

**07 Feb 17**

## **MAA/RN/2017/01 – USE OF THE OBSOLESCENT RA 1500 INITIAL ISSUE – CERTIFICATION OF UK MILITARY REGISTERED AIR SYSTEMS**

### **Issue**

1. To provide guidance on the continued use of the obsolescent RA 1500 initial Issue<sup>1</sup> following publication of RA 5810<sup>2</sup> and RA 5820<sup>3</sup>.

### **Scope**

2. This RN describes the circumstances under which legacy certification programmes will be permitted to be conducted in accordance with the obsolescent RA 1500 Initial Issue.

### **Background**

3. RA 1500, which established the Military Air Systems Certification Process (MACP), has now been replaced by RA 5810 for new Air Systems and RA 5820 for changes in Type Design. However, recognising that certification programmes will normally require a number of years to complete, the new regulations include provision for legacy programmes, commenced prior to publication of RA 5810 and RA 5820, to continue to be conducted in accordance with the obsolescent RA 1500.

### **Guidance**

4. The requirements of the new MACP regulations are not substantially different to those of RA 1500 and RA 5820, in particular, introduces increased flexibility for both the MAA and Type Airworthiness Authority (TAA). Therefore, it is anticipated that, in the majority of cases, the TAA will elect to transition from RA 1500 to the appropriate new regulation. This transition will be agreed between the TAA and the MAA Platform Certification Manager (PCM).
5. For programmes initiated via an MAA Form 30 prior to the publication of RA 5810 and RA 5820, requests to continue in accordance with the obsolescent RA 1500 Initial Issue should be submitted by the TAA to Dep Hd Cert, MAA. In order to support the completion of those programmes that continue in accordance with RA1500 Initial Issue, and to provide an enduring MACP reference for legacy Air Systems and changes in Type Design, the obsolescent RA1500 Initial Issue is attached to this Regulatory Notice below.

### **Further information**

6. Any queries on the application of the obsolescent RA1500 should be raised with the nominated MAA PCM or, by e-mail via [DSA-MAA-MRPEnquiries@mod.uk](mailto:DSA-MAA-MRPEnquiries@mod.uk).

### **MAA Reg Cert Hd**

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<sup>1</sup> RA1500 – Certification of UK Military Registered Air systems

<sup>2</sup> RA5810 – Military Type Certificate (MRP 21 Subpart B)

<sup>3</sup> RA5820 – Changes in Type Design (MRP 21 Subpart D)

## RA 1500 - Certification of UK Military Registered Air Systems

### Rationale

To ensure that an Air System's design meets appropriate safety requirements, a systematic, independent certification process is required for both new types of military registered Air Systems and for major changes to existing designs.

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## 1500(1): Certification of UK Military Registered Air Systems

### Regulation 1500(1)

#### Certification of UK Military Registered Air Systems

1500(1) New UK military Air Systems that will be operated in the Service Environment<sup>1</sup> on the UK Military Aircraft Register (MAR), and Major Changes to the Type Design of such systems already on the MAR, **shall** be certified prior to their Release to Service (RTS).

### Acceptable Means of Compliance 1500(1)

#### Certification of UK Military Registered Air Systems

1. Type Airworthiness Authorities (TAAs) responsible for the introduction of new UK military Air Systems that will be operated in the Service Environment on the MAR or Major Changes to the Type Designs of in-service Air Systems **should** ensure that they are certified in accordance with the Military Air Systems Certification Process (MACP), that comprises the following 6 phases:

- a. Phase 1 – Identify the requirement for, and obtain, organizational approvals.
- b. Phase 2 – Establish and agree the Type Certification Basis (TCB).
- c. Phase 3 – Agree the Certification Programme.
- d. Phase 4 – Demonstrate compliance with the TCB.
- e. Phase 5 – Produce Final Report and issue Certificate.
- f. Phase 6 – Undertake post-Certification actions.

