



Defence  
Safety  
Authority

# Manual of Air Safety (MAS)

Military Aviation  
Authority

Military Aviation Authority  
**MAA**

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## Reference

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## Chapter 1: Introduction

### Regulatory Cross-References

1. This chapter complements the following Regulatory Articles (RA):

**RA 1020** – Aviation Duty Holder - Roles and Responsibilities

▶ **RA 1028** – Contractor Flying Approved Organization Scheme ◀

**RA 1032** – Aviation Duty Holder-Facing Organizations and Accountable Manager (Military Flying)-Facing Organizations - Roles and Responsibilities

**RA 1200** – Air Safety Management

**RA 1205** – Air System Safety Cases

### Purpose and Layout

2. The purpose of this Manual of Air Safety (MAS) is to provide guidance to organizations to establish, maintain and assure the effectiveness of an Air Safety Management System (ASMS) in accordance with (iaw) RA 1200. Air Safety Management (ASM) is a key enabler to the delivery of safe and effective operational capability. A comprehensive ASMS is necessary to deliver a systematic, pro-active and auditable approach to Air Safety. This needs to include all activity and decision making that are key to delivering an appropriate ASMS and, where applicable, the management of any associated Air System Safety Case (ASSC). An ineffective ASMS is likely to compromise Flight Safety, Airworthiness, error management, Risk Management and the ability to learn from Occurrences, all of which are key enablers in the delivery of effective operational capability. The ASMS comprises the entirety of all documented and undocumented structures, processes, procedures, tools and methodologies that exist to manage Air Safety. It is underpinned by a proactive and Engaged Air Safety Culture.
3. Chapter 1 provides the context and background and offers guidance on the structure and implementation of an ASMS. Chapter 2 further explores each of the RA 1200 Acceptable Means of Compliance (AMC) facets and the 16 subordinate 'auditable facets'; Annex A to Chapter 2 provides guidance on Safety Targets. Chapter 3, 'Air Safety Culture' contains Guidance Material related to understanding, establishing and maintaining an Engaged Air Safety Culture. Chapter 4 provides guidance on the error investigation process and use of the Defence Aviation Flowchart Analysis of Investigation Results II (DA FAiR II) ▶<sup>1</sup>◀.
4. The MAS does not include a separate glossary; any terms or abbreviations not contained within the MAA Master Glossary (MAA02) are explained in full.

### Authority

5. The Secretary of State (SofS) for Defence requires the MAA to assure that appropriate standards are met in the delivery of military Air Safety through an independent Assurance process<sup>2</sup>.

### ASM Regulation

6. The Air Safety Management Regulation is contained within RA 1200.

### Background

7. Within RA 1200 and the MAS the terms ASMS and Safety Management System (SMS) are both utilized; there is also reference to Safety & Environmental Management System (SEMS). This manual follows guidance given for other management systems<sup>3</sup>. This is a deliberate approach that recognizes that one 'size' will not fit all. The term ASMS is used to reflect the specific nature of the

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<sup>1</sup> ▶ While terminology has transitioned from "Defence Aviation" to "Defence Air Environment", the model name "DA FAiR II" is retained as a defined product title. The model applies to activities within the scope of the Defence Air Environment (DAE). ◀

<sup>2</sup> Refer to MAA01 – Military Aviation Authority Regulatory Principles.

<sup>3</sup> For example ISO 9001:2015.

Air Safety Management requirements detailed in RA 1200, following principles defined in International Civil Aviation Organization (ICAO) Annex 19 - Safety Management.<sup>4</sup> SMS is a more generic term intended to capture those management systems adopting a more holistic approach. What matters is not what the management system is called, or how it is structured, but that it comprehensively addresses the RA 1200 requirement. Therefore, those management systems that include all of the auditable facets may be considered compliant if the facets can be adequately described and understood.

8. ICAO defines an SMS<sup>5</sup> as 'A systematic approach to managing Safety, including the necessary organizational structures, Accountability, Responsibilities, policies and procedures.' Expanding on this; a Management System is the focus and that may include the following:

- a. **SMS.** The organizational structure, processes, procedures and methodologies that enable the direction and control of the activities necessary to meet Safety requirements and Safety policy objectives.
- b. **Quality Management System (QMS).** A structured and documented system for evaluating and ensuring the robustness of an organization's Quality System.
- c. **ASMS.** An SMS specific to aviation, including activities such as the operation, control and Maintenance of Aircraft, Air Systems and pan-Defence Lines of Development (DLoD) and addresses a combination of the physical components, procedures, controls and human resources organized to deliver Safety within an organization.

9. In more practical terms, an ASMS provides the over-arching Safety policy and is the entirety of all documented and undocumented structures, processes, procedures, tools and methodologies, enabled and underpinned by the prevailing Air Safety Culture, that exist to manage Air Safety. The ASMS ought to address all of the activities of an organization involved in ►DAE activities◄ that are related, directly or otherwise, to the safe operation of Air Systems, and which support and manage pan-DLoD aspects of relevant ASSCs. In reality, an overall ASMS is likely to be a collection of integrated ASMSs of stakeholder and organizations supporting an ASSC, each clearly described in the ASMS.

### ASMS Implementation

10. It is fundamentally important to understand and accept that good Air Safety management is a means and not an end. Whilst there exists a clear legal and moral obligation to take all reasonable steps to protect Service personnel, MOD Civil Servants and the public from harm, managing Safety effectively can enhance Defence output and thus operational capability. By minimizing the harm to personnel, equipment and other assets, their utility and potential can be maximised. This important message is increasingly being recognized and recorded within the various ASMS documentation of Aviation Duty Holder (ADH), Accountable Manager (Military Flying) (AM(MF)) and Duty Holder (DH)-Facing organizations.

11. RA 1200 requires an ASMS that addresses a number of auditable facets that are grouped under the following headings; further detail is provided in Chapter 2:

- a. Safety Policy and Objectives.
- b. Safety Risk Management.
- c. Safety Assurance.
- d. Safety Promotion.

12. The 16 subordinate auditable facets described in RA 1200 serve to provide a framework around which an ASMS can be usefully constructed. Although similar in structure to the framework found in ICAO Annex 19 (Safety Management), the RA 1200 framework has been carefully modified to suit the specific challenges found within the ►DAE◄. It is, however, not a mandatory

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<sup>4</sup> ICAO Annex 19 Safety Management Edn 2 Jul 2016.

<sup>5</sup> Refer to the ICAO Safety Management Manual (SMM – Doc 9859) Fourth Edition, 2018.

framework for the layout of an associated ASMS and to what extent each of the 16 individual facets are applied will be dependent upon the scope and nature of the organization. The key requirement is that the chosen facets clearly describe what the ASMSs manage and how the ASMSs link together to support pan-DLoD elements of relevant ASSCs.

13. A significant number of ►DAE◀ organizations have well established, mature and strongly performing ASMS that have been subject to continual improvement. It is likely and evident, in some cases, that these organizations will have moved beyond compliance in terms of the RA 1200 requirement and the guidance provide herein. All organizations, established and those new to the ►DAE◀, will require evidenced continuous improvement; the following pointers might provide useful focus or guidance to those organizations:

a. The ASMS will provide documented evidence to reflect the priority, focus, role and activities of the organization. It ought to also describe how it manages the ASSC and describe its inter-dependencies to other systems and processes. An appropriate ASMS and associated documentation will be bespoke to the organization in question. Examples of good practice will be available from other organizations, and this may well provide useful guidance.

b. Whether or not they are formalized, fully recognized or accurately documented, it is likely that the organization addresses Air Safety-related issues and will therefore already have elements of an ASMS. Time taken to establish and document those activities currently being undertaken and to then conduct a simple gap analysis against the RA 1200 requirement will be time well spent.

c. Consider the target audience and how the ASMS message will be most effectively communicated. Aim to keep ASMS documentation concise and relevant, replicating higher-level ASMS content only when essential for local context. If it is unlikely that the intended ASMS documentation will be an effective means of widely or appropriately communicating the ASMS message, due size or complexity, consider alternative means that publicize the key themes and messages to a wide audience.

d. The ASMS and associated documentation has to cover a multitude of issues but there are 2 key questions that ought to be kept uppermost as the ASMS is established, documented and continuously improved; how these are addressed during change is of particular significance:

(1) What keeps us safe?

(2) How do we know we are safe?

14. Finally, RA 1200 defines those Air Safety-related facets that the ASMS has to address. It does not specify how this ►will◀ be achieved and it may well be that the facets listed are addressed within a higher-level management system that encompasses Safety and related issues in a wider context; for example, within a more expansive QMS, SMS or SEMS. RA 1200 does not dictate how the ASMS ►will◀ be documented. It is important that organizations analyze what will work best for them, RA 1200 is a useful framework in this regard and organizations need to be able to demonstrate how their ASMS meets the desired end state. Whilst the decision might be taken to document the ASMS following a structure akin to RA 1200, that is not a requirement. If however, a significantly different approach is adopted then the inclusion of a compliance or comparison matrix is welcomed as good practice. The term 'Air Safety Management Plan' (ASMP) is not an explicit requirement of RA 1200 but it is a widely used and entirely appropriate descriptor; in some cases, an ASMP is a specific requirement from the higher authority.

15. The benefits of implementing an ASMS are numerous, and the undertaking ►needs◀ to be seen as output enhancing; a successful ASMS has the potential to increase output - operational or otherwise - by maximizing the effective productivity of both personnel and equipment. However, implementing and maintaining an ASMS is not a straightforward endeavour and does not come without a resource requirement. Mapping current Safety Management arrangements against the requirement and, where possible, aligning effort might provide an opportunity to limit this burden.

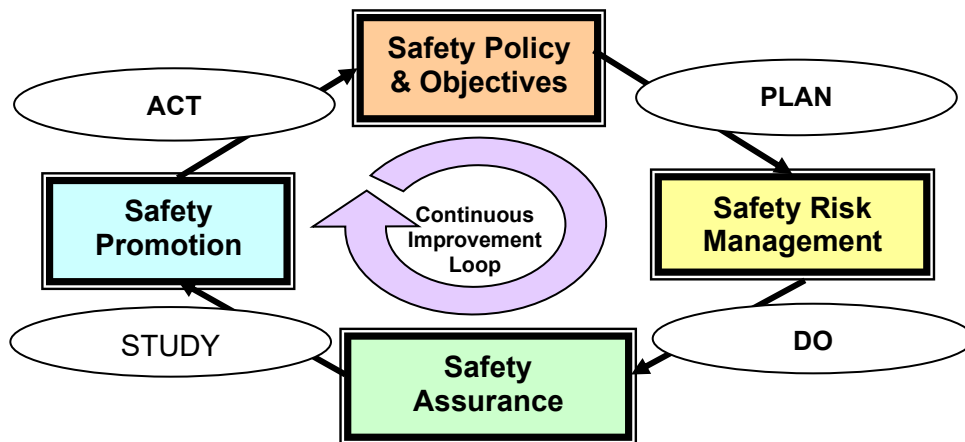
**Separation and Independence**

16. The requirement for independence between the conduct and the Regulation and Assurance of Defence activities is outlined in the SoS’ Health, Safety and Environmental Protection Policy Statement and reinforced within DSA 01.1 and DSA 01.2; within ►the DAE◄ this is achieved by the existence of the MAA. Equally, separation and a degree of beneficial tension is necessary between Safety Management organizations and those operators, engineers, supervisors, commanders, senior managers, etc, who deliver ►DAE◄ activities. This separation ensures that operating or commercial pressures do not unreasonably constrain Air Safety. Dividing these functions provides a degree of impartiality, thus enabling self-Assurance and the balancing of the operational imperative and funding priorities against each organization’s Safety Risk appetite. The manner in which this separation is achieved, and the extent to which it can be accomplished, will depend largely upon the size, role and structure of the organization. In documenting the ASMS it is important to describe the way in which separation is achieved, including any limitations and mitigations.

**Structure of the ASMS**

17. The fundamentals of the SMS are largely consistent regardless of which activity, industry or organization they are applied to. RA 1200 has adopted the 4 top-level ICAO SMS Framework components with some additional facets, appropriate to and required of ►DAE activities◄ added at the sub-component ‘element’ level. Thus, the RA 1200 requirement can now be matched directly to the ‘Deming Cycle’<sup>6</sup> Continuous Improvement Loop shown at Figure 1 below and expanded on in Chapter 2. The MAA expand on this model by introducing the 16 Auditable Facets that break the four pillars into smaller component parts to enable performance measurement and SMS evaluation.

**Figure 1 - ASMS Key Components Continuous Improvement Loop**



<sup>6</sup> PDSA Cycle – The W. Edwards Deming Institute.

## Chapter 2: ASMS Requirements

### Regulatory Cross-References

1. This chapter complements the following RAs:

**RA 1005** – Contracting with Competent Organizations

**RA 1010** – Head of Establishment Aviation Responsibilities and Aviation Duty Holder / Accountable Manager (Military Flying) Establishment Responsibilities

**RA 1020** – Aviation Duty Holder - Roles and Responsibilities



**RA 1026** – Aerodrome Operator and Aerodrome Supervisor (Recreational Flying) Roles and Responsibilities

**RA 1027** – Air Traffic Management Equipment Organizations - Responsibilities of Contracted Organizations

**RA 1028** – Contractor Flying Approved Organization Scheme ▶◀

**RA 1032** – Aviation Duty Holder-Facing Organizations and Accountable Manager (Military Flying)-Facing Organizations – Roles and Responsibilities

**RA 1200** – Air Safety Management

**RA 1205** – Air System Safety Cases

**RA 1207** – Air Safety Data Management and Exploitation

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

**RA 1225** – Air Safety Documentation Audit Trail

**RA 1230** – Design Safety Targets

▶ **RA 1300 – Release To Service** ◀

**RA 1310** – Air System Document Set

**RA 1350** – Air Launched Weapon Release



**RA 1400** – Flight Safety

**RA 1410** – Occurrence Reporting and Management

**RA 1420** – Service Inquiries and Non-Statutory Inquiries

**RA 1430** – Aircraft Post Crash ▶ and Incident ◀ Management and Significant Occurrence Management

**RA 1440** – Air Safety Training

**RA 5010** – Type Airworthiness Strategy

**RA 5011** – Type Airworthiness Safety Management System

**RA 5012** – Type Airworthiness Safety Assessment

**RA 5013** – Air Safety Management of Equipment and Commodity Items

**RA 5407** – Support Policy Statement

## Section A - Safety Policy and Objectives

### Introduction

2. The ASMS Safety Policy defines the fundamental approach that an organization has adopted for managing Air Safety<sup>7</sup> and as a consequence any related ASSC(s). It sets the background and the leadership tone for establishing, maintaining and enhancing an Engaged Air Safety Culture, as described in Chapter 3; this is the 'Plan' element of the ASMS cycle. It is important to understand that an ASMS may manage one or more ASSCs and will describe the why, how and what it manages. There is nothing more important than the active involvement of the senior leadership; it is essential that the Safety Policy has the full, active and sustained backing from the highest levels within the organization and that it clearly reflects the Air Safety priorities and objectives of the organization.

3. Regulations for ► DAE activities ◀ are set by the MAA, encompassing the SofS's objectives of continuous improvement and recognizing the need to balance Safety against operational capability by reducing Risk to Life (RtL) so that they are As Low As Reasonably Practicable (ALARP) and Tolerable.

4. ADH and AM(MF) are legally accountable for the safe operation of Air Systems in their Area of Responsibility (AoR) and for ensuring that RtL are ALARP and Tolerable. Organizations need to establish and maintain an appropriate ASMS in order to undertake and / or support these accountabilities, emphasising the aspects which directly support ASSC(s). Wherever possible, this ought to be accomplished by exploiting existing aviation regulatory structures, publications and Safety Management practices.

5. Responsibility for developing the ASMS Safety Policy, providing Air Safety Assurance to the DH / AM(MF) and managing the ASMS framework may be delegated to an individual within the organization who has a degree of separation from the delivery of output or operational capability such that their advice and guidance is not unduly influenced by operational pressures. This individual is often termed the Safety Manager. It is important that personnel assigned to this role are suitably qualified and experienced and reside at an appropriately senior management level, commensurate with the size and complexity of the organization, from where they are able to implement the Safety Policy.

### A1 - Leadership Commitment, Accountabilities and Responsibilities

6. Concise and unambiguous statements are required to highlight the leadership commitment, Accountability and Responsibility for Air Safety, including the importance and significance of the role the ASMS can play in maintaining and enhancing output or operational capability. ADH, AM(MF), Accountable Managers (AM)<sup>8</sup> or Heads of ADH-Facing Organizations can demonstrate endorsement of their Safety Policy by means of prominent and current Safety statements that highlight the importance of Air Safety and the priority it ► will ◀ be afforded. A clear commitment to promoting and developing an Engaged Air Safety Culture is a crucial element, whilst the undertaking to adequately resource Air Safety, including the appropriate training and empowerment of personnel with Air Safety roles and Responsibilities, will provide a demonstratable measure of a high level of Air Safety commitment.

