# RA 5305 – In-Service Design Changes

**Rationale**

*Following the introduction of an Air System (and related Products, Parts, Appliances, Airborne Equipment and Air Launched Weapons (ALW)) into service it may be necessary to develop design changes which may require Modifications, either to overcome deficiencies or to satisfy new requirements. Proposals for In-Service design changes will be appropriately controlled to avoid impacting on the Safety and Airworthiness of the Air System (and related Products, Parts, Appliances, Airborne Equipment and ALW); this Regulation describes the required control measures.*

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**Regulation 5305(1)**

## In-Service Design Changes – General

5305(1) The Type Airworthiness Authority (TAA)[1] or Commodity Chief Engineer (CE) **shall** be responsible for managing the design change procedure.

**Acceptable Means of Compliance 5305(1)**

## In-Service Design Changes – General

1. In-Service changes to the Air System Type Design **should** be conducted in accordance with (iaw) the classification[2] and approval process in RA 5820[3]. In-Service design changes to individual Products, Parts, Appliances, Airborne Equipment and ALW **should** be conducted iaw this Regulation.

2. The TAA or Commodity CE **should** ensure that, when selecting an organization for any design change, the organization has been approved under the MAA Design Approved Organization Scheme (DAOS)[4, 5].

3. During the design change procedure, the TAA or Commodity CE **should** manage configuration iaw their respective Configuration Management Plan (CMP)[6].

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## In-Service Design Changes – General

**General**

4. A change in the design does not necessarily require the development and embodiment of a Modification since it could just require a change to the design drawings for future production, or a review of the planned usage. That is the intent of the terminology used in this Regulation.

5. Design changes to items of support and test equipment also need to be effectively managed to prevent impacting Air Safety. Therefore, appropriate arrangements are required that deliver the intent of this Regulation for those items.

6. The TAA or Commodity CE manage the design change procedure to amend the design once it is Under Ministry Control[6].

7. Commodity CE input is required at the earliest opportunity[6].

8. If a design change to a Part, Appliance, Airborne Equipment or ALW is implemented independently from a change in Type design of an Air System, the

[1] Where the Air System is ►not UK MOD-owned, Type Airworthiness (TAw) management◄ regulatory responsibility by either the TAA or Type Airworthiness Manager (TAM) needs to be agreed within the Sponsor's approved model ►◄; refer to RA 1162 – Air Safety Governance Arrangements for Civilian Operated (Development) and (In-Service) Air Systems. Dependant on the agreed ►delegation◄ of TAw responsibilities TAM may be read in place of TAA as appropriate throughout this RA, noting the TAM may not authorize major changes.
[2] Classification in this context means 'Major' or 'Minor', rather than the embodiment priority defined in this regulation.
[3] Refer to RA 5820 – Changes in Type Design (MRP Part 21 Subpart D).
[4] Refer to RA 1005(2): Design Organizations.
[5] Refer to RA 5850 – Military Design Approved Organization (MRP Part 21 Subpart J).
[6] Refer to RA 5301 – Air System Configuration Management.

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Commodity CE will need to ensure that their changed item can be integrated into applicable Air Systems and still meet Certification and Safety requirements[7].

9. The Military Continuing Airworthiness Manager (Mil CAM) has a critical role to play in ensuring the effective embodiment of any Modifications[8], so they will be closely engaged in the development process.

10. Design change proposals can be initiated for many reasons[9], including:

a. Continued development to meet the specification;

b. Address faults experienced In-Service;

c. Fulfil new operational roles or improve operational effectiveness in existing roles;

d. Improve reliability, maintainability or cost-effectiveness;

e. Counter obsolescence.

11. The TAA or Commodity CE will give due consideration to the non-exhaustive list of factors detailed in the Modification Proposal Form example within Defence Standard (Def Stan) 05-057[10] prior to, and during, the design change procedure.

**Management Procedures and Responsibilities**

12. The Local Technical Committee (LTC)[6] will consist of technical and operating stakeholders to conduct the technical management of the design change procedure and any associated Modification(s). The LTC may be supported by specialist sub-groups if required, such as for development of detailed Modifications or for software-intensive programmes[7].

**Regulation 5305(2)**

## In-Service Design Changes – Safety

5305(2) The TAA or Commodity CE **shall** ensure that In-Service design changes are conducted within an Air Safety Management System (ASMS)[7].

**Acceptable Means of Compliance 5305(2)**

## In-Service Design Changes – Safety

13. All design changes and associated Modifications **should** be supported by their own Safety Assessment (SA) which **should** demonstrate continued compliance with Certification requirements[3].

14. The TAA **should** conduct a review of the Type Airworthiness Safety Assessment (TASA) when progressing all design change proposals[11].

15. The Commodity CE **should** ensure that the SA for any design change is promulgated to the appropriate Air System TAA for integration into the TASA.

