

RA 1210 - Ownership and Management of Operating Risk (Risk to Life)

Rationale

Aviation Duty Holders (ADHs) and Accountable Managers (Military Flying) (AM(MF)s) have a personal Duty of Care for parties affected by their operations. Failure to ensure a suitable and sufficient Risk Assessment is conducted and the findings acted upon accordingly, will potentially expose individuals to Risks that are neither As Low As Reasonably Practicable (ALARP) nor Tolerable. This RA supports ADHs / AM(MF)s in the ownership and management of Risks to Life (RtL) and to ensure such Risks are ALARP and Tolerable.

Contents

- 1210(1): Risk Ownership**
- 1210(2): Risk Management**
- 1210(3): Standardized Approach to Risk**
- 1210(4): Emerging Hazards and Risks**

Regulation

1210(1)

Risk Ownership

1210(1) As the Risk owners, ADHs / AM(MF)s **shall** always remain accountable for operating RtL¹ within their Area of Responsibility (AoR).

Acceptable Means of Compliance 1210(1)

Risk Ownership

ADH Risk Ownership

1. ADHs **should** use the Defence Aviation Hazard Risk Matrix (HRM) and clearly document their Risk ownership, (detailed at Annex A), and referral / escalation protocols in their Air Safety Management System (ASMS).
2. If a RtL is identified that ►ADHs◄ consider to be of potential Societal Concern², ►this **should be held at a level no lower than Senior Duty Holder (SDH)**.◄ Secretary of State (SofS) **should** be informed for consideration of the wider implications before SDHs accept such a Risk.
3. Director General Defence Safety Authority (DG DSA) **should** be informed in parallel when Risks are referred up to SDHs or the SofS.
4. As a formal element of ADH succession activities, all existing Hazards and Risks that present a credible RtL **should** be reviewed by incoming ADHs to ensure they are personally content that all RtL are ALARP and Tolerable considering the effectiveness of any extant mitigation measures.

AM(MF) Risk Ownership

5. AM(MF)s **should** clearly document the HRM and Risk Management processes (detailed in Annex A paras 6 and 7), and that all operating RtL is owned by the AM(MF), within their ASMS.
6. If a RtL is identified that AM(MF)s consider to be of potential Societal Concern², the SofS **should** be informed (via the relevant MOD Sponsor) for consideration of the wider implications before AM(MF)s accept such a Risk.
7. MOD Sponsors **should** inform DG DSA in parallel when Risks are referred up to the SofS.
8. As a formal element of AM(MF) succession activities, all existing Hazards and Risks that present a credible RtL **should** be reviewed by incoming AM(MF)s to ensure they are personally content that all RtL are ALARP and Tolerable considering the effectiveness of any extant mitigation measures.

¹ The MAA02: Military Aviation Authority Master Glossary provides definitions for RtL, Hazard and Risk which are to be used in conjunction with this RA.

² Reducing Risks, Protecting People (R2P2) – ISBN 0 7176 2151 0, Published 2001 offers assistance to understanding this field.

**Guidance
Material
1210(1)**

Risk Ownership

9. ADHs / AM(MF)s accountable for the RtL of a given activity will be fully engaged in the Risk decision process. In the execution of their specific responsibilities, ADHs are personally accountable to the SofS via their superior ADH chain; AM(MF)s are directly accountable to the SofS.

Societal Concern

10. ► Societal concerns are the Risks or threats from Hazards which impact on society and which, if realised, could have adverse repercussions for the institutions responsible for putting in place the provisions and arrangements for protecting people, eg Parliament or the Government of the day. This type of concern is often associated with Hazards that give rise to Risks which, were they to materialise, could provoke a socio-political response, eg Risk of events causing widespread or large scale detriment or the Occurrence of multiple fatalities in a single event. ◀

**Regulation
1210(2)**

Risk Management

1210(2) ADHs / AM(MF)s **shall** ensure ► that RtL that they hold ◀ are both ALARP and Tolerable.

