Regulatory Instruction

Military Aviation Authority

MAA

30 September 2022

MAA/RI/2022/05 – Transitional Arrangements of the RA 1200 Series

Issue

The Regulatory Article (RA) 1200 Air Safety Management Series has been reviewed, removing the RA 1205[1] requirement for the annual independent assurance of a Live Air System Safety Case (ASSC)[2] and withdrawing RA 1220[3] by transferring content to the more appropriate RA 5000 Type Airworthiness Engineering Regulations. The Regulated Community will require arrangements to allow transition to the new Regulations.

Scope

This Regulatory Instruction (RI) details the transitional arrangements for RA 1205 and RA 1220 and provides an overview of how RA 1220 has been mapped across to the RA 5000 Series.

Implementation

This RI is effective immediately.

Transitional Arrangements for RA 1205

The MAA recognizes that time is required to implement the new arrangements, including completing the independent assurance of the ASSC for any Air System currently or imminently due to become active on the UK Military Aircraft Register where this has not already been achieved under the extant Regulation[4]. To support this, a transitional period of 24 months (until **30 September 2024**) will be in place; however, the relevant Air System Sponsor, ODH or AM(MF) **should** inform the MAA[5] of their requirement by **30 November 2022**, detailing their outline plan to gain independent Assurance of their ASSC.

Transitional Arrangements for RA 1220

The majority of the content in the new RA 5000 series has been rearranged for consistency and clarity, whilst retaining the intent of the original requirements. The MAA does not anticipate that existing compliant systems will need to be entirely rewritten but recognizes that Type Airworthiness organizations will need to commit time to reviewing their own compliance assessment and management tools against the new RA. A transitional period of 6 months (until **31 March 2023**) will, therefore, be in place to account for this review, allowing time for minor amendments or, if necessary, AAMC / Waiver / Exemption applications to be made.

[1] RA1205 – Air System Safety Cases.
[2] Replaced by annual assurance of the Live ASSC by the Operating Duty Holder (ODH) / Accountable Manager (Military Flying) (AM(MF)) at the Air System Safety Working Group.
[3] RA1220 – Delivery Team Airworthiness and Safety.
[4] In accordance with RA 1205 Issue 7.
[5] Email DSA-MAA-Operating-Assurance-Hd@mod.gov.uk.

Additional Information

The following sections of this RI provide additional information on areas identified by the MAA during the consultancy phase of the RA 1200 Series Coherency Multi-Disciplinary Team that would benefit from further explanation.

Compliance During Transition Period

The current versions of RA 1205 and RA 1220 will be withdrawn from the MRP from 30 Sep 2022. To enable continued compliance with these RAs during the transition period, these versions are attached to this RI.

Transition / Mapping of RA 1220 into the RA 5000 Series

The transition of RA 1220 into the RA 5000 Series can be simply explained pictorially:

RA 1220 has been separated to clearly align rationale and purpose in new individual RAs. Detail on independent evaluation and audit has been incorporated in relevant RAs.

Further actions and guidance to align the MAA Regulatory Publications (MRP) with the changes to the RA 1200 Series

Further specific actions to update the MRP and guidance are detailed at Annex A.

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.

DSA MAA Head Regulation and Certification

Annex A to
MAA/RI/2022/05
Dated 30 Sep 2022

Further actions and guidance to align the MRP with the changes to the RA 1200 Series

RA / Manual	Issue	Title	Guidance / Future Changes to MRP
RA 1015	10	Type Airworthiness Management – Roles and Responsibilities	**1015(1) Footnote 13 –** Refer to RA 5010 - RA 5013 and RA 5407.
RA 1023	6	Chief Air Engineers – Air Safety Responsibilities	**1023(1) Footnote 6 –** Refer to RA 1200.
RA 1150	3	Airborne Equipment and Airborne Forces	**1150(1) Annex A –** Refer to RA 5010 - RA 5013 and RA 5407.
RA 1161	Initial	Military Registration of Air Systems Operating within the Defence Air Environment	**1161(2) Footnote 15 –** Refer to RA 5012.
RA 1165	2	UK Civil Aviation Authority Oversight of UK Military Registered Air Systems	**1165(1) Footnote 6 –** Refer to RA 5010.
RA 1207	Initial	Air Safety Data Management and Exploitation	**1207(2) Footnote 14 –** Refer to RA 5010. **1207 Annex A page 4 –** Refer to RA 5011. **1207 Annex A page 5 (CAw) –** Refer to RA 5012. **1207 Annex A page 5 (QM) –** Refer to RA 5011. **1207 Annex A page 6 –** Refer to RA 5010 - 5012.
RA 1208	Initial	Flight Data Monitoring	**1208(1) Footnote 14 –** Refer to RA 5407.
RA 1223	Initial	Airworthiness Information Management	**1223(1) Footnote 5 –** Refer to RA 5010.
RA 1310	7	Air System Document Set	**1310(1) Footnote 11 –** Refer to RA 5012.
RA 1330	5	Release To Service Special Clearances	**1330(1) Footnote 5 –** Refer to RA 5012.
RA 1340	4	Equipment Not Basic to the Air System	**1340(1) Footnote 9 –** Refer to RA 5010 - RA 5013.
RA 1370	4	Release To Service Configuration Control and Audit Trail	**1370(1) Para 11 –** Refer to RA 5012. **1370 (1) Footnote 5 –** Refer to RA 5012.

RA / Manual	Issue	Title	Guidance / Future Changes to MRP
RA 1605	2	Remotely Piloted Air Systems Specific S2 sub-category	**1605(1) Footnote 11 –** Refer to RA 5012. **1605(2) Reg(2)b –** Refer to RA 5012. **1605(2) Para 8 –** Refer to RA 5012. **1605(2) Footnote 28 –** Refer to RA 5012.
RA 4061	3	Air Systems Displaying Abnormal Flying Characteristics	**4601(1) Footnote 11 –** Refer to RA 5407.
RA 4700	2	Military Air Environment Quality Policy	**4700 Rationale –** Refer to RA 1200.
RA 5220	6	Special Flying Instructions and Restrictions on Flying	**5220(1) Footnote 3 –** Refer to RA 5012.
RA 5301	4	Air System Configuration Management	**5301(3) Footnote 21 –** Refer to RA 5010 and RA 5047.
RA 5305	6	In-Service Design Changes	**5305(2) Footnote 11 –** Refer to RA 5012. **5305(2) Footnote 12 –** Refer to RA 5011. **5305(2) Para 17 –** Refer to RA 5012. **5305(3) Footnote 21 –** Refer to RA 5010. **5305(2) Footnote 23 –** Refer to RA 5047.
RA 5406	6	Aircrew Publications	**5406(1) Footnote 8 –** Refer to RA 5012.
RA 5602	3	Propulsion Systems Part Lifing, Critical and Common Pool Parts	**5602(5) Footnote 10 –** Refer to RA 5407.
RA 5724	5	Life Extension Programme	**5724(2) Footnote 4 –** Refer to RA 5012.
RA 5725	4	Out of Service Date Extension Programme	**5725(1) Footnote 3 –** Refer to RA 5012.
RA 5726	4	Integrity Management	**5726(1) Footnote 5 –** Footnote deleted.
RA 5810	6	Military Type Certificate (MRP Part 21 Subpart B)	**5810(1) Footnote 4 –** Refer to RA 5010.
RA 5825	2	Fault Reporting and Investigation	**5825(1) Footnote 4 –** Refer to RA 5010 - RA 5013 and RA 5407.

RA / Manual	Issue	Title	Guidance / Future Changes to MRP
RA 5850	6	Military Design Approved Organization (MRP Part 21 Subpart J)	**5850 Rationale –** The first sentence and Footnote 1 deleted.
RA 5875	3	(European Technical Standard Order (MRP Part 21 Subpart O)	**5875(1) Footnote 4 –** Refer to RA 5012.
RA 5880	7	Military Permit To Fly (Development) (MRP Part 21 Subpart P)	**5880(2) Footnote 11 –** Refer to RA 5010-RA 5013 and RA 5407.
MAS	7	Manual of Air Safety	**Chapter 2 Cross-References –** Refer to RA 5010 - RA 5013 and RA 5407.
MASIM	3	Manual of Air System Integrity Management	**Chapter 2 Footnote 24 –** Refer to RA 5012.
MMAC	3	Manual of Military Air System Certification	**Chapter 2 Footnote 17 –** Footnote deleted. **Chapter 2 Footnote 19 –** Refer to RA 5011.
MMAR	Initial	Manual of Military Airworthiness Recognition	**Footnote 16 –** Refer to RA 5010.
MAM-P	2.4	Manual of Airworthiness Maintenance - Processes	**Chapter 4.2.1.2 –** Refer to RA 5047. **Chapter 9.2.1.2 –** Refer to RA 5010 - RA 5013 and RA 5407. *NB: Not technically part of the MRP, but the MAA publishes it.*

►This RA has been substantially re-written; for clarity no change marks are presented – please read RA in its entirety◄

RA 1205 - Air System Safety Cases

Rationale

Military Air Systems are complex and often have unique and emerging capabilities that present complicated developmental challenges; moreover, the operation of Military Air Systems presents a foreseeable and credible Risk to Life (RtL). A simple risk assessment will not be sufficient to assess the potential impact of these RtL, whereas the use of a safety case provides the ability to understand the cumulative and/or interrelated risks from the use of the complex system. This Regulatory Article (RA) requires that all Air Systems on, or destined for, the UK Military Aircraft Register (MAR) have a robust Air System Safety Case (ASSC) that will demonstrate that the Air System is, or will be capable of being, safe to operate and operated safely for a given application in a given operating environment.

