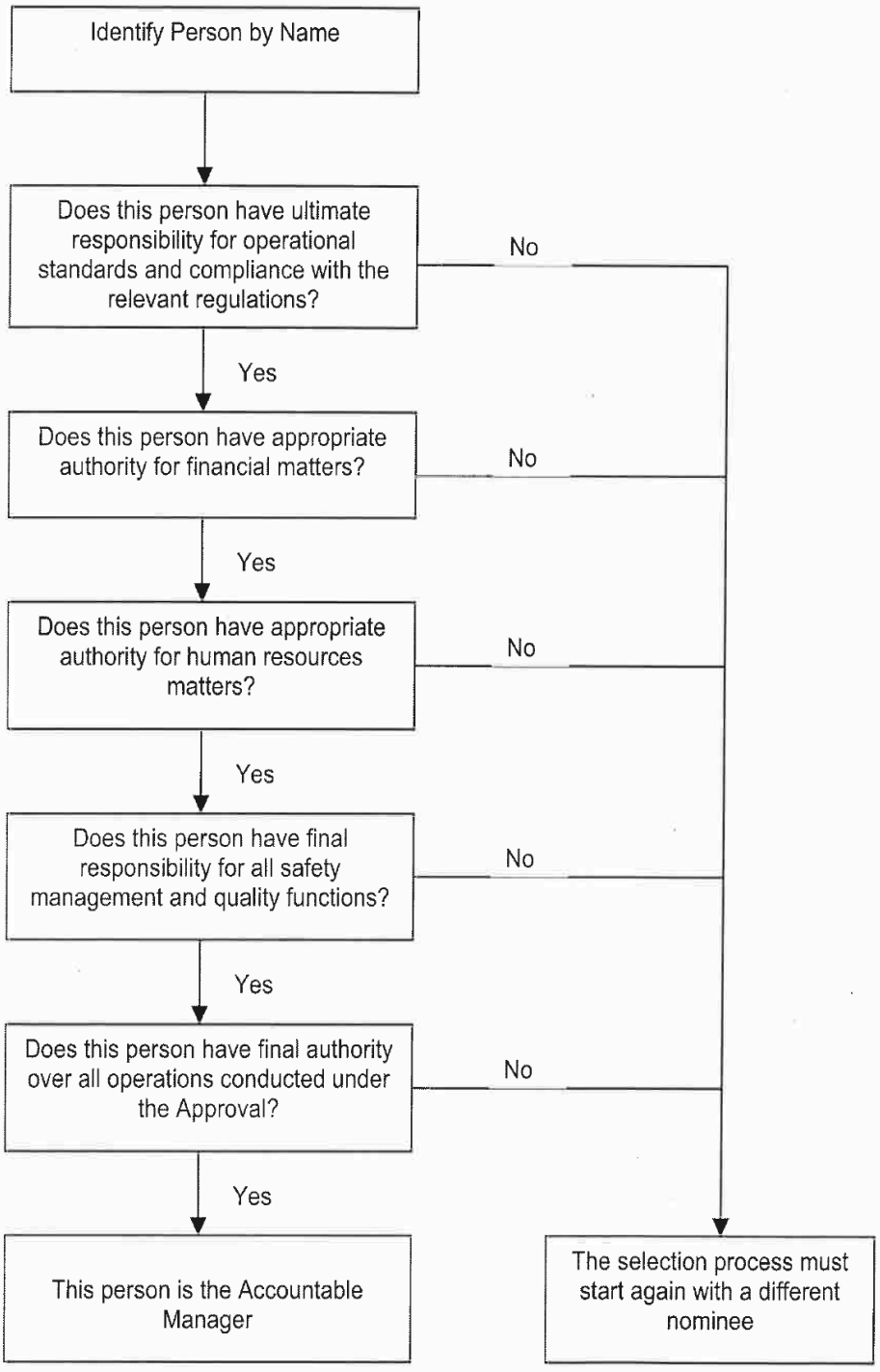
For example, the nominee may have limited experience of safety management systems. In such cases, conditional approval may be given subject to the nominee achieving within a specified time the full level of knowledge and experience required and there being readily available to the nominee a source of experience and knowledge in the area in which he is deficient. In addition, conditions may be attached to the organisation's Approval during this period.

4. Organisational and personnel changes

The senior management of the Approved organisation should notify the Brunei DCA immediately if the Accountable Manager leaves the company or no longer occupies the same post or if the terms of reference associated with the post change substantially.

Any proposed change of Accountable Manager requires the same approval of the regulator as the initial nomination. If there is an interval between the departure of an Accountable Manager and an approved successor taking up the post conditions may be attached to the organisation's Approval or, in extreme cases, the Approval may be suspended

Appendix Accountable Manager Selection Questionnaire



BAR AC-07 Maintenance Contracts

1. Introduction

This Advisory Circular provides information and guidance to Air Operators and Maintenance Organisations in the process of developing maintenance contract agreements.

2. References

ICAO Annex 8.

ICAO Doc 9760.

BAR 8, Part M: Continuing Airworthiness.

BAR 8, Part 145: Approved Maintenance Organisations.

3. Background & Policies

3.1. Background

In accordance with BAR 6 Part ORA, Air Operators are required to manage the airworthiness of their aircraft by means of a BAR 8, Part M Subpart G, Continuing Airworthiness Management Organisation (CAMO). The operator does not need to hold a Maintenance Organisation Approval in accordance with BAR 8, Part 145 and may contract this activity to another organisation holding that approval.

(a) In the case of commercial air transport, when the operator is not also appropriately approved as a maintenance organisation, the operator shall establish a written maintenance contract between the operator (CAMO) and Approved Maintenance Organisation or another operators AMO, detailing the functions of AMO, ensuring that all maintenance is ultimately carried out by an AMO and defining the support of the quality functions. The aircraft base, scheduled line maintenance and engine maintenance contracts, together with all amendments, shall be approved by the Brunei DCA. However, in the case of:

(1) An aircraft requiring unscheduled line maintenance, the contract may be in the form of individual work orders addressed to the AMO.

(2) Component maintenance, including engine maintenance, the contract may be in the form of individual work orders addressed to the AMO.

3.2. Responsibilities

(a) The operator retains primary airworthiness responsibility regardless of the terms of any contractual arrangement. It is the operator's responsibility to verify the suitability of the arrangement.

(b) A contracted AMO must have the capabilities and facilities to perform the contracted work.

4. Guidance and Procedures

4.1. General Information

4.1.1. It is required that an operator shall have approved maintenance programmes relevant to all types of aircraft in the fleet defining the inspection,

maintenance, preventative maintenance and modifications requirements to be performed by him, or contracted to other approved persons that require such work be performed in accordance with the operators Continuing Airworthiness Management Exposition (CAME).

4.1.2. Any organisation or person with whom the air operator or AMO has made an arrangement or contract for the performance of any maintenance, preventative maintenance or modifications involving an aircraft and associated aeronautical products is considered a contracted maintenance provider.

4.1.3. The use of contracted maintenance providers to complete aircraft maintenance is fundamental to an air operator's maintenance programmes as it would have been with his own internal maintenance facilities.

4.1.4. When an air operator uses a maintenance provider to perform all or part of the maintenance on his aircraft or associated aeronautical products, that maintenance provider's organisation becomes in effect the air operator's maintenance organisation.

4.1.5. All parts and/or components used by an air operator on his aircraft must be maintained under the air operator's maintenance programme. Leases, exchanges, or other arrangements that do not allow the air operator to be in control of the maintenance of the leased/exchanged part/component while on maintenance are contrary to the regulations.

Traceability of components and parts information may be included in the contract. This could include everything from new parts to the scrapping and/or returning of parts to the air operator. It could also require parts exchanged being in the same configuration.

4.1.6. BAR 8, Part 145 requires that the organisation or person makes sure it has capabilities and facilities to perform the intended work.

4.1.7. The operator may adopt the publications of a contracted organisation or person in part or in total as methods, techniques, and standards. In this case, the CAME or MOE must describe the applicability and authority of the affected publication.

4.1.8. As part of the continuous analysis and surveillance programme, it is required that the operator develops a schedule for accomplishing continuing audits or inspections that are designed to determine the maintenance provider's level of compliance with the air operator's CAME and maintenance programmes.

4.1.9. BAR 8, Part M; M.A.708 requires that any organisation contracting any aircraft or aircraft equipment maintenance work should have a written contract with whomever it has contracted the maintenance to. This helps to ensure and to evaluate that the air operator's requirements and responsibilities are addressed.

4.1.10. The development of an effective maintenance contract therefore, requires clear understanding of this document, the applicable maintenance contract regulatory requirements, the relevant maintenance programme and the approved maintenance procedures in the CAME or MOE.

4.1.11. BAR 6 and 8 emphasise that whatever maintenance arrangement that is in place, the air operator remains primarily responsible for the continued airworthiness of the aircraft, including airframes, engines, propellers, appliances, and parts thereof.

4.1.12. AMO Subcontract activity

When the contracted AMO subcontracts tasks to other unapproved organisations the AMO is responsible for the subcontracted activity (145.A.75). Hence normally it is not required for the operator to audit organisations that an AMO subcontracts with, however it is necessary for the operator to be aware of them and have knowledge and record of their approval and competency status to perform the contracted function(s).

4.2. Maintenance Contract Requirements

4.2.1. An effective maintenance contract agreement should include clauses that address the following:

(a) The air operator's responsibility for the airworthiness of the aircraft and performance of all elements of the continuous airworthiness maintenance programme.

(b) A statement that the maintenance provider shall allow the operator/contractor to audit the facilities, equipment, personnel, and records pertaining to the services provided to the air operator at any reasonable time.

(c) Brunei DCA shall have unlimited access to the contracted facility for inspection.

(d) A statement that the AMO shall follow the air operator's maintenance programme requirements.

(e) The maintenance provider declaration to comply with all applicable laws and regulations.

(f) A statement confirming the adequacy of staffing levels and sufficiency of the facilities and equipment to support a varied fleet mix; and adequacy of record keeping and exchange of information with the operator/contractor.

(g) That the operator/contractor shall provide all information (including manuals) covering the administration necessary to ensure compliance with the maintenance programme. And that the operator is responsible to verify any information provided by the maintenance provider before application.

(h) That the contracted organisation shall maintain and make available when required a current listing of persons who have been trained, qualified, and authorised to conduct required maintenance. The persons must be identified by name, occupational title, and the inspection that they are authorised to perform.

(i) That the operator shall be responsible for record keeping, however, if the operator delegates this responsibility to the maintenance provider, the contract should clearly explain this arrangement.

4.3. Summary

4.3.1. An effective maintenance contract must capture the following information;

(a) The names of contracting operators

(b) Contract identification and date

(c) Place where maintenance will be performed

(d) Reference documents approved for the control of maintenance

(e) A clause referring to termination or alteration of the contract

Guidance on the maintenance contracts is given in Appendix A to this document.

Appendix A

Contracted Maintenance of the Operator

1. Maintenance Contracts

1.1. The following paragraphs are not intended to provide a standard maintenance contract but to provide a list of **the main points that should be addressed, when applicable, in a maintenance contract** between an operator and an approved maintenance organisation. As only the technical parts of the maintenance contracts have to be acceptable to the Brunei DCA, the following paragraphs only address technical matters and exclude matters such as costs, delay, warranty, etc.

1.2. When maintenance is contracted to more than one approved maintenance organisation (for example aircraft base maintenance to X, engine maintenance to Y and line maintenance to Z1, Z2 & Z3), attention should be paid to the consistency of the different maintenance contracts.

1.3. A maintenance contract is not normally intended to provide appropriate detailed work instruction to the personnel (and is not normally distributed as such). Accordingly, there must be established organisational responsibility, procedures and routines in the Operator's organisation to take care of these functions in a satisfactory manner such that any person involved is informed about his responsibility and the procedures which apply. These procedures and routines can be included/appended to the operator's CAME and maintenance organisation procedures manual or consist in separate procedures. In other words procedures and routines should reflect the conditions of the contract.

2. Aircraft Maintenance

This paragraph applies to a maintenance contract that includes base maintenance and, possibly, line maintenance. Paragraph 4 of this appendix addresses the issue of maintenance contracts restricted to only line maintenance. Aircraft maintenance also includes the maintenance of the engines and APU while they are installed on the aircraft.

2.1. Scope of work

The type of aircraft and engines subject to the maintenance contract must be specified. It should preferably include the aircraft's registration numbers. The type of maintenance to be performed by the approved maintenance organisation should be specified unambiguously.

2.2. Locations identified for the performance of maintenance/ Certificates held

The place(s) where base and line maintenance will be performed should be specified. The certificate held by the maintenance organisation at the place(s) where the maintenance will be performed should be referred to in the contract. If necessary the contract may address the possibility of performing maintenance at any location subject to the need for such maintenance arising either from the unserviceability of the aircraft or from the necessity of supporting occasional line maintenance.

2.3. Subcontracting

The maintenance contract should specify under which conditions the approved maintenance organisation may subcontract tasks to a third party (whether this third party is approved maintenance organisation or not).

In addition the Operator may require the approved maintenance organisation to request the operator's approval before subcontracting to a third party. Access should be given to the operator to any information (especially the quality monitoring information) about the approved maintenance organisation's subcontractors involved in the contract. It should however be noted that under operators responsibility both the operator and the operator's competent authority are entitled to be fully informed about subcontracting, although the operator's competent authority will normally only be concerned with aircraft, engine and APU subcontracting.

2.4. Maintenance Programme

The maintenance programme under which the maintenance has to be performed has to be specified. The operator must have that maintenance Programme approved by its competent authority (usually Brunei DCA). When the maintenance programme is used by several operators, it is important to remember that it is the responsibility of each operator to have that maintenance programme approved under its own name by its competent authority.