Further detail on the 6 phases of the MACP process and what constitutes a Major Change to a Type Design are at Annexes A and B respectively.

2. **Full MACP.** The MACP **should** be applied in full for the certification of:

- a. New UK military registered Air Systems that were pre Main Gate<sup>2</sup> approval on 1 Sep 11.
- b. Major Changes to the Type Designs of UK military registered Air Systems, that were pre Main Gate, or Business Case Approval for lower value programmes, on 1 Apr 12.

3. **Tailored MACP.** An individually tailored version of the MACP **should** be applied to:

- a. New UK military registered Air Systems that were post Main Gate approval and had not achieved RTS on 1 Sep 11.
- b. Major Changes to the Type Designs of UK military registered Air Systems, that were post Main Gate (or Business Case Approval for lower value programmes) but had not achieved RTS on 1 Apr 12.

4. **Release to Service Recommendations (RTSR).** TAAs **should** use the output of MACP Phase 5 certification activities in framing their initial RTSR.

<sup>1</sup> Air Systems are deemed to operate in the Service Environment when there is an RTS and a Duty Holder (DH) responsible for Rtl.

<sup>2</sup> See the Acquisition Operating Framework, [www.aof.mod.uk](http://www.aof.mod.uk) for guidance.

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1500(1)****Certification of UK Military Registered Air Systems****Background**

5. It is not intended to apply the MACP retrospectively to in-service UK military registered Air Systems; however, future Major Changes to the Type Design of such Air Systems will be subject to the MACP. All military registered aircraft that are intended to operate in the Service Environment are required to comply with the MACP. A flow-chart showing the applicability of the MACP to UK military registered Air Systems and to Type Design changes is at Annex C.

**The MACP**

6. **The MACP comprises 6 phases that are described at Annex A.** For those new Air Systems and Major Changes that are to be subject to the Tailored MACP, the MAA will agree how each of the 6 phases will be addressed to ensure that the underlying principles of the MACP are applied in the most appropriate manner. This will be set out in a project-specific Certification Assurance Strategy issued by the MAA. Where it is determined that MACP requirements have already been decided or completed, the MAA will review independently whether they are adequate and auditable.

**MACP Outcomes**

7. **Full MACP: New Air System.** Successful completion of the full MACP for a new Air System will result in the MAA issuing a Military Type Certificate (MTC) to the TAA. This will be underpinned by the production of an MAA Type Certification Report (TCR). Unlike a civil Type Certificate (TC), a MTC will cover the entire Air System, including engines and propellers, where applicable. The MTC will certify that the Air System:

- a. Has been designed by an approved organization.
- b. Meets the approved TCB, or that any airworthiness provisions not complied with are compensated for by factors or mitigations that provide an equivalent level of safety.
- c. Will remain airworthy in its approved roles when operated and maintained in accordance with the Approved Data.

The MTC, and accompanying data sheet, will describe the applicable TCB, provide general information about the Type Design and key conditions or operating limitations.

8. **Full MACP: Major Change.** Successful completion of the full MACP for a Major Change to a Type Design will usually result in the MAA up-issuing the MTC if one exists, or issuing an Approved Design Change Certificate (ADCC) in cases where an MTC has not been issued. In either case, this will be underpinned by the production of a TCR. An ADCC covers similar elements to a MTC, but is limited to the scope of the design change. Where the change to the Type Design of an in-service Air System is so extensive that a substantial investigation of compliance with the applicable TCB is required (for example on the introduction of a new Mark), then the outcome of the MACP is likely to be the issue of an MTC rather than an ADCC.

9. **Tailored MACP.** Tailored application of the MACP will normally result in the issue of a Statement of Type Design Assurance (STDA) to the TAA, again underpinned by a TCR. The STDA will identify the extent to which the MAA has been able to assure the certification evidence provided and will detail any areas where the evidence is unavailable, incomplete or not understood. If the MAA's certification assurance activities conclude that the requirements of the MACP have been met in full, a MTC or ADCC (as appropriate) may be issued rather than a STDA.