This RA is supported by the Manual of Air System Safety Cases (MASSC) which provides comprehensive Guidance Material regarding ASSCs.

Contents

Definitions

Definitions Relevant to this RA

1. **ASSC**. An ASSC is a structured argument, supported by a body of evidence that provides a compelling, comprehensible and valid case that an Air System is safe for a given application in a given environment. It is through-life, pan-Defence Lines of Development (DLoD)[1] and addresses a combination of the physical components, procedures and human resources organized to deliver the capability.

2. **Senior Responsible Owner (SRO)**[2]. The SRO is the single individual with overall responsibility for ensuring that a programme meets its objectives and delivers the projected benefits[3]. For civil-initiated procurement of MRCOA which will not be operated in the interest of the MOD, and therefore not subject to the MOD procurement process, this applies to the programme manager responsible for successful delivery of the programme.

Applicability

Applicability of this RA

3. All Air Systems on the UK MAR.

4. All Air Systems destined for the UK MAR.

5. All SROs responsible for the introduction, development or modification of Air Systems on, or destined for, the UK MAR.

6. All Operating Duty Holders (ODH)/Accountable Managers (Military Flying) (AM(MF)) responsible for the operation of Air Systems on the UK MAR.

[1] DLoD is used throughout the Ministry of Defence, particularly in acquisition. It describes the lines of development that a project needs to consider to be effective using the TEPIDOIL acronym (Training, Equipment and technology, Personnel, Information, Doctrine and concepts, Organization, Infrastructure and Logistics).

[2] Where a programme is initially the responsibility of a Capability Development Sponsor, the Sponsor is responsible for discharging the duties of the SRO detailed within this RA until such time as the SRO is appointed. For clarity, both this RA and the MASSC refer to the SRO throughout, so as to distinguish the role from that of the Crown Servant Sponsor of a Military Registered Civil-Owned Aircraft (MRCOA) as detailed in RA 1019 - Sponsor of Military Registered Civil-Owned Aircraft - Air Safety Responsibilities.

[3] As defined in Managing Successful Programmes (MSP), MOD Knowledge in Defence.

Regulation 1205(1)

The Air System Safety Case and Air System Safety Case Report(s)

1205(1) An ASSC **shall** be produced for Air Systems on, or destined for, the UK MAR. The ASSC **shall** be articulated via an ASSC Report.

Acceptable Means of Compliance 1205(1)

The Air System Safety Case and Air System Safety Case Report(s)

The ASSC

7. The ASSC **should** consist of a claim (or number of claims), a structured and explicit argument, and a supporting body of evidence, that together provide a compelling, comprehensible and valid case that an Air System is safe to operate and being operated safely within a clearly defined context[4].

8. Development of the ASSC **should** begin at the concept stage[5], with safety arguments considered during capability design and selection, and be managed through to disposal.

9. Development of the Air System's safety requirements and context of use **should** be influenced by the current, or intended, operators and maintainers of the Air System. For a unique and emerging technology, with no end-user expertise, an appropriate Suitably Qualified and Experienced Person (SQEP) stakeholder group **should** be established.

10. The ASSC **should** be managed via an Air Safety Management System (ASMS) established and maintained in accordance with (iaw) RA 1200[6].

11. The ASSC **should** explicitly address the Human Factors aspects associated with the operation and maintenance of the Air System.

12. The ASSC **should** explicitly address the inclusion, or justified exclusion, of safety-enhancing technologies and techniques from across the aviation industry, both during the initial development of the capability and once in-service[7] through periodic review of the ASSC. Examples of such technologies[8] and techniques include, among other things: Collision Warning Systems, Terrain Awareness and Warning Systems, Cockpit Voice/Flight Data Recorders, Windshear Alerting Systems, Wire-Strike Protection Systems and Flight Data Monitoring programmes.

13. The ASSC **should** address all operations being, or intended to be, conducted with the Air System. The ASSC **should** explicitly address any higher-technical merit and/or higher-risk activities and present a coherent and convincing safety argument backed up by valid supporting evidence, which might be bespoke to these capabilities; such operations include, among other things: Night Vision Device operations, air-to-air refuelling, embarked operations, degraded visual environment operations, training for contested airspace operations, the use of equipment and/or procedures cleared under an Operational Emergency Clearance (OEC) and operations with reduced safety margins[9].

14. As the ASSC develops, it **should** enable the following:

a. Provision of an 'ASSC Strategy' which effectively argues that the capability has the potential to be managed safely across all DLoDs through its lifecycle.

b. Provision of an 'ASSC Acquisition Basis' which argues that consideration of the operating risks has influenced capability design/selection, how the Pan-

[4] That is, for a given application(s) in a given operating environment(s).
[5] The first stage of the CADMID cycle (Concept, Assessment, Demonstration, Manufacture, In-service, Disposal).
[6] Refer to RA 1200 – Defence Air Safety Management.
[7] The term 'service', when used in the context of an Air System being 'in-service' or 'introduced into service', refers to the phase where the Air System has completed development and is now being used to deliver the capability for which it was intended, be that training or operations. It does not refer to use of the Air System by one of the branches of HM Armed Forces (ie the Services – Navy, Land or Air).
[8] Noting that some safety-enhancing technologies (ie Cockpit Voice/Flight Data Recorder) are mandatory equipment for the Air System to achieve Type Certification iaw RA 5810 – Military Type Certificate (MRP 21 Sub Part B).
[9] For example, tasks utilising approved Reduced Operating Standard or Military Operating Standard take-off and landing performance.

Acceptable Means of Compliance 1205(1)

DLoD safety requirements have been identified and how they will be substantiated.

c. Provision of a 'Live ASSC' which demonstrates, through claim, explicit argument and appropriately cited evidence, that the Air System is safe to operate and operated safely across all DLoDs and that all RtL is both As Low As Reasonably Practicable (ALARP) and Tolerable within a clearly defined context[10].

The ASSC Report(s)

15. An ASSC Report **should** be one document which captures the key components of the ASSC at a point in time; it **should** articulate the safety claim and the safety argument, and summarize the supporting evidence in a clear and concise format.

a. The ASSC Strategy Report (for Initial Gate (IG)[11]) **should** demonstrate that the proposed Air System and the associated processes and measures described are likely to support effective ALARP and Tolerable judgments.

b. The ASSC Acquisition Basis Report (for Main Gate (MG)[11]) **should** demonstrate that the processes and their artefacts have influenced capability design/selection; where this has not been achieved, it **should** demonstrate the additional mitigation measures which are required to be implemented, eg Training Needs Analysis.

c. The ASSC Report(s) associated with the Live ASSC (for either Test and Evaluation (T&E) flying or in-service flying), **should** demonstrate that the processes are supporting effective ALARP and Tolerable judgements within a clearly defined context. A Live ASSC Report **should** be produced prior to activation of the Air System on the UK MAR, and following review of the Live ASSC as required at para 25.

16. To ensure the ASSC Report presents a clear and compelling case, evidence **should** be referenced and only directly transposed into the ASSC Report where critical to the meaning or strength of an argument.

17. Legacy versions of ASSC Reports **should** be considered significant Air Safety related documents and retained iaw RA 1225[12].

Guidance Material 1205(1)

The Air System Safety Case and Air System Safety Case Report(s)

18. **Safety Case Regime**. The safety case regime places the onus on the operator, who understands the Air System and how it will be, or is employed, to identify and manage the risks associated with their activity, rather than simply relying on prescriptive regulation alone. To assist the regulated community, the MAA has produced the MASSC which provides guidance material for the development and management of the ASSC and of the associated ASSC Report(s).

19. **Primacy of the ASSC argument.** As described in the MASSC, an argument without supporting evidence is unfounded, whilst evidence without argument is unexplained and therefore meaningless, regardless of the quality or quantity of that evidence. The overwhelming academic view revolves around the primacy of the safety argument; however, in practice this is often neglected with the emphasis being incorrectly placed on evidence and leaving the connection between the evidence and the argument unexplained. Within an ASSC, it is the safety argument that has primacy, underpinned and supported by evidence.

20. **Safety-Enhancing Technologies and Techniques**. The principle behind para 12 is the requirement to consider good practice as part of any ALARP argument[13]. As such, the design and selection of the Air System has to consider extant safety-enhancing technologies and techniques from across the aviation industry

[10] Refer to RA 1210 – Ownership and Management of Operating Risk (Risk to Life).
[11] The CADMID cycle (Concept, Assessment, Demonstration, Manufacture, In-service, Disposal) for project acquisition management has two approval points, called IG (following the Concept phase) and MG (following the Assessment phase). The MOD is introducing a new approach for investment approvals known as the MOD's Approach to Investment Decisions (MAID); see para 21 for more guidance detail.
[12] Refer to RA 1225 - Air Safety Documentation Audit Trail.
[13] Refer to RA 1210 - Ownership and Management of Operating Risk (Risk to Life) Annex B for more details.