2.5. Quality Monitoring

The terms of the contract should include a provision allowing the operator to perform a quality surveillance (including audits) upon the approved maintenance organisation. The maintenance contract should specify how the results of the Quality surveillance are taken into account by the approved maintenance organisation (see also paragraph 2.22.*"Meetings"*).

2.6. Competent Authority Involvement

When the operator's and the approved maintenance organisation's competent authority are not the same, the operator and the approved maintenance organisation have to ensure together with their competent authority that the respective competent authority's responsibilities are properly defined and that, if necessary, delegations have been established.

2.7. Airworthiness Data

The airworthiness data used for the purpose of this contract as well as the authority responsible for the acceptance/approval must be specified. This may include, but may not be limited to:

(a) Maintenance Programme,

(b) ADs,

(c) major repairs/modification data,

(d) aircraft Maintenance Manual,

(e) aircraft IPC,

(f) Wiring diagrams,

(g) Trouble shooting manual,

(h) Minimum Equipment List (normally on board the aircraft),

(i) Operations Manual

(j) Flight Manual

2.8. Incoming Conditions

The contract should specify in which condition the Operators must send the aircraft to the approved maintenance organisation. For checks of significance i.e. 'C' checks and above, it may be beneficial that a work scope planning meeting be organised so that the tasks to be performed may be commonly agreed (see also paragraph 2.22: *"Meetings"*).

2.9. Airworthiness Directives and Service Bulletin/Modifications

The contract should specify what information the operator is responsible to provide to the approved maintenance organisation, such as:

(a) the due date of the AD,

(b) the selected means of compliance,

(c) the decision to embody Service Bulletins (SB's) or modification, etc.

In addition the type of information the operator will need in return to complete the control of ADs and modification-status should be specified.

2.10. Hours and Cycles Control

Hours and cycles control is the responsibility of the operators, but there may be cases where the approved maintenance organisation must be in receipt of the current flight hours and cycles on a regular basis so that it may update the records for its own planning functions (see also paragraph 2.21: *"Exchange of information"*).

2.11. Life Limited Parts

Life Limited Parts control is the responsibility of the operator. The approved maintenance organisation will have to provide the operator with all the necessary information about the LLP removal/installation so that the Operator may update its records (see also paragraph 2.21 "Exchange of information").

2.12. Supply of Parts

The contract should specify whether a particular type of material or component comes from the operator's or the approved maintenance organisation's store, which type of component is pooled, etc. Attention should be paid on the fact that it is the approved maintenance organisations competence and responsibility to be satisfied that the component in question meets the approved data/standard and to ensure that the aircraft component is in a satisfactory condition for fitment.

2.13. Pooled Parts at Line Stations

The contract should specify how the subject of pooled parts at line stations should be addressed.

2.14. Scheduled Maintenance

For planning scheduled maintenance checks, the support documentation to be given to the approved maintenance organisation should be specified. This may include, but may not be limited to:

(a) applicable work package, including job cards;

(b) scheduled component removal list;

(c) modifications to be incorporated; etc.

When the approved maintenance organisation determines, for any reason, to defer a maintenance task, it has to be formally agreed by the Operator. If the deferment goes beyond an approved limit, refer to paragraph 2.17: *"Deviation from the maintenance Schedule".* This should be addressed, where applicable, in the maintenance contract.

2.15. Unscheduled maintenance/Defect rectification

The contract should specify to which level the approved maintenance organisation may rectify a defect without reference to the operator. As a minimum, the approval and incorporation of major repairs should be addressed. The deferment of any defect rectification shall be submitted to the operator and, if applicable, to its competent authority.

2.16. Deferred tasks

See paragraphs 2.14 and 2.15 above .In addition, the use of the Operator's MEL and the relation with the Operator in case of a defect that cannot be rectified at the line station should be addressed.

2.17. Deviation from the Maintenance Programme

Deviations have to be requested by the operator to its competent authority or granted by the Operator in accordance with a procedure acceptable to its competent authority. The contract should specify the support the approved maintenance organisation may provide to the operator in order to substantiate the deviation request.

2.18. Test Flights

If any test flight is required, it shall be performed in accordance with the operator's CAME. A Permit to Fly in accordance with BAR 8, Part 21 Subpart P may be required.

2.19. Release to service documentation

The release to service has to be performed by the approved maintenance organisation in accordance with its MOE and procedures. The contract should, however, specify which support forms have to be used (Operator's technical log, approved maintenance organisation's maintenance visit file, etc.) and the documentation the approved maintenance organisation should provide to the operator upon delivery of the aircraft.

This may include but may not be limited to:

(a) Certificate of release to service -*mandatory*,

(b) flight test report,

(c) list of modifications embodied,

(d) list of repairs,

(e) list of AD's incorporated,

(f) maintenance visit report, etc.

2.20. Maintenance Recording

The Operator may contract the approved maintenance organisation to retain some of the maintenance records. It should be ensured that every requirement is fulfilled by either the operator or the approved maintenance

organisation. In such a case, free and quick access to the above mentioned records should be given by the approved maintenance organisation to the operator and its competent authority (in case of two different competent authority involved, see paragraph 2.6 *"competent authority involvement"*).

2.21. Exchange of information

Each time exchange of information between the operator and the approved maintenance organisation is necessary, the contract should specify what information should be provided and when (i.e. on what occasion or at what frequency), how, by whom and to whom it has to be transmitted.

2.22. Meetings

In order that the competent authority may be satisfied that a good communication system exists between the Operator and the approved maintenance organisation, the terms of the maintenance contract should include the provision for a certain number of meetings to be held between both parties.

2.22.1. Contract Review

Before the contract is applicable, it is very important that the technical personnel of both parties that are involved in the application of the contract meet in order to be sure that every point leads to a common understanding of the duties of both parties.

2.22.2. Work scope planning meeting

Work scope planning meetings may be organised so that the tasks to be performed may be commonly agreed.

2.22.3. Technical meeting

Scheduled meetings may be organised in order to review on a regular basis technical matters such as AD's, SB's, future modifications, major defects found during maintenance check, reliability, etc.

2.22.4. Quality meeting

Quality meetings may be organised in order to examine matters raised by the operator's quality surveillance and to agree upon necessary corrective actions.

2.22.5. Reliability meeting

When a reliability programme exists, the contract should specify the Operator's and Maintenance Organisation's respective involvement in that programme, including the participation in reliability meetings.

3. Engine Maintenance

This section deals with engine shop maintenance. "On wing" engine maintenance should be covered by section 2 above.

3.1. Scope of work

The type of engine subject to the maintenance contract must be specified.

The type of maintenance to be performed by the approved maintenance organisation should be specified unambiguously.

3.2. Location identified for the performance of maintenance/Certificates held

The place(s) where base and line maintenance will be performed should be specified. The certificate held by the maintenance organisation at the place(s) where the maintenance will be performed has to be referred to in the contract.

3.3. Subcontracting

The maintenance contract should specify under which conditions the approved maintenance organisation may subcontract tasks to a third party (whether this third party is approved maintenance organisation or not). In addition the Operator may require the approved maintenance organisation to request the operator's approval before subcontracting to a third party. Access should be given to the operator to any information (especially the quality monitoring information) about the approved maintenance organisation's subcontractors involved in the contract. It should however be noted that under operators responsibility both the operator and the operator's competent authority are entitled to be fully informed about subcontracting, although the operator's competent authority will normally only be concerned with aircraft, engine and APU subcontracting.

3.4. Maintenance Programme

The maintenance programme under which the maintenance has to be performed has to be specified. The operator must have that maintenance Programme approved by its competent authority. When the maintenance programme is used by several operators, it is important to remember that it is the responsibility of each operator to have that maintenance programme approved under its own name by its competent authority.

3.5. Quality monitoring.

The terms of the contract should include a provision allowing the operator to perform a quality surveillance (including audits) upon the approved maintenance organisation. The maintenance contract should specify how the results of the Quality surveillance are taken into account by the approved maintenance organisation (see also paragraph 3.21. *"Meetings"*).

3.6. Competent authority involvement

When the operator's and the approved maintenance organisation's competent authority are not the same, the operator and the approved maintenance organisation have to ensure together with their competent authority that the respective competent authority's responsibilities are properly defined and that, if necessary, delegations have been established.

3.7. Airworthiness data

The airworthiness data used for the purpose of this contract as well as the authority responsible for the acceptance/approval must be specified. This may include, but may not be limited to:

(a) Maintenance Programme;

(b) ADs;

(c) major repairs/modification data;

(d) Engine overhaul manual; other?

3.8. Incoming Conditions

The contract should specify in which condition the Operator's must send the aircraft to the approved maintenance organisation. For instance it is important

to specify the configuration of the engine, e.g. including the list of the components that remain fitted to the engine before sending it to the approved maintenance organisation. It may also be valuable that a work scope planning meeting be organised so that the tasks to be performed may be commonly agreed (see also paragraph 3.21: *"Meetings"*).

3.9. Airworthiness Directives and Service Bulletin/Modifications

The contract should specify what information the operator is responsible to provide to the approved maintenance organisation, such as the due date of the AD, the selected means of compliance, the decision to embody Service Bulletins (SB's) or modification, etc. In addition the type of information the operator will need in return to complete the control of ADs and modification-status should be specified.

3.10. Hours and Cycles control

Hours and cycles control is the responsibility of the operator, but there may be cases where the approved maintenance organisation must be in receipt of the current flight hours and cycles on a regular basis so that it may update the records for its own planning functions (see also paragraph 3.20: *"Exchange of information"*).

3.11. Life Limited Parts

Life Limited Parts control is the responsibility of the Operator. The approved maintenance organisation will have to provide the operator with all the necessary information about the LLP removal/installation so that the Operator may update its records (see also paragraph 3.20 *"Exchange of information"*).

3.12. Supply of parts

The contract should specify whether a particular type of material or component comes from the operator's or the approved maintenance organisation's store, which type of component is pooled, etc. Attention should be paid on the fact that it is the approved maintenance organisation competence and responsibility to be in any case satisfied that the component in question meets the approved data/standard and to ensure that the aircraft component is in a satisfactory condition for fitment. In other words, there is definitely no way for an approved maintenance organisation to accept whatever he receives from the operator.

3.13. Scheduled maintenance

For planning scheduled maintenance checks, the support documentation to be given to the approved maintenance organisation should be specified. This may include, but may not be limited to:

(a) applicable work package, including job cards;

(b) scheduled component removal list;

(c) modifications to be incorporated; etc.

When the approved maintenance organisation determines, for any reason, to defer a maintenance task, it has to be formally agreed by the Operator. If the deferment goes beyond an approved limit, refer to paragraph 3.16: "Deviation from the maintenance Schedule". This should be addressed, where applicable, in the maintenance contract.

3.14. Unscheduled maintenance/Defect rectification

The contract should specify to which level the approved maintenance organisation may rectify a defect without reference to the operator. As a minimum, the approval and incorporation of major repairs should be addressed. The deferment of any defect rectification shall be submitted to the operator and, if applicable, to its competent authority.

3.15. Deferred tasks

See paragraphs 3.13 and 3.14 above.

3.16. Deviation from the Maintenance Programme

Deviations have to be requested by the operator to its competent authority or granted by the Operator in accordance with a procedure acceptable to its competent authority. The contract should specify the support the approved maintenance organisation may provide to the operator in order to substantiate the deviation request.

3.17. Test bench

The contract should specify the acceptability criterion and whether a representative of the operator should witness an engine undergoing test.

3.18. Release to service documentation

The contract should specify the documentation the approved maintenance organisation should provide to the operator upon delivery of the aircraft/engine.

This may include but may not be limited to:

(a) Certificate of Release to Service - *mandatory*,

(b) test bench report,

(c) list of modifications embodied,

(d) list of repairs,

(e) list of ADs performed,

3.19. Maintenance Recording

The Operator may contract the approved maintenance organisation to retain some of the maintenance records. It should be ensured that every requirement is fulfilled by either the operator or the approved maintenance organisation. In such a case, free and quick access to the above mentioned records should be given by the approved maintenance organisation to the operator and its competent authority (in case of two different competent authority involved, see paragraph 3.6 *"competent authority involvement"*).

3.20. Exchange of information

Each time exchange of information between the Operator and the approved maintenance organisation is necessary, the contract should specify what information should be provided and when (i.e. on what occasion or at what frequency), how, by whom and to whom it has to be transmitted.

3.21. Meetings

In order that the competent authority may be satisfied that a good communication system exists between the Operator and the approved maintenance organisation, the terms of the maintenance contract should

include the provision for a certain number of meetings to be held between both parties.

3.21.1. Contract review

Before the contract is applicable, it is very important that the technical personnel of both parties that are involved in the application of the contract meet in order to be sure that every point leads to a common understanding of the duties of both parties.

3.21.2. Work scope planning meeting

Work scope planning meetings may be organised so that the tasks to be performed may be commonly agreed.

3.21.3. Technical meeting

Scheduled meetings may be organised in order to review on a regular basis technical matters such as ADs, SB's, future modifications, major defects found during shop visit, reliability, etc.

3.21.4. Quality meeting

Quality meetings may be organised in order to examine matters raised by the operator's quality surveillance and to agree upon necessary corrective actions.

3.21.5. Reliability meeting

When a reliability programme exists, the contract should specify the Operator's and maintenance Organisation's respective involvement in that programme, including the participation to reliability meetings.

4. Aircraft line maintenance

This paragraph applies to maintenance contract that includes line maintenance but excludes base maintenance activities.

