

RA 1801 – Air System Environmental Cases

Rationale

Aviation activity has adverse effects on the natural environment for example, through its production of noise and engine emissions. Without adequate tools and processes for managing the Environmental Impacts of UK military registered Air Systems, opportunities to minimize these adverse effects may be missed. This Regulatory Article (RA) requires the Environmental Impacts associated with Air Systems on, or destined for, the UK Military Aircraft Register (MAR) to be managed via an Air System Environmental Case (ASEC).

Contents

Definitions Relevant to this RA

Applicability of this RA

1801(1): The Air System Environmental Case and Air System Environmental Case Report

1801(2): Ownership of the Air System Environmental Case

Definitions

Definitions Relevant to this RA

1. **Environmental Impact**¹. An adverse or beneficial change to the environment resulting from the organization's environmental aspects.
2. **Best Practicable Environmental Option (BPEO)**². The outcome of a systematic and consultative decision-making procedure which emphasises the protection and conservation of the environment across land, air and water.
3. **Aircraft Operator**. The person who at the relevant time has Responsibility³ for the management of the military Aircraft. This might be a Delivery Duty Holder or Accountable Manager (Military Flying).

Applicability

Applicability of this RA

4. All Air Systems on, or destined for, the UK MAR⁴.
5. All Senior Responsible Owners (SROs)⁵ responsible for the introduction, development or Modification of Air Systems on, or destined for, the UK MAR.
6. All Delivery Team Leaders (DTLs), or other nominated individual, responsible for the environmental management of Air Systems on the UK MAR.
7. All Aircraft Operators responsible for the operation of Air Systems on the UK MAR.

Regulation 1801(1)

The Air System Environmental Case and Air System Environmental Case Report

1801(1) An ASEC **shall** be produced for Air Systems on, or destined for, the UK MAR. The ASEC **shall** be articulated via an ASEC Report.

¹ Refer to JSP 418 – Management of Environmental Protection in Defence, Master Glossary.

² Refer to JSP 816 – Defence Environmental Management System Volume 2, Element 5: Supervision, Contracting and Control of Activities.

³ Refer to MAA 02: MAA Master Glossary.

⁴ Civil-registered Aircraft (refer to RA 1166 – UK Civil-Registered Aircraft Utilized and Piloted by the Ministry of Defence and RA 1240 – Chartering of Civilian Air Systems for Military Purposes) are not subject to this RA since civil environmental protection legislation applies.

⁵ For civil-initiated procurement of Civilian-Owned / Civilian Operated Air Systems which do not have a SRO, the programme manager responsible for planning, governing and overseeing the successful delivery of the programme's output / product owns and manages the ASEC until it is transferred to the next ASEC owner in accordance with (iaw) RA 1801(2). Note the programme manager may be from the DT or Industry.

**Acceptable
Means of
Compliance
1801(1)**

**The Air System Environmental Case and Air System
Environmental Case Report**

8. An ASEC **should** consist of a structured argument, supported by a body of evidence that together provide a compelling, comprehensible and valid case that the adverse Environmental Impacts of an Air System have been reduced, where reasonably practicable, or that the BPEO has been applied.
9. Development of the ASEC **should** begin at the concept stage⁶, with Environmental Impacts and any UK environmental legislative requirements being considered during capability design and selection and be managed through to (and including) disposal.
10. The impact of any changes to an Air System's Configuration, role or operating environment that result in a deviation from the original assessment **should** be identified and assessed via the ASEC.
11. The ASEC **should** be managed via an Environmental Management System.
12. The ASEC **should** explicitly address the inclusion, or justified exclusion, of technologies and techniques that would improve the environmental performance of an Air System, both during the initial development of the capability and once in-service.
13. The decision to utilize qualitative or quantitative assessments to support the ASEC argument **should** be explained in the ASEC.
14. To meet the Secretary of State's intent with regards to Defence Derogations, Exemptions or Dis-applications from environmental protection legislation⁷, the ASEC **should** contain specific mention of Aircraft noise, Aircraft engine emissions and Aircraft CO₂ emissions as detailed in paragraphs 15-19.

Aircraft Noise

15. When an Aircraft on, or destined for, the UK MAR falls into one of the International Civil Aviation Organization (ICAO) Annex 16 classifications defined for noise Certification purposes⁸, the noise standards set within Annex 16 **should** be utilized as a benchmark to support an environmental assessment⁹. Where an Aircraft does not fall into one of the ICAO Annex 16 classifications defined for noise Certification purposes, the environmental assessment **should** still be completed but it is accepted that the assessment will not be against an ICAO defined benchmark.
16. Noise-Power-Distance curves and associated spectral information **should** be referenced in the ASEC and provided to the relevant stakeholders to support the creation of Military Aviation Noise Contours iaw RA 1800¹⁰.