**Relationship with RTS Recommendations**

10. The MTC, ADCC or STDA, together with the underpinning TCR, will be used by the TAA in support of the initial RTSR made for the new Air System or a Major Change. As required by RA1013(1) the initial RTSR must be submitted to the Release to Service Authority (RTSA) and the MAA. For new aircraft and Major Changes that result in the Mark Number for the aircraft changing, these recommendations will be subject to independent audit by the MAA. For all other Major

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Changes, it will be decided by the MAA, in consultation with the RTSA and TAA, during Phase 3 of the MACP, as to whether the MAA will carry out an RTSR audit in addition to a TCR

**Urgent Operational Requirements (UORs)**

11. The MAA will take note of the degree of urgency of the Requirement when determining the MACP approach to be adopted for UORs, and the level of rigour to be applied in the assessment of compliance.

## Annexes:

- A. MACP Phases.
- B. Major Changes to Type Design.
- C. MACP Applicability Flowchart.

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## ANNEX A

### MACP PHASES

1. The MACP comprises 6 phases, some of which may run concurrently. The first 2 phases will commence before Main Gate approval, or before Business Case approval for lower value programmes. The TAA must reach an agreement with the MAA on the approach to be taken for the key elements of Phases 1 and 2, before seeking the requisite Main Gate or Business Case approval. The approach to Certification **should** be set out in the Air System Airworthiness Strategy (as defined in RA1220(1)).

#### Phase 1 - Identify the requirement for, and obtain, organizational approvals

2. Organizations with airworthiness responsibilities for the design of new Air Systems or Major Changes must hold appropriate approvals. Normally these **should** be under the MOD DAOS in accordance with RA1005, but alternative approvals may be acceptable where the TAA can demonstrate to the MAA that they are equivalent and appropriate to the prevailing circumstances. Projects intending to place reliance on the approvals of other military regulators or military certification bodies must, as a first step, apply to the MAA for those bodies to be assessed under the MAA's Regulator Recognition Process (RRP) using the Military Authorities Recognition Question Set (MARQ) as the methodology for assessing their competence as laid down in the European Military Airworthiness Document (Recognition) (EMAD(R)) document which is kept up to date through the European Military Airworthiness Authority (MAWA) Forum. A successful recognition will allow approvals or artefacts to be considered as evidence, but does not obviate the requirement to demonstrate equivalence to the MRP. For countries outside of Europe, an External RRP will be delivered by mutual agreement on process between the UK MAA and the regulator of the country of interest, noting that the MAWA Forum is currently working on a recommended process for external recognition.

3. TAAs involved in the introduction of new Air Systems or Major Changes must hold appropriate Letters of Airworthiness Authority, and ensure that the requirements for an Independent Safety Auditor (ISA) and Independent Technical Evaluator (ITE) are considered in accordance with RA1220(3).

#### Phase 2 - Establish and agree the TCB

4. It is necessary to establish the TCB for the Type Design of the Air System or the Major Change. This must be included in the Air System Airworthiness Strategy and involves: selection of the applicable airworthiness codes; a clear statement as to which versions of the selected codes are to be applied; and the identification of any Special Conditions. One of the key differences between the Full and Tailored versions of the MACP is that in the latter case, the TCB will have been established before MAA involvement in the project. Therefore, the approach used for Phase 2 will vary dependent on whether the project is under the Full or Tailored MACP. If the TAA is unsure as to whether the Full or Tailored versions of the MACP **should** be applied, guidance may be sought from MAA Certification Division.