Guidance Material 1205(1)

which are applicable to the intended context, with decision(s) captured within the developing ASSC. The consideration of emerging safety-enhancing technologies and techniques will depend on the anticipated safety benefit, and the maturity of those technologies and techniques against the programme timeline. Once the Air System is In-Service, the periodic review of the Live ASSC (In-Service) will need to confirm that arguments based on the adoption of good practice are still valid, cognisant of any changes in context or adoption of new technologies and techniques across the aviation industry.

21. **MOD's Approach to Investment Decisions (MAID)**. Project MAID is being introduced by the MOD to deliver a more risk-based and proportionate approach to investment approvals. The MAID process will introduce a 3-stage approval process consisting of the Strategic Outline Case (SOC), the Outline Business Case (OBC) and the Full Business Case (FBC). With respect to the application of this RA to capability programmes which have adopted MAID, all references to IG are to be read as OBC and all references to MG are to be read as FBC.

Regulation 1205(2)

Ownership of the Air System Safety Case

1205(2) The SRO or ODH/AM(MF) **shall** develop, manage and own the ASSC subject to the following:

a. An ASSC **shall** have a single owner at any one time.

b. For new capabilities, the SRO **shall** own the ASSC from Concept until transfer of the ASSC to the end-user ODH/AM(MF).

c. The end-user ODH/AM(MF) **shall** take ownership of the ASSC before any RtL is incurred through in-service operation of the Air System.

d. Where T&E flying is to be conducted, the ODH/AM(MF) for the T&E flying **shall** own a separate ASSC specific to the context of the T&E flying.

Acceptable Means of Compliance 1205(2)

Ownership of the Air System Safety Case

Roles and Responsibilities of the ASSC Owner - SRO

22. From nomination as a project SRO and on ownership of the project mandate[14], until transfer of the ASSC to the end-user ODH/AM(MF), the SRO **should**:

a. Manage the development of the ASSC argument and its associated evidence requirements.

b. Ensure delivery of the evidence through Integrated Test, Evaluation and Acceptance (ITEA), or equivalent, which provides the relevant role-relation and independent test and/or evaluation.

c. Ensure that Air Safety considerations are founded in capability requirement design and selection, securing end-user engagement through the Requirements Manager.

d. Ensure appropriate operator, maintainer and ITEA stakeholder engagement during development of the ASSC Strategy and ASSC Acquisition Basis.

[14] Or whatever mechanism is equivalent in civil industry/operators that confers budgetary authority to a nominated programme manager at the start of a programme involving development/procurement of an Air System.

Acceptable Means of Compliance 1205(2)

e. Ensure that a statement of endorsement from the end-user ODH/AM(MF)[15] is available with the IG and MG Investment Appraisal Committee (IAC) submission[16].

f. Secure a MAA scrutiny statement of the ASSC Strategy Report and ASSC Acquisition Basis Report iaw RA 1205(5) paras 45 and 46.

g. Ensure that decisions that have the potential to impact on the safety argument underpinning the subsequent Live ASSC are endorsed by the end-user ODH(AM(MF)[15].

h. Where T&E flying is required during development of a new capability, support the ODH/AM(MF) responsible for conducting the T&E flying to generate the Live ASSC (T&E) specific to the context of the T&E flying.

i. Secure MAA review of a fully-substantiated Live ASSC, articulated through a Live ASSC Report, as part of the Military Aircraft Registration process. As part of the MAA's approval for an Air Systems application for registration on the UK MAR the MAA require evidence that the ASSC can support both an ALARP and Tolerable judgement within a clearly defined context.

j. Manage the development of the ASSC argument, and its associated evidence requirements, when an Air System returns to the developmental domain due to major modification or upgrade project[17].

Roles and Responsibilities of the ASSC Owner – ODH/AM(MF)

23. **T&E Flying.** Prior to accepting any RtL associated with the operation of an Air System for T&E activity conducted during initial capability development or modification, the ODH/AM(MF) responsible for the T&E flying **should**:

a. Own and manage a Live ASSC (T&E) which delivers a substantiated argument for safe T&E flying.

b. Engage with the SRO and/or end-user ODH/AM(MF) to ensure that the T&E evidence requirements are clearly understood and that any role-relatable T&E activity is aligned to the intended in-service operating context.

24. **In-Service Flying.** Prior to accepting any RtL associated with the operation of an Air System in their Area of Responsibility, the end-user ODH/AM(MF) **should**:

a. Implement procedures to review the ASSC as part of the endorsement(s) required by the SRO during ASSC development.

b. Assume ownership and management of the Live ASSC (In-Service) following a review of the ASSC.

c. Ensure the ASMS has been updated to include ASSC management.

25. **Periodic Review.** ODH/AM(MF)s who own a Live ASSC (for either T&E or In-Service Flying) **should**:

a. Formally review the Live ASSC at least annually, producing a Live ASSC Report and Safety Statement.

b. Scrutinise the validity of the Live ASSC argument and supporting evidence as Chair of a pan-DLoD Air System Safety Working Group (ASSWG)[18].

c.

Review of an ASSC

26. In addition to the periodic review of the Live ASSC required at para 25, there will be occasions when changes to either the Air System itself, the operating context for

[15] Where the end-user ODH/AM(MF) has not yet been identified or appointed, endorsement is to be sought from a suitably-empowered representative.
[16] Or equivalent Approving Authority depending on the category case (A-D) of the project.
[17] Refer to RA 5308 - Service Modifications, RA 5312 - In-Service Design Changes and RA 5820 - Changes in Type Design (MRP 21 Subpart D).
[18] Air System Safety Working Group, or AM(MF) equivalent.

Acceptable Means of Compliance 1205(2)

the Air System, or elements of the argumentation supporting the ASSC require a review of the ASSC to be initiated. The requirement to undertake a review of the ASSC **should** be determined by the appropriate ASSC owner, in consultation with the ODH/AM(MF), SRO and Type Airworthiness Authority (TAA) as appropriate. Changes which **should** initiate a review of the ASSC include:

a. A change in the operating context of the Air System.

b. In-service design changes[17].

c. Changes arising from any DLoD requiring change to the Release To Service (RTS)[19] (with the exception of incorporation of existing Clearance with Limited Evidence or OEC).

d. Changes leading to the issue of a new certificate of registration on the UK MAR.

e. Transfer of the Air System to a different operating authority, or as part of ODH/AM(MF) succession.

f. Material change to the safety argument.

g. Major change to Statement of Operating Intent and Usage.

h. A significant Continuing Airworthiness concern.

i. Post an accident, major incident or prior to return to flying.

j. Recognition of a new condition of higher-technical merit and/or higher-risk activity.

k. Adoption of a new safety-enhancing technology and/or technique as good practice by the wider aviation industry.

l. Following any change to the planned Out of Service Date of the Air System.

ASSC Ownership Transfer

27. Transfer of ASSC ownership **should** be captured during a formal pan-DLoD review to ensure continued validity of the ASSC argument and supporting evidence in relation to Air System's new context of use. The transferring owner **should** notify the MAA[20] of the ASSC transfer.

Guidance Material 1205(2)

Ownership of the Air System Safety Case

28. Having a single owner of an ASSC does not limit an Air System type to have a single ASSC; a single In-Service Air System type may be operated by multiple Aircraft Operating Authorities with differing context of use, thus requiring each ODH/AM(MF) operating that type to own and manage a separate ASSC.

29. The principle outlined in para 28 will include those circumstances where an In-Service Air System is transferred to a CFAOS organization[21] for Maintenance Test Flying (MTF). The end-user ODH/AM(MF) will own and manage the ASSC (In-Service) aligned to the full context of in-service flying, whereas the AM(MF) for the CFAOS organization conducting the MTF will own and manage a separate Live ASSC for the specific context of the MTF conducted by that organization. Much of the argument and evidence supporting each ASSC will be common; indeed, the ASSC for the MTF activity may rely heavily on the end-user's Live ASSC (In-Service), but with a much narrower context and a focus on the conduct of the MTF activity. Similarly, the end-user's Live ASSC (In-Service) will include claims relating to the maintenance activity being conducted by the MTF organization. In both cases, a clear articulation of the interface between the organizations, the evidence on which each ASSCs is dependent, and a robust line of communication to highlight any weaknesses will be a fundamental part of the argumentation within each ASSC.

[19] Or equivalent in-service Flight Limitations/Release documentation.
[20] Email DSA-MAA-MRPEnquiries@mod.gov.uk.
[21] That is an organization approved by the MAA to operate military-registered Air Systems; Refer to RA 2501 - Contractor Flying Approved Organization Scheme.