### A2 - Engaged Air Safety Culture

7. An Engaged Air Safety Culture is an essential, enabling characteristic of an ASMS. Detailed Air Safety Culture Guidance Material is provided at Chapter 3.

### A3 - Air Safety Priority, Objectives and Targets

8. The priority afforded to Air Safety by the ADH, AM(MF), AM or Heads of ADH-Facing Organizations needs to be explicitly articulated, and effectively communicated, such that it is

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<sup>7</sup> It is understood that some organizations may adopt a holistic or 'Total Safety' approach to managing Safety, potentially encompassing all Health and Safety, Environmental and Functional Safety areas, as well as Air Safety.

<sup>8</sup> Those AM within: ADH-Facing Organizations, Contractor Flying Approved Organizations, Maintenance Approved Organizations, Air Traffic Management Equipment Approved Organizations, and Design Approved Organizations.

understood at all levels throughout the organization. Given the nature of the role of Defence, it may not always be appropriate to categorize Air Safety as the highest priority. By facilitating the successful management of Risk, thus enabling the reduction of Safety Occurrences and the increased availability of Air Systems, an appropriate ASMS has the potential to support the generation of an enhanced operational capability that is balanced against Air Safety. ► DAE ◀ organizations need to be prepared to justify the balance attained under the ALARP and Tolerable principles, as detailed in RA 1210.

9. Air Safety Objectives are the means by which the organization expresses, in subjective, quantitative and qualitative terms, what the ASMS has been established to achieve; they ought therefore to relate directly to the Air Safety Priority. They additionally provide the high-level measure against which the performance of the ASMS can be assessed. The most appropriate targets will depend entirely upon the organization and will vary widely, particularly between ADH / AM organizations and those DH-Facing and other supporting organizations. Where the ASMS directly contributes to an ASSC, it is expected that there will be flow down of objectives to subordinate ASMS. In seeking to compose suitable Air Safety Objectives the key questions to address are:

- a. What is the aim of the ASMS?
- b. How do we determine whether that aim is being achieved?
- c. How do we determine how well that aim is being achieved?

10. Air Safety Targets need to be derived from, and provide a measure of, the Air Safety Objectives. The inclusion of focused Safety Performance Indicators (SPIs) which allow potentially broad Objectives to be disassembled into directly measurable components will often prove useful. Targets may be expressed in several different ways, but whichever approach is chosen needs to reflect the legal and societal constraints within which the ASMS operates and consider all interfaces ie Continuing Airworthiness Management Organizations (CAMO), Military Maintenance Organizations, Airfield Operator / Air Traffic Control (ATC) etc in compiling the objectives. Further guidance on SMART<sup>9</sup>, Absolute and Relative targets, and Safety Performance Indicators, is provided at Annex A to this chapter.

#### **A4 - Organization, Key Personnel, Air Safety Competencies**

11. The ASMS has the ability to add value to existing aviation supervision across ► DAE activities ◀ by establishing appropriate means to ensure that senior leadership has appropriate strategic oversight of all ► DAE ◀ activities within their AoR to meet their personal and legal Responsibilities.

12. An appropriate ASMS will be structured in a way that is readily defined and easily communicated, such that it is clearly understood throughout the organization. In documenting the scope of an ASMS, the inclusion of context that succinctly defines the organization's function adds significant value. Most significant is the role that the organization will undertake, and the authority it can bring to bear, in terms of influencing Air Safety. Understanding this is vital, both for those working within the organization and for those out with it but seeking to understand the necessary Air Safety interfaces with their own organization. The Manual of Air System Safety Cases (MASSC) highlights that ASMS and ASSC are symbiotic, so it is essential that all personnel clearly understand how their pan-DLoD activities in support of Air Safety (as described in their ASMS) contribute to the ASSC.

13. Organizational arrangements include, but may not be limited to, the ASMS scope, the roles and Responsibilities of the organization with a focus on Air Safety and the structure, composition and aim of Air Safety meetings, working groups and decision-making forums. The ASMS scope has to be clearly identified<sup>10</sup> and it is important that the authority of the ASMS for those Air Systems and personnel within scope is made clear in order to reinforce the priority of the ASMS.

<sup>9</sup> Specific, Measurable, Achievable, Realistic, Time-bound.

<sup>10</sup> The scope may be most effectively presented by way of a diagram identifying all boundary ASMS and the interfaces between them.

Complexity and uncertainty often relate to system boundaries and it is therefore essential that those working within the ASMS, and those that have overlapping ASMS boundaries, understand how they fit and the contribution they make. The ASMS needs to describe the processes supported and information flows across these boundaries. Further guidance on boundaries and interface management with other ASMS is provided at section A5 below.

14. Changes to an organization have the potential to introduce additional Risk. JSP 815, Volume 2, Element 2 and section C2 below provide further direction and guidance on change management.

15. The MAA Regulatory Publications (MRP) require a number of roles with clearly defined Air Safety Responsibilities. Key amongst these are the ADH and their nominated Senior Operators (SO), Chief Air Engineers (CAE)<sup>11</sup>, Military Continuing Airworthiness Manager, AM(MF)s and AM(MF) Post Holders for Industry<sup>12</sup>. There exist numerous others, such as Commanding Officers, Type Airworthiness Authorities (TAA), Type Airworthiness Managers (TAM)<sup>13</sup>, authorizing officers, engineering officers, Air Traffic Controllers, Aircraft captains, etc, that also have Air Safety Responsibilities set out in the MRP. Local arrangements and documentation providing the framework of individual ASMS will vary according to the role, size and complexity of the organization. Where a larger organization establishes an overarching ASMS, the associated higher-level documentation will detail roles and Responsibilities down to an appropriate level; subordinate systems or ASMSs will highlight, and document lower-level detail as required.

16. Implementing and sustaining an appropriate ASMS requires resources but, in many cases, undertaking a gap analysis approach will identify many existing management practices that can be adapted and / or aligned to deliver the ASMS. Key Air Safety personnel, established within a defined hierarchical structure, need to be appointed and provided with clear Terms of Reference (ToR), including unambiguous channels of communication and levels of authority. The requisite Air Safety experience levels and competencies need to be determined, and resourced, for these personnel. The issue of competencies may be addressed separately for those personnel within Air Safety Management roles and for those charged with delivery:

- a. **Air Safety Management.** The MRP provides direction for a number of post holders, including ADH and AM(MF) but, given the breadth and diversity of the ►DAE◀ community and the widely varied roles that personnel will undertake, the specific requisite competencies will need to be determined locally within the organization.
- b. **Delivery.** Competencies for those engaged in aviation activities are well established already across ►DAE activities◀ and are detailed in the MRP and / or ADH, AM(MF), AM or Heads of ADH-Facing Organizations.

17. Air Safety training is further covered at Section D below. In documenting the collective experience, Competency and training requirements, it may be appropriate to collate them into a single matrix, table or Annex.

## A5 - Defined Interfaces with Adjacent SMS

18. An ASMS that exists in isolation from all others will not be effective; an organization's ASMS will include interaction between adjacent organization's management systems (ie ASMS, Safety Management Manuals, QMS etc.) and it is important to understand, quantify and manage these interfaces. All organizations within ►the DAE◀ either rely on, or support, others in delivering ASSCs; in many cases they do both. A key requirement of the ASMS is that it articulates the evidence that is required to support the arguments made in the ASSC. It is important that all relevant interfaces with adjacent SMS are identified, established, managed and documented. The full array of relevant interfaces will depend upon the organizations in question but, at the very least,

<sup>11</sup> Refer to RA 1020 – Aviation Duty Holder – Roles and Responsibilities.

<sup>12</sup> Refer to ►RA 1028 – Contractor Flying Approved Organization Scheme.◀

<sup>13</sup> Where the Air System is Non-UK MOD-Owned, ownership of regulatory Responsibility by either the TAA or TAM needs to be agreed within the Sponsor's approved model for TAw management; refer to RA 1162 – Air Safety Governance Arrangements for Civilian Operated (Development) and (In-Service) Air Systems, or refer to RA 1163 – Air Safety Governance Arrangements for Special Case Flying Air Systems.

arrangements need to be put in place to formalize the exchange of relevant and useful information (particularly with regard to Risks and Hazards), good practices and the personnel relationships required at Air Safety meetings, for example. Adjacent organizations will include, for example, superior, peer and subordinate ADH organizations as well as DH-Facing and other supporting and supplier organizations within the MOD and Industry. In many cases there will also be the requirement to interface with foreign military organizations, as well as suppliers and Contractors that are out with the MOD but very much within ► the DAE. ◀

19. Of all the facets required by RA 1200, defined interface is one that consistently draws adverse comment due to missing or very limited understanding of the interfaces with often plainly overlapping organizations. It is therefore an area that is deserving of close and continued attention because ***it is not possible to manage what you do not know***. In documenting the ASMS consideration will have to be given to producing a comprehensive 'list' (for example a model, diagram, table, matrix or Annex) that clearly identifies all relevant interfaces with as much detail as practicable in terms of ***who, what, why, where and when*** to support Air Safety delivery. Where, for whatever reason, an identified requisite interface or information flow is obstructed<sup>14</sup>, with no prospect of resolving the situation, perhaps due to security or commercial restrictions, this is also worthy of being documented, along with any mitigations and resolution plans that have been put in place.

20. A crucial part of the internal ASMS Assurance process is for an organization to look beyond its own boundaries. It is essential to seek visibility, and Assurance, of the Air Safety activities and related performance of those interfacing organizations, many of which may sit out with the direct command chain and the MOD.

#### **A6 - Emergency Response Planning**

21. Effective emergency response planning enables contingency plans to be developed that clearly document the actions to be taken following emergencies. The aim of these plans is to control the situation, limit the initial impact and enable return to normality at the earliest practicable opportunity. The type, scale and method of documenting such plans will depend on the size and role of the organization and this is not an undertaking that is limited to those organizations directly involved in operating Air Systems. It is important to note that emergency response planning does not only include Post Crash Management or a Business Continuity plan but encompasses all potential threats to Air Safety. It is important to critically assess Safety on all operating conditions, such as using stand-by ATC facilities, or degraded systems eg STARS, CADS, TMIS and aim to describe the transition to contingency operations and back to normal operations.

22. Provision for off-base Occurrences need to be made and amplified in specific instructions, such as detachment orders. But emergency response planning is equally applicable to all providers of Air System products and services as well as ADH-Facing organizations. Any organization that has a role in supporting or enabling ► DAE activities ◀ needs to plan for situations that require an immediate or very rapid response that is out of the ordinary; these plans need to address how each organization continues to provide what is expected and required of it. This might include, for example, the response of Design Approved Organization Scheme, Maintenance Approved Organization Scheme, CAMO and Defence Equipment and Support (DE&S) organizations in the event of a platform-wide cessation of flying due to technical or logistical issues.

23. RA 1420 provides for the initiation of Service Inquiry following Air Accidents and significant Occurrences; RA 1430 contains the Aircraft Post Crash Management requirement.

#### **A7 - SMS Documentation**

24. An ASMS is the entirety of all documented and undocumented structures, processes, procedures, tools and methodologies, enabled and underpinned by the prevailing Air Safety Culture, that exists to manage Air Safety. The ASMS may exist as a distinct entity, or it may be embedded within a higher-level management system that encapsulates Safety across a wider

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<sup>14</sup> An example would be where there is an operational reliance on a foreign military organization that is unwilling to share data and / or documentation relating to Airworthiness, Maintenance, reliability issues, etc.

remit. The most appropriate manner by which to document the ASMS is therefore dependant on the organization's Safety Management structure; it is not dictated by RA 1200. Organizations routinely opt for a top-level ASMS description document, or plan, supplemented by additional lower-level documentation as required.

25. Producing an ASMP that documents a coherent overview of the key aspects of the subject ASMS, potentially by way of a framework influenced by RA 1200, is an approach that has been effectively adopted by a number of ►DAE◄ organizations; but it is not an MRP requirement and it may not be the most suitable approach for a particular organization. Other approaches including a more generic Safety Management Plan (SMP) and a SEMS may be adopted successfully. Additionally, some organizations have elected to produce a 'plan' that is supported by a more detailed manual describing the elements of the ASMS in greater depth. Whatever approach is taken, the resultant plan / documents need to address how the ASMS manages Air Safety, how it documents the evidence underpinning Safety Case Arguments for example in an ASSC, and how it interfaces with the entirety of the organization and all adjacent ASMSs.

26. Irrespective of terminology, clear documentation that describes how an organization meets the ASMS regulatory requirement is essential if all personnel and external agencies are ►able◄ to understand the ASMS, their role within it and interfaces to it. What is most important is that the documentation is bespoke, entirely relevant and that it reflects the organization's Air Safety focus and activities accurately. Whilst the inclusion of higher-level policy and Regulation might be necessary, a considered balance needs to be struck between providing excessive information and too little detail. Consideration ought to be given to referencing or linking to related documents rather than replicating information that adds bulk, little value, and is subject to change with little or no notice. If, due to the size and complexity of an organization the ASMP is of a size and form that renders it unlikely to be readily assimilated by the majority of the target audience, consideration ought to be given to producing a concise précis that contains the key Air Safety priorities, messages and themes.

27. All documentation is auditable, and care has to be taken to ensure that they are version controlled, accurate and current. This applies to all ASMS-related documentation including, but not limited to: DH and Commanders' Orders; AM(MF) Orders; Accountable Managers' Aviation Engineering Standing Instructions and Aviation Engineering Standing Orders; Safety Assessments; training records; Hazard Logs; and the Air System Document Set. As a key part of the Safety evidence underpinning and supporting a robust ASSC, all of these need to be managed for currency and accuracy to ensure that they appropriately describe standards and practices to be followed. The retention of documentation is covered further at Section C4.

## Section B - Safety Risk Management

### Introduction

28. This regulatory approach to Risk Management is described in RA 1210. An understanding of the external context ensures the objectives and requirements of external regulators, agencies and stakeholders (eg the Health and Safety Executive, the MOD, the general public, international regulatory bodies etc.) are proactively considered and comprehensively integrated into a DHs Risk Management processes and Risk toleration statements<sup>15</sup>. This is the 'Do' element of the ASMS Cycle.

29. Whilst the MOD operates in a unique context (taking into account extraordinary considerations such as defence of the national security objectives, operational Risk taking in hostile combat environments etc.) many of the non-contextual principles for Risk Management are shared with the civilian Risk Management environment (such as Health, Safety and Environmental (HSE) guidance on ALARP). It is important to remember that the MAA largely operates alongside the Civil Aviation Authorities regulatory environment and, therefore, within the European Union Aviation Safety Agency and ICAO's guidance as well.

30. The external context can therefore include:

- a. The social, cultural, political, legal, regulatory, financial, technological, economic and natural environment at international, national, regional and local levels.
- b. Significant drivers including Incidents and trends that will impact on the objectives of the organization (eg changes in public perception of Risk taking, major international Incidents such as oil spills, natural disasters, Accidents involving significant loss of life etc.).
- c. Relationships with and the perceptions and values of external stakeholders.

31. The internal context is the internal environment in which the organization lives and breathes whilst seeking to achieve its objectives. The internal Risk Management process will be aligned with and entirely supportive of the organization's culture, processes, structure and strategy. The internal context can include:

- a. Governance, organizational structure, roles and Accountabilities.
- b. Policies, objectives, and the strategies that are in place to achieve them.
- c. Capabilities (eg finance, time, people, processes, systems, communications, Information Systems and technologies).
- d. The relationships with and perceptions and values of internal stakeholders (eg the Tri-Service community).
- e. The organization's culture.
- f. Information Systems, information flows and decision-making processes (both formal and informal).
- g. Standards, guidelines and models adopted by the organization.
- h. The form and extent of contractual relationships.

### B1 - Reporting and Investigation

32. ► The DAE ◀ has mature and robust arrangements in place for the reporting and investigation of Air Safety Occurrences that are facilitated by the Air Safety Information Management System (ASIMS). RA 1410 provides the detailed Occurrence Reporting information and Regulation.

33. A healthy reporting culture is one that is fully encompassing of, and actively embraced by, all those personnel involved – directly or indirectly – with ► DAE activities, ◀ including but not limited

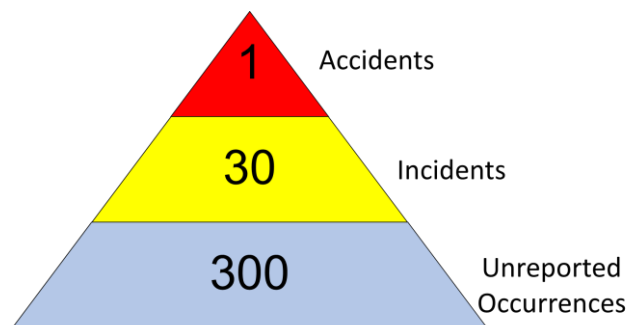
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<sup>15</sup> Refer to RA 1210 – Ownership and Management of Operating Risk (Risk to Life).

to: Aircrew; engineering personnel; Battlespace Management personnel; and all support personnel. RA 1410 provides direction on those Occurrences that require mandatory reporting via Defence Air Safety Occurrence Reports (DASOR). DASORs or equivalent, provide an invaluable source of data, particularly when they are comprehensively completed with the inclusion of causal factors and recommendations that can be analyzed further. However, mandatory Occurrence reporting provides chiefly *reactive* (or lagging) indicators that, whilst important, needs to be supplemented by reporting that provides *proactive* (or leading) indicators and, ideally, *predictive* in nature (Hazard Observations and 'near misses') if the system ►will◀ become truly effective in anticipating Hazard and Risk.