Fuel Venting Requirements

17. The ASEC **should** assess the potential for intentional discharge of liquid fuel from the fuel nozzle manifolds during the engine shutdown process following normal flight or ground operations¹¹. The likelihood of this occurring **should** be reduced by design but, where this is not practicable, the impact needs to be controlled by processes implemented by the Aircraft Operator.

Aircraft Engine Emissions¹²

18. When an Aircraft on, or destined for, the UK MAR has engines that fall into one of the ICAO Annex 16 classifications defined for emission Certification purposes¹³, the emissions standards set within Annex 16 **should** be utilized as a benchmark for an environmental assessment¹⁴. Where the engines fitted to the Aircraft do not fall into

⁶ The first stage of the CADMID cycle (Concept, Assessment, Demonstration, Manufacture, In-service, Disposal).

⁷ Secretary of State for Defence Policy Statement - Health, Safety and Environmental Protection in Defence revised April 2020.

⁸ ICAO Annex 16 Environmental Protection, Volume I – Aircraft Noise.

⁹ Where civil noise certificates are available these can be used as evidence within the ASEC and further noise assessment is not required.

¹⁰ Refer to RA 1800 – Aerodrome and Air Weapon Range Aviation Activity – Management of Environmental Impacts and Risks.

¹¹ ICAO Annex 16, Volume II, Part II, Chapter 2 – Prevention of Intentional Fuel Venting.

¹² Aircraft engine emissions include: smoke; non-volatile particulate matter (nvPM); unburned hydrocarbons; carbon monoxide; and oxides of nitrogen.

¹³ ICAO Annex 16 Environmental Protection, Volume II – Aircraft Engine Emissions.

¹⁴ Where civil engine emissions certificates are available these can be used as evidence within the ASEC and further engine emissions assessment is not required.

Acceptable Means of Compliance 1801(1)

one of the ICAO Annex 16 classifications defined for emission Certification purposes, the environmental assessment **should** still be completed but it is accepted that the assessment will not be against an ICAO defined benchmark.

Aircraft CO₂ Emissions

19. When an Aircraft on, or destined for, the UK MAR has engines that fall into one of the ICAO Annex 16 classifications defined for CO₂ emissions Certification purposes¹⁵, the CO₂ emissions standards set within Annex 16 **should** be utilized as a benchmark for an environmental assessment¹⁶. Where the engines fitted to the Aircraft do not fall into one of the ICAO Annex 16 classifications defined for CO₂ emissions Certification purposes, the environmental assessment **should** still be completed but it is accepted that the assessment will not be against an ICAO defined benchmark.

20. The ASEC **should** support the Aircraft Operator's responsibilities under RA 1802¹⁷.

The ASEC Report

21. An ASEC Report **should** be one document which captures the key components of the ASEC at a point in time. It **should** articulate the environmental argument and summarize the supporting evidence in a clear and concise format.

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

Guidance Material 1801(1)

The Air System Environmental Case and Air System Environmental Case Report

23. Whilst UK civil legislation requires UK civil registered Aircraft to comply with the environmental standards set by ICAO, it is deemed impracticable to require military registered Air Systems to comply with the ICAO environmental standards or to create bespoke environmental standards for military registered Air Systems. Instead, the ASEC will be used to understand and reduce, where reasonably practicable, the adverse Environmental Impacts of an Air System within the context of the operational requirement.

24. **Technologies and techniques that reduce adverse Environmental Impacts.** The principle behind paragraph 12 is the requirement to consider good practice as part of any environmental case. As such, the design and selection of the Air System has to consider extant technologies and techniques that improve the environmental performance of an Air System and are applicable to the intended context, with decision(s) captured within the developing ASEC. The consideration of emerging technologies and techniques will depend on the anticipated environmental benefit, and the maturity of those technologies and techniques against the programme timeline. Once the Air System is in-service, periodic review of the ASEC 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.

25. When considering the management of the adverse Environmental Impacts associated with the operation of an Air System it is important to consider all the likely Air System operating locations eg at an Aerodrome, away from the Aerodrome, in the low flying system.

26. MOD environmental protection policy can be found in:

- a. JSP 816 – Defence Environmental Management System.
- b. JSP 418 – Management of Environmental Protection in Defence.