4.1. Scope of work

The type of aircraft subject to the maintenance contract must be specified. It should include the aircraft's registration numbers. The extent of maintenance to be performed by the approved maintenance organisation should be specified unambiguously.

4.2. Location identified for the performance of maintenance/ Certificates held

The place(s) where line maintenance will be performed should be specified. The certificate held by the maintenance organisation at the place(s) where the maintenance will be performed has to be referred to in the contract.

4.3. Subcontracting

The maintenance contract should specify under which conditions the approved maintenance organisation may subcontract tasks to a third party (whether this third party is approved maintenance organisation or not). In addition the Operator may require the approved maintenance organisation to request the operator's approval before subcontracting to a third party. Access should be given to the operator to any information (especially the quality monitoring information) about the approved maintenance organisation's subcontractors involved in the contract. It should however be noted that under operators responsibility both the operator and the operator's competent authority are entitled to be fully informed about subcontracting, although the

operator's competent authority will normally only be concerned with aircraft, engine and APU subcontracting.

4.4. Quality monitoring

The fact that the operator's contractor is an appropriately approved maintenance organisation, does not preclude the Operator from performing a quality surveillance (including audits) upon the approved maintenance organisation.

4.5. Airworthiness data

The airworthiness data used for the purpose of this contract as well as the authority responsible for the acceptance/approval must be specified. This may include, but may not be limited to:

(a) aircraft Maintenance Manual;

(b) aircraft IPC;

(c) Wiring diagrams;

(d) Trouble shooting manual;

(e) Minimum Equipment List (normally on board the aircraft);

(f) Operations Manual;

(g) Flight Manual.

4.6. Supply of Parts

The contract should specify whether a particular type of material or component is supplied by the operator or the approved maintenance organisation. Attention should be paid on the fact that it is the approved maintenance organisation competence and responsibility to be in any case satisfied that the component in question meets the approved data/standard and to ensure that the aircraft component is in a satisfactory condition for fitment. In other words, there is definitely no way for an approved maintenance organisation to accept whatever he receives from the operator. Storage conditions should also be addressed.

4.7. Pooled parts

The contract should specify how the subject of pooled parts at line stations should be addressed.

4.8. Unscheduled maintenance/Defect rectification

The contract should specify to which level the approved maintenance organisation may rectify a defect without reference to the operator, and what action should be taken in case the defect rectification may not be performed by the approved maintenance organisation.

4.9. Deferred tasks

The use of the operator's MEL and the relation with the operator in case of a defect that cannot be rectified at the line station should be addressed.

4.10. Release to service

The release to service has to be performed by the approved maintenance organisation in accordance with its MOE procedures. The contract should however specify which support forms have to be used (operator's technical log, etc...).

4.11. Exchange of information

Each time exchange of information between the operator and approved maintenance organisation is necessary, the contract should specify what information should be provided and when, how, by whom and to whom it has to be transmitted.

4.12. Meetings

Before the contract is applicable, it may be beneficial that the technical personnel of both parties that are involved in the application of the contract meet in order to be sure that every point leads to a common understanding of both parties' duties.

BAR AC-08 Battery Charging Facilities

1. Introduction

This Advisory Circular provides guidance on the setting-up and operation of facilities equipped for the purpose of charging aircraft batteries.

2. Applicability

This Advisory Circular is applicable to air operators, maintenance organisations, and other entities involved in setting up, operation and maintenance of aircraft battery charging workshops.

3. References

BAR 8, Part 145; 145.A.40.

4. Background

BAR 8, Part 145; 145.A.40 requires an approved maintenance organization to always have the necessary equipment, tools, material and personnel to perform the approved scope of work. The AMO is also required to have, among others, appropriate housing and facilities. These requirements also apply to workshops/rooms used for the purpose of charging aircraft batteries.

5. Building and Equipment

5.1. General

5.1.1. In no circumstance should the same facility be used for both nickel-cadmium and lead-acid battery charging; and the ventilation arrangements shall be such that no cross contamination can occur.

5.1.2. Buildings and rooms used for the purpose of charging batteries should be well lit and cool and should have a ventilation system which is capable of exhausting all the gases and fumes which may be present during the servicing and charging operations. The floor surface should be of a material which is impervious to acid and alkali, has nonslip qualities and is quick drying and able to be washed down easily. Examples of such materials are dustless concrete, bituminous compound or tiling. Adequate and suitable drainage should be provided for washing down purposes. Because of the fire risk, it is strongly recommended that doors should be fitted so that they open outwards, thus facilitating easy evacuation from the building in the event of fire. To permit free and easy movement of batteries, steps and thresholds should, where possible, be eliminated. If, however, different levels are unavoidable they should be linked by inclines.

5.2. Water Supply

At least one tap in each room where battery charging is carried out should be connected to a mains fresh water supply. Sinks and draining boards and a hot water supply should also be provided.

5.3. Lighting

The level of lighting within the charging rooms should be sufficient to enable the level of the electrolyte in individual cells of batteries to be easily determined without additional lighting. To prevent accidental ignition of gases all electrical fittings should be of a spark-proof design.

5.4. Ventilation

Hydrogen is given off at all stages of lead-acid battery servicing; the highest concentration being at the end of the charging cycle. Hydrogen is also produced when nickel-cadmium batteries reach the fully charged state; i.e. at the 'overcharge' point and for a 24 hour period thereafter. Heavy corrosive fumes are also emitted when mixing of electrolytes takes place. Therefore, a ventilation system is required which is capable of extracting all gases and fumes, whether heavier or lighter than air.

5.5. Temperatures

5.5.1. Electrolyte Temperature

The maximum permissible electrolyte temperature during charging is normally 50ºC (122ºF), but some batteries of special design, however, have lower limits; for such batteries the temperature limitations will be specified in the manufacturer's publication for that battery.

5.5.2. Environmental Temperature

Environmental temperatures exceeding 27ºC (81ºF) for lead-acid batteries and 21ºC (70ºF) for nickel-cadmium batteries impose time penalties in reaching the fully charged state and may also be deleterious to the batteries. The temperature of battery charging rooms should, therefore, be maintained at a temperature consistent with specified limitations and with a free air flow around each battery or cell.

6. Charging Boards and Benches

6.1. Detailed differences exist between the various types of charging board, but in general each board consists of a pair of terminals, to which the rectified a.c. supply is connected (or in the case of a board which has a built-in rectifier unit, to which the mains supply is connected), together with a number of pairs of output terminals, to which the batteries are connected for charging.

6.2. All the output circuits are internally connected in parallel and are, therefore, independent of each other, with the level of charge being controlled separately for each output circuit. Each pair of output terminals is normally designed to have one group of batteries or cells connected in series.

The parallel connection of batteries to one pair of output terminals is not permitted.

6.3. Charging boards should be mounted directly above the rear of the benches so that the necessity for long connecting cables is avoided.

6.4. Battery connecting cables should be well insulated and should be of a sufficient capacity to carry the charging current required. The free ends of connecting cables should be fitted with suitable connectors, which should be firmly secured to the battery and charging board before commencing charging operations. Connections to the charging boards should not be made or broken when power is switched on. On completion of the charging cycle, power should be switched off and the charging cables should be disconnected, first from the battery and then from the charging board.

6.5. Benches

6.5.1. Benches and associated equipment should be sited so that the need for personnel to lean over batteries is kept to a minimum. It is recommended that the height of battery charging benches be approximately 0·5 m (20 in) from

the floor. At this height, lifting strain is minimised and a more effective visual inspection of the batteries can be made.

6.5.2. The surfaces of battery charging benches should be acid and alkali resistive and should facilitate cleaning. It is generally considered that batteries should not be allowed to stand directly on wood or concrete, but should rest on suitable grids.

7. Power Supplies

Transformer/rectifiers which normally provide rectified a.c. for charging board supplies should be sited in a fume free, dry and cool position, preferably in a separate room, located as near as possible to the charging boards. Charging boards which require 240/115 volts mains supply should be supplied from a ring main system.

8. Storage

8.1. Batteries

In order to preserve an orderly flow of work through a battery charging room, storage facilities should be provided such that incoming unserviceable batteries may be separated from those ready for issue, preferably in clearly placarded areas. The storage facilities should be further grouped for those batteries requiring initial charge and those awaiting routine servicing. Batteries which are serviceable and awaiting issue are best stored in an area which is not subjected to excessive vibration. It is essential that whilst in store, lead-acid batteries be segregated at all times from nickel-cadmium batteries; preferably in separate store rooms.

8.1.1. Storage Guidelines for Lead Acid Batteries

A charged lead–acid battery which is to be stored for any length of time should be in the "fully charged" condition. Before storing, the electrolyte levels should be checked and the battery bench-charged in accordance with manufacturer's instructions. When fully charged, the battery should be stored in a cool, dry, well ventilated store on an acid resistant tray. Batteries may also be stored in the dry, uncharged state. Additional points to note are as follows:

(a) Every 4 to 6 weeks (depending on manufacturer's instructions) the battery should be removed from storage and fully recharged, i.e. until voltage and specific gravity readings cease to rise.

Note: *Damage to the battery will occur if it is allowed to stand idle beyond the period for charging specified by the manufacturer.*

(b) Regardless of periodic check charges, the battery should be given a complete charge and capacity check immediately before being put into service.

(c) For new batteries, a complete capacity test to the manufacturer's instructions should be made every 6 months, but if the battery has been in service this test should be made every 3 months.

(d) Every 12 months, or earlier if a leak is suspected, an insulation resistance test should be carried out to the manufacturer's instructions.

(e) If the conditions mentioned in the previous paragraphs are observed, a battery may remain in storage up to 18 months. A battery should not be allowed to stand in a discharged condition, and electrolyte temperatures should not exceed 48.8ºC.

Note: *Trickle charging at low rates is not recommended as damage will occur if idle batteries are subjected to this form of charging.*

8.1.2. Silver-Zinc Batteries and Silver-Cadmium Batteries

These batteries should be stored in clean, dry, cool and well ventilated surrounds, not exposed to direct sunlight or stored near radiators.

(a) New batteries will normally be supplied in the dry condition with the electrolyte contained in polythene ampoules. If possible, new batteries should be stored in their original packaging together with the related ampoules of electrolyte. For storage periods of more than 2 years, special instructions should be requested from the manufacturers.

(b) Filled and formed batteries required for use at very short notice may be stored in the charged condition. Manufacturers normally recommend that such batteries should be discharged and recharged every 4 to 6 weeks. The manufacturer's schedule of maintenance should be applied to batteries stored in the charged condition.

(c) Batteries to be stored out of use for protracted periods, should be discharged at the 40-hour rate until the voltage level measured while discharging, falls below the equivalent of 0·8 volt per cell.

(d) Before storing batteries, the electrolyte level should be adjusted to near
the maximum specified by topping up, using a potassium hydroxide solution of 1.300 sg.

(e) The need for care in handling potassium hydroxide, because of its caustic content, is stressed.

After topping up or filling, the top of the batteries should be cleaned and the connections and terminals lightly smeared with white petroleum jelly. In no circumstances should sulphuric acid or acid contaminated utensils be used in close proximity to silver-zinc or silver-cadmium batteries.

8.1.3. Nickel-Cadmium Batteries

This type of battery can be stored for long periods without damage, in any state of charge, provided the storage place is clean and dry and the battery is correctly filled.

(a) For the battery to be ready for use in the shortest possible time, it should be fully charged, correctly topped up and then discharged at normal rate for a period of 1 hour before storage.

(b) The battery should be cleaned and dried and the terminals and connectors lightly smeared with pure mineral jelly.

(c) The battery should be inspected at intervals of 6 to 9 months and topped up if necessary.

(d) Before going into service, the battery should be given a double charge and capacity check as recommended by the manufacturer of the particular type of battery.

(e) The battery should be stored on a shelf or rack, protected from dirt or dust, and where metallic objects such as bolts, hand-tools, etc., cannot drop onto the battery or touch the cell sides.

Note: *The above refers to pocket plate nickel-cadmium cells and not to sintered plate nickel-cadmium cells, for which reference should be made to the manufacturer's instructions.*

8.1.4. Storage Precautions

It should be noted that sulphuric acid will destroy alkaline batteries; therefore, utensils which have been used for this acid should not be used with such batteries. It is also important to avoid any contamination from the fumes of lead-acid types of batteries.

8.2. Electrolytes

8.2.1. The handling and storage of electrolyte materials should always be in accordance with the manufacturer's instructions. It is, however, essential that when undertaking the mixing or breaking down of these chemicals, separate areas are provided. Glass, earthenware or lead-lined wood containers are suitable for the storage of lead-acid battery electrolyte (sulphuric acid), whilst plain iron, glass or earthenware containers are suitable for the storage of nickel-cadmium battery electrolyte (potassium hydroxide). Galvanised containers or containers with soldered seams must not be used. Each container should be clearly marked as to its contents and should be stored accordingly. Waste or surplus materials should be disposed of in accordance with locally approved instructions. If, however, doubt exists, all electrolytes should be neutralised prior to disposal (*paragraph 8.4*). All mixing vessels, mixing rods and other similar items should be clearly marked with 'acid only' or 'alkaline only' and their use should be restricted accordingly.

8.2.2. Stocks of electrolyte materials which are retained in a battery charging room should be restricted to the quantities required for immediate use. The storing of electrolytes mixed ready for use should be avoided as far as possible.

(a) Sulphuric acid containers should be kept tightly sealed when not in use, to prevent contamination. Only the container which is required for immediate use should be retained in the charging room.

(b) Potassium hydroxide is supplied in solid form contained in steel drums. Once a drum has been opened the contents are liable to carbon dioxide contamination. The entire contents should, therefore, always be mixed as soon as a drum has been opened. Any unused mixture should be stored in a stoppered glass container.