34. Heinrich's theory, simplistically represented by the pyramid model at Figure 2 below, proposes that there are large numbers of (often unreported) near misses in relation to the number of reportable Incidents and Accidents. The *ideal* Hazard Observations: Safety Occurrence ratio would be in the region of at least 10:1. This is of course a theoretical value however, the significant and steady increase in the proportion of Hazard Observations being reported annually within ASIMS (14% in 2010, 32% in 2014, 62% in 2020, 59% in 2022) is highly encouraging. It is important that this momentum is sustained to maximise the degree to which proactive or predictive Risk Management can be conducted. Actively encouraging an increase in the use of DASORs to highlight those Hazard Observations, 'error promoting situations' and 'near-miss' events has the potential to significantly strengthen the ASMS by enabling proactive and predictive Risk Management actions to be taken before errors and mistakes manifest as Safety-related Occurrences. This is an area worthy of management priority focused on the continual improvement of the ASMS.

**Figure 2 - Heinrich Theory Model**



### **Ages of reporting**

35. Safety reports can be categorized into one of three "ages of reporting". These ages of reporting are just one of the areas that may be considered when assessing the reporting / Safety culture of an organization. It is worth noting however that 1<sup>st</sup> age reports are not necessarily a negative indicator on their own and striving for an ever-increasing number of 3<sup>rd</sup> age reports does not generate a strong Safety culture. There will always be "things" that happen that were not directly related to the action of an individual.

- a. **1<sup>st</sup> Age.** These are regarded as "safe" reports where there is no fear of repercussions to the individual reporting as the reports don't 'point a finger' at the reporter themselves, other individuals or other organizations. As a result they don't Risk action of any type being taken against the reporter or individuals mentioned. Reports of this type can be indicative of a lack of confidence in the reporting system or Safety culture. 1<sup>st</sup> age reports focus on issues with **things**.
- b. **2<sup>nd</sup> Age.** These reports potentially expose the writer to a degree of retaliation as they highlight issues relating to others. The report may reflect issues related to apparent inadequacies or failures with internal and external organizations / agencies that are perceived to compromise Safety. 2<sup>nd</sup> age reports focus on issues with **them**.
- c. **3<sup>rd</sup> Age.** These reports are regarded as having the greatest potential for repercussions as they directly relate to the individual or team and thus may be indicative of a good level of

psychological Safety within an organization's Safety and reporting culture. Typically this may take one of two forms: Either, an individual reporting how their actions could have had a Safety related consequence, so that others can learn from their experience; or an individual reporting something they have done that could have caused a Safety issue that would otherwise go undetected. 3<sup>rd</sup> age reports focus on issues with **me or us**.

36. The purpose of Occurrence investigation is to establish the facts of a particular Occurrence such that the root Causes might be established and addressed, rather than the assumption of individual blame. In this way, the likelihood of repeat errors can be reduced through the development and implementation of improved systems, procedures, processes and training. RA 1410, the ASIMS manual, single Service guidance<sup>16</sup> and Chapter 4 to this Manual provides further direction and guidance on the conduct of the investigation process. Minor Occurrences will generally be investigated locally whilst more serious Occurrences and Accidents will almost always be subject to a Service Inquiry under the Armed Forces Act 2006. RA 1420 contains the direction for the conduct of Air Accident and Significant Occurrence Investigation.

## **B2 - Hazard Identification**

37. In generic terms Hazard Identification is a process used to identify possible situations where potential for harm exists in achieving a specific objective and will include Causal Analysis (looking backwards - to identify the Hazards that might have led to previous harms) and Consequence Analysis (looking forward - to identify possible harmful outcomes from given events or situations including change management). It will result in an understanding of a possible Accident sequence(s), from Cause to outcome.

38. Hazards themselves only have potential for harm, so the Risk is assessed from the likelihood and severity of the harmful outcome (the Accident) associated with that Hazard, rather than the likelihood of the Hazard itself. For complex Accident sequences, selection of the Hazard (or 'top event' in the BowTie analysis) at a sensible point makes the subsequent analysis and Risk Assessment more effective. It provides a focus for:

- a. Understanding how Hazards could arise (and so how they might be prevented).
- b. Understanding how Hazards could escalate into harmful outcomes (and so how the realization of harm could be avoided or minimized).

39. If the Hazard is chosen too far back in the Accident sequence (ie dealing separately with each single Cause of the same hazardous situation), then it will:

- a. Not be based on an adequate appreciation of interactions in complex Accident sequences.
- b. Lead to 'Accident splitting' with too many Hazards, each of which on their own may appear to be less significant and lead to a poor appreciation of the overall Risk exposure.

40. If the Hazard is chosen too far forward in the Accident sequence (ie dealing with consequence groups rather than situations with potential for harm), then it will:

- a. Require potentially complex causal analysis for each consequence group to identify the routes by which that harmful consequence could occur.
- b. Obscure the relationship between each Hazard and the control measures put in place to reduce the associated Risk.

41. There is no single 'correct' level at which a Hazard may be selected. An important aspect of Competence in Hazard Analysis and Risk Assessment is the selection of Hazards at a level which is useful and supports Safety improvement. Experience as a practitioner is an important part of developing this Competence: it cannot be based solely on following a pre-defined process in a rigid way.

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<sup>16</sup> For example, AP8000 Leaflet 8203.

42. Use of ►DAE◄ Hazard Risk Matrix (HRM) (Figure 3) is directed as the means to identify which ADH level ‘owns’ the subject RtL. It is not meant to be a Risk Management tool and has been deliberately designed so that most fatal Accidents, particularly any involving 3rd Party, sit at the Operating Duty Holder (ODH) level. Prioritising the response to the RtL is the role of the ODH, with the ASMS providing the methodology to inform the decisions.

**Figure 3 - The ►DAE◄ Hazard Risk Matrix (HRM)**

		Severity				
		Reportable injuries to any person	Specified injuries to any person. A large number of reportable injuries <b>should</b> also be included in this category.	One or two fatalities of MOD employees engaged in the activity in question. A large number of specified injuries <b>should</b> also be included in this category	Three or more fatalities of MOD employees engaged in the activity in question or a single fatality of a member of the public	
		Minor	Major	Critical	Catastrophic	
Likelihood	Likely to occur at least several times a year	<b>Frequent</b>	<b>M</b>	<b>H</b>	<b>VH</b>	<b>VH</b>
	Likely to occur one or more times per year	<b>Occasional</b>	<b>L</b>	<b>M</b>	<b>H</b>	<b>VH</b>
	Likely to occur one or more times in 10 years	<b>Remote</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>H</b>
	Unlikely to occur in 10 years	<b>Improbable</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>M</b>

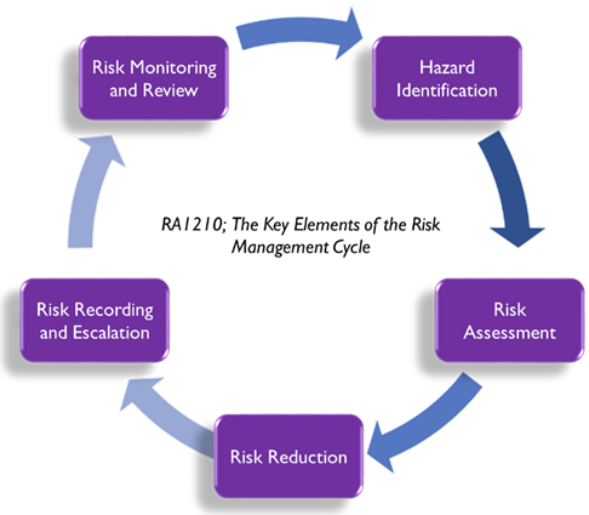
Mod employees include MOD contractors engaged in MOD-supervised activity. Specified injuries are defined on the Reporting of Injuries, Diseases and Dangerous Occurrence Regulations (RIDDOR) 2013 website at: <http://www.hse.gov.uk/riddor/>. Injuries that result in a worker being away from work or unable 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>.

**B3 - Safety Risk Assessment and Mitigation**

43. Having identified Hazards and considered their potential consequences, there has to be a process in place to analyze and control or mitigate the associated Safety Risks. These activities are key enablers for successful Risk Management and needs to be adequately resourced, and clearly documented, within the ASMS. RA 1020, RA 1024 and RA 1210 contain the Regulation and detailed guidance on all aspects of the ownership and management of operating RtL, including the required documentation. Whilst these RAs are clearly ADH focused, the content is of relevance to DH-Facing and other supporting organizations that have a vitally significant role in enabling the ADH and AM(MF) to manage RtL. Recognizing and addressing interfaces to the ADH and AM(MF) are key here, as are the processes and methods that are employed to ensure the timely and robust exchange of essential information.

44. An auditable and detailed record of the entire process, including the approach to information exchange and the rationale underpinning all decisions and actions, including any that were discounted, needs to be maintained.

**Figure 4 - The Risk Management Cycle**



- a. **Hazard Identification.** A process used by numerous parties and Safety stakeholders involved in an ASMS to identify situations where the potential for harm exists. The process may use historical reporting, trending, external case studies, structured checklists or specific facilitation approaches (eg Bowties, HAZOPS, HEART, STAMP etc.) to guide the thinking and expertise of a carefully selected Suitably Qualified and Experienced Person (SQEP) in the identification of potentially hazardous situations, environments, scenarios etc. In the complex environment of Air System Safety, it is often advisable to employ or amalgamate input from several different techniques to ensure as broad an identification as possible.
- b. **Risk Assessment.** Having identified hazardous conditions and scenarios within an Air System's operation, specific Risks are derived and considered from within them that establish how the potential for harm within from the Hazard can be realized. Risks are measured and assessed against each other in terms of their likelihood of Occurrence and severity of impact and can be prioritized as such using a common classification medium such as a HRM. Risks can also have multiple outcomes (most likely vs worst credible), and judgement needs to be employed when deciding how best to sum consider complex Risk events to understand which represents the greatest overall detriment concern.
- c. **Risk Reduction.** Risk Reduction involves the treatment, mitigation or elimination of Risk through various methods and options to reduce both likelihood and severity to a level that can be deemed and evidenced by the Risk holder to be 'As Low As Reasonably Practicable'. The law requires ALARP to have been achieved as a precursor to the Risk owner's judgement regarding whether the activity is Tolerable. Does the benefit warrant the Risk being taken in achieving the outcome?
- d. **Risk Recording and Escalation.** What is being considered is the actual Risk which is constantly changing in response to a plethora of conditions such as environmental conditions and Human Factors, Risks will be reduced (with appropriate supporting evidence) to ALARP and recorded through an appropriate mechanism (Bowties, Risk Registers etc.) and communicated across the Air System Safety stakeholders, the RtL resulting from the 'as flown configuration in the prevailing conditions with the crew authorized on the day' needs to be assessed for tolerability. The placement of this Risk exposure on the Defence HRM will define the appropriate level of ADH / AM Risk ownership moving forwards, with Risk being held at the lowest acceptable level by the ADH / AM with the appropriate level of authority and resources.
- e. **Risk Monitoring and Review.** Once the ADH / AM ALARP and Tolerable position is established and recorded the situation has to be constantly monitored and regularly reviewed to ensure that the planned, anticipated or supposed residual Risk exposure is and remains true in reality. Some mitigation measures may not be immediately effective or may have second order effects that only manifest after implementation and reduce mitigation effectiveness in other areas (eg procedural mitigations that cause secondary Human Factors (HF) consequences). Regular Risk reviews will ensure that the Air System Risk picture remains up to date and relevant, whilst significant changes in operating circumstances may require extraordinary reviews outside the established battle rhythm.

## Section C - Safety Assurance

### Introduction

45. The MAA approach to Assurance of the Regulated Community (RC) is based on the Regulators' Code. Assurance is Risk based which necessitates gaining a clear understanding of RC performance and exposure to RtL, to ensure that activity is appropriately targeted. The Code also requires an open and constructive relationship between the regulators and those they regulate. Therefore, Safety Assurance is the sum of those processes and activities that are undertaken to establish whether the ASMS is functioning as intended and to confirm that Safety requirements are being met. It is the '**Study**' element of the ASMS and ought to provide a framework capable of capturing the auditable evidence necessary to prove whether the organizational arrangements and associated activities are achieving the organization's Safety policy and objectives.

46. Change is inevitable in ►the DAE.◄ The significant potential for change to introduce new and unforeseen Risk ought not to be underestimated and those managing the ASMS need to remain constantly alive to this challenge. Continuous improvement of the ASMS has to be considered an obligatory goal, not an aspirational one. The appropriate processes and Engaged Air Safety Culture need to be in place to ensure that identified lessons are learned and acted upon, and that relevant good practice is incorporated.

47. Given the pace of change, the rapid personnel churn, and the personal Accountability of ADH, AM(MF), AM<sup>8</sup> or Heads of ADH-Facing Organizations, it is essential that there are robust procedures in place to ensure the effective retention of information and Air Safety-Related documentation. Efficient Safety Assurance relies on the accurate analysis, or evaluation, of data that can then be fed back to both communicate the ASMS message and to report performance, within and out with the organization.

### C1 - Safety Performance Measurement and Compliance Monitoring

48. Air Safety Objectives provide the index against which Safety performance ►will◄ be measured or assessed. The ASMS needs to consider the need for an Assurance programme that measures and monitors success against those Air Safety Objectives, and may require subjective assessment of some criteria, other objectives can be more readily identified eg 'evidence of a closed loop reporting system, where reports are managed, investigated, considered, changes implemented (if necessary) and feedback provided'. The organization needs to have the structures, tools and processes in place to undertake a comprehensive Assurance programme covering the entirety of the organization's own activities and, where appropriate, those of interfacing organizations. A comprehensive Assurance programme will comprise: 1<sup>st</sup> Party Assurance (1PA), 2<sup>nd</sup> Party Assurance (2PA) and 3<sup>rd</sup> Party Assurance (3PA); detailed definitions for these terms are provided within MAA02<sup>17</sup>. The MAA Air Safety Management Assessment Tool (ASMAT) is an optional tool that has been produced to facilitate the Assurance of all 16 facets of the ASMS by 1PA, 2PA and 3PA organizations. The ASMAT is available for download from the MAA gov.uk site<sup>18</sup>.

49. **Risk Based Assurance (RBA)**. The MAA defines RBA as the intelligent targeting of resources to determine a holistic picture of overall Air Safety across ►the DAE◄ for the purposes of deciding whether and how to intervene, informing the MAA's longer-term strategies and priorities. This holistic picture will provide a qualitative assessment of whether the organization's Air Systems are 'Safe to Operate' and being 'Operated Safely' by reviewing how ASSCs are developed and managed, with particular emphasis on ASMSs, ASSCs and MRP compliance.

50. ASMS Assurance activity will usually be programmed to ensure appropriate application of the requirements of the ASMS and assure its ongoing effectiveness. ASMS Audits enable strategic oversight and facilitate the Maintenance of Risks at an acceptable level. Assurance activities will usually be either targeted at specific areas seeking general evidence or applied in a wider context

<sup>17</sup> Refer to the MAA02 – Master Glossary, 'Assurance'.

<sup>18</sup> [MAA gov.uk](http://maa.gov.uk) - ASMAT link.

with the purpose of attaining a particular form of information or data. All Assurance activities (eg Standardization visits, Continuing Airworthiness, Type Airworthiness via Quality Audit) will still provide Assurance evidence and that Air Safety related directives, procedures, standards or principles are being complied with and, as such, contribute to managing Air Safety Risks.

