



29 November 2024

## MAA/RI/2024/06 – Transitional Arrangements for RA 1230 – Design Safety Targets - Issue 7

### Issue

Regulatory Article (RA) 1230 – Design Safety Targets has been reviewed to restructure the RA into 2 new separate sub-Regulations to cover requirements for both newly acquired and currently In-Service Air Systems. For sub-Regulation 1230(3) of the RA, the Regulated Community (RC) will require arrangements to allow transition to the new Regulation. Additionally, given the significant extent of changes to RA 1230 at Issue 7, to keep the RA as succinct as possible, some additional contextual information is required supporting its release.

### Scope

This Regulatory Instruction (RI) details the transitional arrangements for RA 1230 sub-Regulation 1230(3) and provides supporting information for wider content of RA 1230 at Issue 7.

### Aim

This RI is aimed at: Air System Senior Responsible Owners (SRO) / Sponsors; Operating Duty Holders (ODH) / Accountable Managers Military Flying (AM(MF)); Type Airworthiness Authorities (TAA) / Type Airworthiness Managers (TAM); and Design Organizations (DO).

### Implementation

This RI is effective immediately.

### RA 1230 Review

RA 1230 was originally published in 2011 to provide the Regulatory requirement for Design Safety Targets. However, experience of its implementation has highlighted some inconsistencies within the RA which no longer reflect best practice. Therefore, the MAA has restructured the requirements of the RA into 2 new sub-Regulations:

- 1230(2) – For New Air Systems
  - Requires the SRO<sup>1</sup> to establish design Safety Targets.
  - Stipulates that targets are to be set at Failure Condition level<sup>2</sup>.
  
- 1230(3) – For In-service Air Systems
  - Requires TAA / TAM declaration of a design Safety baseline (for ODH / AM(MF) acceptance) against which Type Design changes and emerging Hazards can be measured.

<sup>1</sup> Or Sponsor.

<sup>2</sup> As opposed to whole platform / Air System accident level.



## **Transitional Arrangements - Sub-Regulation 1230(3) only**

For RA 1230 (Issue 7) sub-Regulation 1230(3) the MAA recognizes that time may be required for the RC to implement the new arrangements to declare the design Safety Baseline for In-Service Air Systems, including reviewing supporting evidence where required and updating relevant documentation. To support this, a transitional period of 12 months (until 30 November 2025) is in place.

### **Additional Information**

There are no transitional arrangements for sub-Regulation 1230(2). The requirements of this sub-Regulation are to be complied with for all Air Systems for which an Air System Safety Case (ASSC) Strategy Report has not yet been submitted as of 30 November 2025. For Air Systems for which an ASSC Strategy Report has been submitted prior to this date, sub-Regulation 1230(3) applies at the appropriate juncture commensurate with the transitional period above.

Annex A provides additional detailed information for the RC on the background to RA 1230 and the changes presented at Issue 7.

It is anticipated that publication of RA 1230 Issue 7 may impact existing Alternative Acceptable Means of Compliance / Waivers / Exemptions (AWEs) and therefore the RC is to engage the MAA to discuss impacted AWEs as required.

### **Queries**

Any observations or requests for further guidance on the content of this RI should be submitted by email to [DSA-MAA-MRPEnquiries@mod.gov.uk](mailto:DSA-MAA-MRPEnquiries@mod.gov.uk)

## **MAA Head Regulation and Certification**



## Annex A – RA 1230 Issue 7 Supporting Information (No Regulatory Requirements within this Annex)

### Background

RA 1230 was originally published in 2011 to regulate the need to set acceptable Safety Targets for the design of military Air Systems, a critical element being the Acceptable Means of Compliance (AMC) requirement to achieve a cumulative probability of less than  $1 \times 10^{-6}$  per flying hour (FH) for Aircraft loss or a death. The genesis of the RA was JSP 553<sup>3</sup> with much of the content used verbatim. However there has been much evolution in the domain of Airworthiness design since original publication, both in terms of adopting civilian Certification standards, system complexity and Regulatory content<sup>4</sup>. Additionally, accounts from the RC highlighted some difficulty with complying with the Regulation, and these combined factors drove the need for a critical review of RA 1230 within the MAA.