Guidance Material 1205(2)

30. Where an Air System is undergoing T&E flying as part of initial development or modification, the ODH/AM(MF) responsible for the T&E flying will be required to own and manage a separate Live ASSC (T&E) specific to the context of the T&E flying. The Live ASSC (T&E) will therefore exist in parallel to the Live ASSC (In-Service), with the latter being either owned and developed by the SRO, or owned and managed by the end-user ODH/AM(MF). Whilst some elements of the Live ASSC (T&E) and the Live ASSC (In-Service) are likely to be common, the context for each will be different and the overall claim is likely to require a different argument strategy. For example, the argument strategy for the Live ASSC (In-Service) might include reliance on a fully-substantiated equipment safety assessment and RTS to support world-wide operations in poor weather with the Air System flown by any qualified front line crew, regardless of experience. Conversely, the context for the Live ASSC (T&E) is specifically about testing and/or evaluating new capabilities; the argument strategy may therefore focus on the organizational aspects such as the specific competencies of trials personnel, the highly-controlled environment and the specific trials approval / risk assessment processes in place.

31. Amplifying guidance regarding the through life applicability of the ASSC, its influence on the development of a 'safety capable' Air System, the lifespan of ASSC ownership and the changing roles and responsibilities for its management, can be found in the MASSC Chapter 4.

32. The SROs or ODH/AM(MF)s may consider the utility of appointing an ASSC manager to provide consistent oversight of the ASSC.

33. An effective safety case regime recognises that a system is unsafe until it is proven to be safe, and sets primacy in challenging all claims, arguments, evidence and evidence owners to enable the ASSC owner to state that all RtL are both ALARP and Tolerable.

Regulation 1205(3)

The Safety Statement

1205(3) ODH/AM(MF)s **shall** make a Safety Statement as a formal declaration that all RtL associated with an Air System are both ALARP and Tolerable within a clearly defined context.

Acceptable Means of Compliance 1205(3)

The Safety Statement

34. ODH/AM(MF)s **should** issue a Safety Statement that includes:

a. A formal declaration that all current or foreseeable RtL are both ALARP and Tolerable within a clearly defined context.

b. Supplementary information outlining areas of concern with the ASSC or management of RtL.

35. Additionally, ODHs **should** note in their Safety Statement any RtL that has been escalated for higher-level ownership.

36. ODH/AM(MF)s **should** review their Safety Statement:

a. At least annually, following review of the ASSC.

b. Prior to implementing a significant change to an Air System in any DLoD, including change in use or operating context.

c. Following any other change that the ODH/AM(MF) judges to impact on the validity of the extant Safety Statement.

d. As a formal element of ASSC ownership transfer.

37. ODHs **should** present their Safety Statement to their Senior Duty Holder. AM(MF)s **should** present their Safety Statement to the MAA[20].

Guidance Material 1205(3)

The Safety Statement

38. The Safety Statement is a formal, personal confirmation that the RtL for an Air System is both ALARP and Tolerable within a clearly defined context and is supported by an auditable record of key Air Safety related assumptions, decisions and arguments within the ASSC. The Safety Statement may also document a summary of the key issues arising from the ASSC, the understanding and management of which will have enabled the ODH/AM(MF) to sign the Safety Statement.

39. A suggested format for the Safety Statement is provided on the MAA websites.

Regulation 1205(4)

Responsibilities of Organizations Supporting the Air System Safety Case

1205(4) SROs and ODH/AM(MF)s **shall** ensure that heads of organizations[22] delivering elements of the ASSC, understand their roles and responsibilities in supporting the ASSC.

Acceptable Means of Compliance 1205(4)

Responsibilities of Organizations Supporting the Air System Safety Case

40. SROs and ODH/AM(MF)s **should** ensure that Heads of organizations supporting, or delivering elements of, the ASSC:

a. Are responsible for the performance, safety and integrity of those ASSC elements for which they are responsible and/or the services that they provide.

b. Deliver those elements of an ASSC for which they are responsible.

c. Inform the relevant SRO or ODH/AM(MF) of any deviations or deficiencies that might affect the associated ASSC.

Guidance Material 1205(4)

Responsibilities of Organizations Supporting the Air System Safety Case

41. Some of the pan-DLoD elements of an ASSC may be delivered by external organizations outside the direct control of the ASSC owner, such as Release To Service Authorities (RTSAs), Delivery Teams, infrastructure providers, airfield service providers etc. The onus is on the ASSC owner (SRO or ODH/AM(MF) as appropriate) to clearly articulate the responsibilities of such organizations, and the relevance of those responsibilities within the context of the ASSC, to the head of each organization and to ensure they are being delivered.

42. With clearly articulated responsibilities, heads of organizations supporting the ASSC will understand the consequences of failing to deliver in respect of an ASSC.

Regulation 1205(5)

Assurance, Endorsement and Scrutiny of the Air System Safety Case

1205(5) The ASSC **shall** be subject to independent assurance. Additionally, the ASSC **shall** be subject to endorsement and scrutiny at defined points of development.

Acceptable Means of Compliance 1205(5)

Assurance, Endorsement and Scrutiny of the Air System Safety Case

Assurance

43. SROs **should** obtain independent assurance of their respective ASSC Strategy and ASSC Acquisition Basis as part of the IG and MG IAC submissions.

[22] Refer to RA 1020 - Aviation Duty Holders and Aviation Duty Holder-Facing Organizations - Roles and Responsibilities.

Acceptable Means of Compliance 1205(5)

44. ODH/AM(MF)s **should** obtain annual independent assurance of their Live ASSC by demonstrably SQEP individual(s) or organization(s) that are not unduly influenced by commercial, peer or rank/status pressures.

Endorsement and MAA Scrutiny

45. For Air Systems subject to MOD IG and MG approval, the ASSCs **should** be endorsed by the end-user and scrutinised by the MAA at the following points:

a. **Initial Gate**. As part of the IG submission, the SRO **should** prepare an ASSC Strategy Report capturing the ASSC Strategy; this Report **should** be endorsed by the end-user ODH/AM(MF)[15] and copied to the MAA[20] for provision of their scrutiny statement.

b. **Main Gate**. As part of the MG submission, the SRO **should** prepare an ASSC Acquisition Basis Report; this Report **should** be endorsed by the end-user ODH/AM(MF)[15] and copied to the MAA[20] for provision of their scrutiny statement.

c. **Activation on the UK MAR.** The SRO **should** submit the Live ASSC Report (for T&E or in-service flying as appropriate to the stage of development) to the MAA[20] for review prior to activation on the UK MAR as either a Development or In-Service Air System.

46. For civil-initiated procurement of MRCOA which are not subject to MOD IG and MG approval, the following ASSC endorsement schedule **should** be used:

a. The company **should** submit the ASSC Strategy Report to the MAA[20] for review at the same stage as the application for Approval in Principle for registration on the UK MAR.

b. The company **should** submit the ASSC Acquisition Basis Report to the MAA[20] for review at the same stage as the Air Safety Strategy for registration on the UK MAR.

c. The AM(MF) **should** submit the Live ASSC Report, for T&E or in-service flying, to the MAA[20] for review prior to activation on the UK MAR (on which issue of Certificate of Usage would be contingent).

Guidance Material 1205(5)

Assurance, Endorsement and Scrutiny of the Air System Safety Case

47. Those responsible for the development and management of the ASSC may determine the most appropriate means of independent assurance of the ASSC as determined by factors such as the stage of ASSC development and the overall context/complexity of the ASSC. Options may include a suitable Independent Safety Auditor, RTSA, Safety Centre, or the Air Safety Team or Safety Case Manager from another Group or Service, providing that the individual or organization is not unduly influenced by commercial, peer or rank/status pressures.

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RA 1220 - Delivery Team Airworthiness and Safety

Rationale

An Airworthiness Strategy is required for each Air System in order to set down the intended approach to the demonstration and sustainment of Airworthiness through life. Not having the Airworthiness Strategy in place may result in key stakeholders not being sufficiently aware of the Airworthiness management details for each Air System, resulting in the lack of evidence necessary to support Airworthiness decision making. ►Regulatory Article (RA) 1220◄ sets out the requirements and processes necessary to support the Airworthiness Strategy.

Contents

Regulation 1220(1)

Airworthiness Strategy

1220(1) The Type Airworthiness Authority (TAA) **shall** produce an Airworthiness Strategy for an Air System consistent with the Project Through Life Management Plan (TLMP).

Acceptable Means of Compliance 1220(1)

Airworthiness Strategy

1. ►The TAA **should** ensure that:

   a. The Airworthiness Strategy is approved by the Defence Equipment & Support (DE&S) Operating Centre Director (OCD)[1] before Initial Gate (IG) and before Main Gate (MG).

   b. The DE&S OCD approves each issue, and every amendment to, the Airworthiness Strategy[2].

   c. The Airworthiness Strategy is reviewed and approved by the TAA and DE&S OCD within 6 months of a change in incumbent in either post.

   d. Prior to submission to the OCD for approval, the Airworthiness Strategy is forwarded to the MAA, Senior Responsible Owner (SRO), receiving Operating Duty Holder (ODH), current ODH or Accountable Manager (Military Flying) (AM(MF)), the relevant Release To Service Authority (RTSA), DE&S Airworthiness Team and the respective Operating Centre Safety Team (OC Safety Team) for review and comment. The OCD's approval of the Airworthiness Strategy represents their endorsement that Airworthiness aspects of the programme are viable.◄

2. The TAA **should**:

   a. Formulate an Airworthiness Strategy that defines the scope of the project, including the intended military use of the Air System, and details the approach to Airworthiness management.

   b. Ensure that as a minimum, the Airworthiness Strategy contains the attributes detailed within the sections of the exemplar Airworthiness Strategy►◄.

   c. Ensure that the Airworthiness Strategy includes explanation of the four Airworthiness pillars, which comprise:

      (1) Air Safety Management System (ASMS). The approach to establishing an effective ASMS[3] **should** be detailed, and cover, specifically, the relationship (contractual or otherwise) with, and requirements placed upon, stakeholder organizations such as the Front Line Command (FLC) Capability Organization SRO, current or future

[1] ►Refer to RA 1013 – Air Systems Operating Centre Director – Provision of Airworthy and Safe Systems.
[2] Refer to DE&S Air Environment Operating Centres – Safety and Environmental Management System.◄
[3] Refer to RA 1200 – ►◄ Air Safety Management.