8.3. De-mineralised and distilled water are generally supplied in carboys and should be stored separately from the electrolytes, so as to avoid contamination. Carboys should be firmly stoppered when not in use and should be clearly marked as to the contents. Only the water container used for 'topping up' should be kept in the charging room and the stopper should be refitted immediately after use.

8.4. The neutralising agents for the two types of electrolytes are given below, together with the action that should be taken in the event of contamination and/or spillage.

8.4.1. Sulphuric Acid

The neutralising agents are:

(a) Saturated solution of bicarbonate of soda

(b) Ammonia powder

(c) Borax powder

The acid should be soaked up with sawdust which should then be removed and buried. The affected area should be treated with one of the above, followed by washing down with copious amounts of fresh water.

8.4.2. Potassium Hydroxide

The neutralising agents are:

(a) Boric acid solution

(b) Boric acid crystals or powder

The alkali should be soaked up with sawdust, which should then be removed and buried.

The affected area should be treated with one of the above, followed by washing down with copious amounts of fresh water.

8.4.3. Containers of sawdust and neutralising agents should be clearly marked with their contents and use and sited in readily accessible positions.

9. Protection

9.1. To prevent the risk of burns, such personal items as rings, metal watches, watchstraps and identification bracelets should be removed, to avoid contact with connecting links and terminals.

9.2. In general, smoking should only be permitted in rooms which do not have a direct access to battery charging rooms or chemical mixing areas. Naked lights, non-safety matches and automatic lighters should not be taken into battery charging rooms.

9.3. Fire extinguishers of the CO_2 type and buckets of sand should be placed at strategic points inside the building for use in the event of any chemical fires.

10. Documentation

Records of battery servicing should be maintained.

11. Servicing and Test Equipment

11.1. Servicing of aircraft batteries should be carried out in accordance with the instructions contained in the manufacturers' Maintenance Manual.

11.2. In addition to the general engineering hand tools which may be required for aircraft battery servicing, the following specialised items will also be required:

(a) Hydrometers

(b) Thermometers

(c) Battery kits (as supplied by battery manufacturers)

(d) Capacity test sets

(e) Leakage tester (lead-acid batteries)

(f) Filler pumps (for transferring of liquids from one container to another)

(g) Calibrated test equipment:

(1) Insulation resistance tester

(2) Universal test meter

(3) Digital voltmeter

11.2.1. To prevent cross-contamination between the two types of aircraft batteries, two sets of equipment should be held, each being contained in separate cupboards and clearly marked 'acid only' or 'alkaline only' as appropriate to the application. Wherever possible, tools and equipment comprising the sets should be those manufactured of an insulating material. Each item should be identified as to its application and in the case of hydrometers and thermometers, this is usually best done on the instrument case.

BAR AC-09 Aircraft Equipment and Installation Criteria

1. Introduction

This Advisory Circular provides information and guidance and serves as acceptable means of compliance for some of the aircraft equipment and instruments require by the BAR 6 Operations Regulations.

2. References

ICAO Annex 6.

ICAO Annex 8.

BAR 6, Part CAT.IDE and Part NCC and Part NCO.

BAR 8, Part 21, Subpart K.

3. Abbreviations

The following abbreviations are used in this circular:

AC Advisory Circular

ACAS Airborne Collision Avoidance System (European Term for TCAS)

AMC Acceptable Means of Compliance

CVR Cockpit Voice Recorder

DCA Department of Civil Aviation (Brunei)

EASA European Aviation Safety Agency

ELT Emergency Locator Transmitter

ETSO European Technical Standards Order (EASA)

EUROCAE European Organization for Civil Aviation Equipment

FAA Federal Aviation Administration (United States of America)

FDR Flight Data Recorder

GPWS Ground Proximity Warning System

ICAO International Civil Aviation Organization

JAA Joint Aviation Authorities

MOPS Minimum Operational Performance Specifications

STC Supplemental Type Certificate

TAWS Terrain Awareness Warning System

TAC Type Acceptance Certificate

TC Type Certificate

TCAS. Traffic Collision Avoidance system (USA Term for ACAS)

TSO Technical Standard Order (FAA)

4. Background

BAR 6 Operations Regulations requires any person who flies an aircraft to ensure that the aircraft is equipped with equipment and instruments specified

in the Parts CAT, NCC or NCO as applicable. The Regulation further requires all required equipment and instruments to be approved and installed in accordance with applicable airworthiness requirements specified under BAR 8, Part 21, Subpart K.

5. Required Specifications

5.1. The table below lists the applicable operational Equipment TSO (or ETSO) performance standards and the installation criteria as most of the installations will made be by the TC holder or the STC holder to FAA or EASA/JAA standards. These are generally quoted.

5.2. If the Applicant or Brunei DCA inspector is unsure as to what the equipment installation complies with they should request that the applicant obtains a statement from the TC or STC holder as applicable.

System	**Equipment Minimum Operational Performance Specification**	**Installation Criteria**
CVR	FAA TSC C123( ) or EASA ETSO C123( )	EUROCAE ED-112 (Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems)
FDR	FAA TSC C124( ) or EASA ETSO C124( )	EUROCAE ED-112 (Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems)
ELT	FAA TSO C91a (now obsolete) or, EASA ETSO 2C91a (for 121.5 MHz and 243.0 MHz ELT), or FAA TSO C126/ EASA 2C126( ) (for 406 MHz)	TAC or STC (Basic TC Certification basis). FAA AC91-44 exists dealing with operation and maintenance of ELTs
GPWS inc Forward Looking Terrain (TAWS Class A)	FAA TSO C151 ( ) or EASA ETSO TSO C151( ) - Class A	FAA AC25-23, JAA TGL 12 or EASA CS-ACNS
TCAS (ACAS)	FAA TSO C119c or EASA ETSO C119c to meet latest ICAO Annex 10	FAA AC20-131A, FAA AC20-151, JAA TGL 8 Rev 1, or EASA AMC20-15

BAR AC-10 Aircraft Field Loadable Software (FLS) & Database Field Loadable Data (DFLD)

1. Introduction

1.1. The Brunei DCA is aware that a lack of adequate control of FLS and DFLD by operators could lead to safety related occurrences.

1.2. The purpose of this document is to provide guidance for operators, maintenance organisations and the Brunei DCA on the configuration management, procurement, embodiment and tracking of aircraft FLS and DFLD to ensure that continued airworthiness and operating safety standards are met.

1.3. The content of this document is based upon established as well as developing international standards.

1.4. It is recognised that operators and maintenance organisations may have already implemented satisfactory alternatives that meet the intent of this document. It will not be necessary for those organisations to change these procedures if they already meet the intent of this document.

1.5. The content of this document should be used to supplement the content of the Type Certificate (TC) or Supplemental Type Certificate (STC) holder's instructions.

1.6. This document is technology focussed and the content should be considered as applicable to any aircraft using this level of technology.

1.7. This document does not apply to software applications for Electronic Flight Bags. For guidance on this subject the reader should refer to EASA AMC 20-25.

2. Definitions

2.1. For the purpose of this document the following definitions apply:

(a) **Aircraft Configuration List (ACL):** A list of Line Replaceable Units (LRU) and modules with Loadable Software Aircraft Parts (LSAPs) that are applicable to a specific aircraft. This list may be contained on data supplied by the Type Certificate (TC) Holder in a Service Bulletin (SB), Service Information Letter (SIL) or Illustrated Parts Catalogue (IPC), or as a separate tracking system.

(b) **Field Loadable Software (FLS):** Software (executable code) that can be loaded without removing the system or equipment from the aircraft. FLS can be loaded onto an aircraft system by a maintenance mechanic/technician in accordance with defined maintenance manual procedures. FLS can be configured as a component of target hardware and thus affect the part number of the target hardware.

There are numerous types of FLS, but most can be categorised as follows:

(1) Loadable Software Aircraft Part (LSAP): FLS that is required to meet a specific airworthiness or operational requirement or regulation and not considered as a component of the target hardware, but is considered to be part of the aircraft approved design and therefore an

aircraft part requiring formal controlled release documentation (EASA Form 1 or FAA 8130-3).

(2) User Modifiable Software (UMS): Software declared by the aircraft Type Certificate holder's design organisation (or Supplementary Type Certificate holder's design organisation) as being intended for modification by the aircraft operator.

(3) Option Selectable Software (OSS): LSAP that contains approved and validated components and combinations of components that may be activated or modified by the aircraft operator within defined TC/STC Holder boundaries.

(c) **Database Field Loadable Data (DFLD):** Data that is field loadable into target hardware databases.

(1) Database: A term generally misused to describe the "data" that is field loaded into target hardware. However, the database is actually an embedded item that resides within the target hardware and is not, itself, field loadable. The process normally described as "loading a database" actually loads a data file onto the target hardware's embedded database. The updating of the data held on a database, by the uploading of a new data file, will normally be conducted to provide for modifications to operating functions, including the revision of the aircraft performance or navigational data. It should be noted that whilst "LSAP" is only associated with FLS (executable code), certain DFLD should be treated in the same manner, in that they will have their own part number requiring control as an aircraft part and should be accompanied by controlled release documentation (EASA Form 1 or FAA 8130-3). The form of release required for different types of DFLD is defined in paragraph 3.

(2) Data File: A specific file that contains the actual data that is the object of the database and is field loaded.

(d) **Target Hardware**: The hardware such as Line Replaceable Units (LRU) and modules that are intended to be loaded with FLS or DFLD.

(1) Examples of target hardware for LSAP (FLS) could be: an Electronic Engine Control (EEC), a Digital Flight Data Acquisition Unit (DFDAU), an Auxiliary Power Unit's Electronic Control Unit (ECU), a Flight Guidance Computer (FGC), or an Integrated Modular Avionics (IMA) Unit.

(2) Examples of target hardware with databases that could be field loaded with DFLD that need to be tracked in the same manner as an aircraft part, could include: a Flight Management Computer (FMC), a Terrain Awareness Warning System (TAWS) Computer, or an IMA Unit.

(3) Examples of target hardware for UMS could be: Aircraft Condition Monitoring System (ACMS) and In-Flight Entertainment System (IFE).

(4) Examples of target hardware for OSS could be an IMA Unit.

(e) **Media Distribution of FLS or Data files:** A process whereby FLS or Data files are moved from the production organisation or supplier to a remote site (generally the operator) using storage media.

(f) **Storage Media**: Device that contains a copy of the FLS or Data files such as a diskette, Personal Computer Memory Card International Association (PCMCIA) card, Compact Disc Read Only Memory (CD ROM), Onboard Replaceable Modules (OBRM), file servers or portable data loaders.

(g) **Electronic Distribution of FLS or Data files**: A process whereby FLS or DFLD are moved from the producer or supplier to a remote site (generally the operator) without the use of FLS storage media.

3. Release of FLS and DFLD

3.1. Methods of Release

The release of FLS and DFLD is dependent upon whether it is required to meet a specific airworthiness or operational requirement, or certification specification.

3.2. Release of Non-Required FLS or DFLD

For FLS or DFLD that is not required to meet a specific airworthiness or operational requirement or regulation, or certification specification, a Certificate of Conformity should be sufficient.

3.3. Release of Required FLS or DFLD

Where the FLS or DFLD is required to perform a function to meet a specific airworthiness or operational requirement or regulation, or certification specification, the following should be taken into account.

3.3.1. LSAP

An EASA Form 1 or FAA 8130-3 should accompany any FLS (executable code) that is required to meet a specific airworthiness or operational requirement or regulation, or certification specification, i.e. LSAP. Examples of LSAP that would require such release could be FLS that is associated with any of the examples of target hardware in paragraph 2(d)(1) above.

3.3.2. DFLD

An EASA Form 1 or FAA 8130-3 should accompany any DFLD (data file) that is required to meet a specific airworthiness or operational requirement or regulation, or certification specification. Examples of DFLD that require such release could be those associated with IMA, as mentioned in paragraph 2(d)(2) above.

3.3.3. Navigational Data

A “Letter of Acceptance” (LOA) as defined on EASA’s website, or equivalent, should accompany the release of any navigational database’s DFLD, where

approvals are required (e.g. Precision RNAV), because an EASA Form 1 or FAA 8130-3 cannot be provided.

(a) Type 1 LOA

A Letter of Acceptance granted where a Navigation Database supplier complies with EUROCAE ED-76 / RTCA DO-200A documents with no identified compatibility with an aircraft system. A Type 1 LOA holder confirms that the processes for producing navigation data comply with these Conditions and the documented Data Quality Requirements. A Type 1 LOA holder may not release navigation databases directly to end-users.

(b) Type 2 LOA

A Letter of Acceptance granted where a Navigation Database supplier complies with EUROCAE ED-76 / RTCA DO-200A documents and provides data compatible with specified avionics system(s). A Type 2 LOA holder confirms that the processes for producing navigation data comply with these Conditions and the documented Data Quality Requirements for the avionics systems specified. The Data Quality Requirements must be provided by or agreed with the specified equipment design organisation in accordance with a formal arrangement. A Type 2 LOA holder may release navigation databases directly to end-users. Such releases may also include data packing tools, where the use of such tools has been demonstrated to be ED-76/DO-200A compliant.

A Type 2 LOA holder may interface directly with data originators (such as State AIP providers and operators), or may use data supplied by a Type 1 LOA holder in which case interface with data originators may not be necessary.

3.4. Release Equivalency

It should be noted that Certificates of Conformance are not considered to be equivalent to either an EASA Form 1 or FAA 8130-3.