The challenges observed with RA 1230 predominantly fall into the following areas:

- The suitability of the  $1 \times 10^{-6}$  number across all Air System types.
- Confusion on the wording and how the 'number' was presented in the RA and therefore how it is to be applied in design (ie cumulative probability of loss of Aircraft vs probability of death vs probability of both).
- The requirement was not seen as a good 'one size fits all' solution for new Air Systems and In-Service / 'legacy' Air Systems.
- Some of the content was seen as outdated and clarity was required on applicability to Remotely Piloted Air Systems, Historic Aircraft, and Aircraft Assisted Escape Systems (AAES) (as well as other 'event-based' Systems).

In addressing some of these challenges, the MAA has restructured the Regulation in to 2 new sub-Regulations 1230(2) and 1230(3) (noting sub-Regulation 1230(1) has been retained 'Withdrawn', highlighting to the RC that its contents are no longer applicable), and the content of these sub-Regulations is summarised in this Annex. Much of the Safety Target detail is now provided in 1230(2) Guidance Material with a key component being that actual Safety Target values for new Systems must be agreed with the MAA during early engagement on the Type Certification Basis (TCB). Targets are only relevant during initial design activity and, in accordance with 1230(3), once designed the value is fixed (the 'baseline'), the emphasis must be on justifying why the system is, and remains, acceptably safe.

<sup>3</sup> JSP 553 – Military Airworthiness Regulations.

<sup>4</sup> Eg, civilian Certification Specification's (CS) may require military deltas to be applied; onboard systems are no longer Independent; plus the MRP has added discrete Regulations for Type Certification (RA 5810 – Military Type Certificate (MRP Part 21 Subpart B)), Type Airworthiness Safety (RA 5012 – Type Airworthiness Safety Assessment) and overall Safety (RA 1205 – Air System Safety Cases).



## Sub-Regulation 1230(2) - Establishing Design Safety Targets during Acquisition

This first new sub-Regulation is aimed at new Air Systems and is the Regulatory 'hook' for the SRO<sup>1</sup> to establish design Safety Targets at a sufficiently early point during the Acquisition process. In doing so it provides a requirement for these Targets to be adequately captured in procurement contracts and considered at an appropriate design stage by the DO. Targets are agreed with the end user ODH / AM(MF), the TAA / TAM and also the MAA during its scrutiny and follow-on engagement. It also requires the SRO<sup>1</sup> and ODH / AM(MF) to detail their approach to design Safety Targets in their ASSC reports. Similarly, the TAA / TAM is required to include their Targets within their application for a Military Type Certificate and within the Type Airworthiness Strategy.

Accepted practice<sup>5</sup> in the commercial aviation sector is based on historical analysis of Accidents which found that the likelihood of crashes due to technical Causes was approximately  $1 \times 10^{-7}$  per FH (whole Air System). The purpose of setting a quantitative value for a Failure Condition<sup>6</sup> (FC) probability as a design benchmark is to drive a safe design by allowing allocation of individual design budgets to each constituent System contributing to the appropriate FC based on the consequences of their failure. For large commercial Air Systems with approximately 100 Systems (and therefore FCs) assumed, an acceptable probability of  $1 \times 10^{-9}$  per flying hour for each FC was established historically. The overall value of  $1 \times 10^{-6}$  per FH in JSP 553 and earlier versions of RA 1230 is an order of magnitude lower than for commercial transport Aircraft to recognize the different design drivers for military Air Systems and the acceptance of higher societal Risk for military operations.

A key change at Issue 7 in sub-Reg 1230(2) is for targets to be set at System level for identified FCs which can lead to Aircraft loss or death, requiring them to meet 'Extremely Improbable' (EI) probability criteria, rather than earlier versions of the RA 1230 which required targets to be set for cumulative probability of Air System level failures. A problem with focusing at the whole system Accident level was that contributing Systems are no longer independent, and that death could be prevented by use of suitable survival aids (lifejackets / life rafts) which led to earlier Design Safety Targets encroaching into non-technical ASSC aspects rather than the purely technical Airworthiness aspects at which the Regulation is aimed.

Therefore, sub-Regulation 1230(2) Table 1 provides varying 'EI' probability figures for different Air System Types and, in some cases, this is presented as a 'range' of probability figures for which the expectation is that a figure within that range is justified as suitable through engagement with MAA. As part of the MAA's agreement of a suitable design Safety Target, assumptions (eg number / types of FCs) will require validation and hence the need for early, and potentially continuing, engagement with the MAA may be required as designs mature.