51. There are three main categories of Audits, which depend on the relationship between the auditor and the person being audited. These are called third-party Audits, second-party Audits, and first-party Audits:

a. **Third Party Assurance. (3PA).** A 3<sup>rd</sup> Party Assurance Audit occurs when the higher-level independent organization has decided that an entity or organization under which it has Responsibility to regulate requires further analysis. In reality this is not a single visit or event, but a summation of the activities described above. In this sense the MAA acts as Certification body, and they are in the business of conducting Audits, or may employ other Audit organizations on their behalf, to compare and verify that the ASMS meets all the standards or Regulations and continues to meet requirements on an ongoing basis. They then provide Assurance or Certification to organizations or entities that they approve (if it is required). This can be used to give Defence the confidence that ►◀ RtL is ALARP and Tolerable.

b. **Second Party Assurance. (2PA).** 2nd Party Assurance is conducted by, or on behalf of, an organization that has an interest in the business<sup>19</sup>. In the MAA's view, 2nd party providers include but are not limited to: Air Safety Cells that support the ODH; each Front Line Command (FLC) flying standards and 'external Quality Audit' organizations; standards evaluation (STANEVAL) organizations that exist in the ►DAE◀ community; and the Safety and environmental management teams that support the air domain Operating Centre Directors in DE&S. As a 3rd Party Assurance organization supporting the SofS, the MAA has a Responsibility for assessing whether the oversight provided by the 2nd parties is accurate, timely and effective.

c. **First Party Assurance. (1PA).** 1st Party Assurance Audits are often called **internal Audits**. This is when someone from the organization itself will Audit a process or set of processes to ensure it meets the procedures or Regulations that the higher organization has specified. This person can be an employee of the entity or someone hired by the organization to perform the internal Audits, such as a consultant, but the important thing is that the person is acting on behalf of the entity itself rather than as an assured organization or Certification body. This type of Audit is focused not only on whether the organization's processes meet the requirements of a standard, but all rules the entity has set for itself. The Audit will look for problem areas, areas where processes do not align with each other, opportunities for improvement, and the effectiveness of the ASMS. By design, these Audits can be and are more in depth than the other Audits, since this is one of the best ways for an organization to find areas to improve upon.

52. The MAA will, where appropriate, seek to minimize the burden on the RC by increasing the use of evidence that has been generated by second parties, thus reducing the number of Assurance visits that the RC is required to host. The MAA expectation of organizations conducting 1PA and 2PA can be summarized as follows; an organization will:

- a. Define explicitly the standards against which it provides Assurance.
- b. Define the scope of the organizations that it assures.
- c. Operate a comprehensive and documented Assurance programme that is Risk-based, 1PA and 2PA.
- d. Employ, or have access to, sufficient subject matter expertise among its auditors.
- e. Define the Competence required of its auditors and ensure they are SQEP.

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<sup>19</sup> Refer to ISO 19011 – Guidelines for Auditing Management Systems.

- f. Have an Enforcement regime and be able to demonstrate its effectiveness when non-compliance and / or positive / negative observations are discovered.
- g. Routinely share Assurance / oversight findings with the MAA.

53. Overlapping Assurance activities, including those addressing non-ASMS activities, may be beneficial so long as both parties are aware of the activity, the danger is that assumptions are made that the other party is conducting the Assurance and vice versa leading to no one doing it. Repetition however, can cause wasted resources, both for the auditing organization and that being audited. The audited organization will not necessarily have influence or advance notice of all Assurance activities but identifying all potential 1PA, 2PA and 3PA<sup>20</sup> in the ASMS documentation will provide clarity and a degree of managed expectation.

54. Compliance monitoring comprises those surveillance<sup>21</sup> activities undertaken to provide Assurance that an organization is conforming to all relevant and current legislation, Regulations, rules, standards and orders, be those internally or externally generated. This is applicable at the organization and the individual level. An awareness of new and emerging 'Regulation' has to also be maintained. Compliance monitoring is most effectively undertaken by those personnel working within an organization who are innately familiar with its remit and roles. The creation and robust Maintenance of a compliance matrix will add rigour to this process. The approach to, and results of, compliance monitoring ought to be formally laid down and documented. Compliance will normally be confirmed through 1PA, 2PA and 3PA activities.

## C2 - Management of Change

55. Change has significant potential to introduce new and unforeseen Risk. Managing change requires a proactive and progressive approach such that potential unwanted consequences, across all DLoD, can be considered before the change is implemented and while there is still time to apply control actions. Change occurs frequently, often rapidly and at short notice, within ►the DAE◀ and it can be a challenge to assess changes in good time. The process, by which change will be managed, along with the formal records of all decisions and rationale for the control actions and adopted approach, ought to be formally documented.

56. JSP 815, Vol 2, Elements 2 and 4 place an explicit requirement on commanders and managers to make a proper assessment prior to any planned organizational change (termed an Organizational Safety Assessment (OSA)), to demonstrate that the change will not be detrimental to Safety and that its implementation will be suitably managed. Further information can be found in JSP 375 Vol 1, Ch 35.

## C3 - Continuous Improvement of the ASMS

57. Continuous Improvement is enabled by the monitoring of an organization's Safety performance and relating that to the maturity and effectiveness of its ASMS. This needs to be a proactive process that is both inward and outward looking, such that lessons learnt, and good practices displayed, by others can be beneficially exploited. There is, arguably, no quantifiable way in which to describe the desired end state performance of an ASMS; neither is such an aspiration necessarily desirable. In the same way that the ALARP and Tolerable status of an Air System requires constant evaluation, so it is for the ASMS. What was previously considered pioneering or exemplar good practice cannot be assumed to be an acceptable standard moving forward.

58. It is important to seek feedback, so far as possible, across the entirety of the ASMS activities such that any and all areas that can be enhanced are identified and improvements instigated. As with Safety performance measurement, the sources of information that can feed the continuous improvement process are many and varied. ASIMS and other Error Management Systems (EMS) employed by the ASMS will enable the identification of emerging trends. Such information can then be effectively utilized and shared between organizations.

<sup>20</sup> Within ►the DAE◀ it is the MAA that conducts 3PA.

<sup>21</sup> Surveillance includes routine activities conducted at desk level, such as DASOR analysis and document reviews, or attendance at a forum or activity that is already planned.

59. The ASMS, ASSC and other Safety documentation needs to also be reviewed on an appropriately regular and recurrent basis. This is particularly relevant within ► the DAE ◀ where the rate of personnel turnover is often rapid and Corporate Memory can be easily lost. Outlining the review process within the ASMS documentation with the detail of the individual(s) responsible and the timeline provides a clear statement of intent and an implicit level of expectation.

#### C4 - Retention, Evaluation and Feedback of Information

60. Records provide a traceable and auditable information trail that can be used to review, revise and, ultimately, justify the Risk Management and associated decision-making processes. It is essential that all relevant information and documentation retention requirements are strictly adhered to. RA 1225, the Air Safety Documentation Audit Trail Regulation, requires that relevant documentation is retained for a minimum of 5 years beyond the out of service date of the Air System concerned. Given that this Regulation is Air System specific it may not be entirely relevant in all cases and there may well be instances where more stringent requirements exist. Nonetheless, in the absence of more relevant or explicit Regulation RA 1225 provides a baseline which can be tailored on the basis of informed judgement. In the likely event that information or documentation is related to more than one Air System the latest out of service date would apply.

61. The MAS does not attempt to replicate the full extent of the data retention requirements, rather, the following considerations and potential limitations are highlighted:

- a. **Regulatory Requirement.** The MRP contains a number of specific data and documentation retention requirements that are applicable to various sections of ► the DAE. ◀ Depending upon the specific activity there may be additional aviation-related Defence, National or International requirements that are applicable to organizations and Air Systems within ► the DAE. ◀
- b. **Archive requirement.** Selected documentation is required to be kept for a designated period of time by the organization creating it prior to it being forwarded to an official archive repository (eg ATC Watch Logs). The details for these arrangements will be contained in the related Regulations.
- c. **MOD and Government Policy.** The retention requirement for some records is legislated for in departmental and wider Government policy, such as the Freedom of Information Act.
- d. **Records for Trend Analysis.** The methods by which trend analysis is conducted, and on what Occurrences, will dictate how long the records will be kept. A wealth of data will be used eg DASORs, Flight Data Monitoring, 1PA and 2PA etc.
- e. **Data Storage.** It is inevitable that data will be stored and captured (eg Flight Data Monitoring) electronically. A robust approach to ensuring that data will remain accessible in the face of media readers or particular data formats becoming obsolete ought to be adopted.

62. Before data can be developed into a source of worthwhile information it needs to be analyzed and evaluated. When evaluating and comparing data, defining the operating context is an important factor prior to attempting to assess Safety performance via the stated ASMS Air Safety Objectives. For example, a direct comparison between the Accident or Incident rates of 2 separate years may not necessarily enable a valid judgement to be made on Safety performance in light of some or all of the following considerations; whilst these are largely illustrated with reference to flying activities, they will apply to a ► broader scope of DAE activities ◀:

- a. **Level of Activity.** In order to undertake a useful and enduring evaluation of data comparable units of measurement has to be used. Simply monitoring and recording the number of Occurrences, for example, without the context of the level of activity provides data of little use as periodic flying rates will inevitably differ. In order to provide comparable Occurrence information, a rate may be calculated for specific Occurrences, defined as the number of events divided by the exposure to those events. The most common method is ► relating ◀ Occurrences to Flying Hours. Alternatively, where the Occurrence relates to a phase of flight or Maintenance, some other measure may be more appropriate. If, for

example, landing Accidents are being analyzed, the number of Occurrences per 10,000 landings could be calculated. For Maintenance Occurrences, a useful gauge might be per 10,000 Maintenance hours.

b. **Usage / Type of Activity.** The context provided by considering how an Air System is being utilized and the type of activity is important. For example, different flying techniques and varying Air System Configurations are likely to present different kinds and levels of Risk. The willingness to accept Risk will depend on the imperative to complete the task - the Risk appetite. Records need to distinguish between activities considered higher Risk and those of lower Risk so that useful comparisons can be made.

c. **Environment.** The environment, in terms of terrain, prevailing weather, working conditions, etc, will alter the nature and / or the level of Risk and needs to be considered when evaluating data.

d. **Timing.** Regularly timed evaluation - of the reporting of performance in particular - is important to ensure a consistent depiction of the overall picture. Random and seldom evaluation approaches are best avoided as they may result in improvement opportunities being lost.

63. The exchange of evaluated data presents valuable opportunities to learn from the practice, errors and success of others without having to repeat the experience. ASIMS enables all registered users to conduct detailed data analysis and trending. Advice and guidance are available, in the first instance, from Unit Air Safety personnel, the ASIMS on-line training and the ASIMS User Manual (available from the Resources section of the ASIMS homepage<sup>22</sup>). Further assistance is available from the MAA ASIMS Helpdesk, details of which are on the ASIMS homepage.

64. The requirement, content and timing of reporting and the feed-back of Safety performance data will be specific to the organization. Safety reports will normally be produced from the analysis and evaluation process, primarily to provide ADH and AM(MF)s with the Assurance that Safety Targets and objectives are being met; ie that the ASMS is functioning as intended. Such reports will also inform those organizations undertaking Assurance and Regulation activities.

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<sup>22</sup> ASIMS homepage link (<https://asims.ice.mod.gov.uk/MODCas/login>).

## Section D - Safety Promotion

### Introduction

65. Safety Promotion is the means by which personnel are prepared and trained to perform their Safety Management roles and duties and by which Safety issues are widely and effectively communicated. Safety Promotion sets the tone for individual and organization behaviours and policies. The tangible building blocks of an effective ASMS are the Air Safety related processes, tools and structures, but these elements cannot function in isolation. This is the 'Act' element of the ASMS. The ASMS requires properly trained and experienced personnel to 'operate' it, and it requires the effective promulgation of the relevant Air Safety 'message' across the organization, and beyond to the wider ►DAE◄ community.

66. The importance of an Engaged Air Safety Culture within the ASMS cannot be overstated. Safety Promotion activities have a hugely significant role in justifying, developing and improving the Air Safety Culture. This is a lengthy, challenging and potentially fragile process and Safety Promotion has to be considered an unremitting undertaking that is continually reviewed and refreshed as necessary.

### D1 - Training and Education

67. The requisite Air Safety training will inevitably depend on the organization and the individual in question. RA 1440 provides further regulatory detail and guidance but is by no means exhaustive in terms of the expected Air Safety training and education requirement across ►the DAE◄. Elements of Air Safety training, such as HF training, will be applicable across ►the DAE◄ but the majority will be specifically annotated against the role being undertaken by personnel with specific Air Safety Responsibilities.

68. It is important that the training and education requirements are appropriate and current; a regular review process will ensure this. They also need to be documented and monitored against a completion target. An effective way to capture the requirement is ►documenting◄ the details against the individual (in the relevant ToR, job specification, or equivalent) and, in order to aid the monitoring and Assurance processes, to collectively capture the organization's training plan in ASMS documentation. Monitoring and managing the collective Air Safety training requirement is most effectively conducted by a nominated individual or group within the organization.

### D2 - Safety Communication

69. The purpose of Safety Communication is to ensure that Air Safety issues are openly and effectively communicated throughout the organization. There are many ways to achieve this and it is likely that a wide and varied range of measures will be required in order to spread the complete Air Safety message. Particular consideration ought to be given to publicising the Air Safety aims, priorities, objectives, challenges and performance to those personnel who are removed from the conspicuous day-to-day workings of the ASMS and might therefore not directly or automatically link their individual role or activity to Air Safety.

70. For the majority of organizations, it is probably an unrealistic expectation to depend on all personnel being familiar with the entirety of the ASMS and the associated documentation or plan. There are many good examples across ►the DAE◄ producing concise, engaging and accessible summaries of the current challenges and activities, either through bespoke leaflets, briefings and 'flyers', or by including regular ASMS and Air Safety specific content in established publications. Widely publicizing exemplar performance, particularly those less obvious contributions, is a highly effective means of communicating the potential for all personnel to influence Air Safety and provides a tangible example of the 'reward' element within a Just Culture.

71. Once again, the most effective approach will depend on the organization, but the degree of Safety Communication success will be largely driven by the enterprise of Air Safety personnel, driven by the leadership commitment. The emphasis ought to be on actively 'pushing' the relevant Air Safety information including impressing on the entire organization why and how they need to seek to 'pull' it.

## Chapter 2 - Annex A: Safety Targets Guidance

### Introduction

1. Safety objectives focus on WHAT the SMS functions are, whilst targets focus on HOW effective those functions are and HOW you are developing them. This will allow the DH / AM to be able to assess how effective their SMS is and how it is performing. Assessment of an SMS will be a collection of quantitative data supported by qualitative and subjective assessments. Done well, objectives, target setting, and performance measurement aid the Holding to Account (H2A) process and show continued development of the SMS and ASSC. DSA01.1: Defence policy for Health, Safety and Environmental Protection Performance Assessment Levels and RA 1200 details the required facets of the ASMS and whilst objectives and measurables can flow from higher authorities and Regulation, they need to be relevant, specific and applicable to the organization. Quantitative objectives may be based on the SMART methodology whereas more subjective or qualitative objectives will need to use other assessment methods.

### Objectives

2. Objectives ► **will** ◀ be meaningful in the context of the organization developing them based on their SMS, this will enable measurement of benefit, performance and development of the SMS within the stated time. In considering setting Air Safety Management objectives consider that they are:
- a. **Specific.** Objectives will be focused in order to pinpoint what is required, to enable performance of specific interest to be assessed, eg, The Safety performance in the UK or Safety performance during training etc. See also guidance on operating context for analysing Safety performance.
  - b. **Measurable.** Targets will be able to be assessed therefore, reporting performance against them, this may be subjective or objective.
  - c. **Achievable.** Overly ambitious objectives will be unachievable within the given time scale, conversely easily attainable objectives will not fully describe the SMSs performance.
  - d. **Relevant.** Relevant aspirations will ensure that only those activities of interest are covered.
  - e. **Time-bound.** Objectives will be restricted within a period of time to enable meaningful data collection and comparison on a like-for-like basis.
3. Objectives are either:
- a. **Absolute Objectives.** Absolute objectives set a level of performance that is not necessarily related to previous performance; often they are set by a regulator based on a legal requirement, Societal Concerns or norms, a limitation of resources or as a result of analytical study: eg 95% of Safety critical posts staffed within 3 months; all Occurrence Safety Investigations completed within 2 weeks.
  - b. **Relative Objectives.** Relative targets compare performance against previous performance or the performance of a similar organization: eg Reduce number of Runway Incursions by 20% by Dec 23; 50% increase in identified causal factors on DASORs by Jun 23.

### Safety Performance Indicators

4. Appropriate Safety Performance Indicators (SPIs) need to be selected in order to measure progress toward achievement of objectives, effectiveness and development of the SMS. Outcome indicators (eg Accident and Incident rates, 3rd Age DASORs) measure the output of the SMS but are reactive, it will be noted that an absence of a SPI, ie, not having an Accident, is not an indicator

of an effective SMS. Therefore, objectives that are based on outcome indicators may drive poor behaviour eg, an increase in DASOR report numbers does not indicate an improving or worsening Safety situation. Process indicators (eg qualification of personnel, effectiveness of error management investigations, effectiveness of Risk Management activity) are crucial leading indicators. Measuring Safety is about measuring the absence of something and in such cases the industry standard ►will◀ validate the underlying process through process indicators. The most significant drawback with process indicators is that the effect on Safety performance in terms of reduced Accidents and Incidents is neither guaranteed nor predictable. Therefore, a mix of outcome indicators and process indicators will provide a holistic assessment of the SMS.