**Acceptable
Means of
Compliance
1210(2)**

Risk Management

11. ADHs / AM(MF)s **should** be able to demonstrate that RtL ► has ◀ been reduced to ALARP.

12. ADHs / AM(MF)s **should** be able to satisfy themselves that the Risk exposure is Tolerable, such that people are only exposed where some defined benefit is expected, where the Risk exposure is proportional to the expected benefit and where the Risks are adequately controlled.

13. Operating Duty Holders (ODHs) / AM(MF)s **should** record and justify an argument that Risks are ALARP and Tolerable in their Air System's annual Safety Statements, which support the appropriate Live Air System Safety Case (ASSC) and Latest ASSC Report³.

14. ► ADHs / AM(MF)s ◀ **should** ► understand ◀ both single Risks and the overall Risk⁴ exposure.

a. ► ◀

b. ► ◀

15. ALARP and Tolerable arguments **should** be revisited periodically and on any occasion which suggests a change in associated assumptions or analysis as part of the ADH's / AM(MF)'s Risk review process, to ensure that it remains valid⁵.

**Guidance
Material
1210(2)**

Risk Management

16. ADHs / AM(MF)s need to consider and address any RtL to 1st, 2nd and 3rd Parties⁶.

17. Guidance Material on the standardized approach to ALARP and Tolerable decision making is contained in Annex B.

18. A Risk can be said to be reduced to a level that is ALARP when the sacrifice ► ◀ is "grossly disproportionate" to the decrease in Risk that would be achieved

³ Refer to RA 1205 – Air System Safety Cases.

⁴ Overall Risk is sometimes referred to as 'Aggregated Risk'. Aggregated Risk is defined within the International Organization for Standardization Risk Management vocabulary as: "the process of combining individual Risks to obtain a more complete understanding of Risk". The purpose of Risk aggregation is to provide a more complete picture of the Risks posed by a system, or Risks faced by an individual or group of people, than is given by considering possible Risk outcomes one at a time.

⁵ This Risk review process is expected to be stipulated in the ASMS (see RA 1200 – Air Safety Management) and reflected in the ASSC (see RA 1205 – Air Safety System Cases).

⁶ ► For crewed Aircraft, 1st Parties are Aircrew and Supernumerary Crew, 2nd Parties are other personnel working on Air Systems, or as ground crew, Supernumerary Support Crew or duty Passengers (this excludes Passengers not on duty (eg ministers)) and 3rd Parties are the general public and personnel who do not fall within the categories of 1st or 2nd Parties; Remotely Piloted Air System (RPAS) Remote Pilots, Aircrew and Supernumerary Crew are considered to be 2nd Party. ◀

**Guidance
Material
1210(2)**

► (see Annex B); ◀ ADHs / AM(MF)s need to be able to show that this is the case when the decision not to incorporate a recognized Risk reduction measure is made. The balance needs to be weighted in favour of Safety, with a greater “disproportion factor” for higher levels of Risk⁷.

19. Once a Risk has been reduced to ALARP, ADHs / AM(MF)s will balance the residual Risk against the expected benefit to determine whether the Risk is Tolerable. ADHs need to be aware of how much Risk they can accept and when to elevate Risk decisions to a higher level.

20. The validity of an ALARP and Tolerable argument can only be decided definitively by the courts in the event of an Accident or Incident.

21. Heads of ADH-Facing Organizations⁸ need to be cognisant of their responsibilities in the delivery of their outputs and dependencies of their respective ADHs⁹, and to any AM(MF)s that may be similarly influenced / affected, when assessing RtL.

**Regulation
1210(3)**

Standardized Approach to Risk

1210(3) ADHs / AM(MF)s **shall** adopt a standardized approach in managing RtL.

**Acceptable
Means of
Compliance
1210(3)**

Standardized Approach to Risk

22. Superior ADHs **should** ensure a coherent and consistent approach to managing RtL, particularly if lower level ADHs have similar responsibilities or where multiple Air System types operate under a single Delivery Duty Holder (DDH).

23. AM(MF)s **should** ensure a coherent and consistent approach to managing RtL.

24. ADHs / AM(MF)s **should** ensure that Risk Assessments are carried out. The ► following ◀ core elements ► ◀ **should** be conducted ► when carrying out a Risk Assessment: ◀

- a. Hazard identification.
- b. Assessment of the Risk (likelihood, consequence, who is exposed, existing mitigation, and Accountability).
- c. Reduce Risk until ALARP. Ensure residual Risk is Tolerable.
- d. Record significant findings.
- e. Monitor and review.