3.5. Electronic Distribution Release

The Electronic Distribution of FLS or Data files should recognise this requirement and provide an equivalent means of formally controlled release. This will need to be agreed by the Brunei DCA

4. Procurement and Documentation of FLS and DFLD

4.1. FLS and DFLD

FLS and DFLD are normally delivered with the new aircraft and contained in the Target Hardware and in media sets in binders or storage bins, noting that the part number of the Target Hardware may not necessarily indicate the loaded software part number (see Appendix 1 Paragraph 1.4 b)).

4.2. LSAP

Procured LSAP must be obtained from an approved source, using the part number specified and accompanied by an EASA Form 1 or an equivalent acceptable to the Brunei DCA. The part number can typically be confirmed as approved by reference to documents such as the IPC, SB and SIL, or to an appropriately approved modification (TC/ STC).

4.3. DFLD

Data Field Loadable Data files used for the update of databases such as Navigational Databases, Terrain Databases and Model/Engine Databases should be acquired from a source that is acceptable to the Target Hardware Manufacturer, and accompanying documentation and DFLD Storage Media containing the data file should clearly identify this. The DFLD storage media should also be annotated with the originator identification and quality/conformity markings. The Electronic Distribution of DFLD should recognise these points and provide an equivalent level of control agreed by the Brunei DCA. The responsibility of obtaining appropriate confirmation of the authenticity, performance specification and accuracy of the DFLD rests with the operator. It is also recommended that a "confidence" check of the received data be accomplished to ensure that the new data satisfies the intended use. The DFLD should be subjected to a configuration control process acceptable to the Brunei DCA (see Appendix 1 paragraph 1).

4.4. UMS

UMS is FLS that is normally modified by the operator, their contracted maintenance organisation or approved vendor using the appropriate methods identified during initial certification. The responsibility for obtaining adequate documentation confirming the appropriateness of the software rests with the operator. If an instance occurs, when a change to target hardware's software that has been defined as UMS actually modifies aircraft performance information presented to the flight crew, Brunei DCA advice should be sought as approval maybe required and the software classification of UMS may be removed.

4.5. Distribution of FLS and DFLD

FLS and Data Files can be distributed to the aircraft operator using a variety of methods, which include use of software media (such as diskettes), CD ROMs, PCMCIA Cards or electronically, such as via the Internet. The operator is responsible for establishing a process to ensure that the FLS or data file received is the FLS or data file approved and that the FLS or data file has not been corrupted (e.g. making use of a Cyclic Redundancy Check (CRC)). Complying with the aircraft manufacturers recommendations and utilising the recommended tooling could achieve this.

4.5.1. Media Distribution of FLS or DFLD

If the FLS or DFLD is to be supplied using diskettes, CD ROMs or PCMCIA cards the following should be considered:

(a) The FLS or DFLD should be virus checked upon receipt and stored in a controlled location if not being immediately loaded onto an aircraft system. (This requirement assumes that the media store has appropriate protections and controls to prevent unauthorised access to the media. If this is in any doubt, the FLS or DFLD should be virus checked immediately prior to loading it onto an aircraft system.) The target hardware manufacturer should provide guidance on how this virus checking should be accomplished.

(b) The method of transportation should be appropriate to ensure that it does not result in damage or corruption of the storage media or FLS or DFLD. If this is in any doubt, the FLS or DFLD should not be loaded onto an aircraft system.

(c) The FLS or DFLD should be accompanied by the appropriate release paperwork, as stated in paragraph 3.

4.5.2. Electronic Distribution of FLS or DFLD

EDS is increasingly being utilised to transfer FLS or DFLD from the supplier to an operator. The obvious advantages of this are the speed of distribution and the removal of the need for physical transport media. This should be accomplished to an acceptable standard (see Appendix 1 paragraph 1). Such an acceptable standard would normally be that of meeting the intent of the guidance in this document. If the FLS or DFLD is supplied over the Internet this should be accomplished in accordance with a procedure detailed in Appendix 1, paragraph 1.3.

5. FLS and DFLD Storage Media Handling

The operator is responsible for ensuring the suitability of any storage media used. In order to ensure FLS and DFLD integrity, the storage media should be kept and processed in an environment that is not detrimental to that storage media, noting any limitations associated with that media. Additional information may be found in Appendix 1.

6. FLS and DFLD Loading and Certification

6.1. Prior to loading

Prior to loading FLS or DFLD onto the aircraft the operator should consider the points in Appendix 1.

6.2. Loading FLS or DFLD

Loading FLS or DFLD onto aircraft target hardware should be carried out and verified in accordance with the established processes and procedures detailed in the maintenance manual or associated approved maintenance or modification data.

6.3. Recording aircraft FLS and DFLD configuration

All FLS and DFLD loading should be recorded in the Aircraft Configuration List (ACL), and a copy kept on board the aircraft with a further copy also kept in the operators' aircraft maintenance records system.

6.4. 6.4Aircraft Release to Service

After any loading of FLS or DFLD a Certificate of Release to Service must be issued by an appropriately authorised/licensed person.

7. Replication of FLS and DFLD

7.1. FLS or DFLD copies

If FLS or DFLD copies are to be made by the aircraft operator for use within their organisation, this should be accomplished using the aircraft type design organisation approved FLS and DFLD Storage Media replication process. This replication should be recorded in an Aircraft FLS/DFLD Replication Register and be traceable to the original source from which copies were made. This is to ensure that this activity could be audited.

7.2. Release documentation

A copy of the original JAA Form One, EASA Form 1, FAA 8130-3, Letter of Acceptance (for navigation databases) or other Brunei DCA accepted release documentation, as defined in paragraph 3, should accompany the FLS or

DFLD Storage Media containing copies of the FLS or DFLD (BAR 8, Part 21.303 and BAR 8, Part 145.A.42 refer).

8. Procedure

8.1. Configuration Control

It is essential that operators consider use of appropriate procedures such that at any time they can determine the equipment, FLS and DFLD configuration of each aircraft in their fleet.

8.2. Use of notice recommendations

Operators involved in the procurement, modification and embodiment of FLS and DFLD should consider producing a documented procedure within their Company Procedures, Maintenance Management Exposition (MME) or equivalent that describes their means of implementing procedures recommended by this document.

Further guidance can be found within Appendix 1 to this document. It is expected that any procedure would cover the complete cycle from procurement specification; distribution methodology (e.g. Electronic Distribution, media type etc.); receipt inspection and assessment through to embodiment; subsequent testing and release to service. This process should also be considered for inclusion in the operator's internal audit programme.

8.3. Staff

Operators should ensure that sufficient numbers of competent staff are retained in order to ensure that the intent of guidance within this document is met.

9. Recommended Reference Material

USA	Europe	Description
RTCA DO 178B	EUROCAE Doc. ED 12B	Software Considerations in Airborne Systems and Equipment Certification
RTCA DO 200A	EUROCAE Doc. ED 76	Standards for Processing Aeronautical Information
AC120-76 ( )	EASA AMC 20-25	Airworthiness and operational consideration for Electronic Flight Bags (EFBs)

Note: *or any later versions of the above documents.*

9.1. Documents referenced in this document can be obtained from:

EUROCAE, 102 rue Etienne Dolet, 92240-Malakoff, France.

Fax No. +33 (0)140927930

Web site: www.eurocae.org

RTCA Inc. 1828 L Street NW, Suite 805, Washington DC. 20036 USA

Web site: www.rtca.org

Appendix 1 FLS and DFLD Control, Tooling and Loading

1. Procedures for the control of FLS and DFLD

The operator should consider providing the following for the control of FLS and DFLD:

1.1. FLS and DFLD Register

A controlled FLS and DFLD register, which includes the following:

(a) The version of the FLS and DFLD owned;

(b) Which aircraft the FLS and DFLD are installed on;

(c) The aircraft, systems and equipment that they are only applicable to;

(d) The functions that the recorded FLS or DFLD performs;

(e) Where it is stored (on or off aircraft location, including the storage media) and who has access to it;

(f) Who can decide whether an upgrade is needed and then authorise that upgrade; and

(g) A record of all replicated FLS/DFLD, traceable to the original source.

1.2. Storage Facility

An appropriate storage facility for the FLS and DFLD. While selecting an appropriate location, the following should be taken in to account:

(a) Access to the location should be appropriately controlled.

(b) The environmental conditions within the location should be appropriate for the storage of the FLS and DFLD media and provide protection against all forms of environmental contamination, including water, fire, heat and electrical or magnetic fields.

(c) If the main source of the FLS and DFLD are an electronic store (e.g. a central database of software programs) that store should be:

(1) subject to configuration control processes;

Note: *ED-12B/DO-178B provides criteria for such a process by defining the configuration control process's objectives as:*

(i) Configuration items are identified.

(ii) Baselines and traceability are established.

(iii) Problem reporting, change control, change review, and configuration status accounting are established.

(iv) Archive, retrieval, and release are established.

(v) Software load control is established.

(vi) Software life cycle environment control is established.

(2) appropriately isolated from the rest of the network to prevent unauthorised access or contamination from viruses. This isolation

can be achieved using a series of access control functions and firewalls. However, protecting a networked system against viruses is a complex issue and consideration should be given to this store being separated from the network.

(d) An appropriate number of backups should be maintained utilising standard software backup techniques.

1.3. FLS and DFLD Receipt Procedures

Specific procedures implemented for the receipt of FLS and DFLD that are transferred using electronic distribution techniques should give consideration to the following:

(a) That the FLS or DFLD has come from an appropriate source and that sufficient configuration control processes are in place to ensure that the correct data and/or executable code will be supplied.

(b) That they are accompanied by suitable release documentation.

(c) That a record of purchase is created.

(d) That suitable controls are in place to prevent use of FLS and DFLD that have become corrupted during its existence in any "open" environment, such as on the Internet.

(e) That means are provided to allow detection of corruption.

(f) That connecting a central electronic store for FLS and DFLD storage directly to the Internet is avoided wherever possible.

However, where this cannot be avoided, or if the FLS or DFLD are ported straight from the Internet to a central electronic store, a means to detect interference or corruption are provided.

1.4. FLS and DFLD Loading Procedures

Specific procedures implemented for the loading of FLS and DFLD, to target hardware, should consider the following:

(a) The criteria identified within the FLS and DFLD control register, defined in paragraph 1.1 above.

(b) The appropriate authority to embody FLS onto the aircraft (e.g. Aircraft Manufacturer's Service Bulletin) has been issued and received, i.e. Aircraft Manufacturer's SB or an STC.

***Note**: A vendor SB does not provide the authority to embody a different part number onto the aircraft.*

(c) The need for appropriate verification and recording of target hardware and FLS and certain DFLD part number changes:

(1) For airborne equipment having separate part numbers for hardware and FLS/DFLD the FLS/DFLD part numbers need not be displayed on the outside of the unit, as long as it can be verified through some kind of electronic query.

When new FLS/DFLD is loaded into the unit, the same requirement applies and the approved FLS/DFLD part number should be verified before the unit is released for

service. It should be noted, that in circumstances where only the top-level FLS/DFLD part number is displayed for an entire FLS/DFLD load, that affects several items of target hardware – such as might be found in IMA applications.

(i) the verification of this number would be necessary.

(2) It is the aircraft operator's responsibility to ensure that the maintenance organisation has entered the FLS/DFLD identification in the aircraft maintenance records such that they can update the aircraft configuration information, such as an ACL.

(3) If airborne equipment has only one part number, which represents a specific configuration of software and hardware, the unit identification on the nameplate should be changed if new software is loaded. In order for this to be embodied on the aircraft this should be accomplished in accordance with an Aircraft Manufacturer's Service Bulletin. The software part number stored in the target computer after data loading should be verified electronically and confirmed to be an approved configuration as detailed in the SB.

(d) Verification that the upgrade actually is needed.

(1) If the system is working as required and the FLS or DFLD upgrade is not introducing a required solution or function addition or change, it is not always necessary to upgrade the FLS or DFLD simply for the sake of upgrading.

Equally, it is possible that the upgrade could introduce problems that did not exist before.

(2) It is also necessary to check any support agreements to ensure that customer support for the FLS or DFLD will remain valid.

(e) Identify what has changed between the different versions of the FLS or DFLD.

This should include identifying and recording within the FLS and DFLD register the problems that have been fixed and what functionality has been added or removed (see paragraph 1.1 d) of this appendix.)

2. Control of FLS or DFLD Tooling

2.1. 2.1FLS or DFLD can be loaded into the Target Hardware using a variety of tools as recommended and/or approved by the aircraft or target hardware manufacturer.

These can include OEM supplied tools, Commercial Off The Shelf (COTS) tools or in-house developed tools.

There are a number of issues associated with FLS or DFLD tooling that the aircraft operator would need to take into account if an alternative to the tooling recommended by the aircraft or target hardware manufacturer was to be considered. Prior to seeking the aircraft or target hardware manufacturer's

approval for any alternative tools' use, the aircraft operator should take the following items into account. These are associated with the general tool selection, and the control and the suitability of those tools.

2.2. 2.2General Tool Selection

The following general issues should be considered when making a FLS or DFLD tool selection:

(a) What function is the tool required to perform:

(1) Is it simply loading, leaving other tools or processes to perform compatibility checks and validation tasks?

(2) Is it loading and validating the final load, leaving initial compatibility checks to other tools or processes?

(3) Is it providing all the tasks associated with loading (compatibility checks, loading and validation) and providing a diagnostic feature?

(4) Any other combination of the above should be considered.

(b) Is the tool (which could be a laptop) able to be suitably controlled?

(c) Does the tool supplier have any previous experience in developing tools for the required purpose?

(d) Will the tool supplier provide support and training?

(e) Does the tool provide all the needed functionality or will additional tools or processes be needed?

(f) Does the tool provide the necessary confirmation of what has been loaded on to the aircraft?

(g) Do any existing tools that have Brunei DCA acceptance already provide the required functionality?