5. Air Safety performance measurement may wish to answer such questions as:
  - a. Where are we now relative to our overall Air Safety aims and objectives?
  - b. Where are we now in controlling Hazards and Risks?
  - c. How do we compare with others?
  - d. Are we getting better or worse over time?
  - e. Is our management of Air Safety effective (doing the right things)?
  - f. Is our management of Air Safety reliable (doing things right consistently)?
  - g. Is our management of Air Safety proportionate to our Hazards and Risks?
  - h. Is our management of Air Safety efficient?
  - i. Is an effective ASMS in place across *all* parts of the organization (deployment)?
  - j. Is our culture supportive of Air Safety, particularly in the face of competing demands?
6. In addition to the above, the ASMAT 'Things to Consider' may provide indicators to focus on for your specific unit / organization. These questions are asked not only at the highest level but also at the various management levels and across the unit / organization. The aim will be to provide a complete picture of the organization's Safety Management performance.

## Chapter 3: Air Safety Culture

*'A broad consensus has developed across the Safety community, academia, and informed opinion in Industry, that fostering a strong and effective 'Safety Culture' is vital to helping to reduce the number of Accidents that occur in complex systems and organizations'<sup>23</sup>.*

### Background

#### What is Culture?

1. Haddon-Cave cites the Columbia Accident Investigation Board (CAIB)<sup>24</sup> definition of Organizational Culture<sup>25</sup>:

*"Organizational Culture refers to the basic values, norms, beliefs and practices that characterise the functioning of a particular institution. At the most basic level, organizational culture defines the assumptions that employees make as they carry out their work; it defines "the way we do things here". An organization's culture is a powerful force that persists through reorganizations and the departure of key personnel."*

From this, a simple, useful, working definition of culture can be derived as:

*"The way we do things around here."*

#### Work-as-imagined vs work-as-done

2. If "the way we do things around here" is referred to as work-as-done, then work-as-imagined<sup>26</sup> is an idealistic view of "how a task should be done". It is the specification of work-as-imagined (how someone originally thought "the work should be done") which takes on several forms in our organization including Regulations, rules, procedures, checklists, standards and so on. However, work-as-imagined doesn't necessarily consider how task performance is adjusted to match the constantly changing conditions of work and of the real world. Work-as-done is what people actually do to get the job done, taking into account the realities of the situation such as the equipment Configuration, and ease of use of the procedure, the environment as well as the time and resources they have.

3. If there is a frequent disconnect between these aspects, then perhaps the system is setting the individuals up to fail. When devising rules, Regulations and procedures, managers and leaders need to be cognisant of the external factors that may impact on how the work is carried out. We need to give our people the best possible chance of conducting the work in line with the prescribed rules and Regulations. By not taking into account time, tooling, workforce, training etc – we could be setting our people up to fail. Put very simply, if one person does something wrong it could just be down to their skill / judgement on the day. If 2 people making the same mistake is a coincidence, 3 or more people making the same mistake suggests that the system / organization is at Fault.

#### How is Culture Formed?

4. In terms of how culture is formed and shaped it is useful to consider the following:

- a. **Leadership** – A critical factor in forming and maintaining a positive Safety Culture is the organization's leadership. Effective leaders promote and demonstrate Safety as a value (not an obstacle) and visibly demonstrate their commitment to Safety.
- b. **Followership** – The Maintenance of culture is very much dependant on followership. It is the beliefs, perceptions, thoughts and feelings of the individuals in the organization that form the underlying assumptions which are the bedrock of Safety Culture. The engaged Air

<sup>23</sup> The Nimrod Review, Chapter 27, Page 570, Para 27.2.

<sup>24</sup> CAIB was set up in 2003 following the loss of NASA Space Shuttle Columbia.

<sup>25</sup> The Nimrod Review, Chapter 17, Page 449, Para 17.5.

<sup>26</sup> This concept is described in: Dekker, S. 2006. Resilience engineering: Chronicling the emergence of confused consensus. In Hollnagel, E., Woods, D.D., and Leveson, N.(eds.) Resilience Engineering: Concepts and Precepts. Aldershot. UK: Ashgate.

Safety Culture principles need to be understood and shared throughout the entire organization, empowering individuals to preserve and enhance Safety at all levels.

5. The individual aspects of culture can be broken down into 3 simple categories:
  - a. **Underlying Assumptions** – These live in the organization as the unconscious taken for granted, beliefs, perceptions, thoughts and feelings. They are by no means fixed but they are generally slow to change.
  - b. **Values** – Often referred to as “espoused values” (meaning adopted / embraced values). At the leadership level these are the publicly espoused values which comprise the strategies, goals and philosophies of the organization. Arguably more important are the privately espoused values – these shape the way members of the organization interact with Safety Culture.
  - c. **Artifacts** – These are the visible / tangible organization structures and processes such as Safety noticeboards, meetings, briefings, technical logs etc.

### What is Air Safety Culture?

6. The use of the term Safety Culture originates from the investigation into the Chernobyl disaster in 1986<sup>27</sup>. There are many different definitions available, utilized throughout a wide range of Safety critical industries, but there is no single internationally recognized definition. The term ‘Engaged Culture’ is one used by NASA to stress the active and inclusive nature of the desired culture and one subsequently adopted by Haddon-Cave<sup>28</sup>. The MAA has adopted the ‘Engaged Culture’ term and, tailoring it for ►the DAE, ◀ has adopted the following definition of **Engaged Air Safety Culture**:

***An Engaged Air Safety Culture is that set of enduring values and attitudes, regarding Air Safety issues, shared by every member, at every level, of an organization. It refers to the extent to which each individual and each group of the organization: seeks to be aware of the Risks induced by its activities; is continually behaving so as to preserve and enhance Safety; is willing and able to adapt when facing Safety issues; is willing to communicate Safety issues; and continually evaluates Safety related behaviour.***

7. A positive, pro-active and engaged Air Safety Culture is crucial to reap the maximum benefit from the ASMS. Military aviation is a highly sophisticated and complex system of people, equipment and processes. It is therefore important to understand and manage the fundamental characteristics and limitations of human performance in such complex systems - HF. HF aims to increase awareness and improve management of the human element and provides the necessary tools to improve Safety and efficiency. HF policy, training requirements and guidance are contained in RA 1440.

8. Building on the work of Professor James Reason<sup>29</sup>, and developing the list of Safety Culture characteristics detailed in the Nimrod Review<sup>30</sup>, the MAA has developed a model of Engaged Air Safety Culture shown in Figure 5.

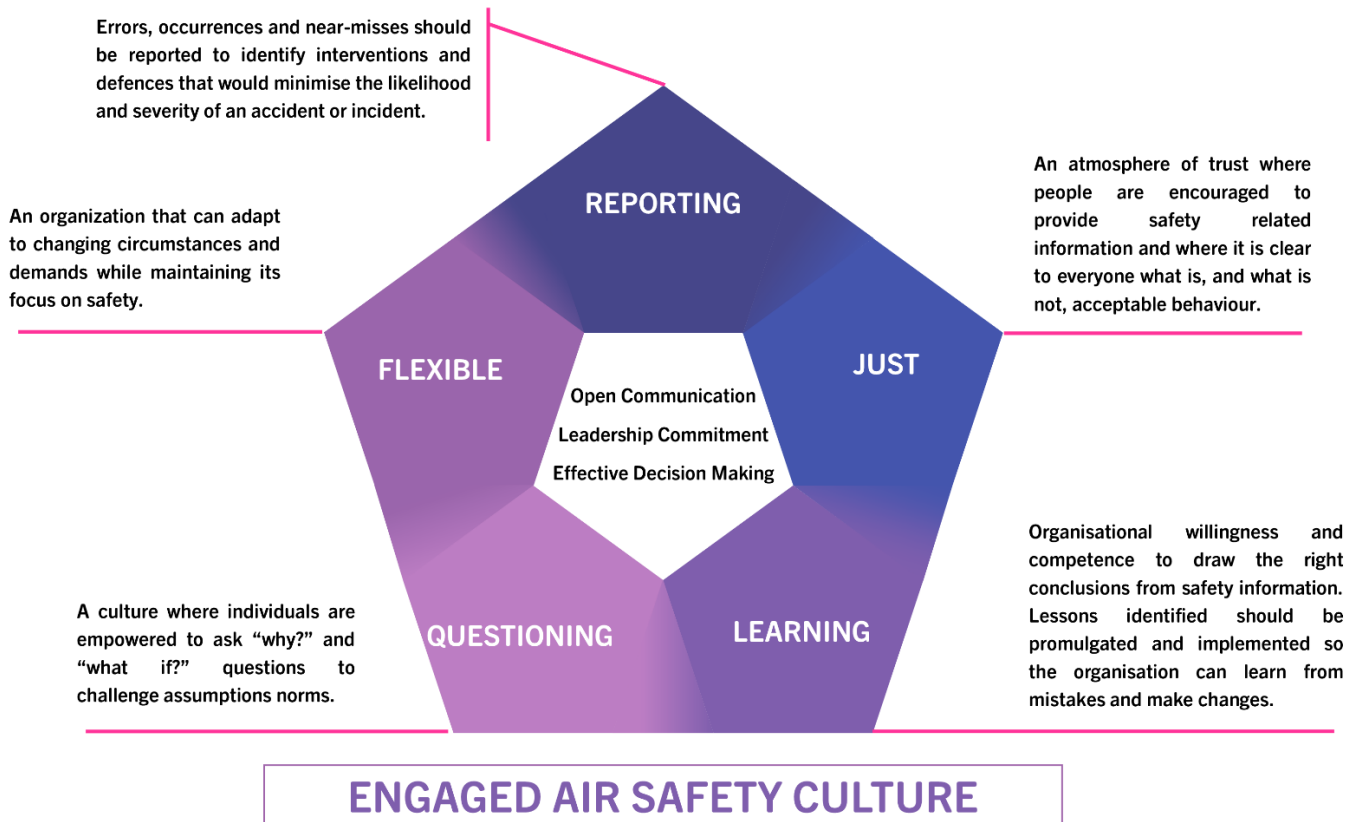
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<sup>27</sup> International Nuclear Safety Group (INSAG) - “Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident”, 1988.

<sup>28</sup> The Nimrod Review, Chapter 27, Page 572, Para 27.11.

<sup>29</sup> Managing the Risks of Organizational Accidents, Reason J, Aldershot, 1997, page 195.

<sup>30</sup> The Nimrod Review, Chapter 27, Page 575, Para 27.33.

**Figure 5 - Components of an Engaged Air Safety Culture**

9. This model is expanded upon below and within the ‘Engaged Safety Culture on a Page’ diagram at Annex A to this chapter. Each component has an associated descriptor which provides a subjective ‘goal’ – *‘what good may look like’* - against which to assess progress:

10. **Values and Behaviours:**

- a. **Just Culture** - An atmosphere of trust where people are encouraged, and even rewarded, for providing Safety related information and where it is clear to everyone what is acceptable and unacceptable behaviour. Investigations into Safety Occurrences are conducted by trained individuals using appropriate processes, such as the DA FAiR II framework, where the emphasis is on preventing future Occurrences and not on culpability. It is important to remember however that this is not a blame free culture.
- b. **Reporting Culture** - An organizational climate where people readily report problems, errors and near misses. A healthy reporting culture includes not only the willingness to report anything, not just free from unfair reprisals for our own mistakes, but also free from ridicule for reporting things that others may not deem worthy of a report – this is referred to as Psychological Safety<sup>31</sup>.
- c. **Learning Culture** - Organizational willingness and Competence to draw the right conclusions from its Safety information and to take appropriate actions based upon those conclusions.
- d. **Flexible Culture** - An organization that actively adapts to changing circumstances and demands in a system of continuous improvement, working proactively to update Safety practices in response to changes in Risk / Hazards.

<sup>31</sup> The Fearless Organisation, Amy Edmondson, 2018.

- e. **Questioning Culture** - A culture where people are engaged and ready to ask "what if?" and "why?" questions that challenge assumptions and reduce the possibility of incubated mistakes.
- f. **Characteristics<sup>32</sup>:**
  - (1) **Leadership Commitment** - *An organization where leadership commitment to Air Safety exists without question.*
  - (2) **Open Communication** - *An environment where Air Safety issues are openly and effectively communicated throughout the organization.*
  - (3) **Effective Decision Making** - *An environment where the consideration of any impact on Air Safety is clearly embedded within any decision-making process.*

### Assessing Air Safety Culture

11. A Safety Culture Assessment Framework is provided at Annex D to this chapter. It includes the component goals, and some indicative 'themes' (or sources of evidence) that ought to be considered when assessing each of the components.

12. The Safety Environment Assessment Tool (SEAT)<sup>33</sup> has been developed to allow unit commanders to survey their personnel and receive real-time data on their attitudes and perceptions. The design of SEAT ensures individuals are free to respond without fear of reprisal ensuring that accurate and honest opinions are recorded.

### Managing A Just Culture

13. Following a Safety-related event, a tension may be created between the requirements of Safety and discipline. Effective Safety requires finding out what happened to prevent recurrence, while the disciplinary processes need to ensure that, where appropriate, suitable sanctions are applied. A Just Culture comprises both a set of beliefs and a set of duties that are expected from the individuals as well as from the organization as a whole. The beliefs and duties that underpin healthy Occurrence reporting and fair and effective investigation are listed in the policy statement template at Annex C to this Chapter, and are based on the following principles:

- a. Individuals are encouraged to contribute actively to improving Safety and will be commended for owning up to mistakes that occur in an honest endeavour to do their best.
- b. ► **The DAE**, ◀ and all involved in it, acknowledge that it is the human condition to make errors and understand the role that HF plays in both aviation and Safety.
- c. Personnel, regardless of status, experience or employer need to know they will be treated in a fair, consistent, objective and swift manner.
- d. Personnel, whatever their role, have a Responsibility to actively participate in the reporting system (see RA 1410 for the reporting formats to be used) and to support learning and improvement in Safety. Failing to report Occurrences and Hazards is not acceptable and may incur sanction.

14. When considering Air Safety Occurrences, the ADH, AM(MF), AM<sup>8</sup> or Heads of ADH-Facing Organizations will encourage free and full reporting and thus facilitate the primary aim of establishing *why* an event happened and *how* to prevent it from re-occurring.

### Determining the Behavioural Type and Accountability

15. When an event, or number of different events, lead to an Occurrence then the behavioural type and Accountability for each separate event needs to be determined. Determination of the behavioural type and Accountability is underpinned by a number of established tests which are described in Chapter 4.

<sup>32</sup> The Nimrod Review, Chapter 27, page 575, para 27.33.

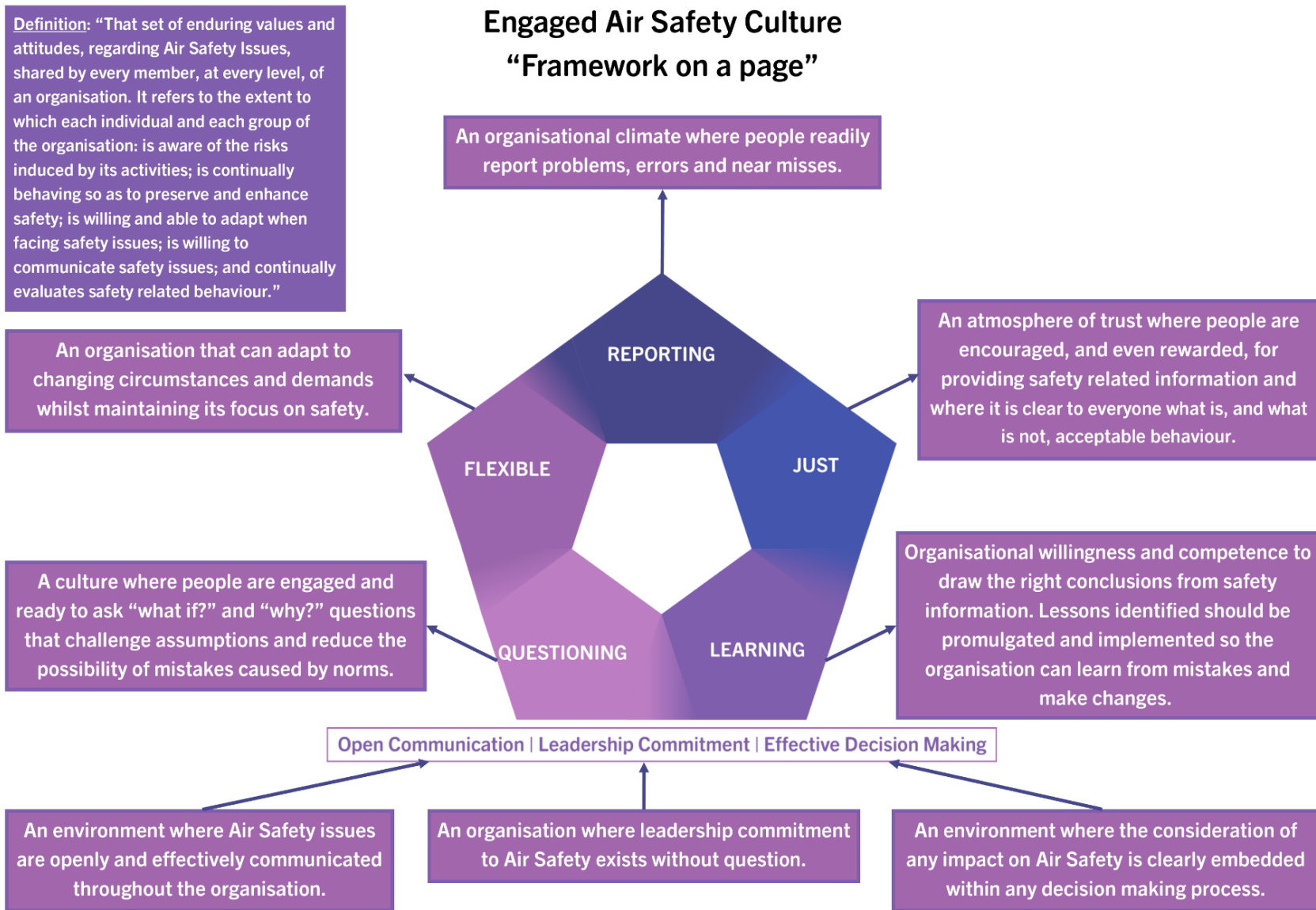
<sup>33</sup> <https://seatsurvey.co.uk/>.