As well as requiring these 'quantitative' values for Systems which have a probabilistic failure mode, 1230(2) requires that qualitative targets are established for Systems to which a quantitative figure cannot easily be applied. This includes areas such as software or events such as lightning strike, with the RA directing to the relevant Part of Defence Standard (Def Stan) 00-970<sup>7</sup> and Def Stan 00-055<sup>8</sup> for further guidance.

<sup>5</sup> For example, AMC to European Aviation Safety Agency (EASA) Certification Specification (CS) 25.1309.

<sup>6</sup> A condition that introduces a Hazard to the Air System, caused by one or a combination of lower-level system failures

<sup>7</sup> Refer to Def Stan 00-970 - Certification Specifications for Airworthiness.

<sup>8</sup> Refer to Def Stan 00-055 - Requirements for Safety of Programmable Elements (PE) in Defence Systems.



The above assumes a 'blank canvas' Military design which matures through Acquisition. However, 1230(2) also applies to procured Air Systems which have been Type Certified against a Civil CS; in these cases the targets contained with the applicable CS can be used to support a declaration of design Safety Target achievement.

Key in the approach to design Safety Targets is positive engagement throughout the process and particularly with the MAA Certification Division both early in the Acquisition process and as the design and associated Certification activity progress, to ensure Safety Targets are appropriate.

### **Sub-Regulation 1230(3) - Design Safety Baseline**

Whilst sub-Regulation 1230(2) only applies to Air Systems in the early Acquisition process (both 'blank canvas' design and mature / off-the shelf design), 1230(3) applies both to those acquired Air systems once they transition to In-Service flying and equally applies to Air Systems currently In-Service on the Military Aircraft Register.

Whereas 1230(2) requires setting of Safety targets during design, 1230(3) requires that the 'achieved' position is declared once design is completed. The TAA / TAM declares and justifies the baseline in the Type Airworthiness Safety Assessment (TASA) for acceptance by the end user ODH / AM(MF) via the TASA's feed into the ASSC. This declared baseline then becomes a reference point or benchmark against which to assess the impact of changes in future, including design changes or emerging Hazards.

The methodology used in the declaration of the baseline could be different depending on whether the Air System was subject to 1230(2) or, for example, whether the Air System was already In-Service and potentially complied with earlier versions of RA 1230. In the case of Air Systems to which sub-Regulation 1230(2) has been applied, the declared baseline then provides the assessed / achieved end result at the end of the design process, which may not meet the Target initially aspired to, but robust justification and MAA agreement will be required.

For Air Systems already In-Service, it is acknowledged that there may be varying approaches to compliance across the RC and that many platforms already have a declared cumulative (Air System level) design Safety Target derived in accordance with earlier issues of RA 1230. In the case of these Air Systems, the declaration of the baseline is the 'line in the sand', with which the TAA / TAM argues that the existing Type Design is acceptably safe, at a level accepted by the ODH / AM(MF). The TAA / TAM may choose to use the methodology with which their existing design Safety Target had been formulated and use this existing evidence / data to support declaration of a baseline, provided it provides a compelling argument that the design is acceptably safe (to the ODH's / AM(MF)'s satisfaction). Equally, they could choose to use the system-level Failure Condition methodology used in 1230(2). In the case of an Air System where full compliance or fully substantiated quantitative (or indeed qualitative) targets meeting earlier RA 1230 requirements has not been possible (such as the previous reference to Historic Aircraft in RA 1230 Issue 6) then, again, the onus is on the TAA / TAM to provide a compelling argument and reference position against which future changes can be assessed.

### **Design Safety Targets – Future Activity**



Early drafts of RA 1230 Issue 7 contained additional context to ‘tell the story’ of the evolution of the Regulation. However, this was subsequently condensed, hence the amplifying information within this Annex. A challenge with the development of RA 1230 was to ensure the revision remained focussed on the requirement for Safety Targets to be established early in the project, consistent with a 1000-series RA, and that it did not grow to become a detailed guide to system Safety analysis. The processes to demonstrate compliance with design Safety Targets sits more appropriately within the Military Air System Certification Process.

Whilst these processes are largely well-established within existing standards, the MAA recognise the benefit of additional guidance to the RC, and this will be developed as part of the 2024 / 2025 MAA Regulatory Programme of Work.

Def Stan 00-970 currently includes a number of requirements linked directly to the legacy version of RA 1230 and, specifically, the requirement for a cumulative achievement figure to be calculated. These will be deleted in line with the publication of Issue 7 of RA 1230.

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