5. **Full MACP Projects.** The initial TCB **should** be proposed by the relevant DE&S Operating Centre Director (OC D) and agreed with the MAA prior to Main Gate (or equivalent) approval for the project. The TCB **should** include relevant supporting Military Certification Review Items (MCRIs). The process includes:

- a. **Selection of Applicable Airworthiness Code(s).** Def Stan 00-970 is the default airworthiness code, but other specifications or standards may be proposed. These will be acceptable where they can be shown to be appropriate and equivalent to Def Stan 00-970. It is incumbent on the TAA to articulate in the TCB, through the MCRIs, how equivalence will be demonstrated. Equivalence evidence **should** be presented in a clear, traceable format and made available to the MAA for review, together with the appropriate underpinning compliance evidence documents. This may be by comparison of elements of Def Stan 00-970 or to other Standards referenced in Def Stan 00-970 as suitable, to the airworthiness codes to which the Air System was designed. As an example, in describing a System's software standard, if equivalence to DO178B (which is referenced in Def Stan 00-970) can be demonstrated, there would be no requirement to demonstrate equivalence to Def Stan 00-55 (which is also referenced as another option in Def Stan 00-970).
- b. **Version of Airworthiness Code to be applied.** Normally, the most recent version of an airworthiness code will be applied. Exceptionally, an earlier version may be acceptable for compatibility with the baseline design of the Air System. In these cases the TAA will be required to demonstrate that this is the most appropriate approach and that any associated risks are managed appropriately.

c. **MCRIs.** MCRIs **should** be used to record Deviations, Special Conditions, new Means of Compliance or any other Certification issues that require clarification and interpretation. The MCRI **should** clearly state the detail of the airworthiness codes being used. Where the TAA intends to use requirements other than those in Def Stan 00-970 (including the other Standards it refers to) these must be articulated as a Deviation, with an explanation of how equivalence will be demonstrated as discussed at Para 5a above. Where extant airworthiness codes are judged to be inadequate these are to be identified through Special Conditions in the TCB. Where extant airworthiness codes cannot be met, but the TAA believes that equivalent levels of safety can be demonstrated, they will be identified as Equivalent Safety Findings (ESF). When a TAA intends to propose new Interpretive Material and Means of Compliance to the TCB, this must be articulated in the MCRIs.

All subsequent amendments to the TCB will be proposed by the TAA and agreed by the MAA.

6. **Tailored MACP Projects.** For projects (either new Air Systems or Major Changes) undergoing the Tailored MACP, the TCB will have been approved under legacy arrangements. The Air System Airworthiness Strategy (RA1220) **should** detail the approach to the TCB, and it **should** be articulated in detail in the Type Certification Exposition (TCE) produced by the TAA as part of the MACP Phase 4 activities. The TAA will be required to demonstrate to the MAA that: an appropriate TCB has been selected; that it has been demonstrated as equivalent to Def Stan 00-970; and that it was appropriately authorized by the relevant OC D in accordance with legacy regulations.

a. **Equivalence to UK Def Standards.** Where Def Stan 00-970 has not been used, then it is incumbent on the TAA to demonstrate the equivalence of the selected airworthiness codes. To demonstrate that the TCB is equivalent to Def Stan 00-970, the TAA may construct an equivalence matrix to an appropriate level of detail and which refers to documentation demonstrating evidence of equivalence. Types of evidence that could be included are: direct comparisons of alternative airworthiness codes to UK Def Stan requirements; comparison of the aircraft design to UK Def Stan requirements; testing (including simulation, flight tests and ground tests) that compare results against Def Stan requirements; and physical inspections by the TAA that demonstrate that the design meets UK Def Stan requirements. This evidence **should** be submitted to the MAA for review, together with the appropriate compliance documentation.

b. **Version of Airworthiness Code to be applied.** The TAA must be able to articulate the version of the airworthiness code that has been used. Normally, this would have been the most recent version of an airworthiness code, at the time of contract signature. However, in some cases an earlier version may have been used for compatibility with the baseline design of the Air System. In these cases the TAA will be required to demonstrate that this was the most appropriate solution.

c. **Subsequent Changes.** After MAA scrutiny activity starts, any changes to the selection of applicable airworthiness codes or versions applied must be proposed by the TAA, endorsed by the OC D, and agreed by the MAA.