Acceptable Means of Compliance 1220(1)

ODH or AM(MF), the Design and Production Organizations, the appropriate Test & Evaluation (T&E) organization[4], the Military Continuing Airworthiness Manager (Mil CAM), and other relevant contractors and other defence equipment organizations (eg Commodity Delivery Teams (DT)).

(2) Recognized Standards. The use of recognized standards to ensure Airworthiness, including the approach to complying with Military Type Certification[5], **should** be detailed, in conjunction with the ODH who has responsibility for Continuing Airworthiness of the Air System or AM(MF) who ►needs◄ to be assured of the Continuing Airworthiness of the Air System.

(3) Competence. The arrangements for ensuring the use of Airworthiness competent persons[6] and competent organizations[7] **should** be detailed, including the process for managing the issue of Letters of Airworthiness Authority[8] and Level K and Level J authorizations to contractors[9].

(4) Independence. The arrangements for ensuring independent (see RA 1220(4)) assessment by the DT, independent technical evaluation, and independent safety audit **should** be detailed.

d. Ensure the Airworthiness Strategy also references the means by which assurance and review of the Airworthiness management activities are undertaken (including confirmation that the DT has sufficient human and capital resource to conduct the task). This is likely to include, but is not restricted to, MAA and Independent Safety Auditor (ISA) Audit, and Quality Management Systems that are active and in place.

3. ►◄

Guidance Material 1220(1)

Airworthiness Strategy

4. The Airworthiness Strategy facilitates the following management elements:

a. Identification and development of project-specific Airworthiness and safety-related standards, guidelines, procedures and training.

b. Ensuring that resource provision is sufficient to produce an airworthy design and to carry out necessary Safety Management activities.

c. Provision of feedback on the effectiveness of the ASMS by means of internal and external audits and closure of corrective actions.

5. Where safety justifications from other Certification bodies are to be used, refer to Annex A of RA 5810[5].

6. If relying on civil or foreign flight manuals or other approved data, the Airworthiness Strategy ►needs to◄ provide evidence and argument that the flight profile, operating environment and the Type and Continuing Airworthiness programmes are relevant, and that arrangements will be put in place to manage any significant differences in terms of design standard and usage where they exist.

Users of the Airworthiness Strategy

7. The TAAs will generate their Airworthiness Strategy to guide their planning of the acquisition of and support to the Air Systems under their responsibility. The TAAs will use the Strategy to lay out how they will satisfy their principal responsibilities.

8. DE&S OCDs will use the document to approve the TAA's approach to delivering airworthy Air Systems.

[4] Refer to RA 2370 – Test and Evaluation.
[5] Refer to RA 5810 – Military Type Certificate (MRP 21 Subpart B).
[6] Refer to RA 1002 – Airworthiness Competent Persons.
[7] Refer to RA 1005 – Contracting with Competent Organizations.
[8] Refer to RA 1003 – Delegation of Airworthiness Authority and Notification of Air Safety Responsibility.
[9] Refer to RA 1006 – Delegation of Engineering Authorizations.

Guidance Material 1220(1)

9. It is recommended that the MAA (►DSA-MAA-OA-ACC@mod.gov.uk◄) is able to review the Airworthiness Strategy prior to IG and MG approvals, as the MAA will use the document to derive confidence that Airworthiness will be ensured in accordance with (iaw) the regulations.

10. The ODHs or AM(MF)s will use the document as part of their overarching Air System ASMS, complementing it with their management of operators, maintainers (via the Mil CAM), infrastructure and airspace management.

The Airworthiness Strategy through the CADMID/T[10] Cycle

11. The Airworthiness Strategy is particularly important in the early stages of the CADMID/T cycle. The first issue of the Airworthiness Strategy is to be available before IG. Thereafter it will evolve with the project, remaining relevant through to disposal.

12. At IG the Airworthiness Strategy is expected to indicate basic details of the policies that the TAA intends to adopt for each Airworthiness pillar.

13. At MG, the Airworthiness Strategy is expected to refine the policies, and indicate the processes, procedures, people and products that the TAA intends to adopt for each Airworthiness pillar.

14. It is expected that after MG, TAAs will be targeting their effort towards the development of the Airworthiness Strategy, detailing their Airworthiness solutions rather than further developing intent. Nevertheless, the Airworthiness Strategy ►needs to◄ be kept up-to-date for future use throughout the life of the Air System as it provides the high level context. Most notably, it is likely to need to be refreshed (and approved) in any of the following circumstances:

a. Changes in approach to the delivery of Airworthiness (perhaps because the assumptions that were made in the original Airworthiness Strategy proved to be incorrect).

b. Changes in commercial arrangements.

c. Major modification to the Air System.

d. Changes in the Air System operating environment and/or usage.

e. Planning the delivery of Airworthiness in a new stage of the CADMID/T cycle.

f. Significant changes in legislation, regulation or policy.

15. Note that where an Airworthiness Strategy is first drafted beyond the concept phase through the CADMID/T cycle (as might be the case for some legacy Air Systems), various documents (including the ASMS associated plan) will typically already be in place. Nonetheless, the documentation of the underlying policies and principles applicable to the Air System in a succinct Airworthiness Strategy remains an essential and valuable exercise.

Addressing Standards in Airworthiness Strategies

16. The Airworthiness Strategy ►needs to◄ address all Airworthiness related standards that the TAA expects to employ to ensure delivery of an airworthy solution and demonstrate compliance with the MAA Regulatory Publications (MRP). At the core of the Airworthiness standards set is the MRP, and the TAA ►will◄ outline their approach to compliance for all relevant aspects of the MRP and detail the top-level processes and standards (eg Defence Standard (Def Stan) 00-056 and Def Stan 00-970) which will guide the project. ►◄

17. ►◄

Regulation 1220(2)

Project Safety Management

1220(2) The TAA or Commodity Delivery Team Leader (DTL) **shall** be responsible for the Safety Management of the Project.

[10] The Concept, Assessment, Demonstration, Manufacture, In-Service and Disposal (CADMID) Cycle. In some cases, Termination of service is more appropriate than Disposal.

Acceptable Means of Compliance 1220(2)

Project Safety Management

Project Safety Management Plan (Project SMP)

18. The TAA or Commodity DTL[11] **should**:

a. Generate and manage the Project SMP in consultation with the relevant other TAAs or Commodity DTLs and the SRO or the ODH[12] depending on the phase of the project.

b. Ensure that the Design Organization (DO) produces and maintains a Project SMP covering their activities, and that this is integrated and co-ordinated with the Project SMP.

c. As part of the Project SMP ensure that a Hazard Log is generated and maintained, containing the minimum attributes listed in Annex A.

19. For an Air System Project SMP, the TAA **should** review the list of Integrity►[13]◄ assurance measures, at least twice yearly and incorporate safety milestone measures into the Project TLMP.

Project Safety Panel (PSP)

20. The TAA or Commodity DTL **should** establish and chair the PSP to support the SRO, ODH or AM(MF), depending on the phase of the project.

21. When risks are identified that ►might◄ lead to a Risk to Life, the TAA or Commodity DTL **should** communicate this to the relevant other TAAs or Commodity DTLs, SRO, ODH or AM(MF). In addition, the PSP **should** ensure satisfactory communication exists between the DT and stakeholders to address any Air Safety and Airworthiness issues.

22. The PSP **should** review the Equipment Safety Assessment(s) and supporting products (including Hazard Log(s)), co-ordinate the Project SMP and provide advice to the appropriate SRO, ODH, AM(MF) and their staff.

Project Safety Committee (PSC)

23. The TAA or Commodity DTL **should** ensure that a PSC is established.

24. The PSC **should** give detailed considerations to the hazards identified by the DO's safety analysis and the tolerability of the safety risks, and make recommendations on the acceptability of the Equipment Safety Assessment that are considered by the PSP.

Guidance Material 1220(2)

Project Safety Management

Project Safety Panel

25. SRO, ODH or AM(MF) involvement with the PSP will vary dependant on project phase; for each phase the relative role of the DTL, TAA, SRO, ODH or AM(MF) is to be described in the Project SMP, and when appropriate, in an Internal Business Agreement.

26. The PSP is to include representatives from the following areas:

a. DT (technical, contracts and finance officers as required).

b. Other relevant TAAs or Commodity DTLs.

c. FLC Capability Organization.

d. RTSA.

e. Aviation Duty Holders (ADH) and Commanders.

f. DO.

g. The appropriate T&E organization.