(h) How much dependence will be placed on the tool?

(i) Will the tool supplier provide support for the tool for the duration of its use?

(j) Is the tool widely used in the industry and does it have a good reputation?

(k) If the tool isn't widely used in the industry, is there any other way to establish its integrity?

(l) Will special training be required to use the tool?

(m) Are there any human factors issues associated with its use?

2.3. Specific Tool Selection – Original Equipment Manufacturer (OEM) and Commercial Off The Shelf (COTS)

The issues detailed above apply to the selection of any tool, regardless of who supplies it. The issues detailed below are specific, additional, considerations that need to be considered for OEM and COTS Tools of software tools. If a tool is going to be supplied by the aircraft Type Certificate holder (STC holder) or the equipment manufacturer, or where COTS tooling is going to be supplied (COTS tools are considered to be those which were not supplied by the aircraft Type Certificate holder (or STC holder) or the equipment manufacturer, or developed by the airline/ maintenance organisation) the following additional issues need to be considered:

(a) Does the aircraft or target hardware manufacturer recommend it?

(b) Is the tool needed for the FLS or DFLD and aircraft in question?

(c) Was the tool actually developed for use with the FLS or DFLD and aircraft in question?

(d) If the tool was not specifically developed with the FLS or DFLD and aircraft in question, is it compatible with them?

(e) Is the tool likely to be compatible with the whole fleet?

2.4. Specific Tool Selection – In-house developed tools

If an aircraft operator is considering developing their own tools the following additional issues need to be considered:

(a) The tool must be developed such that it cannot corrupt the functionality of the aircraft systems it is being used for.

(b) The aircraft operator or their organisation must have a sufficient understanding of the internal aircraft system functionality to be sure of creating a tool that will work correctly.

(c) The aircraft operator or their organisation must have personnel that are experienced in writing tools for aircraft maintenance functions and the associated human factors issues.

(d) The tool should be developed in a suitably controlled fashion.

(e) The operator should gain acceptance for the use of the tool from the aircraft or target hardware manufacturer.

2.5. Control and suitability of Tools

If tools are to be used by the aircraft operator, specific processes should be introduced to control their use. These processes should ensure that:

(a) The control of tools including Portable Electronic Devices, such as laptop PCs should prevent the accidental or malicious transfer of viruses.

(b) Portable Electronic Devices should be equipped with up-to-date virus protection software or virus scanned immediately before they are used to load FLS or DFLD on to an aircraft system's target hardware.

(c) The ability of the tool to actually run the software that enables loading should be considered.

(d) Access to the tools should be controlled and recorded.

BAR AC-11 Guidance on applying for a BAR 8, Part M, CAMO Approval

1. What is a BAR 8, Part M Subpart G Approval

BAR 8, Part M determines the rules for the continuing airworthiness and maintenance of aircraft in Brunei Darussalam Subpart G of BAR 8, Part M concerns the management of continuing airworthiness of aircraft registered in Brunei Darussalam

Organisations approved to BAR 8, Part M Subpart G can additionally be approved to make recommendations to the Brunei DCA that a Certificate of Airworthiness may be issued or renewed by means of a Certificate of Airworthiness Renewal Report (AIR Form 52).

There are two discrete elements of a Part M Subpart G approval:

(a) Those associated with the aircraft registrations listed on the organisations Air Operators Certificate (AOC) and covering the continuing airworthiness management of commercial air transport (CAT) aircraft.

(b) Those associated with the continuing airworthiness management of aircraft not involved in commercial air transport (non-CAT), as listed on their Part M Subpart G approval certificate. These are sometimes referred to as stand alone approvals.

2. Who can apply

An organisation, located in Brunei Darussalam that wishes to carry out the management of continuing airworthiness of eligible aircraft.

Organisations wishing to hold a BAR 8, Part M, Subpart G approval should apply directly to Brunei DCA on an AIR Form 2 –Part M.

3. You will need to provide

3.1. For Approvals Associated with an AOC.

Applications made in association with an Air Operator Certificate (AOC) should be submitted to Brunei DCA's Flight Operations section in the first instance.

Please refer to the AOC guidance for details of how to make an application.

The application for the BAR 8, Part M Subpart G approval will be passed to Airworthiness Department (AWD) for processing. At this stage AWD will ask for the following documents;

(a) BAR 8, Part M Subpart G Compliance Check list

(b) Draft of the organisations Continuing Airworthiness Management Exposition (CAME). Organisations wishing to gain the privilege carry out Airworthiness Reviews in accordance with M.A.711(b) should include the relevant procedure / supplements in the exposition

(c) AIR Form 4's for all nominated personnel, including Airworthiness Review staff if applicable

3.2. For Approvals not associated with an AOC

Applications made for 'standalone' Part M Subpart G approval not associated with the organisations AOC.

On application to Brunei DCA Airworthiness Section;

(a) AIR Form 2 signed by the proposed Accountable Manager. The aircraft ratings should be listed as per BAR 1, Part-66 Appendix 1 listing

(b) The Relevant fee

(c) Copy of the company Certificate of Incorporation if your organisation is trading as a registered company

(d) BAR 8, Part M Subpart G Compliance Check list

(e) Draft of the organisations Continuing Airworthiness Management Exposition (CAME). Organisations wishing to gain the privilege carry out Airworthiness Reviews in accordance with M.A.711(b) should include the relevant procedures / supplements in the exposition

(f) AIR Form 4's for all nominated personnel, including Airworthiness Review staff if applicable

3.3. All applicants will also need to provide;

(a) Draft Technical Log for approval (if applicable)

(b) Base Maintenance Contracts and Line Maintenance Contracts (where appropriate) for approval

(c) Applications for Maintenance Programme approval

(d) Any contracts for continuing airworthiness tasks being carried out by organisations working under the applicant's quality system.

Submit the application pack to Applications and Approvals at the address below.

3.4. Associated rules, regulations and forms

(a) AIR Form 2 –Part M signed by the Accountable Manager. Aircraft ratings should be listed as per BAR 1, Part-66 Appendix 1 listing

(b) AIR Form 4

(c) BAR 8, Part M Subpart G Compliance Check list

(d) Example Continuing Airworthiness Management Exposition (BAR AC 21 refers)

(e) Brunei Civil Aviation Regulations 2006

(f) BAR 8, Part 21

(g) BAR 8, Part 26

(h) Brunei DCA Website

(i) EASA Website

3.5. What to expect

(a) Your application will be acknowledged within 10 working days

(b) A Airworthiness Inspector will make an initial assessment of your application and CAME and will contact you with any queries

(c) The assigned inspector will contact you to arrange an initial meeting and an on-site audit. Any questions regarding the scheduling of your on site visit can be directed to the Airworthiness section at [insert telephone number and email]

(d) The Airworthiness Inspector will conduct an audit against the requirements and raise an audit report detailing any findings

(e) The Airworthiness Inspector will review the nominated personnel. Interviews for key personnel may be carried out.

(f) The Airworthiness Inspector will assess the supporting documentation; Technical Logs, Maintenance Contracts and Maintenance Programmes. When able to, the Airworthiness Inspector will approve the supporting documentation.

(g) If findings have been raised the organisation should address the findings and notify the Airworthiness Inspector of the actions taken

(h) Once the audit findings relating to the initial application have been closed and when the Airworthiness Inspector is able to, a recommendation for the issue of the approval will be forwarded to the Senior Airworthiness Inspector.

(i) When the Airworthiness section receives the recommendation the approval certificates will be raised and sent to your organisation within 20 working days

(j) On receipt of the certificates, your organisation may commence undertaking and releasing work

Please note that if your organisation has made application for the issue of an Air Operator Certificate (AOC), this investigation for the AOC will be carried out by the Brunei DCA's Flight Operations Department. Further guidance on AOC applications.

4. Contact information

Contact email ……..

Airworthiness Section

Brunei Department of Civil Aviation

Brunei International Airport,

Bandar Seri Begawan,

BB2513 Negara Brunei Darussalam,

Tel/fax 00673-2330649

BAR AC-12 Implementation of Article 83bis

1. Introduction

This Information Leaflet provides information and guidance for applying for, evaluating and approving Article 83bis requirements. This material is applicable in cases where the AOC holder leases a foreign registered aircraft or where an aircraft registered in Brunei Darussalam is leased to another contracting State.

2. Applicability

This information herein is applicable to holders of Air Operators Certificates (AOC) issued by the Brunei DCA and Airworthiness Inspectors.

3. References

ICAO Annex 6

ICAO Annex 8

ICAO Doc 8335

ICAO Doc 9760

ICAO Circular 295

Brunei Civil Aviation Regulations 2006

BAR 8, Part M

4. Definitions and Abbreviations

4.1. The following definitions are used in this leaflet:

Chicago Convention: means the Convention on International Civil Aviation

Dry Lease Agreement: Means an agreement between under takings pursuant to which the aircraft is operated under the AOC of the lessee.

Lessee: A Brunei operator or entity, other than a State of Brunei operator, who through a contractual arrangement leases in an aircraft from a lessor.

Lessor: The owner/operator of an aircraft who, through a contractual arrangement, leases out an aircraft to another operator in Brunei Darussalam, or entity other than an operator in Brunei Darussalam.

State of the Operator: means the State in which the Operator's principal place of business is located, or if there is no such place, the Operator's permanent residence.

State of Registry: means the State on whose register the aircraft is entered.

Wet Lease Agreement: Means an agreement between air carriers pursuant to which the aircraft is operated under the AOC of the lessor.

4.2. The following abbreviations are used in this circular:

AC: Advisory Circular

AOC: Air Operator Certificate

BARs: Brunei Aviation Requirements

DCA : Department of Civil Aviation

ICAO: International Civil Aviation Organisation

5. Background

5.1. When an aircraft registered in a contracting State is operated under an agreement of lease, charter, or interchange of the aircraft or any similar arrangement by foreign operator, the State of Registry may, by agreement with the State of the Operator, transfer all or part of its safety oversight functions as the State of registry to the State of the Operator in respect of that aircraft.

5.2. In the case of operators in Brunei Darussalam, Regulation XYZ of the Civil Aviation Regulations 2006 permits an AOC holder to dry-lease a foreign registered aircraft for commercial air transport under Article 83bis of the Chicago Convention. In that case, there should be an agreement between the Brunei Darussalam and the State of Registry specifying airworthiness responsibility to be transferred to the Brunei DCA. Under Article 83bis, Brunei Civil Aviation (General) Regulations will apply to the extent agreed upon by the Brunei DCA and the State of Registry.

5.3. Such transfer of airworthiness functions and duties may include:

(a) The rules and regulations that govern the carrying and use of radio transmitting apparatus aboard an aircraft.

(b) Issuing and rendering valid an aircraft Certificate of Airworthiness.

5.4. he transfer of functions does not have effect until the transfer Agreement has been registered with the ICAO Council and has been made public and its scope directly communicated to the Authorities of the other Contracting States.

5.5. Under a wet and/or dry Lease Agreement the State of operation should have operational control over the aircraft in question.

6. Guidance

6.1. An operator intending to lease a foreign registered aircraft or to lease out a State registered aircraft to another Contracting State should notify the Brunei DCA at least thirty days (30) before the commencement of the lease.

6.2. It is required to notify the Brunei DCA how the aircraft safety oversight, certificate of airworthiness and operating crew licenses shall be managed when the State of registry cannot easily access the aircraft in question to ensure continued compliance with the approval terms and crew licenses validity requirements.

6.3. If there is a need for the State of Registry to transfer all or part of its functions and duties in respect of that aircraft, the two State Authorities must sign an Agreement of transfer of duties and safety oversight responsibility as required by Brunei Civil Aviation Regulations 2006, and Article 83bis of ICAO Convention on International Civil Aviation.

6.4. The Article 83bis Agreement should clearly indicate what duties and functions are being transferred by the State of Registry (and accepted by the State of operation) to the foreign Contracting State. It should also permit the State of Registry unrestricted access to the aircraft at any place and time.

6.5. It is the responsibility of the State of Registry transferring its safety oversight duties and responsibilities to ensure that the other Contracting State has

the capacity, capability and competence to undertake the functions being transferred.

6.6. The State of operation should not accept oversight duties and functions under the Article 83bis agreement of an aircraft for which it does not have the capacity, capability and competence to oversight.

7. Article 83bis Application and Approval Procedure

7.1. A holder of an AOC issued by the Brunei DCA who wishes to lease or lease out an aircraft under an Agreement that shall necessitate the transfer or acceptance of safety oversight responsibilities to or from another Contracting State in accordance with the provisions of Article 83bis shall submit an application to the Brunei DCA indicating the likelihood of transferring oversight duties and responsibilities to the Authority in the State of operation.

7.2. The operator is required in addition to submit the contact address, fax Number, email or any other formal contact of the State of the Operator's CAA.

7.3. The application shall be evaluated to determine which safety oversight duties may be transferred or accepted as the case may be.

7.4. In the case of leasing out a State registered aircraft, the Brunei DCA shall evaluate the lessee and State of operation's capacity, capability and competence to undertake the effective safety oversight of the aircraft in question.

7.5. In the case of accepting the safety oversight responsibilities, the Brunei DCA shall evaluate the lessee and its capacity, capability and competence to undertake the effective safety oversight of the aircraft in question.

7.6. In either case, an 83bis Agreement clearly indicating the transferred (and accepted) duties and responsibilities shall be drawn and signed by the two State Authorities after a satisfactory and successful arrangement evaluation.

7.7. The signed 83bis Agreement shall be communicated to the ICAO Council for information, registration, publicising and communicating to the Authorities of the other contracting States.

7.8. The AOC holder applying for the implementation of Article 83bis shall facilitate the Brunei DCA in the administering of the Article 83bis arrangement.