25. ADHs / AM(MF)s **should** maintain clear, unambiguous and auditable records of each of their Risks including details of Risk decisions and periodic Risk reviews. The minimum information requirements and Risk review process is at Annex C which **should** be used by ADHs / AM(MF)s.

**Guidance
Material
1210(3)**

Standardized Approach to Risk

26. Hazard identification, Risk Assessment, reduction, recording, monitoring and review are key elements in managing RtL and need to be maintained and updated to ensure a coherent Risk picture. Annex D provides further detail on the key elements of Risk Management.

27. ADHs / AM(MF)s will be cognisant of the high levels of Risk exposure associated with military aviation and the requirement for more rigorous Risk Management than that typically expected of activities with lower Risk exposure.

⁷ Further guidance on ALARP is available from ► [Risk Management: Expert guidance - ALARP at a glance](http://www.hse.gov.uk/enforce/expert/alarpglance.htm) (www.hse.gov.uk/enforce/expert/alarpglance.htm). ◀

⁸ 'Heads of ADH-Facing Organizations' includes Type Airworthiness Authorities (TAA), Type Airworthiness Managers (TAM), Commodity Delivery Team Leaders, Heads of Establishment (HoE), Military Continuing Airworthiness Managers (Mil CAMs), etc.

⁹ Refer to RA 1020 – Aviation Duty Holder - Roles and Responsibilities.

**Regulation
1210(4)**

Emerging Hazards and Risks

1210(4) ADHs / AM(MF)s **shall** be involved in the understanding and management of emerging Hazards and Risks.

**Acceptable
Means of
Compliance
1210(4)**

Emerging Hazards and Risks

28. ADHs / AM(MF)s **should** identify, record and manage emerging Hazards that undermine RtL mitigations, within the relevant ASSC.

29. ADHs / AM(MF)s **should** ensure that emerging Safety Risks derived from current and future Air System types, Systems, ► **Type Design Changes**, ◀ technologies, environments and activities¹⁰ are managed in accordance with (iaw) this RA.

**Guidance
Material
1210(4)**

Emerging Hazards and Risks

30. Emerging Risks may be best managed through an early, pan-Defence Lines of Development (pan-DLoD) focus on the ASSC while the System or ► **Type Design Change** ◀ is still in development. Emerging Risks may ► **also** ◀ arise ► **post Development, for example** ◀ from changes in the operating ► **context**. ◀

¹⁰ Refer to RA 1200 – Air Safety Management.

Annex A

Risk Ownership, Referral and Defence Aviation Hazard Risk Matrix

Service Organizations

1. Risk Ownership.

a. ▶◀ To ensure ▶single Risks are owned at the appropriate level of authority,◀ the following graduated scale **should** be used:

- (1) Very High (VH) Risks - **SDH**.
- (2) High (H) and Medium (M) Risks – **ODH**.
- (3) Low (L) Risks – **DDH**.

b. All operating Risks **should** have an ADH owner and this **should** be indicated in the Risk Register or suitable alternative¹¹. ADHs can delegate the management of Risks to other Suitably Qualified and Experienced Person (SQEP) as and when appropriate. However, as the Risk owners, ADHs **should** always remain accountable for RtL within their AoR.

2. **Defence Aviation HRM.** The HRM at Table 1 enables Risk classification according to each Single Risk's assessed severity and likelihood. ▶It◀ is designed to assist with assessing the Hazards on a like-for-like basis and to determine the appropriate levels of ADH Risk ownership. The position of a Risk in a HRM is not an indication of its ALARP or Tolerable status. ▶A simple, common 4 x 4 HRM is used across the Defence Air Environment¹² to encourage intelligent assessment over subjective and prescriptive numerical assessments¹³.◀