[11] The Commodity DTL might have responsibility for a number of tems of equipment, each of which would require its own Project SMP.
[12] Noting that for Equipment, as opposed to an Air System, there ►might◄ be several ODHs.
[13] ►Refer to RA 5726 – Integrity Management.◄

Guidance Material 1220(2)

h. Defence Aircrew Publications Squadron.

i. ISA.

j. DE&S OC Safety Team.

k. Specialist advisers where appropriate.

27. To support the PSP the TAA or Commodity DTL may establish one or more Working Groups (WGs) (proportionate to the scale of the Project) to assess hazards or review the integrity of specific systems.

Project Safety Committee

28. If the PSC is for a project that contains many systems (ie upgrading an Air System mark (eg Mk1 upgrade to Mk2)), then the TAA ►will◄ chair the meeting, with DO participation, iaw Def Stan 00-056, (specifically the DO Project Safety Engineer) as the DO may not be the Subject Matter Expert (SME) for all systems within the project.

29. If the PSC is for a project that contains only one system (eg upgrade of rotor blades/engines/TCAS), then the TAA is to ensure that the DO (specifically the DO Project Safety Engineer) is contracted to Chair the meeting, as they will be the system's SME.

Regulation 1220(3)

Equipment Safety Assessment

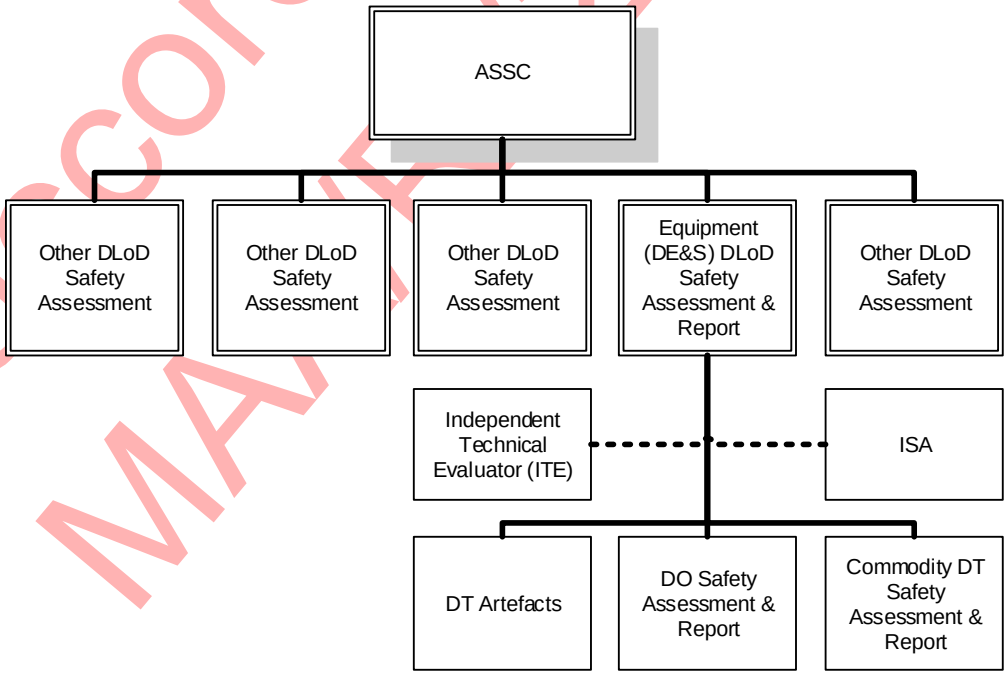
1220(3) The TAA or Commodity DTL **shall** initiate and maintain an up-to-date Equipment Safety Assessment.

Acceptable Means of Compliance 1220(3)

Equipment Safety Assessment

30. The Equipment Safety Assessment[14] for an Air System **should** clearly set down the evidence and arguments used to justify the safety of the Air System so that agreement can be reached on the validity of the conclusions to underpin the Release To Service (RTS) and to be a key component of the ODH's overall Air System Safety Case (ASSC)[15]. The relationship of the ASSC to the Equipment (and other Defence Lines of Development (DLoD)) Safety Assessments is illustrated in Figure 1.

Figure 1. Relationship of ASSC



[14] An Equipment Safety Assessment ►can◄ be written to cover several minor variations to the as-flown configuration by means of compatibility matrices.
[15] Refer to RA 1205 – Air System Safety Cases.

Acceptable Means of Compliance 1220(3)

31. The Safety Assessment for an item of equipment **should** clearly set down the evidence and arguments used to justify the safety of the item such that it can be used to support the host Air System's Equipment Safety Assessment and the ODH's ASSC.

32. The Equipment Safety Assessment **should** be maintained and routinely kept up-to-date throughout the life of the Air System or Equipment.

33. The Equipment Safety Assessment **should**:

a. Define the configuration and operating environment (referencing the Statement of Operating Intent and Usage) for an Air System where appropriate to which it applies.

b. Describe the safety requirements, targets and attributes.

c. Describe the design.

d. Provide a justification for the Airworthiness of the design; this means addressing both new equipment and systems, and the effect of changes to existing equipment and systems.

e. Detail the evidence for Airworthiness, including, as appropriate, the results of analysis, tests and trials carried out by the DO and independent technical evaluation organizations, safety questionnaires for Service Modifications, etc.

f. Identify the limitations and procedures necessary to achieve the required level of safety for the subject configuration.

g. Note that safe operation of the design is dependent upon an effective Support Policy Statement (SPS) iaw RA 1220(5).

34. The Equipment Safety Assessment **should** be summarized periodically in an Equipment Safety Assessment Report. The Equipment Safety Assessment Report **should** be produced to support approval of the project business case at IG and MG, and for Air Systems, as a key component of the ASSC at RTS. Equipment Safety Assessment Reports **should** follow the structure identified in Def Stan 00-056.

35. Where a change to an Air System is not covered by the existing Equipment Safety Assessment, the Assessment **should** be revised. An updated Equipment Safety Assessment Report **should** be produced for an Air System as follows:

a. For Major Changes[16] or changes with a large safety impact, as a complete new issue of the Equipment Safety Assessment Report.

b. For Minor Changes[16] with little safety impact, as an Annex to the previous Report, providing a Safety Statement.

c. At least every 4 years for an In-Service Air System, once a platform is in Service.

d. Additionally, as determined by the TAA.

Safety Analysis

36. The TAA or Commodity DTL **should** ensure that an Equipment Safety Assessment is supported by safety analysis iaw Def Stan 00-056. The safety analysis **should** be carried out by the equipment DO, or by specialist agencies contracted by the DT. The safety analysis **should** be carried out on new Air Systems, equipment, and on subsequent changes.

Commercial Off The Shelf (COTS) Systems and Software

37. The TAA or Commodity DTL for projects involving the use of COTS systems or software **should** ensure that the Equipment Safety Assessment contains an adequate safety justification for the COTS components.

Demonstration of Airworthiness

38. For all military-type Air Systems the TAA **should** commission a Safety Assessment from the DO, to satisfactorily demonstrate the Airworthiness of the design.

[16] Refer to RA 5820 – Changes in Type Design (MRP 21 Subpart D).

Acceptable Means of Compliance 1220(3)

39. For civil derivative Air Systems a suitable argument to demonstrate Airworthiness **should** be constructed by the TAA.

40. The DO's Safety Assessment **should** be based on Def Stan 00-056, or for higher integrity software, Def Stan 00-970 Part 13.

Guidance Material 1220(3)

Equipment Safety Assessment

Safety Analysis

41. The TAA or Commodity DTL is to ensure that, where applicable, the Equipment Safety Assessment:

a. Addresses any differences in the operating environment and usage from those in the certification basis of the competent certifying body.

b. Addresses the risks and mitigations of not complying with UK legislation and standards.

42. The TAA or Commodity DTL may consider seeking advice from:

a. The DO.

b. Other relevant TAAs or Commodity ►DTLs.◄

c. The SRO.

d. The RTSA.

e. Relevant ADHs and Commanders.

f. Appropriate specialists (Defence Ordnance Safety Group and Defence Electromagnetic Environmental Effects Authority) where weapons safety, electromagnetic compatibility or radiation hazard may be involved.

g. The appropriate T&E organization.

h. MAA Certification Division staff where Integrity Management is involved.

i. Specialist agencies.

COTS Systems and Software

43. Generally, COTS components will not be originally designed for use in military Air Systems. One difficulty is that it may not be possible to perform detailed testing or analysis based on knowledge of the design. This limitation implies that many of the current approaches to Airworthiness evaluation are not applicable. Furthermore, it may be difficult to make safety decisions based on the quality of the development process because there is insufficient information. Therefore, evaluation of the safety of a COTS component has generally to be undertaken by analysing its performance. Two possible means are:

a. Functional Test Data. Functional tests can be used to derive test data related to the specification; the tests usually aim to exercise all the functions of the component.

b. Use of Field Data. Data may be available on the safety performance of the component in other, similar applications. However, commercial pressures to produce frequent upgrades of COTS components may mean that data is limited and that priority is given by the manufacturer to providing new features rather than improving reliability.