16. The TAA or Commodity CE **should** ensure that design changes are addressed within the project Safety Management activities[12].

[7] Refer to RA 1200 – Air Safety Management.
[8] Refer to RA 4963(1): Modifications and Repairs.
[9] Refer to the Knowledge in Defence website - https://www.gov.uk/guidance/knowledge-in-defence-kid.
[10] Refer to Def Stan 05-057 – Configuration of Defence Materiel.
[11] Refer to RA 5012 – Type Airworthiness Safety Assessment.
[12] Refer to RA 5011 – Type Airworthiness Safety Management System.

**Guidance Material 5305(2)**

## In-Service Design Changes – Safety

17. Managing design changes within an effective ASMS will ensure that they will receive the required focus on Air Safety, and any Hazards which impact on the Air System Safety Case[13] can be appropriately managed. Specifically, RA 5012[11] describes the role of the TASA in supporting the Release To Service (RTS)[14] and Military Permit To Fly (MPTF)[15]. There is also the requirement to seek Defence Equipment and Support (DE&S) Operating Centre Director approval[16] to reject any significant Airworthiness advice which may be received in relation to a proposed design change.

18. The aim will be to meet the requirements of an In-Service design change within the project's Design Safety Target (DST)[17] but in some instances this may not be achievable. In such cases any residual Risk needs to be appropriately managed and communicated to the Aviation Duty Holder (ADH) ►/ Accountable Manager (Military Flying)AM(MF). If the ADH / AM(MF) assesses that the residual Risk is not As Low As Reasonably Practicable and Tolerable[18], they may reject the proposed Design Change stating their rationale.◄

**Regulation 5305(3)**

## In-Service Design Changes – Modification Procedure

5305(3) The TAA or Commodity CE **shall** select the most appropriate Design Organization (DO) to develop the required Modification.

**Acceptable Means of Compliance 5305(3)**

## In-Service Design Changes – Modification Procedure

19. The TAA or Commodity CE **should** task development of the Modification to the DO of the Air System or relevant Product, Part or Appliance wherever possible[19] (termed 'Lead DO' henceforth in this Regulation).

20. When an Alternate DO is tasked to develop an Alternate Design Organization Modification (ADOM)[20], the TAA or Commodity CE **should** ensure that the CMP and the Airworthiness Strategy[21] clearly describe how the intent of RA 5301[6] and this Regulation will be met to retain Configuration, ensure continued access to relevant Design Records, and maintain Air Safety.

21. If an ADOM is developed for integration into an Air System, a Certificate of Design (CofD)[22] **should** be provided for the complete installation as part of the evidence to support the change in Type Design.

22. The TAA or Commodity CE **should** seek a Cover Modification from the Lead DO when an ADOM has been embodied where there is a need to fully incorporate the change into Design Records.

23. Where no Cover Modification is intended, the TAA **should** implement equivalent arrangements to ensure the effective through-life support of modified items and detail them within the relevant Support Policy Statement[23].

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[13] Refer to RA 1205 – Air System Safety Cases.
[14] Refer to RA 1300 – Release To Service.
[15] Refer to RA 1305 – Military Permit to Fly (In-Service), (Special Case Flying) and (Single Task).
[16] Refer to RA 1013 – Air Systems Operating Centre Director - Provision of Airworthy and Safe Systems.
[17] Refer to RA 1230 – Design Safety Targets.
[18] Refer to RA 1210 – Ownership and Management of Operating Risk (Risk to Life). If the modified item is not being fitted to an Air System, the DST requirement does not apply.
[19] The DO (termed here the Lead DO for convenience) will maintain the Configuration Status Record (CSR) (refer to RA 5301 – Air System Configuration Management) and fulfil the requirements of RA 1014 – Design Organization and Co-ordinating Design Organizations - Airworthiness Responsibilities.
[20] In legacy terms this would often have been termed a Service Modification.
[21] Refer to RA 5010 – Type Airworthiness Strategy.
[22] Refer to RA 5103 – Certificate of Design.
[23] Refer to RA 5407 – Support Policy Statement.

**Acceptable Means of Compliance 5305(3)**

24. Regardless of any requirement for Cover Modification action, the Lead DO **should** be informed of the Modification development via the LTC to enable the CSR to be appropriately annotated.

25. The LTC **should** recommend for Configuration Control Board[6] agreement the embodiment priority classification and roll-out plan for all Modifications to be undertaken iaw Def Stan 05-057[10] Annex E.