### Just Culture Policies, Processes and Models

16. Organizations need to incorporate a Just Culture into their Occurrence management using the 3 key components shown below. The templates given here may be adapted as necessary for local use. However, to preserve consistency of approach and culture across ►the DAE,◄ variations will be limited to those needed to link the ►DAE◄ Just Culture with outputs, and to align terminology with local usage.

- a. **Just Culture and Error Management Policy.** The ►DAE◄ Just Culture and Error Management Policy statement, which can be used as a template for a local Just Culture and Error Management Policy statement, is at Annex C.
- b. **Error Investigation Process.** A template for the process to be followed for Error Investigation, to be used in conjunction with the Occurrence reporting and investigation processes is at Appendix 1 to Chapter 4. A description of how the DA FAiR II Behaviours Analysis Flowchart may be used within this process is contained within the body of Chapter 4.
- c. **Behavioural Type and Accountability Model.** The DA FAiR II Behaviours Analysis Flowchart is at Appendix 2 to Chapter 4, whilst the Tests, Interventions and Accountability Model is at Appendix 3. Once an investigation is complete, the ADH having considered the Occurrence Review Group (ORG) chair's recommendations will consider both of these processes in order to review the results, establish the behavioural type and Accountability, and, most importantly, to determine the most appropriate intervention(s). They are not to be used to make any judgement on Accountability without a proper investigation taking place. However, they can be used to support the Just Culture policy by demonstrating how fair treatment will be ensured.

### Chapter 3 - Annex A: Engaged Air Safety Culture ‘Framework on a Page’



<p style="text-align: center;"><b><u>JUST</u></b></p> <ul style="list-style-type: none"> <li>- Policy Statement ('line in the sand').</li> <li>- Unsafe behaviour dealt with consistently and in line with policy. (DA FAIR tool).</li> <li>- Safe behaviour rewarded appropriately.</li> <li>- Human Error dealt with consistently and in line with policy.</li> <li>- Recognising that people do make errors.</li> <li>- Investigations (Formal process, trained investigators).</li> </ul>	<h2 style="margin: 0;">Engaged Air Safety Culture</h2> <h3 style="margin: 0;"><i>Themes/Indicators</i></h3>	
<p style="text-align: center;"><b><u>REPORTING</u></b></p> <ul style="list-style-type: none"> <li>- Functioning and effective Air Safety Reporting System.</li> <li>- Functioning and effective Error Management System.</li> <li>- Number of reports commensurate with size/type of organization.</li> <li>- Effective/timely management of reports.</li> <li>- Proactive v reactive reporting.</li> <li>- Value of reporting is understood.</li> <li>- Confidence in the system (Underpinned by Just Culture).</li> </ul>		<p style="text-align: center;"><b><u>LEADERSHIP COMMITMENT</u></b></p> <ul style="list-style-type: none"> <li>- Demonstrable leadership commitment towards Air Safety.</li> <li>- Clearly defined leadership/management Air Safety responsibilities.</li> <li>- Air Safety sufficiently resourced (established, manned, trained).</li> <li>- Appropriate understanding of Air Safety risks within levels of management.</li> </ul>
<p style="text-align: center;"><b><u>QUESTIONING</u></b></p> <ul style="list-style-type: none"> <li>- Challenging of process and assumptions is encouraged.</li> <li>- Positive attitude to identification of new risks.</li> <li>- Proactive risk management.</li> <li>- Danger of organization norms recognised and managed.</li> </ul>		<p style="text-align: center;"><b><u>OPEN COMMUNICATION</u></b></p> <ul style="list-style-type: none"> <li>- Air Safety comms throughout all levels of the organization.</li> <li>- Management are 'connected' to workforce on Air Safety issues.</li> <li>- Effective and inclusive Air Safety meetings.</li> </ul>
<p style="text-align: center;"><b><u>LEARNING</u></b></p> <ul style="list-style-type: none"> <li>- Learning from experience (good and bad).</li> <li>- Timely follow-up.</li> <li>- Robust action tracking.</li> <li>- Monitoring at appropriate level.</li> <li>- Trend analysis.</li> </ul>		<p style="text-align: center;"><b><u>EFFECTIVE DECISION MAKING</u></b></p> <ul style="list-style-type: none"> <li>- Air Safety plays fundamental role in day to day decision making.</li> <li>- Air Safety has appropriate priority against output.</li> <li>- The 'can do' attitude is appropriate and risk based.</li> </ul>
<p style="text-align: center;"><b><u>FLEXIBLE</u></b></p> <ul style="list-style-type: none"> <li>- Appetite for Continual Improvement.</li> <li>- Air Safety implications of Change Management</li> </ul>		<p style="margin: 0;">Military Aviation Authority</p> 

## **Chapter 3 - Annex B: Engaged Air Safety Culture Assessment Framework**

This Annex has been moved to Chapter 3 - Annex D.

## Chapter 3 - Annex C: ► DAE ◀ Just Culture and Error Management Policy Statement Template

1. This policy establishes an open and honest reporting culture within (*insert Organization / Ship / Unit / Stn*) in which all personnel, regardless of status; experience or employer can expect to be treated in a fair, consistent, objective and timely manner.
2. The mission of (*insert Organization / Ship / Unit / Stn*) is to (*insert mission*).
3. To achieve this objective, it is essential to attain the highest possible Flight Safety standards in all aspects of the output of (*insert Organization / Ship / Unit / Stn*). To ensure this, we need to systematically and actively manage events and balance the potentially conflicting requirements of Safety and standards with operational necessity. I intend to do this within a **Just Culture** that encourages open and honest reporting of Air Safety events.
4. I recognize that it is the human condition to make errors, and that HF plays an important role in aviation and Safety. It is my intent to implement an exemplary EMS that recognizes best practice and meets the highest regulatory standards. I encourage everyone to contribute actively to improving Safety and assure you that you will be commended for owning up to mistakes made in an honest endeavour to do your best.
5. All personnel involved in aviation activity at this unit, regardless of status, experience or employer, will be treated in a fair, consistent, objective and timely manner. All personnel involved in aviation activity at this unit have a Responsibility to actively participate in the EMS by reporting Occurrences and Hazards so that learning and improvement can happen. At the heart of this **Just Culture** are some core beliefs and duties that we all need to share – these are summarized below and listed in bullet form at Appendix 1 to this Annex.
6. Under this **Just Culture** (*insert Organization / Ship / Unit / Stn*) will follow a defined, consistent system for the management of errors. The deciding part of this system will be independent of the employer or chain of command. This is neither a “blame” nor “no-blame” culture. All Incidents will be investigated by a SQEP Occurrence Investigator (OI)<sup>34</sup> approved by me and, where Incidents are reported in a timely and open manner, the presumption of blamelessness will be the norm and the expectation is that disciplinary action will be the exception. If any disciplinary or administrative action is needed, this will not be done without a proper investigation and a full review of the findings of that investigation. Nevertheless, the following serious failures of personnel to act responsibly could attract sanction under this policy:
  - a. Premeditated or intentional acts of damage to equipment or property.
  - b. Actions or decisions involving recklessness which no reasonably prudent person, with relevant training and experience, would take.
  - c. Failure to report Incidents as required by this policy.
7. All personnel, wherever they work in (*insert Organization / Ship / Unit / Stn*) and whatever their role, need to recognize that they have a part to play and a Responsibility to participate actively in the process of attaining the highest Flight Safety standards.
8. This **Just Culture**, and the associated reporting system, will enable (*insert Organization / Ship / Unit / Stn*) to meet the operational requirements efficiently while ensuring the highest possible Flight Safety standards. The system will drive errors to a low level whilst recognizing that people will make errors and the **Just Culture** will provide every possible support to personnel to meet this goal.

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<sup>34</sup> Needs to have completed the Safety Training for Error Prevention (STEP) Occurrence Investigators Course.

## Chapter 3 - Appendix 1 to Annex C: ► DAE ◀ Just Culture - Beliefs and Duties

### Beliefs

All those involved in aviation activities at (*insert Organization / Ship / Unit / Stn*):

- Recognize that professionals will occasionally make mistakes.
- Recognize that even professionals will develop unhealthy routines of behaviour.
- Are intolerant of reckless conduct.
- Recognize that inappropriate blame gets in the way of error management.
- Expect that errors will be reported.
- Accept that we are all accountable if we choose to take Risk.
- Expect that Safety standards will improve if we manage errors effectively.
- Believe that when something goes wrong all will be treated fairly and with complete integrity while we investigate whether mistakes have been made, and why, in our collective efforts to get things right for the next time.

### Duties

All those involved in aviation activities at (*insert Organization / Ship / Unit / Stn*) have a duty to:

- Report and admit where a mistake has been made.
- Report when a Risk is identified.
- Manage Risk at the appropriate level.
- Avoid and be intolerant of reckless behaviour.
- Encourage uninhibited reporting without fear or embarrassment.
- Actively participate in error management and Air Safety in order to help create an engaged Air Safety Culture.
- Understand clearly that the **Just Culture** provides a qualified immunity from sanctions while investigations take place and any Accountability is established.
- Understand clearly the difference between acceptable and unacceptable behaviour.
- Provide active leadership, appropriate to your position in the organization, to the **Just Culture** at (*insert Organization / Ship / Unit / Stn*), its beliefs and duties.

### Chapter 3 - Annex D: Engaged Air Safety Culture Assessment Framework<sup>35</sup>

**Engaged Air Safety Culture Definition:** That set of enduring values and attitudes, regarding Air Safety issues, shared by every member, at every level, of an organization. It refers to the extent to which each individual and each group of the organization: is aware of the Risks induced by its activities; is continually behaving so as to preserve and enhance Safety; is willing and able to adapt when facing Safety issues; is willing to communicate Safety issues; and continually evaluates Safety related behaviour.

**Guidance for Use:** It is recognized that achieving an objective assessment of culture is challenging. This framework is designed to aid assessment and is not a mandated list of necessary evidence; nor is the list exhaustive. The 'Evaluation Evidence / Themes' may be used as a guide when conducting the self-assessment of your organization and are not intended as stand-alone questions. Accurate responses will enable you to identify possible interventions for continuous improvement of your Air Safety Culture. Evidence can be obtained in a variety of ways, including surveys, questionnaires and workshops. The overall assessment of each goal ►will◄ be measured as a level of agreement that the goal has been achieved. Disagree, Partially Agree, Generally Agree or Totally Agree ►will◄ be recorded against each goal in the blue line on the table.

Component	Evaluation Evidence / Themes	Justification / Comments
<b>Values and Behaviours</b>		
<b>Just Culture</b>		
<i>Goal: An atmosphere of trust where people are encouraged, and even rewarded, for providing Safety related information and where it is clear to everyone what is acceptable and unacceptable behaviour.</i>	Is the distinction between acceptable / unacceptable behaviour (The 'line in the sand') appropriately defined and communicated?	
	How do procedures compare with the way that you actually do your job?	
	Is safe behaviour is rewarded appropriately?	
	How much trust is there between JNCOs / SNCOs / Officers?	
	Is the perception throughout the organization that human errors and unsafe acts are dealt with fairly and consistently?	
	Are Occurrence Safety Investigations carried out iaw a formal process and by appropriately trained personnel iaw RA 1410?	

<sup>35</sup> A downloadable version of the Safety Culture Assessment Framework is available at ►[www.gov.uk/government/publications/manual-of-air-safety-mas](http://www.gov.uk/government/publications/manual-of-air-safety-mas)◄.

	Are there sufficient numbers of trained (and current) investigators?	
	How are people treated following an unwanted event involving an honest mistake?	
	Do you feel comfortable raising Safety concerns? Are you able / comfortable to call STOP?	
	Do investigations cut across all levels of the organization?	
<b>Just Culture Goal Achieved</b>		
<b>Reporting Culture</b>		
<i>Goal: An organizational climate where people readily report problems, errors and near misses.</i>	Is there is a functioning and effective Air Safety Reporting System?	
	Is there appropriate awareness of the Air Safety reporting and Error Management systems at all levels? INFORM, DASOR, DCORS, SON Local book etc.	
	Are 'ages' of reports understood?	
	Is the Air Safety / Error Management reporting system fully inclusive and available to everyone who needs access? (access to Contractors etc)	
	Are sufficient people trained on the Air Safety / Error Management reporting system and new arrivals are trained / briefed in an appropriate timeframe?	
	Are you encouraged to report by your leadership?	
	Is there is a willingness to report Air Safety Occurrences / near misses / errors?	
	Is there a positive attitude within the organization, at all levels, towards Air Safety / Error Management reporting?	
	Is the value of reporting is understood?	
	Is there any perception that there will be unjust negative consequences for those who have submitted reports?	
	Are those submitting reports given appropriate and timely feedback?	
	Is there effective management of Air Safety related reports?	
<b>Reporting Culture Goal Achieved</b>		

<b>Learning Culture</b>		
<p><b>Goal:</b> <i>Organizational willingness and Competence to draw the right conclusions from its Safety information and to take appropriate actions based upon those conclusions.</i></p>	Are reported Occurrences dealt with appropriately?	
	Are follow up actions monitored at an appropriate level and tracked through to completion?	
	Are follow up actions timely / robust / effective?	
	Are lessons Identified appropriately disseminated?	
	Is there evidence of trend analysis - both undertaken and effective?	
	Is there an appetite within the organization for learning from experience (from both good and bad experiences)?	
<b>Learning Culture Goal Achieved</b>		
<b>Flexible Culture</b>		
<p><b>Goal:</b> <i>An organization that can adapt to changing circumstances and demands while maintaining its focus on Safety.</i></p>	Is there is a clear appetite for and evidence of Continual Improvement within Air Safety?	
	Are organization change programmes are appropriately scrutinised for Air Safety implications?	
<b>Flexible Culture Goal Achieved</b>		
<b>Questioning Culture</b>		
<p><b>Goal:</b> <i>A culture where people are engaged and ready to ask "what if?" and "why?" questions that provide the antidote to assumptions and reduce the possibility of incubated mistakes.</i></p>	Does the organization work proactively to attempt to prevent Occurrences before they happen?	
	Is there a positive attitude towards the identification of new Risks?	
	Is the challenging of processes and assumptions encouraged?	
	Are the dangers of 'organizational norms' understood and managed?	
<b>Questioning Culture Goal Achieved</b>		

<b>Underpinning Elements</b>		
<b>Leadership Commitment</b>		
<i>Goal: An organization where leadership commitment to Air Safety exists without question.</i>	There are clearly defined leadership / management Responsibilities for Air Safety.	
	There is clearly demonstrable leadership / management commitment towards Air Safety.	
	There is an appropriate understanding of Air Safety Risks within levels of management.	
	Air Safety is sufficiently resourced (Established, staffed, trained).	
<b>Leadership Commitment Goal Achieved</b>		
<b>Open Communication</b>		
<i>Goal: An environment where Air Safety issues are openly and effectively communicated throughout the organization.</i>	Is the management 'connected' to the workforce on Air Safety related issues?	
	Are the management understanding of the workforce's view of Air Safety?	
	Do individuals understand their particular role in Air Safety?	
	Does the workforce have inclusive and appropriate involvement in Air Safety related meetings? Who attends them? How often are they held?	
	Is Air Safety related communication effective throughout all levels of the organization?	
<b>Open Communication Goal Achieved</b>		
<b>Effective Decision Making</b>		
<i>Goal: An environment where the consideration of any impact on Air Safety is clearly embedded within any decision making process.</i>	Does Air Safety play a fundamental role in day to day decision making?	
	Does Air Safety have an appropriate priority against output?	
	What is the process for identifying, reviewing and managing issues which affect Air Safety?	
	Is the 'can do' attitude appropriate and Risk based?	
<b>Effective Decision Making Goal Achieved</b>		

**Overall Safety Culture Assessment**

**Engaged Air Safety Culture Definition:** That set of during values and attitudes, regarding Air Safety issues, shared by every member, at every level, of an organization. It refers to the extent to which each individual and each group of the organization: is aware of the Risks induced by its activities; is continually behaving so as to preserve and enhance Safety; is willing and able to adapt when facing Safety issues; and continually evaluates Safety related behaviour.