44. Further guidance on the Equipment Safety Assessment of COTS systems is contained in Def Stan 00-056. Guidance on the assessment of Software of Unknown Pedigree is available ►within the Knowledge in Defence portal◄[17]. Ultimately, Def Stan 00-970 Part 13 refers to acceptable standards for software.

Demonstration of Airworthiness

45. The demonstration of Airworthiness may include design analysis, application of specified standards (such as Def Stan 00-970) and procedures, historical evidence of

[17] http://aof.uwh.diif.r.mil.uk/index.htm.

Guidance Material 1220(3)

successful use of particular design features, system tests, and ground and air tests to arrive at an overall assessment of Airworthiness. The demonstration will be as specified in the Air System or modification contract including the operating conditions to be applied, and may be undertaken during the development phase for the Air System or modification.

Concept Phase

46. The SRO and the TAA or Commodity DTL will ensure that the safety requirements are identified (from the Equipment Safety Assessment) and recorded in the developing ASSC. The ASSC will be in outline form, with the risk analysis being carried out for each business option on a functional basis. By the end of the Concept phase, the TAA or Commodity DTL will have developed the project safety strategy in sufficient detail to demonstrate that:

a. The safety risks are understood.

b. The ASSC can be properly managed throughout the remainder of the acquisition phases.

c. Key milestones and acceptable high-level safety targets have been identified.

Assessment Phase

47. A preliminary Equipment Safety Assessment of each of the competing technical solutions, identifying the hazards and risks through life and the strategies for their control, will be undertaken.

Demonstration, Manufacture and In-Service Phases

48. During the Demonstration phase, the Equipment Safety Assessment and Equipment Safety Assessment Reports will be progressively developed to fulfil two complementary but distinct purposes:

a. The safety of the planned Demonstration phase tests and trials is to be assessed and documented to justify embarking on the trials programme. In particular, prior to commencement of flying or significant trials phases, the safety of flight trials is to be addressed by Equipment Safety Assessment Reports issued in support of the Certificate of Design[18] and Military Permit to Fly[19].

b. Support the design of series production equipment.

Decommissioning and Disposal/Termination

49. The Equipment Safety Assessment will need to address decommissioning and disposal of the Air System, sub-system or Equipment (further guidance is contained in the Defence Logistics Framework), or termination of service. The following are to be covered:

a. Disposal of hazardous materials.

b. Safe recovery and disposal, or neutralization of the hazard if recovery is impractical, following an incident or accident.

c. Scope of the Safety Assessment and supporting justifications when the Air System, sub-system or Equipment is disposed of to a third party or terminated from service.

Regulation 1220(4)

Independent Evaluation and Audit

1220(4) The TAA or Commodity DTL **shall** ensure the Equipment Safety Assessment and Project Safety Management System (Project SMS) is subject to independent evaluation and audit.

[18] Refer to RA 5103 – Certificate of Design.
[19] Refer to RA 5880 – Military Permit to Fly (MRP 21 Subpart P).

Acceptable Means of Compliance 1220(4)

Independent Evaluation and Audit

50. The Equipment Safety Assessment and Project SMS **should** be subjected to independent evaluation and audit consisting of:

a. Independent analysis of the data evidence supporting the Equipment Safety Assessment, including, where appropriate, a qualitative assessment of Air System handling, Human Machine Interface (HMI) and crew workload undertaken by an ITE.

b. An independent process audit against the Project SMP, covering such activities as (but not limited to) the PSP, RTS WG, DT processes, DO's ASMP, carried out by an ISA iaw Def Stan 00-056.

51. The decision whether to undertake a qualitative assessment of Air System handling, HMI and crew workload **should** be made by the SRO or receiving ODH.

52. Both the ITE and ISA **should** be competent and suitably qualified individuals or teams, independent of the outcome or processes they are reviewing.

53. The ITE **should** be recognised as a SME in the field which is being reviewed.

Guidance Material 1220(4)

Independent Evaluation and Audit

54. Care is to be taken to ensure there is no possibility of an organization auditing its own Equipment Safety Assessment or Project SMS.

55. Varying ITEs may be employed to provide evaluation of different aspects of an Equipment Safety Assessment.

56. Where a contractor is employed as ITE, it is to be exclusively by the DT to act on its behalf and not via the Prime Contractor and/or DO; noting that if the MOD has the required competence, and based on the level of acceptable risk, then this technical evaluation (►needs to◄ be an independent evaluation) could be provided from within the DT.

57. Def Stan 00-056 states that the appointment of an ISA is to be at the sole discretion of the MOD. Early appointment will allow the ISA to assess early versions of the Project SMP, assist with tendering and provide safety advice throughout the project's life. The ISA could also provide generic safety advice about the Project SMS to the DT, the DO and other stakeholders.

58. It is acceptable for the ISA and ITE to be involved in the joint working environment between the DT and DO; for example in a Hazard Log WG or in a Combined Test Team approach. Duplication of effort will be avoided if the ISA and ITE work collaboratively with the MOD and DO so that their assessments can be incorporated in the overall project schedule. It is important that the ISA and ITE work is conducted on behalf of the TAA or Commodity DTL and any advice they may have about the design and/or safety is to be directed to them.

Regulation 1220(5)

Support Policy Statement

1220(5) The TAA or Commodity DTL[20] **shall** ensure that a SPS is produced, promulgated and maintained for their Air System or Equipment.

Acceptable Means of Compliance 1220(5)

Support Policy Statement

59. The SPS **should**:

a. Define the on-aircraft and equipment Maintenance philosophies (both preventive and corrective), and the methodology used to develop the relevant Maintenance schedule.

[20] ►To enable the safe and efficient operation of the Air System, Air System SPSs are required detailing specific engineering and supporting administrative actions necessary for the Products, Parts, and Applicances. Where separate SPSs exist (eg for equipment such as APUs, Radars, Ground equipment, etc), they are to be referenced in the Air System's SPS.◄

Acceptable Means of Compliance 1220(5)

b. Detail the Approved Data that ►enables◄ delivery of the Support Policy, including the planned method for promulgating amendments.

c. Identify the equipment and systems which are included within the Equipment Safety Assessment but which are managed and supplied by other DTs, referencing the appropriate individual SPS and the relevant providers.

d. Identify the data to be gathered through life and how it is intended to support the requirements for data exploitation and fault trend analysis.

e. Be promulgated as the first leaflet in the Topic 2(N/A/R)1 or equivalent, with specific support policy requirements identified in subsequent leaflets.

60. The TAA or Commodity DTL **should** ensure that a routine review of the SPS for continued accuracy is included within the Quality Management System. The SPS **should** be issued at initial RTS and reissued following any material change, or at least every 5 years.

61. The SPS **should** contain the minimum requirements listed in Annex B.

Guidance Material 1220(5)

Support Policy Statement

62. The SPS describes the engineering and supporting administrative actions that are necessary to enable the safe and efficient operation of the Air System or Equipment and it forms an essential element of the ASSC, and Air System Document Set that underpins the RTS. A comprehensive SPS is also a key component of the Establish-Sustain-Validate-Recover-Exploit approach to Integrity Management[13].

63. Reviews of the SPS will be carried out in consultation with appropriate Mil CAM and other support organizations, and are to include exploitation of relevant data sources ►◄[21].

64. The Approved Data will encompass Instructions for Sustaining Type Airworthiness[22] provided by the appropriate DO. Approved Data may also include information (such as equipment bay servicing schedules) provided by Competent Organizations or from other DTs, which is ultimately approved for use by the TAA.

65. For off-board systems that contribute to Air System operation (such as Mission Planning tools and Logistic Information Systems (LIS)), it is acceptable for support aspects to be addressed in their individual Safety Assessments rather than requiring a separate SPS. Each Safety Assessment will be referenced by the ASSC.

66. The individual Equipment SPS referenced from the Air System SPS will include systems within the Air System Type Design (such as Avionics and Commodities), Air Launched Weapons and Role Equipment.

67. The TAA or Commodity DTL is to ensure appropriate arrangements are in place with other DTs responsible for delivering the required support according to the related SPS.

68. The Maintenance philosophy ►needs to◄ address aspects such as the rationale for grouping of servicing operations, the anticipated location for their conduct (eg Forward or Depth), and relevant latitudes or periodicities.

[21] Refer to RA 1140 – Military Air System Technical Data Exploitation.
[22] Refer to RA 5810 – Military Type Certificate (MRP 21 Subpart B).