3. Risk Referral.

a. The process for referring Risks classified using the HRM to superior ADHs is outlined below. However, the purpose of referring a Single Risk is not limited to transferring ownership. It also informs a superior ADH's assessment of RtL across the related activity and wider AoR, the importance of the activity being undertaken, and re-evaluation of whether the RtL remains demonstrably ALARP and Tolerable▶¹⁴◀.

b. **Key Principles of Risk Referral.** SDHs **should** ensure:

- (1) Risks are owned at the lowest acceptable level, by ADHs with the appropriate level of authority and resources.
- (2) Positive control of all Risks at the appropriate level through the escalation process.
 - (a) The decision over who is best placed to manage a Risk is separate from Risk ownership.
 - (b) Once escalated, superior ADHs **should** provide formal feedback to the lower level ADHs on the treatment and outcome of the subject Risk. It is the Responsibility of the accepting ADH to ensure that the Risk Register or suitable alternative is annotated accordingly and to establish a review process to monitor the Risk and associated mitigating action.

4. **Risk Severity.** The severity of a Single Risk is an assessment of the worst credible outcome¹⁵ that may result from the Hazard. The severity categories listed below **should** be used by ADHs.

a. Catastrophic. Three or more fatalities of MOD employees¹⁶ engaged in the activity in question¹⁷ or a single fatality of a member of the public.

b. Critical. One or two fatalities of MOD employees engaged in the activity in question ▶◀. A large number of specified injuries¹⁸ **should** also be included in this category.

¹¹ Any suitable alternative **should** enable a record to be kept ▶which meets the minimum requirements detailed within Annex C.

¹² Annex A, Para 7 provides further guidance on CFAOS organisations who may use a different HRM.

¹³ The Nimrod Review (Recommendation 21.E.7) recommended that the Regulator lay down a HRM which is no more than a 4 x 4 matrix grid.

¹⁴ JSP 892 Part 2 Leaflet 4C provides further guidance on considerations to make when transferring Risk.◀

¹⁵ Although the HRM is calibrated on worst credible outcome, care **should** be taken to ensure that ADHs are aware of the full range of outcomes when considering appropriate mitigations.

¹⁶ Including MOD Contractors engaged in MOD-supervised activity.

¹⁷ "MOD employees engaged in the activity in question" refer to the 1st and 2nd Parties ▶◀ who are involved in the activity (including Air System operation, pre-op preparation and post-op wrap up).

¹⁸ Specified injuries are defined on the Reporting of Injuries, Diseases and Dangerous Occurrence Regulations (RIDDOR) 2013 website at: <http://www.hse.gov.uk/riddor/>.

- c. Major. Specified injuries to any person. A large number of reportable injuries¹⁹ **should** also be included in this category.
- d. Minor. Reportable injuries to any person.

5. **Risk Likelihood**. Likelihood is assessed with respect to the ►probability of a specific undesirable consequence occurring. ◀ The appropriate category listed below **should** be used by ADHs:

- a. Frequent. Likely to occur at least several times a year.
- b. Occasional. Likely to occur one or more times per year.
- c. Remote. Likely to occur one or more times in 10 years.
- d. Improbable. Unlikely to occur in 10 years.

Table 1. The Defence Aviation HRM.

		Severity			
		Minor	Major	Critical	Catastrophic
Likelihood	Frequent	M	H	VH	VH
	Occasional	L	M	H	VH
	Remote	L	L	M	H
	Improbable	L	L	L	M

Contractor Flying Approved Organization Scheme (CFAOS) Organizations

6. **Risk Ownership**. For CFAOS organizations all operating RtL are owned by the AM(MF). The decision over who is best placed to manage a Risk is separate from Risk ownership, and AM(MF)s can delegate the management of Risks to other SQEP as and when appropriate. The AM(MF) **should**:

- a. Ensure that the Risk Register or suitable alternative articulates that all operating RtL are owned by the AM(MF), and clearly shows individual Risk managers.
- b. Establish a review process to monitor Risks and associated mitigating actions.

7. Hazard Risk Matrix (HRM) and Risk Management.

- a. AM(MF)s **should** apply the principles of paragraphs 2, 4 and 5 above ensuring that:
 - (1) An HRM appropriate to the organization is employed that enables Risk classification according to each single Risk's assessed severity and likelihood.
 - (2) Risk Severity categories are clearly defined.
 - (3) Risk Likelihood categories are clearly defined.
- b. The position of a Risk in an HRM is not an indication of its ALARP or Tolerable status.