27. Environmental considerations for the Acquisition process can be found in JSP 655 – Defence Investment Approvals.

¹⁵ ICAO Annex 16 – Environmental Protection, Volume III – Aeroplane CO₂ Emissions.

¹⁶ Where civil CO₂ emissions certificates are available these can be used as evidence within the ASEC and further CO₂ emissions assessment is not required.

¹⁷ Refer to RA 1802 – Aviation Greenhouse Gas Emissions.

**Regulation
1801(2)**

Ownership of the Air System Environmental Case

- 1801(2) The SRO or DTL **shall** develop, manage and own the ASEC subject to the following:
- a. An ASEC **shall** have a single owner at any one time.
 - b. For new Air Systems, the SRO **shall** own the ASEC from concept until transfer of the ASEC to the DTL.

**Acceptable
Means of
Compliance
1801(2)**

Ownership of the Air System Environmental Case

Roles and Responsibilities of the ASEC Owner – SRO

28. From nomination as a project SRO and on ownership of the project mandate, until transfer of the ASEC to the DTL, the SRO **should**:
- a. Own and manage the development of the ASEC argument and its associated evidence requirements.
 - b. Ensure that environmental considerations are founded in capability requirement design and selection.
 - c. Ensure appropriate stakeholder¹⁸ engagement during development of the ASEC.
 - d. Manage the development of the ASEC argument, and its associated evidence requirements, when an Air System returns to the developmental domain due to major Modification or upgrade project¹⁹.

Roles and Responsibilities of the ASEC Owner – DTL

29. The DTL **should**:
- a. Assume ownership and management of the ASEC on handover from the SRO. This will follow a review of the ASEC during which the DTL confirms that they understand the environmental argument and associated body of evidence.
 - b. Ensure appropriate engagement with the Aircraft Operator is maintained to enable effective management of the ASEC.
 - c. Formally notify the relevant stakeholder(s)²⁰ of any Environmental Impacts and obtain their acceptance of them, noting that the DTL will continue to own the ASEC.

Roles and Responsibilities of the Aircraft Operator

30. The Aircraft Operator **should**:
- a. Provide the SRO and / or DTL with information from an operating perspective that will be relevant to the development and Maintenance of the ASEC, including any change in the operating context of the Air System.
 - b. Understand the adverse Environmental Impacts associated with the operation of the Air System as outlined in the ASEC.
 - c. Where possible and reasonably practicable to do so, employ operating measures that will reduce the adverse Environmental Impacts. These measures will be captured in the ASEC.
31. For Special Case Flying Air Systems²¹ where no DTL exists, the Aircraft Operator **should** produce the ASEC. The Sponsor³ **should** ensure that the Environmental Impacts articulated in the ASEC are acceptable to the MOD.
32. **Review of the ASEC.** The requirement to undertake a review of the ASEC

¹⁸ Including Aircraft Operators, DTLs, Front Line Commands, relevant Contractor Flying Approved Organization Schemes, and Heads of Establishment (HoE) representatives at relevant MOD Aerodromes.

¹⁹ Refer to RA 5305 – In-Service Design Changes; and RA 5820 – Changes in Type Design (MRP 21 Subpart D).

²⁰ The individual with responsibility for managing the Environmental Impact identified in the ASEC, such as Aircraft Operator, HoE (see RA1800 for HoE responsibilities), Maintenance organization etc.

²¹ Refer to RA 1163 – Air Safety Governance Arrangements for Special Case Flying Air Systems.

**Acceptable
Means of
Compliance
1801(2)**

should be determined by the appropriate ASEC owner. Changes which **should** initiate a review of the ASEC include, but are not limited to:

- a. A change in the operating context of the Air System.
- b. In-service Design Changes²².
- c. A change to the environmental case argument²³.

**Guidance
Material
1801(2)****Ownership of the Air System Environmental Case**

33. A single in-service Air System type may be operated by multiple Aircraft Operators with differing context of use. Where the Environmental Impacts associated with each context differ, the ASEC will need to capture this clearly but there is no requirement to maintain separate ASECs for each Aircraft Operator.

²² Primarily Major in-service Design Changes iaw RA 5305 – In-Service Design Changes; and as defined in RA 5820 – Changes in Type Design (MRP 21 Subpart D).

²³ Including, but not limited to: changes to environmental legislation or MOD Policy; changes to relevant project stakeholders or the information available from them; or as a result of an Environmental Incident as defined in Joint Service Publication (JSP) 418 – Management of Environmental Protection in Defence, Master Glossary.

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