ANNEX A

HAZARD LOG MINIMUM REQUIREMENTS

Attribute	Description
Cause(s)	A cause is a factor which leads directly to an occurrence (MAA02►23◄).
Date Created	Date the hazard is initially registered.
Hazard Title	Hazard Title, will be identified by a unique identifier.
Hazard Description	Detailed description of the hazard.
Hazard Log Description	Description of the system/equipment, the hazard log purpose and details its boundaries.
Pre-Mitigation Risk	Describes the risk severity and probability with reference to the Hazard Risk Index, before controls and mitigation applied.
Hazard Manager	Identifies the person responsible for the day-to-day management of a hazard, its progression, documenting controls, mitigations leading to As Low As Reasonably Practicable (ALARP) justification in preparation for acceptance by the *owner*. In addition the hazard manager is responsible for preparing the periodic review documentation.
Controls	Field indicating the controls (sometimes referred to as mitigation) required to manage a cause/hazard/accident and if they are planned or implemented when related to an individual hazard; will have a unique identifier.
Probability	The frequency/likelihood of a hazard developing into an accident.
Severity	The potential consequence of a hazard .
Hazard Risk Matrix (HRM)	A HRM, used in Defence Aviation (DA), enables classification according to each Single Risk's assessed severity and likelihood. It is designed to enable hazards to be assessed on a like-for-like basis and to assist with the determination of appropriate levels of ADH risk ownership (MAA02►23◄).
Post-Mitigation Risk	Describes the current risk severity and probability with reference to the Hazard Risk Index, after controls and mitigation applied.
Hazard Status	Current status of hazard ie draft, open, closed, managed, approved and date the status changed.
Accident	With respect to Aviation Risk Management, an Accident is the realization of a Hazard becoming a harmful outcome (MAA02►23◄).
ALARP Justification	The evidence and controls required for the owner to declare the hazard ALARP. The residual risk is to be described in all cases for easy identification by the owner. The evidence will be cross referenced, linked to or embedded in the database.
Risk Evaluation	Analysis of a hazard detailing probability and severity of a hazard maturing to an accident. This to be expressed as two values pre and post mitigation.
Risk Owner	The 'Risk Owner' is the person lowest in the aviation chain (Senior Duty Holder, Operating Duty Holder (ODH) or Delivery Duty Holder (DDH)) with the authority for the activity and resource to effect control. Normally the DDH or ODH .
Links	Links from cause to hazard to accident, linking in control measures.
Review Date	The date the hazard was last reviewed and when next due.

Database Administrator – It is recommended the database administrator and his deputy are the only people to have 'Write' access.

[23] ►Refer to MAA02 – Military Aviation Authority Master Glossary.◄

ANNEX B

AIR SYSTEM OR EQUIPMENT SUPPORT POLICY STATEMENT (SPS) MINIMUM REQUIREMENTS

Section	Description
Introduction	The Introduction provides a brief description of the Air System/Equipment, its operational role, location of operating base(s) and the quantity of Air System/Equipment to be supported. The Introduction **should** also highlight any unusual features that are likely to influence support arrangements.
Aim	Detail the aim of the SPS in such a way to define the support arrangements necessary to maintain the aircraft type in the Defence Air Environment.
Management Responsibilities	Detail the authorities and/or organizations with management responsibilities. These ►**should**◄ include the following: • DO. • DT or TAA. • RTSA; Operating Authority. • FLC. • Unit (Forward and Depth). • ►Continuing Airworthiness Management Organization.◄
Security Aspects	Detail the security classification of the Air System/Equipment.
Engineering Maintenance Philosophy	Describe the preventive and corrective Maintenance philosophies (in ►Forward/Depth and Base/Line◄) applicable to the Air System/Equipment. This would include, but is not limited to: • On-aircraft preventive maintenance philosophy, covering: ○ Flight Servicing. ○ ►Preventive◄ Maintenance. ○ Condition-based Maintenance. ○ Contingency-based Maintenance. ○ ►◄ ○ Anti-deterioration Maintenance. ○ De-contamination instructions and Maintenance. ○ Flight Testing. ○ Aircraft Displaying Abnormal Flying Characteristics. ○ Health Monitoring System. ○ Aircraft Weighing. ○ Equipment acceptance. ○ Maintenance of equipment in storage. ○ Calibration. ○ Flight Simulation and Synthetic Trainers (FsAST) installed equipment. ○ ►Dehumidification. • Limits for the deferral of Preventive Maintenance, and limits for the extension of: ○ Explosives Maintenance lives (these also need to be detailed in the Joint Service Munitions Control Register). ○ Extensions to component scrap, reconditioning, bay Maintenance and textile scrap lives.◄ • On-aircraft corrective Maintenance, covering: ○ Identification of Maintenance philosophy. ○ Allocation of on-aircraft corrective Maintenance. ○ ►◄ • ►Policy for the acceptable use of an environmentally sealed, in-line, crimped splice in the Air System's Electrical Wiring Interconnect System.◄ • Continuous charge, in particular: ○ Specify the roles covered by the authorization. ○ State any limitations, eg flying hours, number of landings. ○ Detail specific checks to be undertaken by aircrew.

	• Equipment controlled by other DTs – authorized equipment to be maintained in-phase with the Air System Maintenance cycle is to be detailed in the Topic 2(N/A/R)1. • Component Maintenance – detail the arrangements for off-aircraft preventive and corrective Maintenance of components. • Surface finish – detail the surface finish philosophy. • Embarked aviation – due to the additional risks associated with operations in the maritime environment, where necessary risk assessments ►**should**◄ be completed to suit the environmental conditions. Specific engineering procedures and appropriate washing routines are to be detailed in the Topic 2(N/A/R)1. • Integrity Management – identify the major factors affecting Integrity Management and the procedures to be used for fatigue management. • Software support – describe the arrangements for software support. • Quality assurance – detail the appropriate Quality Management System. • Safety and environment – detail how the safety of the Air System/Equipment in its operating environment ►**should**◄ be managed. In particular identify the safety hazards to the equipment, in-use and during Maintenance. A non-exhaustive list of topics to be considered is: ○ Environmental: thunderstorm warnings, refuelling operations. ○ Contamination of the Air System/Equipment by body fluids. ○ Chemical Biological Radiological Nuclear procedures. ○ Radio frequency. ○ High voltages. ○ Hazardous materials. ○ Laser emissions. ○ Maintenance precautions, in particular handling Electro-Sensitive Semiconductor Devices. ○ ►Maintenance precautions, in particular working in Hardened Aircraft Shelters/Rubb Hangar.◄
Armed Air System	Where appropriate, define the procedures in the aircraft Topic 2(N/A/R)1 and appropriate Topic 5 for the following processes: 1. Maintenance on armed Air Systems. 2. Maintenance on Air System armament systems. 3. Armed Air System safety precautions.
Independent Inspections	Detail a list of those systems that are subject to Independent Inspection in the appropriate system chapters of the aircraft Topic 1, and where appropriate in any of the following publications: 1. Aircraft Topic 5A2 – Warnings, Cautions and Maintenance Notes (Army). 2. Aircraft Topic 5A2, Chapter 4 – Cautions (RAF). 3. Aircraft Topic 5A2, Chapter 5 – Systems Requiring Independent Checks. 4. Aircraft Topic 2(N/A/R)1 – General Orders and Special Instructions.
Personnel and Training	Specify the trades and levels of skill/experience to be employed, ensuring that the levels set are the minimum required for the task.
Test and Support Equipment	Identify any of the following as required: 1. General Purpose Test and Measurement Equipment. 2. Special-to-Type Test Equipment. 3. Ground Support Equipment (GSE). 4. Special-to-Type GSE. 5. Special-to-Type hand tools.
Technical Information (TI)	Air Publications – identify the authorized ►Air Publications◄ for the Air System/Equipment and the standard to which they are written. Maintenance Schedules – identify the authorized Maintenance schedules for the Air System/Equipment. Engineering Maintenance Documentation – detail the Maintenance documentation applicable to the Air System/Equipment.

	Fault Report Procedures – detail the fault reporting and Mandatory Fault Reporting Instruction procedures applicable to the Air System/Equipment. Special Instructions (Technical) (SI(T)) – detail the arrangements for issuing SI(T). Fatigue Data – state the arrangements for recording and handling fatigue data. Joint-Service Responsibilities – detail the procedures for obtaining support from, or providing support to, other Services.
Facilities	Air System Support – identify the resources required to support the Air System/Equipment, including any Contractor-run Maintenance organizations. Accommodation – identify the ►technical◄ accommodation and any infrastructure requirements. FsAST – specific where applicable FsAST are located (the FsAST DT provides support for all FsAST).
Information Technology (IT) Resources	IT System – detail any IT systems that are provided exclusively to support the Air System/Equipment. LIS – detail the utilization of LIS for the Air System/Equipment.
Deployment Plans	Detail the provision for logistic support in response to the build-up of Air System/Equipment deployment, including dispersed deployment. ►◄
Product Support – Through Life Management Plan (TLMP)	The TLMP provides the support solution for the Air System/Equipment. It documents the requirement to maintain an effective support system that ►**should**◄ include a process for obsolescence management and spares scaling. This section of the SPS ►**should**◄ include the arrangements for: • Post-Design Services. • Modifications. • Industry and contractual support. • Post-production support.
Supply Support Philosophy	DTs are to deliver an assured support solution through the use of the Support Solutions Envelope, which contains four Key Support Areas (KSA): • Sustainability (KSA 1). • Support Engineering (KSA 2). • Joint Support Chain (KSA 3). • Logistics Information (KSA 4). Detailed advice and guidance on the application of KSA 3 to individual projects is available from the Supply Chain Support, Support Solutions Teams based at MOD Abbey Wood for Fixed Wing projects and Royal Naval Air Station (RNAS) Yeovilton for Rotary Wing projects.