¹⁹ Injuries that result in a worker being away from work or unable to perform their normal work duties for more than seven consecutive days (not counting the day of the Accident). See HSE guidance: <http://www.hse.gov.uk/pubns/indg453.pdf>.

Annex B

ALARP and Tolerable

1. ▶◀
2. ▶ Regulation 1210(2) mandates ADH / AM(MF) to ensure that the R_tL they hold are ALARP and Tolerable.◀ A Risk can be said to be reduced to a level that is ALARP when the sacrifice of further reduction is “grossly disproportionate” to the decrease in Risk that would be achieved▶◀. An ALARP argument will balance the “sacrifice” (in time, money or trouble) of possible further Risk reduction measures against their expected Safety benefit (incremental reduction in Risk exposure).
3. In their Safety Statements³, ODHs / AM(MF)s are required to make an argument that Risks are ALARP and Tolerable; justifying and recording how this conclusion has been reached is an important and vital step in Safety Management. This argument will be revisited periodically in line with ADHs / AM(MF)s Risk review processes or when ▶the operating context◀ has changed to ensure it ▶remains ALARP.◀ The Health and Safety Executive (HSE)²⁰ identifies 2 approaches to supporting an ALARP claim:
 - a. **Good practice justification.** ▶This◀ is based upon the argument that compliance with a recognized code of practice / MAA approved process / guidance / Defence Standard is acceptable. ADHs / AM(MF)s will understand that practices change over time and that “Good Practice” is only the minimum initial standard to achieve.
 - b. **First principles.** ▶This◀ can be further divided into:
 - (1) **Qualitative judgements.** ▶These◀ are founded upon professional and military judgement, common sense and experience from SQEP using the best available evidence.
 - (2) **Quantitative assessment.** ▶This is a systematic Risk analysis approach to quantifying the Risk.◀ A quantitative ALARP argument / judgement will ▶usually consist of◀ a Cost Benefit Analysis (CBA)²¹ and a gross disproportion test, the results of which will be used as evidence to support the ALARP claim. A CBA cannot be the sole determinant of an ALARP decision.
4. The approach chosen to support an ALARP claim can be constructed in a number of ways, which may include one or more of the above. The choice of approach is the ADHs / AM(MF)s Responsibility and is informed by the nature of the Risk. ALARP arguments will therefore consider the wider Risk reduction measures which are available for ‘reasonably practicable’ adoption, in both the short and long term. ▶Once an ALARP decision has been reached, Risk owners will assess how the decision would be judged in the event of an Accident.◀
5. Before exposing an individual to a Risk, a judgement is required of ADHs / AM(MF)s, on whether the Risk is ALARP and the exposure is Tolerable. The HSE defines Tolerable as a “willingness by society as a whole to live with a Risk so as to secure certain benefits and in the confidence that the Risk is one that is worth taking and that it is being properly controlled”²².
6. Given the unique nature of, and unavoidable Hazards associated with Defence Aviation activity, ADHs / AM(MF)s are to ensure that the residual Risk exposure is proportional to the expected benefit. The residual Risk exposure can only be fully understood once the ALARP principle has been applied. It will be noted that what is considered ‘Tolerable’ in one scenario does not necessarily apply to another (eg a residual Risk that, when balanced against an urgent operational need is considered Tolerable, is not necessarily Tolerable when balanced against a need that is less urgent). The HSE highlights that “what is Tolerable may differ in peace or war”²³.

²⁰ Risk Management: Expert guidance - ALARP at a glance (<https://www.hse.gov.uk/enforce/expert/alarpglance.htm>)

²¹ HSE principles for CBA in support of ALARP decisions are detailed at: Risk Management: Expert guidance – HSE principles for Cost Benefit Analysis in support of ALARP (www.hse.gov.uk/enforce/expert/alarpcba.htm)

²² Reducing Risks, Protecting People (R2P2) page 3 – ISBN 0 7176 2151 0, Published 2001.