7.9. A copy of the signed Article 83bis Agreement, communication to and from the ICAO Council and all documentation generated in the approval process and records of the Agreement on surveillance shall be kept by the Brunei DCA.

BAR AC-13 Maintenance Data Control

1. Introduction

This information leaflet serves as an acceptable means of compliance with airworthiness data requirements

2. Applicability

This guidance is intended for Approved Maintenance Organisations (AMOs) and Continuing Airworthiness Management Organisations that maintain aircraft registered in Brunei Darussalam.

3. References

ICAO Annex 6

ICAO Annex 8

ICAO Doc 9760

Brunei Civil Aviation Regulations 2006

BAR 8, Part M

BAR 8, Part 145

4. Definitions and Abbreviations

4.1. The following definitions are used in this leaflet:

Applicable: means relevant to any aircraft, component, or process specified in the organisations approval class rating schedule and in any associated capability list.

Organisation: This refers to an approved maintenance organisation or continuing airworthiness management organisation (CAMO), unless otherwise specified.

4.2. The following abbreviations are used in this circular:

AMC: Acceptable Means of Compliance

AMO: Approved Maintenance Organisation

CAME: Continuing Airworthiness Management Expostion (Analogous to MCM as per ICAO Annex 6)

CAMO: Continuing Airworthiness Management Organisation

MOE: Maintenance Organisation Exposition (Analogous to MPM as per ICCAO Annex 6).

NDI: Non Destructive Inspection

NDT: Non Destructive Testing

STC: Supplementary Type Certificate

TC: Type Certificate

5. Background

5.1. Brunei Aviation Requirements BAR 8, Part M and 145 requires a CAMO and an AMO to have in its custody airworthiness data appropriate to support the maintenance work managed or performed on the aircraft or aircraft component

5.2. The source of the data should be the Brunei DCA, the OEM or any other approved design organisation in the State of manufacture or State of design, as appropriate.

5.3. The person or organisation maintaining an aircraft or aircraft component should ensure that all applicable maintenance data is current and readily available for use when required

6. Applicable Maintenance Data

6.1. The organisation should use applicable current maintenance data in the performance of maintenance, including modifications and repairs.

The applicable maintenance data includes any of the following:

(a) Any applicable requirement, procedure, operational directive or information issued by the Authority responsible for the oversight of the aircraft or component;

(b) nstructions for continuing airworthiness, issued by TC holders, STC holders, any other organisation required to publish such data, and in the case of aircraft or components from other countries, the airworthiness data mandated by the Authority responsible for the oversight of the aircraft or component;

(c) Any applicable standard, such as but not limited to, maintenance standard practices recognised by the Brunei DCA as a good standard for maintenance;

(d) Maintenance instructions on how to carry out the particular maintenance task, excluding the engineering design of repairs and modifications.

6.2. In the case of maintenance data provided by an operator or customer, the organisation should hold such data when the work is in progress.

7. Additional Requirements

7.1. Except as specified in sub-paragraph 6.1(d) above, each AMO should hold and use the following minimum maintenance data relevant to the organization's approval class rating:

(a) All maintenance regulations/requirements and associated AMC's, approval specifications, and guidance material;

(b) All applicable national maintenance requirements and notices which have not been superseded by a Brunei DCA requirement, procedure or directive; and,

(c) All applicable Airworthiness Directives.

7.2. In addition to sub-paragraph 7.1, an AMO with an approval class rating in category A -Aircraft, should hold and use the appropriate sections of the following maintenance data where published:

(a) Operator's aircraft Maintenance Program,

(b) Aircraft maintenance manual,

(c) Repair manual,

(d) Supplementary structural inspection document,

(e) Corrosion control document,

(f) Service Bulletins,

(g) Service Letters,

(h) Service instructions,

(i) Modification leaflets,

(j) NDT manual,

(k) Parts catalogue,

(l) Type Certificate Data Sheet, and,

(m) Any other specific document issued by the TC or STC holder as maintenance data

7.3. In addition to sub-paragraph 7.1, an AMO with an approval class rating in category B - Engines/APUs, should hold and use the appropriate sections of the following maintenance data where published :

(a) Engine/APU maintenance and repair manual,

(b) Service bulletins,

(c) Service letters,

(d) Modification leaflets,

(e) NDI manual,

(f) Parts catalogue,

(g) Type certificate data sheet, and,

(h) Any other specific document issued by the TC holder as maintenance data

7.4. In addition to sub-paragraph 7.1, an organisation with an approval class rating incategory C - Components other than complete engines/APUs, should hold and use the appropriate sections of the following maintenance data where published:

(a) Vendor maintenance and repair manual,

(b) Service Bulletins,

(c) Service Letters, and

(d) Any document issued by the TC holder as maintenance data on whose product the component may be fitted when applicable.

7.5. Appropriate sections of the sub-paragraphs 7.2 to 7.4 means in relation to the maintenance work scope at each particular maintenance facility. For example, a base maintenance facility should have almost complete set(s) of the maintenance data whereas a line maintenance facility may need only the maintenance manual and the parts catalogue.

7.6. An organisation only approved in class rating category D –Specialised services, should hold and use all applicable Specialised service(s) process specifications.

8. Maintenance Data Integrity

8.1. The organisation should establish procedures to ensure that if found, any inaccurate, incomplete, or ambiguous procedure, practice, information, or maintenance instruction contained in the maintenance data used by aintenance personnel is recorded and notified to the author of the maintenance data

8.2. The referenced procedure should ensure that when maintenance personnel discover inaccurate, incomplete, or ambiguous information in the maintenance data they should record the details.

8.3. The procedure should then ensure that the AMO notifies the problem to the author of the maintenance data in a timely manner. A record of such communications to the author of the maintenance data should be retained by the AMO until such time as the TC holder has clarified the issue by e.g. amending the maintenance data.

8.4. The referenced procedure should be specified in the maintenance organisation's Maintenance Organisation Exposition (MOE).

9. Changes to Maintenance Data

9.1. The organisation may only modify maintenance instructions in accordance with a procedure specified in the MOE.

9.2. With respect to those changes, the organisation should demonstrate that they (changes) result in equivalent or improved maintenance standards and should inform the TC holder of such changes. Maintenance instructions for the purposes of this paragraph means instructions on how to carry out the particular maintenance task excluding the engineering design of repairs and modifications.

9.3. The referenced procedure should address the need for a practical demonstration by the mechanic to the quality personnel of the proposed modified maintenance instruction. Upon being satisfied, the Quality personnel should approve the modified maintenance instruction and ensure that the TC or STC holder is informed of the modified maintenance instruction.

9.4. The procedure should include a paper/electronic traceability of the complete process from start to finish and ensure that the relevant maintenance instruction clearly identifies the modification. Modified maintenance instructions should only be used in the following circumstances;

(a) Where the TC / STC holder's original intent can be carried out in a more practical or more efficient manner.

(b) Where the TC/STC holder's original intent cannot be achieved by following the maintenance instructions. For example, where a component cannot be replaced following the original maintenance instructions.

(c) For the use of alternative tools / equipment.

10. Work (Job) Cards

10.1. The organisation should provide a common work card or worksheet system to be used throughout relevant parts of the organisation.

Note: *Relevant parts of the organisation means with regard to aircraft base maintenance, aircraft line maintenance, engine workshops, mechanical workshops and avionic workshops. Therefore, for example, engine workshops should have a common system throughout such engine workshops that may be different to that in aircraft base maintenance*

10.2. The work cards should differentiate and specify, when relevant, disassembly, accomplishment of task, re-assembly, and testing. In the case of a lengthy maintenance task involving a succession of personnel to complete such task, it may be necessary to use supplementary workcards or worksheets to indicate what was actually accomplished by each individual person.

A work card or worksheet system should refer to particular maintenance tasks

10.3. In addition, the organisation should either transcribe accurately the maintenance data onto such work cards or worksheets or make precise reference to the particular maintenance task or tasks contained in such maintenance data.

10.4. Work cards and worksheets may be computer generated and held on an electronic database subject to both adequate safeguards against unauthorised alteration and a back-up electronic database which should be updated within 24 hours of any entry made to the main electronic database. Complex maintenance tasks should be transcribed onto the work cards or worksheets and subdivided into clear stages to ensure a record of the accomplishment of the complete maintenance task.

10.5. Where the organisation provides a maintenance service to an aircraft operator who requires their work card or worksheet system to be used then such work card or worksheet system may be used. In this case, the organisation should establish a procedure to ensure correct completion of the aircraft operators' work cards or worksheets.

11. Availability

11.1. The organisation should ensure that all applicable maintenance data is readilyavailable for use when required by its maintenance personnel.

11.2. Data being made available to personnel maintaining aircraft means that the data should be available in close proximity to the aircraft being maintained, for supervisors, mechanics and certifying staff to study.

11.3. Where computer systems are used, the number of computer terminals should be sufficient in relation to the size of the work programme to enable easy access, unless the computer system can produce paper copies. Where microfilm or microfiche readers/printers are used, a similar requirement is applicable.

12. Currency of Maintenance Data

12.1. The organisation should establish a procedure to ensure that maintenance data it controls is kept up to date.

12.2. In the case of operator/customer controlled and provided maintenance data, the organisation should be able to show that either it has written confirmation from the operator/customer that all such maintenance data is up to date or it has workorders specifying the amendment status of the maintenance data o be used or it can show that it is on the operator/customer maintenance data amendment list.

12.3. To keep data up to date a procedure should be set up to monitor the amendment status of all data and maintain a check that all amendments are being received by being a subscriber to any document amendment scheme.

BAR AC-14 Safety Critical Maintenance Tasks

1. Introduction

This Advisory Circular provides information on dealing with safety critical tasks

2. Applicability

This guidance is intended for Approved Maintenance Organisations (AMOs) and Continuing Airworthiness Management Organisations that maintain aircraft registered in Brunei Darussalam

3. References

ICAO Annex 6

ICAO Annex 8

ICAO Doc 9760

Brunei Civil Aviation Regulations 2006

BAR 8, Part M

BAR 8, Part 145

4. Information

4.1. A factor in a serious incident involving an oil leakage on a large twin engine commercial air transport aircraft was the failure to re-install the drive cover plate on both engines following maintenance.

The Brunei DCA wishes to highlight the potential safety benefit where companies choose to apply aspects of Extended Range Twin Operations (ETOPS) maintenance philosophy to multi-system aircraft in order to avoid the possibility of simultaneous incorrect maintenance on two or more safety critical systems. In this context, such systems are those which have a fundamental influence upon the safe operation of the aircraft, engines and their systems being a case in point.

4.2. Operators and maintenance organisations should consider the following paragraphs when planning, and accomplishing scheduled and non-scheduled maintenance tasks on multi-system aircraft.

(a) Arrangements should be made to stagger scheduled maintenance tasks on essential or primary systems such that the accomplishment of similar critical tasks on two or more systems are segregated. Consideration should be given to introducing procedures that will ensure that such tasks are separated by at least one flight cycle. Where it is not practical to introduce staggered maintenance, inspections and functional checks should be performed independently to ensure system serviceability.

(b) Where it is not practical to introduce staggered maintenance at Base Maintenance inputs or during rectification of Line or Base defects, the use of separate work teams together with the accomplishment of appropriate functional checks to verify system serviceability should ensure a similar level of system integrity.

(c) Procedures should be established to provide maintenance and planning personnel with guidance on the identification and accomplishment of safety critical tasks conducted during

scheduled and non-scheduled maintenance activities. Routine task documentation should identify those tasks which may have a critical effect on safety and should clearly identify the individual stages of such tasks. Maintenance Programme or Maintenance Schedule basic rules should provide the necessary standards to ensure the identification of critical scheduled maintenance tasks.

4.3. Maintenance personnel's initial and continuation training should highlight the critical

4.4. nature of conducting maintenance tasks on essential or primary systems. The instruction given should provide personnel with the necessary information to identify and satisfactorily accomplish such tasks. Training programmes should focus on safety critical tasks and the possible consequences of failure to follow the associated maintenance procedures.

The development of these training programmes should use feedback from maintenance experience, to enhance the programme and maintenance procedures.

4.5. The Brunei DCA considers that the intent of this guidance provides a basis for organisations to adopt good maintenance practices for multi-system aircraft.

BAR AC-15 Return to Service of Aircraft Items Recovered from Aircraft Involved in Accidents/Incidents

1. Introduction

This Advisory Circular provides information on dealing with components/parts that have been removed from aircraft involved in incidents or accidents.

2. Applicability

This AC is intended for Approved Maintenance Organisations (AMOs) and Continuing Airworthiness Management Organisations that maintain aircraft registered in Brunei Darussalam

3. References

ICAO Annex 6

ICAO Annex 8

ICAO Doc 9760

Brunei Civil Aviation Regulations 2006

BAR 8, Part M

BAR 8, Part 145

BAR 8, Part 21

4. Background

4.1. This AC reviews the factors involved in establishing the acceptability of aircraft items recovered from aircraft involved in accidents/incidents, and states the conditions to be met before such items may be returned to service.

4.2. There is worldwide evidence that some aircraft items, (including highly stressed rotating parts) have been released to service after having been recovered from aircraft involved in accidents/incidents even though the accident circumstances may have caused damage or changed characteristics from those of the type design. Since such items may not manifest any visual evidence of damage, distortion or changed characteristics, a serious airworthiness hazard could result from their use without special precautions being taken as detailed in this Guidance.

5. Establishing the Origin of Recovered Items

5.1. When an aircraft has been involved in an accident/incident, the title to the salvage may pass from the insured owner to other persons (e.g. aircraft insurers) and this salvage may be offered for sale either complete or as separate aircraft items in an 'as is - where is' condition. While some items may be totally unaffected by the accident/incident which caused the aircraft to be declared as salvage, it is essential to obtain clear evidence that this is the case. If such evidence cannot be obtained, the item may not be returned to service.