7. **Period of Validity of TCB.** In all cases the TCB will be effective for a period of 5 years from the date of initial agreement. If RTS is not achieved within that timescale, a review of the changes to the airworthiness codes that defined the TCB will be required to assess any shortfall against contemporary requirements. The MAA will agree with the TAA which of these changes need to be adopted as part of an updated TCB.

### Phase 3 - Agree the Certification Programme

8. The Certification Programme will be owned and managed by the TAA and agreed with the MAA, and will usually form part of the Integrated Test, Evaluation and Acceptance Plan (ITEAP). For each element of the TCB, the Certification Programme will identify the following, typically in the form of a compliance checklist or matrix:

a. The proposed Means of Compliance, which may include:

- (1) Compliance statement, design review, calculation, analysis, safety assessment, simulation, inspection or equipment qualification.
- (2) Laboratory test, ground test on aircraft or flight test.

In summary this is the evidence from trials, tests and calculations. In the case of tests, the TAA must ensure that either the test specimen conforms to the Type Design, or that any deviations from the Type Design do not influence the test (refer to RA5208).

b. The compliance documents or evidence to be presented.

9. The Programme will also identify when the compliance documents or evidence will be available and include periodic progress reviews between the MAA, TAA and other relevant organizations.

## Phase 4 – Demonstrate Compliance

10. In order to demonstrate compliance, the TAA must provide the MAA with the evidence identified in the Certification Programme. The extent to which the MAA will audit that evidence will be informed by both the extent of the 3<sup>rd</sup> party assurance that the TAA has put in place and a broader risk assessment conducted by the MAA. TAAs will be expected to ensure the design is subject to independent evaluation and audit (refer to RA1220(3)), and design organizations will be expected to have undertaken independent internal compliance verification of all evidence prior to submission. Where the certification evidence does not demonstrate compliance with the TCB, the TAA must assess the consequent risks of the non-compliance. The TAA will be required to demonstrate to the MAA that this risk assessment has been endorsed by the relevant OC D and accepted by the Duty Holder (DH) chain.

11. A TC or Supplemental TC (STC) issued by a recognized civilian or foreign military authority may, with appropriate justification, be presented as evidence, in part or in full, of compliance with the TCB for a military Air System. EASA, the UK CAA and the FAA are automatically recognised by the MAA as providing an appropriate degree of independent scrutiny and assurance that the type design complies with a civil TCB as defined in the TC. Further work on civil-certified aircraft will normally focus on military differences associated with military mission equipment for which no civil airworthiness code exists, and the military usage spectrum which may differ from the assumed civil usage spectrum, which is an assumption underpinning the civil TC. For Air Systems with a TC issued by civilian (other than EASA, UK CAA or FAA) or foreign military authorities, the relevant authority will likely require further assessment under arrangements agreed in Phase 1. Accordingly, when wishing to use an artefact from a foreign military authority the MAA may wish to recognize this Authority using the process set down at Para 2 to this Annex.

12. At the conclusion of this Phase, the TAA must produce a TCE that demonstrates compliance with each element of the TCB, identifying any airworthiness provisions not complied with that are compensated for by factors that provide an equivalent level of safety. The TCE must include details of the Type Design, operating limitations and a draft MTC Data Sheet.

## Phase 5 – Produce Final Report and issue Certificate

13. The MAA will review the TCE to confirm that the design conforms to the TCB, and to determine any areas where compliance evidence is incomplete. The outcome of the MAA's analysis will be a formal TCR that will underpin the subsequent issue of an MTC, ADCC or STDA as appropriate. Where an STDA is issued, the level of Assurance will be based on the extent of MAA engagement with the project and degree of compliance with the MACP. Definitions of the Assurance levels are as follows:

- a. **Full Assurance.** Effective compliance with the Tailored application of MACP demonstrated with no identified non-compliances and/or MAA level of involvement with/oversight of design compliance programme judged sufficient to support degree of Assurance.
- b. **Substantial Assurance.** Effective compliance with the Tailored application of MACP demonstrated, except for a limited number of areas where minor non-compliances have been identified and/or MAA level of involvement with/oversight of design compliance programme judged sufficient to support degree of Assurance.
- c. **Limited Assurance.** Effective compliance with the Tailored application of MACP demonstrated, except for some areas where significant non-compliances have been identified or where MAA involvement has been limited and/or MAA level of involvement with/oversight of design compliance programme limited because of late stage of engagement.
- d. **No Assurance.** Effective compliance with the Tailored application of MACP not demonstrated. Major areas of non-compliance identified in multiple areas of the MACP or MAA involvement insufficient to provide assurance and/or MAA level of involvement with/oversight of design compliance programme insufficient to provide assurance because of late stage of engagement.

14. The MTC, ADCC or STDA as appropriate, along with the underpinning TCR, must be used by the TAA to support the initial RTSR.

## Phase 6 – Undertake post-Certification actions.

15. After a new Air System has been certified there will be ongoing involvement from the MAA if and when Major Changes to the Type Design need approval, and in monitoring Type Airworthiness throughout the Air System's lifecycle. This latter activity will include assurance activities, such as attendance at: Type Airworthiness Reviews; safety meetings; Structural, Systems and Propulsion Integrity Working Groups; condition surveys; Ageing Aircraft Audits and MAA oversight and assurance activities.

**ANNEX B****MAJOR CHANGES TO TYPE DESIGN**

1. The need for MAA certification of a design change is related to the airworthiness implications of the change, including any associated with integration of new equipment or capabilities into the baseline aircraft. Design changes that have significant potential to affect air safety must be categorized as Major by the TAA and notified to the MAA who will carry out independent certification of the change using the MACP<sup>3</sup>. In case of any doubt over categorization, TAAs must seek advice from the MAA. The following Design changes must be classed as Major, unless the TAA can demonstrate to the satisfaction of the MAA that they do not change the air safety baseline as defined by the prevailing TC or configuration and RTS:

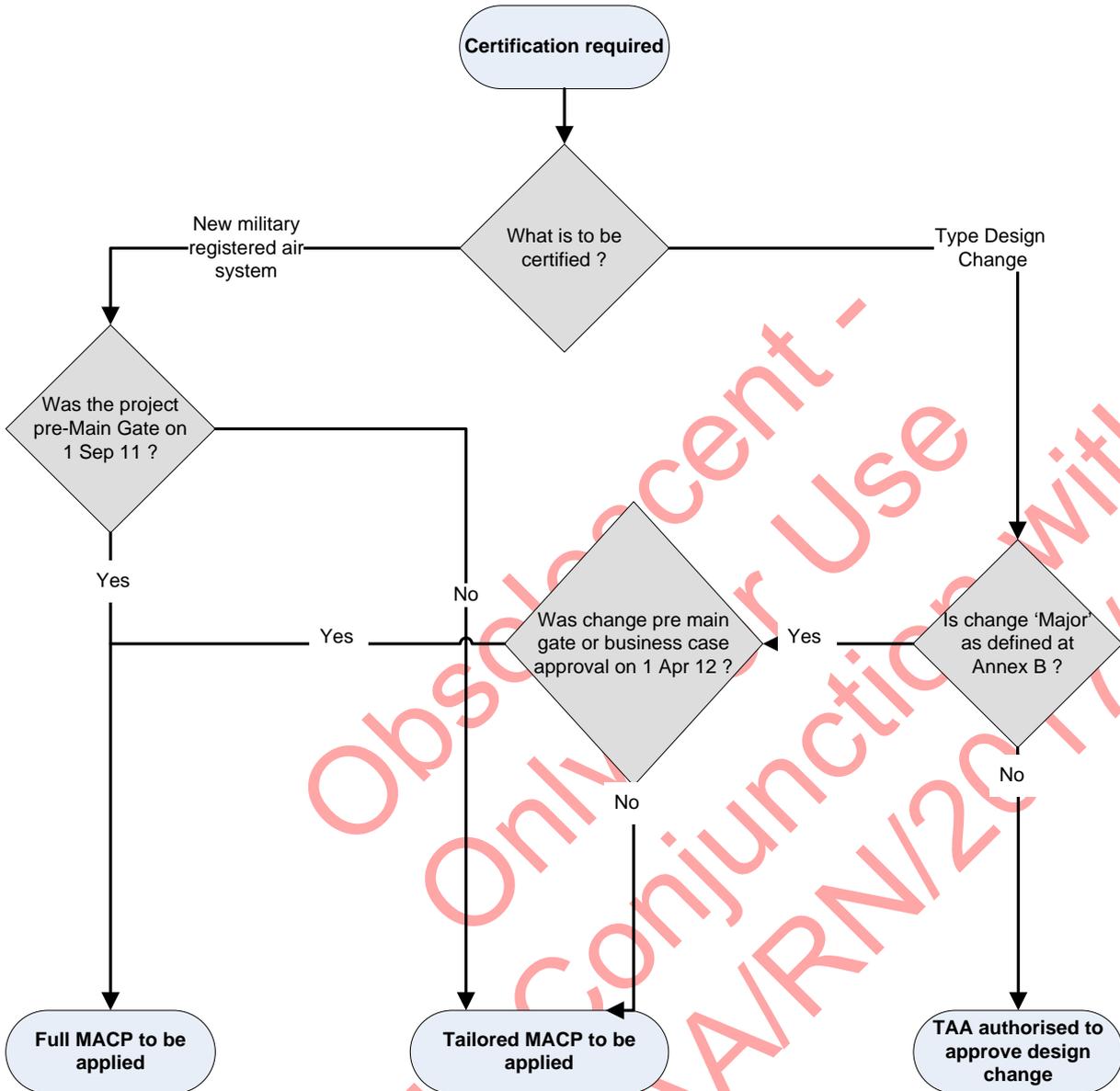
- a. The change results in a Mark number change or the addition of a suffix to the Mark number.
- b. The change involves multiple systems and areas, e.g. as part of a mid-life update, capability sustainment programme or US-style block upgrade programme, but does not result in a Mark number change.
- c. The change results from mitigation action taken to reduce:
  - (1) An Equipment Risk categorized by the TAA as A or B.
  - (2) A Risk to Life that is categorized by the DH as High or Very High.
- d. The worst credible risk of a failure related to the design change under consideration is categorized by the TAA as Category A or B.
- e. The change involves any of the following:
  - (1) Structural changes to the air vehicle that could invalidate previous airworthiness assessments, such as increases in air vehicle all up mass, manoeuvre limits or cleared life.
  - (2) Introduction of a new engine type or Mark number to an existing Air System.
  - (3) Changes with the potential to introduce fire or explosion hazards, e.g. the introduction or modification of any air-to-air refuelling systems, modification of fuel systems or modification of hot air systems.
  - (4) Any modification to the weapons release/firing system, other than minor changes to the hardware installation such as the routing of the wiring.
  - (5) Extensive modification of cockpit instrumentation and/or flight control software, such as the introduction of a 'glass cockpit' or head-up display.

2. For changes other than Major, and which will not therefore be assured by the MAA through the MACP, the TAA must ensure, in accordance with extant DME 5000 series regulations, that the proposed change has undergone an evaluation process in line with the intent of this RA. The appropriate categorization and approval of Type Design changes will be subject to routine MAA assurance and audit.

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<sup>3</sup> Major changes to Legacy aircraft, i.e. aircraft that had achieved RTS by 1 Sep 11, remain subject to the MACP, as described in para 5 of this RA.

**ANNEX C**  
**MACP APPLICABILITY FLOWCHART**



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