²³ Reducing Risks, Protecting People (R2P2) page 43 – ISBN 0 7176 2151 0, Published 2001.

Annex C**Risk Recording and Review Process****Risk Recording**

1. ODHs / AM(MF)s are to maintain clear, unambiguous and auditable records of each of their Risks including details of decisions, activities and periodic Risk reviews. For ODHs, all Risks of Catastrophic, Critical and Major severity (definitions at Annex A) **should** be recorded in a Risk Register or suitable alternative^{11, 15}. For AM(MF)s, they **should** apply the same principles iaw Annex A. It is at the discretion of ODHs / AM(MF)s whether to record Minor severity Risks. ► **Table 2 details the minimum information that should be recorded to support effective Risk Management.** ◀
2. ODHs / AM(MF)s **should** own and hold the aggregated view²⁴ of Risks and review them on a regular basis. There **should** be an aggregated individual Air System view and an aggregated view of all Air Systems operated by ODHs / AM(MF)s within their AoRs, which considers pan-DLoD elements and have a suitably senior and empowered nominated Risk Records Manager (RRM). A suitably empowered individual **should** be nominated for the administration of the Risk Management process but this in no way relieves the managers and owners of individual and collective Risks of their personal responsibilities.
3. Once a Risk is identified and recorded, it **should not** be removed from records but **should** be closed only once the Risk no longer has any relevance to, or impacts upon, the operating Risk environment or ODHs / AM(MF)s respective AoRs. Effective safeguards **should** be in place to ensure records are protected from unauthorized access and editing. High confidence backups **should** be made to ensure through-life business continuity and that records cannot be corrupted or lost²⁵.

Review Process

4. Air Safety Steering Groups and Air System Safety Working Groups led by ODHs and equivalent meetings led by AM(MF)s **should** include the review of Risk mitigations, the aggregated Risk and ALARP and Tolerable decisions. More frequent reviews may prove beneficial, particularly where there is a change in circumstances to better understand and manage Risk.
5. ADHs / AM(MF)s **should** consider the frequency of subordinate working groups and attendance of Subject Matter Experts (SMEs) to ensure that sufficient and effective review is achieved, whilst avoiding an unwieldy and unnecessary burden. Minutes or Records of Decisions for the supporting meeting are to be taken, recorded, and relevant activity reported upwards as necessary.

MAA Assurance

6. Artefacts supporting the Risk Management process, including records of Risk decisions, activities and supporting review meetings will be scrutinized during MAA oversight.
7. ►◀

²⁴ The aggregated view is a compilation of an ODH / DDH chain's or an AM(MF)'s standardized Risk Registers or suitable alternatives.

²⁵ Refer to RA 1225 – Air Safety Documentation Audit Trail.

Table 2. Minimum Information Recording Requirements.

Each Risk should have:	Description
A unique identifier (number and / or title)	The unique identifier allows traceability of Risk Management decisions.
Description	A description of the Risk using plain language to provide clarity on the relationship between the specific Hazards and potential consequences.
Current likelihood	Assessed iaw Annex A.
Current severity	Assessed iaw Annex A.
HRM Classification	Assessed iaw Annex A.
Risk owner	Determined iaw Annex A.
Risk manager	The individual managing the Risk as nominated by the ADH / AM(MF).
Existing mitigations	Details the existing mitigations in place (eg barriers (proactive and recovery)). This should refer out to the ASSC and where appropriate high level Safety claims.
Proposed mitigations	Details of the strategies and action plans proposed to mitigate the Risk and any additional strategies or controls required. If known, illustrative costs of proposed mitigations and timescale of action plans should be recorded. Artefacts supporting the Risk Management process, including records of Risk mitigation decisions should be retained.
▶ Target ◀ likelihood	Identifies likelihood post implementation of proposed mitigation. Assessed iaw Annex A.
▶ Target ◀ severity	Identifies severity post implementation of proposed mitigation. Assessed iaw Annex A.
▶ Target ◀ HRM Classification	The severity and likelihood should be recorded using a HRM. Assessed iaw Annex A.
Proposed mitigations status (funded, endorsed, not endorsed (include those rejected as grossly disproportionate))	Details of whether the proposed mitigation is funded, endorsed, not endorsed. Artefacts supporting the Risk Management process, including records of Risk mitigation decisions should be retained. The Rationale for those Risk mitigations rejected as 'grossly disproportionate' should be recorded.
Last review date	Details the date and level of review carried out.
Next review date	Details the date and level of review to be carried out.
Closure date and reference to Risk owner authority to close Risk	Risks should not be removed from records and should only be closed by the Risk owner.