5.2. All such items must therefore be subject to competent assessment and inspection in the light of adequate knowledge of the circumstances of the accident, subsequent storage and transport conditions, and with evidence of

previous operational history obtained from valid airworthiness records, before overhaul and re-installation can be considered.

5.3. In particular, if a crash load is sufficient to take any part above its proof strength, residual strains may remain which could reduce the effective strength of the item or otherwise impair its functioning. Loads higher than this may of course crack the item, with an even more dangerous potential. Further, a reduction in strength may be caused by virtue of the change of a material's characteristics following overheat from a fire. It is therefore of the utmost importance to establish that the item is neither cracked, distorted nor overheated. The degree of distortion may be difficult to assess if the precise original dimensions are not known, in which case there is no option but to reject the item. Any suggestion of overheating would be cause for a laboratory investigation into significant change of material properties.

5.4. The standard procedures appropriate to items removed for overhaul following normal service life may not therefore be sufficient for items from salvaged aircraft. If the information in the Manufacturer's Manual, or other technical publications, is insufficient to deal with the considerations detailed above then the manufacturer must be consulted for guidance. If the manufacturer provides the additional information, and the item can be shown to meet this, then it may be returned to service.

5.5. Where a difficulty exists in classifying the airworthiness significance of an aircraft item recovered after an accident/incident, the question should be referred to the Airworthiness section of the Brunei DCA's for advice. The Brunei DCA will require full details of the circumstances of the accident/incident before a response is made to the enquiry.

5.6. It should be noted that licensed engineers in Brunei Darussalam or Brunei DCA Approved Organisations cannot inspect components or assess the implications of impact damage or fatigue without the involvement of the manufacturer if the existing approved data for the aircraft type does not provide appropriate and specific inspections. The component can only be released in accordance with approved data.

6. Information obtained from Aviation Insurers

6.1. Aviation insurers and other persons who obtain title to salvage parts may supply to salvage purchasers the details of the accident/incident leading to the aircraft, or aircraft item, being declared as salvage. It is also common practice for aviation insurers to pass over the airworthiness records to the salvage purchaser. Whilst such information and records are an essential part of the assessment, where return to service is being considered, they are not a guarantee that the item is acceptable for re-installation.

6.2. Some aviation insurers may agreed to co-operate with the Brunei DCA's attempt to prevent items being returned to service if their airworthiness cannot be confidently confirmed.They have agreed to supply details of the occurrence, and to identify the party to whom the salvage has been sold, to the Airworthiness section. This information may be relevant when Brunei DCA advice is sought under paragraph 5.5 of this guidance, but does not excuse the enquirer from furnishing the information required by that paragraph.

7. Supplementary Information

Attention is drawn to Guidance document BAR AC-16 which also deal with the safeguards necessary for users obtaining aircraft parts in the open market,

particularly in relation to the release documentation and evidence of previous history.

BAR AC-16 The Problem of Bogus Parts

1. Introduction

This Advisory Circular provides information on dealing with issues pertaining to bogus parts.

2. Applicability

This AC is intended for Approved Maintenance Organisations (AMOs) and Continuing Airworthiness Management Organisations that maintain aircraft registered in Brunei Darussalam

3. References

ICAO Annex 6

ICAO Annex 8

ICAO Doc 9760

Brunei Civil Aviation Regulations 2006

BAR 8, Part M

BAR 8, Part 145

BAR 8, Part 21

4. Background

4.1. The Brunei DCA is concerned about the quantity and variety of unapproved parts which may find their way on to Brunei registered aircraft, in particular helicopters. Evidence from other NAA's indicates that these counterfeit and/or fraudulently identified parts are being imported, largely from North America; however, there is also evidence of such bogus parts originating from the UK and also other foreign sources.

4.2. There is also evidence of the falsification of release documentation (Form One or equivalent) and this has also been observed.

4.3. Installing bogus parts onto aircraft has serious airworthiness implications; to illustrate just how serious, the following two examples are quoted involving aircraft which are available in the international market place:

(a) A helicopter main rotor blade complete with release documentation was traced as having been scrapped by the manufacturer during the manufacturing process.

(b) An engine mount described as fitted new to an aircraft in 1979 was traced as having been factory installed in 1966.

5. 5 Unapproved Parts

5.1. For the purpose of this guidance an Unapproved part is a part or material intended for installation on a type certificated product/aircraft, which has been neither manufactured according to approved procedures, nor conforms to an approved type design; or it fails to conform to declared specifications or accepted industry standards (i.e. standard parts).

5.2. Unapproved parts include, but are not limited to:

(a) Parts specified in the illustrated parts catalogues (IPC) of a type certificated aircraft, but which have been manufactured, reclaimed

or reworked and then marked by an unauthorised source and provided with documents which indicate falsely that the part(s) are genuine and conform to the approved type design, or meet a particular industry standard and are offered for use as conforming with an aircraft manufacturer's authorised IPC.

(b) Parts shipped directly to users by manufacturers, suppliers, or distributors who do not themselves hold appropriate production approvals for the parts, and have not been authorised to make direct shipments to users or stockists by the Type Certificate holder, who alone has production approval, e.g. production overruns. This is a particular phenomenon in the United States.

(c) Parts which have not been maintained, overhauled or repaired in accordance with the requirements of approved airworthiness data and/or statutory requirements, or that have been maintained, overhauled or repaired by persons not authorised to perform and certify these functions.

6. FAA Suspect Unapproved Parts Notifications

6.1. The FAA has intensified efforts to educate the public regarding the potential safety threat posed by aeronautical parts that do not meet applicable design, manufacturing or maintenance requirements. To achieve this, the FAA established a Suspect Unapproved Parts programme (SUPs) and issued guidance in an Advisory Circular 21-29B.

6.2. Suspect Unapproved Parts Notifications can be found on FAA Internet site: www.faa.gov/about/office_org/headquarters_offices/avs/offices/sup/

6.3. Because of the increased activity being undertaken in the United States against suspect unapproved parts, it is likely that the vendors of these parts will direct their activities towards Asia, Europe and other parts of the world because of the reduced risk of detection.

7. Mandatory Occurrence Reporting Procedures

7.1. Users of aircraft components and spares are reminded that suspected unapproved parts should be reported to the Brunei DCA through the Mandatory Occurrence Reporting (MOR) procedures.

7.2. On receipt of an MOR, and where appropriate, the Brunei DCA will pass the details to the FAA SUPs office by the submission of a SUPS Report. In addition to assisting the FAA, who are implementing a vigorous campaign against unapproved parts, this procedure will enable the CAA to establish the dimensions of the problem as it affects the United Kingdom.

7.3. To assist in tracing unapproved parts or material, persons raising an MOR should, as far as possible, provide the following information on their report:

(a) The name of the suspected unapproved part.

(b) Part number, or any other number on the part.

(c) Serial number of part.

(d) List next higher assembly that suspected unapproved part is assembled into (i.e. fuel pump, engine, landing gear) and list part number, if known.

(e) Quantity of suspected unapproved parts found or identified.

(f) Make and model number of the aircraft or component that the suspected unapproved part is applicable to.

(g) The identification of the commercial source of the suspected unapproved part. If the part is identified with Part Manufacturer or Distributor marking, this should be quoted.

(h) Describe any pertinent facts relating to the suspected unapproved part and identify where the part may be inspected (provide photos, invoices, etc., if available).

(i) The date suspected unapproved part was discovered.

(j) Name and address in full or the location where suspected unapproved part(s) was discovered.

7.4. In accordance with normal protocol for confidentiality any SUPS report submitted to the FAA would not give details of the MOR reporter.

7.5. Foreign aircraft and approved component manufacturers can be contacted by users through their UK agent or direct, for verification that specific serial numbered items purported to be manufactured by them are in fact recorded in their archives. As an example, this process was used to verify that a particular helicopter main rotor head was in fact bogus.

8. The Certifying Person and User Responsibility

8.1. The Certifying Person (User) can be either the Approved Organisation, a person authorised in accordance with that organisation's Exposition, or an appropriately Type Rated Licensed Engineer, who issues the Certificate of Release to Service for installation of an aircraft part into an aircraft, its engine(s), propeller(s) or equipment.

8.2. The User of an aircraft part is responsible for ensuring that the part is serviceable and conforms to the standard determined by the appropriate Type Certificate holder as being suitable for the intended application. In order to discharge this responsibility to the satisfaction of the Brunei DCA, the user must, when obtaining an aeronautical part from a supplier:

(a) Ensure that the purchase order contains accurate definition of the aircraft parts and full details of the quality control and certification requirements to be met by the supplier in satisfying the order;

(b) Take all necessary steps to verify that the supplier is meeting the requirements of the purchase order. This may require the user visiting the supplier's facilities.

8.3. In order to contain the serious problem of unapproved parts, Commercial Air Transport Operators and associated Maintenance organisations who are users of aircraft spares should ensure that their aircraft spares purchasing policy and procedures are unequivocally stated in their company expositions/engineering procedural documents. They should also ensure that any deviation from that policy must be approved by the quality manager in accordance with procedures acceptable to the Brunei DCA.

8.4. Other organisations and private owners who purchase aircraft parts or materials can only be advised to exercise extreme caution and remember they will have to convince the user of the authenticity of such spares.

BAR AC-17 Non Destructive Inspections

1. Introduction

This Advisory Circular provides information on methods of Non Destructive Inspections.

2. Applicability

This AC is intended for Approved Maintenance Organisations (AMOs) and Continuing Airworthiness Management Organisations that maintain aircraft registered in Brunei Darussalam.

3. References

ICAO Annex 6

ICAO Annex 8

ICAO Doc 9760

Brunei Civil Aviation Regulations 2006

BAR 8, Part M

BAR 8, Part 145

4. Information

The following guidances can be found at UKCAA CAP 562, Chapter F:

- Oil And Chalk Processes
- Penetrant Dye Process
- Fluorescant Penetrant Process
- Performance Testing of Penetrant Testing Materials
- Ultrasonic Flaw Detection and Thickness Measurement
- Radiological Examination of Aircraft Structures
- Magnetic Flaw Detection
- Eddy Current Methods
- Endoscope Inspections

BAR AC-18 Vibration Health Monitoring (VHM)

1. Introduction

1.1. VHM is used on the many of large public transport rotorcraft, operating in Brunei Darussalam. The system has been operaitng in the UK since the early 1990's The purpose of embodying VHM was to reduce the likelihood of rotor, rotor drive system and engine failures that could prevent continued safe flight and safe landing. Since the early 1990's the accident rate attributable to such failures for this category of helicopter has reduced significantly, and the UK Civil Aviation Authority believes that VHM played and continues to play a major role in this achievement.

1.2. This Advisory Circular provides guidance on acceptable standards that may be used for implementing a Vibration Health Monitoring System on rotorcraft operated in Brunei Darussalam

2. Applicability

This AC is intended for Continuing Airworthiness Management Organisations or Approved Maintenance Organisations (AMOs) and that operate and Maintain Rotorcraft in Brunei Darussalam.

3. The Standard

UK CAA CAP 753 (as amended) may be used as the standard for installations in Brunei Darussalam. The CAP 753 provides additional guidance for Operators utilising VHM in rotor and rotor drive systems of helicopters; this covers both VHM system design and operation

BAR AC-19 Approval, Operational Serviceability and Readout of Flight Data Recorder and Cockpit Voice Recorder Systems Introduction

1. Introduction

Aviation Legislation in Brunei Darussalam reflects ICAO Standards and requires that certain categories of aircraft are equipped with crash protected Flight Data Recorder (FDR) systems and Cockpit Voice Recorder (CVR) Systems These systems are installed primarily to asssit investigations into incidents or accidents or, additionally, either by using the FDR or via secondary Quick Access Recorder (QAR), a number of operators monitor certain operational aspects of their aircraft.

To satisfy legal requirements the installations have to comply with the appropriate minimum requirements dependent upon the class of aircraft. Continued serviceability requires compliance with the installer's maintenance instructions as a well as validation of data recorded in flight. This AC provides general advice and guidance for operators of aircraft equipped with FDRs and to the facilities that provide an FDR data readout service of their respective responsibilities to achieve correlation of this activity.

2. Applicability

This AC is intended for Continuing Airworthiness Management Organisations or Approved Maintenance Organisations (AMOs) and that operate and maintain aircraft equipped with CVR and FDR systems in Brunei Darussalam

3. The Standard to be Adopted

UK CAA CAP 731 (as amended) may be used as the standard to address CVR and FDR serviceability in Brunei Darussalam.

BAR AC-20 Example BAR 8, Part 145 MOE

1. Introduction

This Advisory Circular provides information for an example BAR 8, Part 145 Maintenance Organisation Exposition (MOE) document that can be used to assist an organisation in compiling their own MOE for its approval.

2. References

BAR 8, Part 145, para 145.A.70

3. Information

4. This document is available from the Brunei DCA or from their website.

The organisations MOE should address all headings of the example MOE. However where a heading is not applicable, the heading should included but the text be identified as “Not Applicable” below it.

BAR AC-21 Example BAR 8, Part M CAME

1. Introduction

This Advisory Circular provides information on an example BAR 8, Part M Continuing airworthiness Management Exposition (CAME) document that can be used to assist an organisation in compiling their own CAME for its approval.

2. References

BAR 8, Part M, Subpart G

3. Information

This document is available from the Brunei DCA or from their website.

The organisations CAME should address all headings of the example CAME. However where a heading is not applicable, the heading should included but the text be identified as “Not Applicable” below it.