26. The TAA or Commodity CE **should** ensure the following when implementing design changes via Modification:

a. That the urgency of developing the Modification is appropriate to the embodiment priority allocated, and that progress is actively managed via the relevant committees[24].

b. That clear instructions for embodying the Modification are developed iaw an effective, consistent process and are provided in a Modification Leaflet (ML) in advance of the Modification kits being issued.

c. The ML specifies the tools and equipment necessary to embody the Modification.

d. That the ML specifies how the Modification **should** be recorded, both on the item and in the technical records.

e. That sufficient Modification kits, tools and equipment are provisioned and made available for the Mil CAM to plan embodiment.

f. That amendments to the Air System Document Set (ADS)[25] and Commodity CE-approved Maintenance Manuals are provided which identify all required changes to affected operating, Maintenance and handling instructions. The ML **should** be filed within the Topic 2 series (or equivalent) of relevant publications.

g. A copy of the draft ML is provided to the Officer Commanding Defence Aircrew Publications Squadron (OC DAPS) or competent contractor and the User Authenticator as appropriate to determine its effect, if any, on operation or handling of the Air System[26].

**Guidance Material 5305(3)**

## In-Service Design Changes – Modification Procedure

27. The Lead DO would be the preferred consideration for implementing design changes due to the existing infrastructure for managing design configuration, ADS contributions and through life support. However, the use of Alternate DOs provides the flexibility to embody Modifications of an urgent, special or short-term nature when normal procedures may not be suitable.

28. Careful consideration needs to be given before tasking Modifications to Alternate DOs in the following circumstances due to the potential impact on commercial arrangements and wider interchangeability of equipment:

a. Equipment supplied or maintained by Government agencies outside the MOD, unless a prior agreement has been arranged with the provider;

b. Equipment on loan to the MOD, unless a prior agreement has been arranged with the provider;

c. Equipment that forms part of a global spares pool or Contractor Logistic Support agreement where the Contractor owns the equipment unless a prior agreement has been arranged.

[24] The ADH and Mil CAM will have an input regarding the urgency of developing Modifications for Air Systems.
[25] Refer to RA 1310 – Air System Document Set.
[26] Refer to RA 5406 – Aircrew Publications.

**Guidance Material 5305(3)**

29. If development of the Modification requires a trial installation which takes the Air System outside of its RTS or MPTF (In Service) or MPTF (Special Case Flying) and a Special Clearance[27, 28] is not appropriate, a MPTF will be required[29].

30. The roll-out plan proposed by the LTC will need to consider effective concurrent operation of pre and post Modification Systems where applicable.

**Certificate of Design**

31. Where the design change is undertaken by the Lead DO for the Air System and is deemed to be a Major Change[3], a new CofD will be required; a Minor Change can generally be annotated in the Design Records. RA 5103[22] details minimum requirements for generating a new CofD and the relevant LTC will agree any additional requirements.

**Recording of Modifications**

32. The CSR will reflect the details of the Modification in the Design Records and marking of individual items will be iaw RA 5885[30]. For Products which have been subject to multiple Modifications during production, it may be appropriate to mark the item and annotate its individual record card with a Y-List[31] number for ease of identifying its configuration standard.

**Preparation of Modification Leaflets**

33. Regardless of who is tasked to produce the ML, the TAA or Commodity CE retain responsibility for ensuring their accuracy and suitability for use; the Mil CAM(s) will be closely engaged. Careful configuration control of MLs will be required where the ML and embodiment kits iterate through trial installations as part of development prior to formal issue.

**Cover Modifications**

34. Prior to a Cover Modification being progressed, the Lead DO will, as a minimum, be provided with a general assembly drawing of the proposed Modification for temporary annotation of the Design Records. This will allow appropriate consideration when the Lead DO conducts other activities such as scheming repairs. The decision to not seek Cover Modification action will need to be appropriately justified within the relevant Safety Assessment, given the potential challenges introduced for managing configuration, maintaining the ADS and Commodity CE Maintenance Manuals, increased complexity in conducting Maintenance[32] and ensuring long-term provisioning of spares. Support of the Mil CAM for the proposed support solution will be obtained via the appropriate committee (paragraph 11).

[27] Refer to RA 1305 – Military Permit To Fly (In-Service), (Special Case Flying) and (Single Task).
[28] Refer to RA 1330 – Release To Service Special Clearances.
[29] Refer to RA 5880 – Military Permit To Fly (Development) (MRP Part 21 Subpart P).
[30] Refer to RA 5885 – Identification of Products, Parts and Appliances (MRP Part 21 Subpart Q).
[31] An example of an item Modification record is the MOD Form 753 (Refer to the Manual of Airworthiness Maintenance - Documentation). The LTC may decide (for instance) that Modifications 1 - 100 form Y/1 which will be annotated on the item and its MOD Form 753, rather than listing all 100 Modifications.
[32] The Instructions for Sustaining Type Airworthiness (ISTA) (refer to RA 5815 – Instructions for Sustaining Type Airworthiness) contain the Lead DO's instructions, thus the need to follow the revised Maintenance instructions will be clearly indicated and robustly managed.

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