Annex D

Standardized Approach to Risk Management

1. Risk Management is an essential element of an effective ASMS¹⁰. Its implementation is also essential for the higher control and management of Air Safety Risk and will enable Defence resources to be appropriately targeted to that end. The diagram below outlines the key elements and continuous cycle of Risk Management.

Figure 1. Key elements of Risk Management



2. Risk is a measure of exposure to possible loss and it combines the severity of loss (how bad) and the likelihood of suffering that loss (how often). RA 1210 is concerned solely with RtL and so addresses fatality and Injury but excludes damage to assets or the environment where no personal harm results.

3. The following are required as a minimum to manage single Risks:

- a. **Hazard Identification.** Hazards may be identified by a variety of different means: previous Occurrences, reporting, checklists, Hazard and Operability Study (HAZOPS), Zonal Hazard (Safety) Analysis²⁶, error trends, monitoring, Systems-Theoretic Accident Model and Processes (STAMP) etc. Whichever techniques are used, sound Hazard identification depends on the engagement of individuals recognized as SQEP for the activity. A combination of techniques could be selected with the aim of providing high confidence that all credible Hazards have been identified. Once identified, these are to be recorded iaw Annex C.
- b. **Risk Assessment.** ▶ ◀ A potential harmful outcome ▶ of a Hazard is ◀ assessed ▶ against likelihood and severity. It is the worst credible outcome that is used for classification in the HRM. However, ADHs / AM(MF)s needs to be made aware of the full range of outcomes when considering appropriate mitigations. ◀ The assessment may be ▶ carried out using ◀ a range of approaches, ▶ and it is therefore ◀ recognized that the results will only be an estimate ▶ ◀ and subject to uncertainty. Hence, it may also be necessary to consider other more likely outcomes, rather than just the worst credible ▶ ◀. ▶ ◀ The Defence Aviation HRM enables classification according to each Single Risk assessed for severity and likelihood. It is designed to assist ADHs with assessing the Hazards on a like-for-like basis and enable determination of the appropriate levels of ADH Risk ownership (noting that AM(MF)s own all RtL when operating UK military-registered Aircraft). Before

²⁶ Refer to ARP 4761: Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment.

exposing an individual to a Risk, a judgement is required whether the Risk is ALARP and the exposure is Tolerable.

c. **Risk Reduction.** In order that a single Risk is reduced ALARP, Risk mitigation techniques are to be applied. These may range from eliminating the Hazard altogether, to reducing the severity and / or likelihood.

d. **Risk Recording and Escalation.** Once Risk mitigation is applied ADHs / AM(MF)s will assure themselves that the Risk is ALARP and the exposure is Tolerable. Key information regarding Risks decisions and Risk Management activities will be recorded as detailed at Annex C, and communicated across all relevant stakeholders, ie ADHs, AM(MF)s, AMs, and ADH-Facing Organizations. ADHs will be aware of how much Risk they can accept and when to elevate Risk decisions to a higher level.

e. **Risk Monitoring and Review.** ADHs / AM(MF)s will routinely monitor identified Risks. Mitigation activity may take time to implement, therefore ADHs / AM(MF)s ► need to ◀ review the timescales and effectiveness of mitigation plans to ensure that Risks remain ALARP and Tolerable.

4. Due to the high levels of Risk exposure associated with Defence Aviation and the potential for Societal Concerns, Risk Management within the Defence Air Environment requires a more rigorous approach than typically expected of activities with lower Risk exposure. Therefore, the requirement for techniques, tools, Assurance, recording, monitoring and SQEP involvement are far greater. Recognized good practice will, where possible, be the minimum level applied to Risk Management processes.

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