**Overall Assessment Narrative:**

## Chapter 4: Error Investigation Process and Use of Defence Aviation Flowchart Analysis of Investigation Results II (DA FAiR II)

### Safety Culture and Error Management

1. Regulation covering Occurrence Investigation can be found at RA 1410. The fragility of an Engaged Air Safety Culture, especially a Just Culture, means that consistency of approach is vital. As investigations progress, there are clear lines between the non-judgemental investigation, the Review Group or meeting, and any judgemental or disciplinary action. Notwithstanding this, if the investigation highlights that criminal activity or offences contrary to the Armed Forces Act 2006 might have occurred then this has to be brought to the attention of the chain of command at the earliest opportunity.

### Determining the Behavioural Type and Accountability

2. The process diagram at Appendix 1 to this Annex illustrates how error investigation processes, and the DA FAiR II behavioural type model, will be used to consider Occurrences, Incidents, errors or near misses. It is important to remember that the **principal** purpose of this entire process is to determine the most appropriate intervention(s) or action(s) for the system and / or individuals involved. In other words; '**how can we 'fix' this situation and / or prevent it from happening again**'.

3. The DA FAiR II model is intended to assist in identifying the behavioural type and to help resolve any question of Accountability arising due to the actions of an individual or group of individuals. The determining factor that will enable the ORG to establish Accountability will be the question of intention; were the actions and ensuing consequences intended by the individual? How and whether these findings are used to inform recommendations regarding appropriate disciplinary or administrative actions are decisions for the command chain and not the ORG. The command chain remains responsible for determining (with appropriate legal advice if necessary) and enacting any action iaw single Service procedures. If it appears that a potential offence under Schedule 2 of the Armed Forces Act 2006 has been committed, or if the Incident falls under the proscribed circumstances described in that Act, then appropriate legal advice must be sought before proceeding.

4. The DA FAiR II Behaviours Analysis Flowchart at Appendix 2 to this Annex is designed to determine behavioural types based upon information gathered during a non-judgemental investigation. This **▶will◀** be used in conjunction with the framework, at Appendix 3 to this Annex to assess the relative levels of Accountability ascribed to those behavioural types. Application of the model requires a degree of sensitivity and discretion but will ensure an impartial and consistent judgement as to what are deemed acceptable and unacceptable actions. It relies upon a complete and comprehensive investigation having been conducted by trained personnel and will not be used in isolation or without the support of such an investigation. Application of DA FAiR II will lead to one of 5 top-level behavioural types in the following 3 categories:

- a. **Errors.** Unintended Action, Unintended Consequence. Where neither actions nor consequences were as intended by those involved.
- b. **Mistakes, violations or recklessness.** Intended Action, Unintended Consequence. Where the actions were planned but the consequences were not.
- c. **Sabotage.** Intended Action, Intended Consequence. Where both actions and consequences were as planned.

### Procedure for Using the DA FAiR II Model

5. Using the DA FAiR II flowchart, investigators and ORG members will address the questions posed based on the information gathered during the investigation. If the ORG requires clarification or further information it needs to verify any issues with the error investigation team before continuing with the analysis. It is fundamentally important to consider and attempt to understand what was in the mind of the individual, **at the time of the Occurrence and the situation the individual was faced with**. Great care has to be made to avoid assumptions and hindsight bias.

6. In order to assess the behavioural type, and the level of Accountability, the following questions and tests needs to be answered while working through the flowcharts:

a. **Accountability Questions.**

(1) *Was there a conscious and substantial and unjustifiable disregard for Risk?* Did the individual knowingly take a significant Risk whilst ignoring the potential for harm? Answering yes to this question leads to question (2).

(2) *Was there malicious intent?* Was the outcome what the individual intended? Answering yes to this question will determine that the behavioural type was **Sabotage**; answering no results in a **Recklessness** assessment.

(3) *Were the rules intentionally broken?* Did the individual knowingly contravene rules or not follow procedures in order to undertake the task? Answering No here leads to question (4). Answering Yes will lead to one of 5 **Violation** assessments; in this context, all Violations are therefore to be considered deliberate acts. There is a follow-on question (at para (9) below) to determine the primary benefactor of each violation type.

(4) *Was the action intended?* Did the individual mean to do what they did; this refers to the **act** and not the outcome. Answering Yes leads to a **Mistake** assessment, which can be either rule or knowledge based; answering No leads to one of two **Error** types (Slip or Lapse).

(5) *Was the violation considered normal practice?* Has this action become common practice - or 'normalised' - within the organization, perhaps due to resource, infrastructure, culture and / or leadership limitations? Answering Yes here results in a **Routine Violation** assessment; these violations are often *perceived* by the instigator to involve limited Risk as they are likely to have been repeated many times, perhaps without previous serious outcomes.

(6) *Was the individual faced with a highly unusual situation?* This is likely to apply only rarely where the individual was faced with a situation far removed from the norm and, potentially, one for which they were not prepared or trained. It might include, for example, an emergency or other equipment failure that cannot be otherwise mitigated. It could result in a conscious decision or an instinctive reaction, perhaps ignoring a rule to protect a colleague or equipment from immediate and significant harm. Answering Yes results in an **Exceptional Violation** assessment.

(7) *Did the circumstances dictate that a violation was necessary to complete the task?* Were there pressures or limitations (time, task, resource, environmental conditions, equipment, documentation, etc) that made it necessary to step outside of the rules / procedure to complete the task? This question is not intended to determine whether the decision to proceed was justified; rather it **▶ will ◀** determine whether the task could reasonably have been completed by following the rules, in the circumstances. Answering Yes here results in a **Situational Violation** assessment.

(8) *Was the individual trying to make the task more exciting or relieve boredom?* Answering Yes results in an **Optimising Violation** assessment. Optimising Violations can be driven by a broad spectrum of motives but have an underlying desire by the individual to improve the circumstances they are in or the process being carried out, they might arise from a simple desire to impress or relieve boredom, but they might also stem from a desire to improve the process and thus the outcome or productivity; therefore, establishing the motive here, whilst challenging, is of importance. Answering No to question (8) (and No at questions (5), (6) and (7)) results in an **Unspecified Violation**; this is included only to allow for the situation where it has not been possible to determine, or agree upon, any other form of violation type. Whilst the reasons for violations are many, varied and not always obvious, the **Unspecified Violation** assessment ought to be considered a last resort as it does not immediately aid the identification of useful interventions.

(9) *Did the individual believe the violation would benefit the organization?* The re-ordering of the wording in this question is significant; it is quite likely that both the organization and the individual may benefit from a violation. Was it primarily **Organizational Gain** or **Personal Gain**? The challenge ►will◀ determine whether the individual reasonably believed the organization would be the primary benefactor, or whether it was based on blatant self-interest. Where it is not possible to make a clear determination, the question is intended to give the benefit of the doubt to the individual.

b. **The Substitution Test.** This considers whether an equivalent person, similarly trained, current, Competent and motivated, would have behaved in the same way in the same circumstances. If the answer is yes, then it is likely to lead the ORG to evaluate that the level of Accountability is diminished. This evaluation will be most effective and credible when based on advice and input from representatives of the individual's peer group with similar experience, training, qualifications, etc.

c. **The Routine Test.** This considers whether the event in question has happened before to either the individual or the organization. Establishing whether the behaviours are routine or whether the event has happened previously will have a direct influence upon determining the most appropriate intervention. This test seeks to ascertain whether:

(1) The actions of the individual were normative, in that they were a reflection of the normal way of working. This would also align with the findings of the substitution test above.

(2) The individual had been involved with similar Occurrences before.

(3) The organization had experienced similar Occurrences before; but that remedial actions had failed to prevent recurrence (examples might include replenishing a Propulsion System engine oil tank with an incorrect fluid, or selecting an incorrect but nearby and similar cockpit switch).

### Outcomes - Behavioural Classifications

7. Following the DA FAiR II flowchart, addressing the questions at para 6 above and applying the Substitution and Routine Tests, will lead to one of the following behavioural type assessments<sup>36</sup>:

a. **Error.** Errors are associated with familiar tasks that often require little conscious attention but can occur if attention is diverted, even momentarily. Simplistically, they are actions that are not intended – 'not doing what you meant to do'. A **Slip** is an error of *commission*, whereby a simple and frequently performed action goes wrong. Examples could include operating the wrong switch, operating a switch accidentally, moving a lever in the wrong direction or taking a reading from the wrong instrument / gauge. A **Lapse** is the *omission* of a required action and could include forgetting to obtain a necessary Approval / clearance or missing out a step or losing your way in a procedure. However, it is important here to separate the physical action, which might well be classified an error, from other human behavioural types or failures (for example, choosing not to follow a mandated checklist that might have reduced the likelihood of an error) which may be assessed quite differently.

b. **Mistake.** Mistakes are decision-making or judgement failures whereby the wrong or inappropriate action is carried out but as the individual intended. They can be linked to shortcomings in mental processing, information gathering, planning, etc; simplistically, 'doing the wrong thing believing it to be right, at the time'. Where the misjudgement is based on remembered and correct rules or procedures (wrong torque setting, airframe speed limits) it is deemed to be a **Rule-based Mistake**. Where the decision was based on incorrect or missing information (an out-of-date or unclear manual or map) the failure is termed a **Knowledge-based Mistake**. Again, it is important to consider wider matters, such as relying

<sup>36</sup> The HSE publication 'Human Failure Types' is one of a number of documents underpinning these explanations and examples.

on memory and making a rule-based mistake when a following checklist was required, as well as the physical action.

c. **Routine Violation.** Where the violation has come to be considered normal practice, is in widespread use and might even be tolerated (or overlooked) by the management. Non-compliance has become the norm and there has been a lack of meaningful Enforcement. Potentially, proposed efforts to improve the procedure have been ignored, not acted upon due to resource, or significantly delayed. Consequently, routine violations are often perceived by the instigator to involve limited Risk as they are likely to have been repeated many times, perhaps without previous serious outcomes.

d. **Exceptional Violation.** Where individual was faced with situation far removed from the norm and, potentially, one for which they were not prepared or trained, and attempts to solve the 'problem'.

e. **Situational Violation.** A non-compliance dictated by situation-specific factors; Were all of the applicable rules and resources available, workable, up to date, intelligible and correct? Was there undue time, operational pressure, unsuitable / unavailable equipment, environment, etc. It is important to consider both whether the task could have been completed iaw the procedure and, if it could not, what drove the decision to proceed with the task regardless.

f. **Unspecified Violation.** This assessment is included only to allow for the situation where it has not been possible to determine, or agree upon, any other form of violation type. Whilst the reasons for violations are many, varied and not always obvious, the **Unspecified Violation** assessment ought to be considered a last resort as it does not immediately aid the identification of useful interventions.

g. **Optimising Violation.** Optimising Violations might arise from a simple desire to impress or relieve boredom, but they might also stem from a desire to improve the process and thus the outcome or productivity; therefore, establishing the motive here, whilst challenging, is of great significance.

h. **Violation for Organizational or Personal Gain.** An individual may believe that their actions are for the good of the organization in terms of a reduction of time, cost or resource; or to achieve organizational goals such as meeting schedules or targets. Conversely, the actions might be driven by blatant self-interest. In practice, it is quite likely that both the organization and the individual may benefit from a violation. Where it is not possible to make a clear determination, the question is intended to give the benefit of the doubt to the individual.

i. **Recklessness.** A conscious and substantial and unjustifiable disregard for Risk. Whilst there is no intent to do harm to others, recklessness implies that an individual knowingly ignored the potential consequences of their actions. For example, coming into work under the influence of alcohol or knowingly operating a sector in an excessively fatigued state having not taken the required rest period.

j. **Sabotage.** Malicious intent and a conscious and substantial and unjustifiable disregard for Risk. To determine whether an individual's actions constitute sabotage there needs to be intent for both the actions and the consequence.

### Determining Levels of Accountability and Appropriate Interventions

8. The resulting behavioural type assessment, supported by the outcome of the Substitution and Routine tests, can be aligned with a relative level of Accountability, determined largely by the intention of both the actions and the consequences. However, the primary purpose of this whole process ► will be ◀ to drive the identification and implementation of changes that can be made, at the personal and / or organizational level, to limit or stop re-occurrence. Whilst this process can also support the determination of appropriate administrative or disciplinary action, this is of secondary importance. A successful Just Culture requires a published policy that is effectively communicated and adhered to. This will make it clear exactly what is, and what is not, acceptable

behaviour – creating a notional ‘line in the sand’, if you like. Therefore, whilst DA FAiR II can assist the command chain in determining which behaviours might be managed through disciplinary action, the clear majority of behaviours can be most effectively managed by addressing performance-influencing factors. Where the command chain is considering further administrative or disciplinary action, the process (potentially, the ORG) needs to additionally consider the Proportionality Test to determine an intervention best suited to the attributed behaviour classification, using the following guidance:

- a. **The Proportionality Test.** This test considers whether the proposed action will have any Safety value; ie is it likely to improve Safety by changing behaviours balanced against any intended or unintended consequences that may potentially damage the Engaged Air Safety Culture. This test may help determine the appropriate extent of any administrative or disciplinary action in terms of its contribution to Safety, learning and improvement.
- b. **Determining the Intervention.** In order to determine intervention(s) the process will consider what needs to happen to reduce the likelihood of recurrence at both the individual level and the organizational level. For an intervention to be successful in its aim to reduce the likelihood of recurrence, it needs to be appropriate to the behavioural type determined using DA FAiR II model. Errors, mistakes and the different types of violations all have differing psychological and motivational precursors and it is essential therefore that consideration is given to this when developing an intervention; some guidance and examples are provided at Figure 6 and in the remainder of this chapter.

**Figure 6 - Behaviours and Interventions**

Behaviour	Intervention
Error	Address the identified HF and consider how to improve: individual skills; checklists; teamwork, supervision & CRM; removal and / or awareness of distraction; design / Human Machine Interface (all switches work the same ‘way’); task pressure and timelines; warnings, alarms; HazOb reporting; Reporting & Questioning culture; ‘soft’ issues affecting morale; job satisfaction.
Mistake	Address cognitive errors and consider how to improve: individual skills and drills through additional training; focussed HF training and awareness; documentation currency, Quality and availability; reporting to highlight issues with data and information.
Routine Violation	Address: reporting; questioning; learning; supervision, Assurance and leadership (don’t accept or encourage reducing standards); sub-optimal procedures / rules; tool availability; feedback; ‘draw a line in the sand’.
Exceptional Violation	Address: unusual situations awareness; HF training; supervision; shift patterns.
Situational Violation	Address: resources (have they got what they need?); environment and working conditions; education and promotion; clear direction and priorities, including perception of the ‘operational imperative’; communication.
Unspecified Violation	Consider all violation interventions, situation dependant.
Optimising Violation	Determine motive then: consider job satisfaction; adequacy or effectiveness of procedures; take admin or disciplinary action as appropriate.
Violation for Organizational Gain	Manage through appropriate: education; training; admin or disciplinary action if appropriate.

Behaviour	Intervention
Violation for Personal Gain	Manage through appropriate: education; training; supervision; admin or disciplinary action as appropriate.
Recklessness	Manage through appropriate HF training and education; take admin and / or disciplinary action as appropriate.
Sabotage	Manage through disciplinary action; potentially, civil and / or criminal prosecution.

### The hierarchy of Intervention Effectiveness

9. This is a key concept, providing an order of priority when creating report Recommendations following an LI or ORG. The process ought to be undertaken in consultation with those who actually do the work and will focus on changes which are most likely to produce sustained Safety improvements.

10. To reduce the chance of reoccurrence to the lowest level possible, start with option (1) and work down the list. Consider the interventions in the order shown, do not just jump to the easiest / cheapest option to implement. The more severe the potential consequences, the more important it ► will be ◀ to focus on Interventions at the top of the hierarchy.

(1) **Forcing Functions:** Make it impossible to conduct the task incorrectly is the most effective of the Hierarchy of Interventions. Although the most effective, forcing functions are typically the most challenging to implement. Example. Diesel pump nozzles do not fit into modern petrol cars.

(2) **Standardization / Simplification:** Reducing the complexity of a procedure reduces the amount of steps where an error could occur. Standardization reduces the requirement to remember multiple processes to suit different platforms / environments. Simply adding more and more steps each time an Incident occurs actually increases the chance of future errors / mistakes.

(3) **Checklists / Reminders:** Working from a checklist as opposed to from memory reduces the likelihood of errors and also helps to ensure that everyone completes the task in the same way. Reminders can form a last line of defence to make us double check an important factor before continuing. Example. Breaking down lengthy tasks into small checklists, each of which needs to be completed and ticked off before continuing onto the next. Electronic systems can introduce a forcing function here where it is not possible to move onto the subsequent list before the present list has been signed off.

(4) **Rules / Policies:** Implementing Regulations and procedures to articulate the safe and correct way to carry out a procedure. Over a long period of time this can produce an unwieldy set of documents that would be daunting to individuals new to the organization.

(5) **Training:** Delivering focussed training to an individual or group of individuals to address the situation in which the error or Incident occurred. To be effective the training needs to be specifically targeted and delivered in an engaging fashion by a subject-matter expert (SME), and not simply be a repetition of previous training.

(6) **Warning:** Highlighting the potential for an error / Incident to the rest of the organization and external agencies. Example. A sign that highlights a specific Hazard.

#### a. Interventions need to be SMART

(1) **Specific:** Ensure the recommended intervention is a clear and specific action that includes a verb, ie somebody is tasked to do something.

(2) **Measurable:** Is it clear when this action will be complete; have you made it quantifiable?

(3) **Assigned:** The action needs an owner. This is ideally the person who is accountable for ensuring the intervention is implemented, and not necessarily the person responsible for physically doing it.

(4) **Realistic:** Ensure the intervention is achievable, within the scope of the actioned, and that they have adequate resources to complete it.

(5) **Time bound:** Ensure that there is a time frame within which the intervention is planned to be completed and then check that it has been.

b. **Interventions also need to be:**

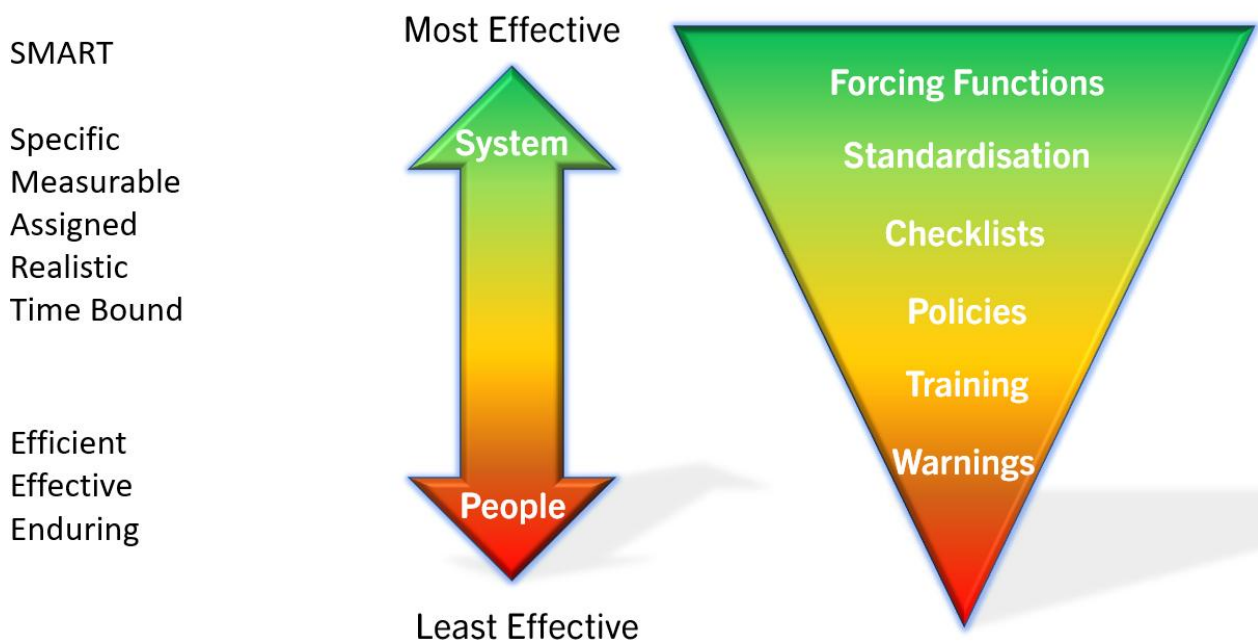
(1) **Effective:** They need to address the actual problem in order to prevent or at least reduce the likelihood of reoccurrence.

(2) **Efficient:** If the recommendation eliminates the problem but the 'cost' to the business is that it cannot realistically operate then the recommendation needs to be reviewed. This is essentially a Risk balancing exercise looking at the Safety improvement versus the sacrifice (cost, time, effort) of implementation.

(3) **Enduring:** The recommendation will be enduring over time and not something quickly forgotten. It will therefore also remain effective despite staff churn.

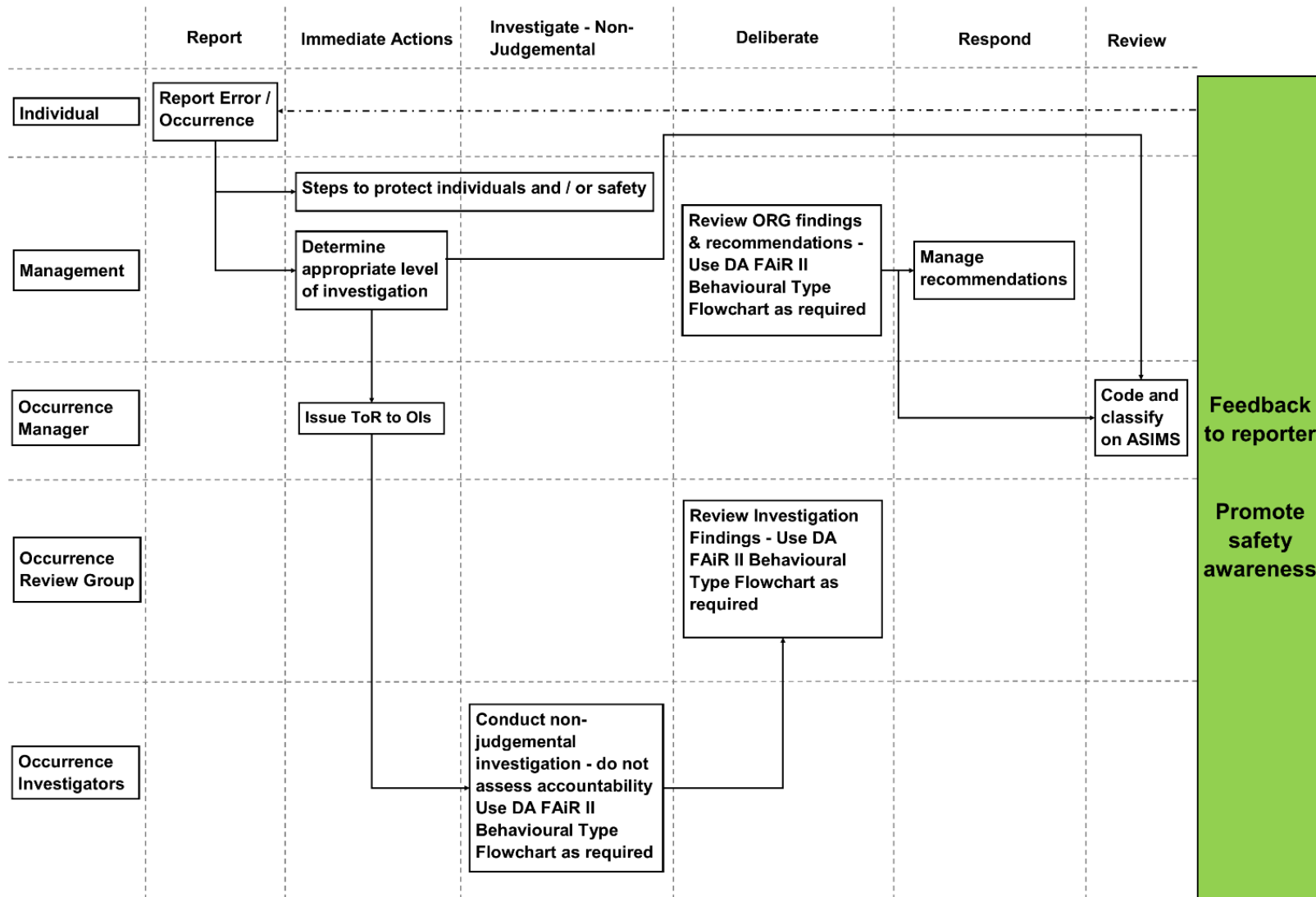
**Figure 7 - Intervention Effectiveness**

Intervention Effectiveness



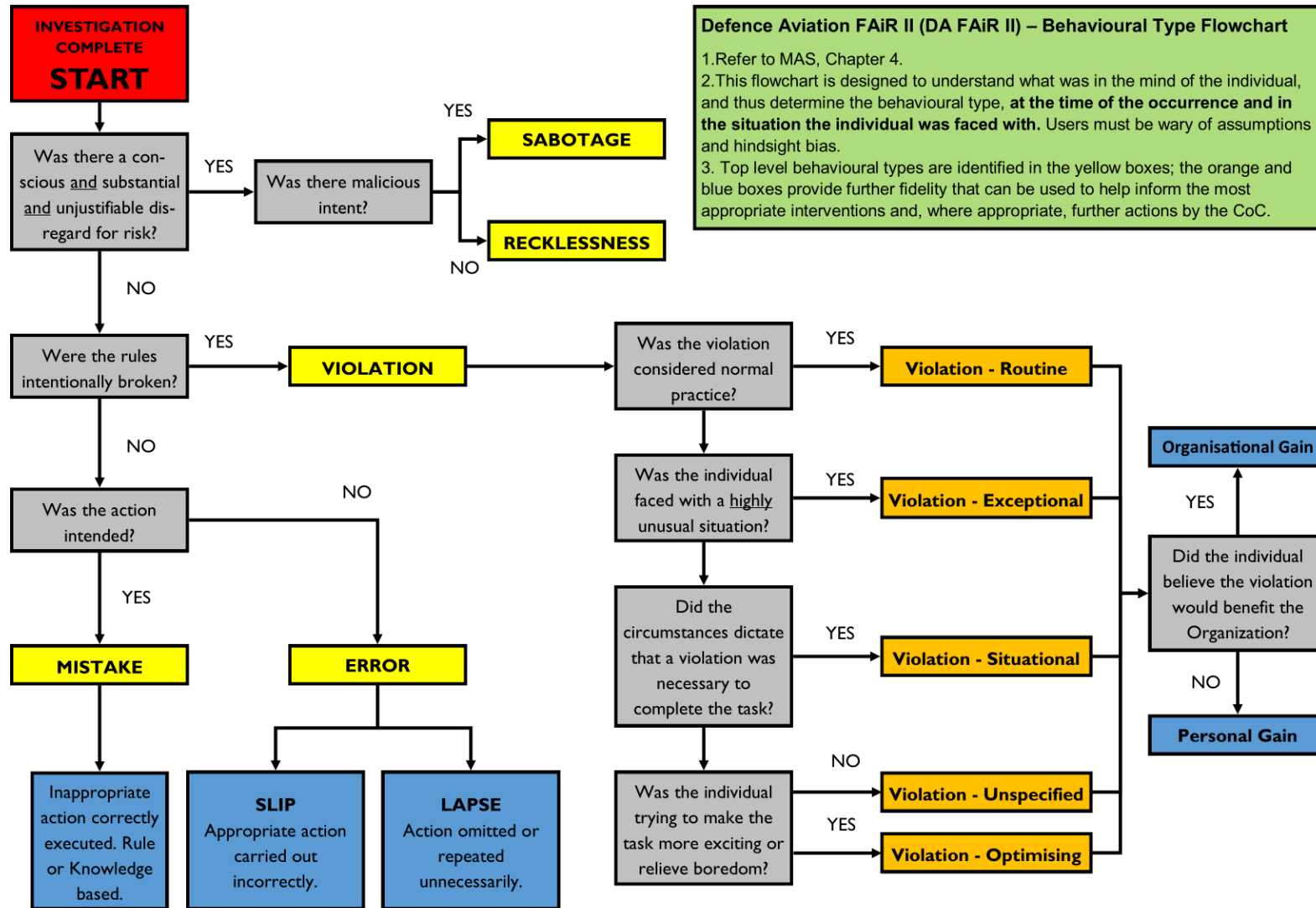
## Appendix 1 to Chapter 4: Application of DA FAiR II - Process Flowchart

Figure 8 - Application of DA FAiR II - Process Flowchart



## Appendix 2 to Chapter 4: DA FAiR II Behavioural Type Flowchart

Figure 9 - DA FAiR II Behavioural Type Flowchart



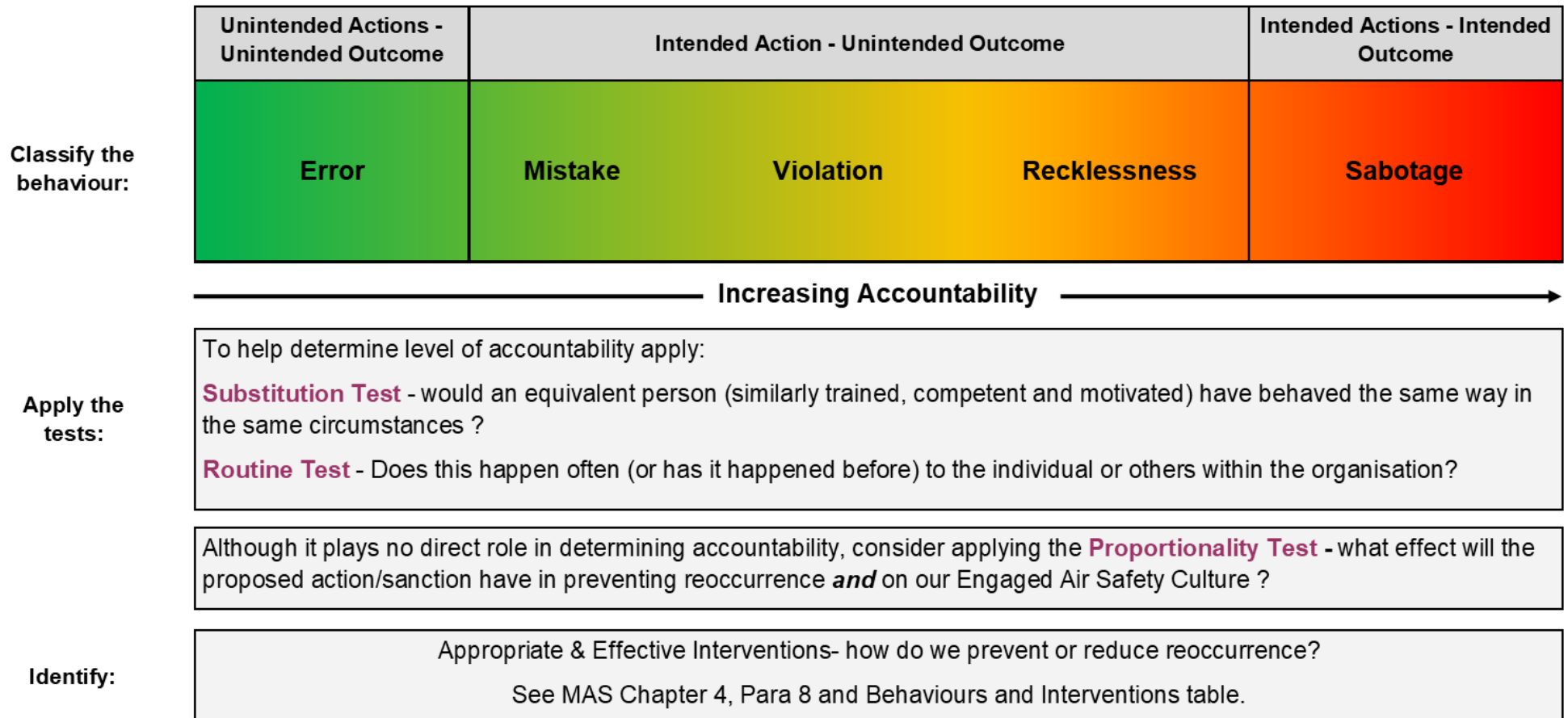
**Defence Aviation FAiR II (DA FAiR II) – Behavioural Type Flowchart**

1. Refer to MAS, Chapter 4.
2. This flowchart is designed to understand what was in the mind of the individual, and thus determine the behavioural type, **at the time of the occurrence and in the situation the individual was faced with**. Users must be wary of assumptions and hindsight bias.
3. Top level behavioural types are identified in the yellow boxes; the orange and blue boxes provide further fidelity that can be used to help inform the most appropriate interventions and, where appropriate, further actions by the CoC.

### Appendix 3 to Chapter 4: DA FAiR II Tests, Interventions and Accountability

Figure 10 - DA FAiR II Tests, Interventions and Accountability

- Classify the behaviour type) as identified by using Appendix 2)
- Apply the additional tests to determine Accountability
- Identify appropriate and effective interventions



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