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System Safety and DASR Competencies

Australian System Safety Conference 2018
WGCDR Phillip Telfer
23 – 25 May 18

AGENDA

- System safety in ADF Aviation
- Safety Management Systems (SMS) in ADF aviation and link to System Safety
- Competency requirements in the Defence Aviation Safety Regulations (DASR)
- Overlap of Competency and System Safety activities
- Summary / Observations

System Safety in ADF Aviation

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Defence & System Safety

- 15-20 years ago realised the importance of System Safety to design
- Around 2003 introduced ‘mandatory’ System Safety design requirements for new designs (via standards such as MIL-STD-882 and FAR XX.1309)
- Achieved good identification and management of hazards and associated risks during initial design

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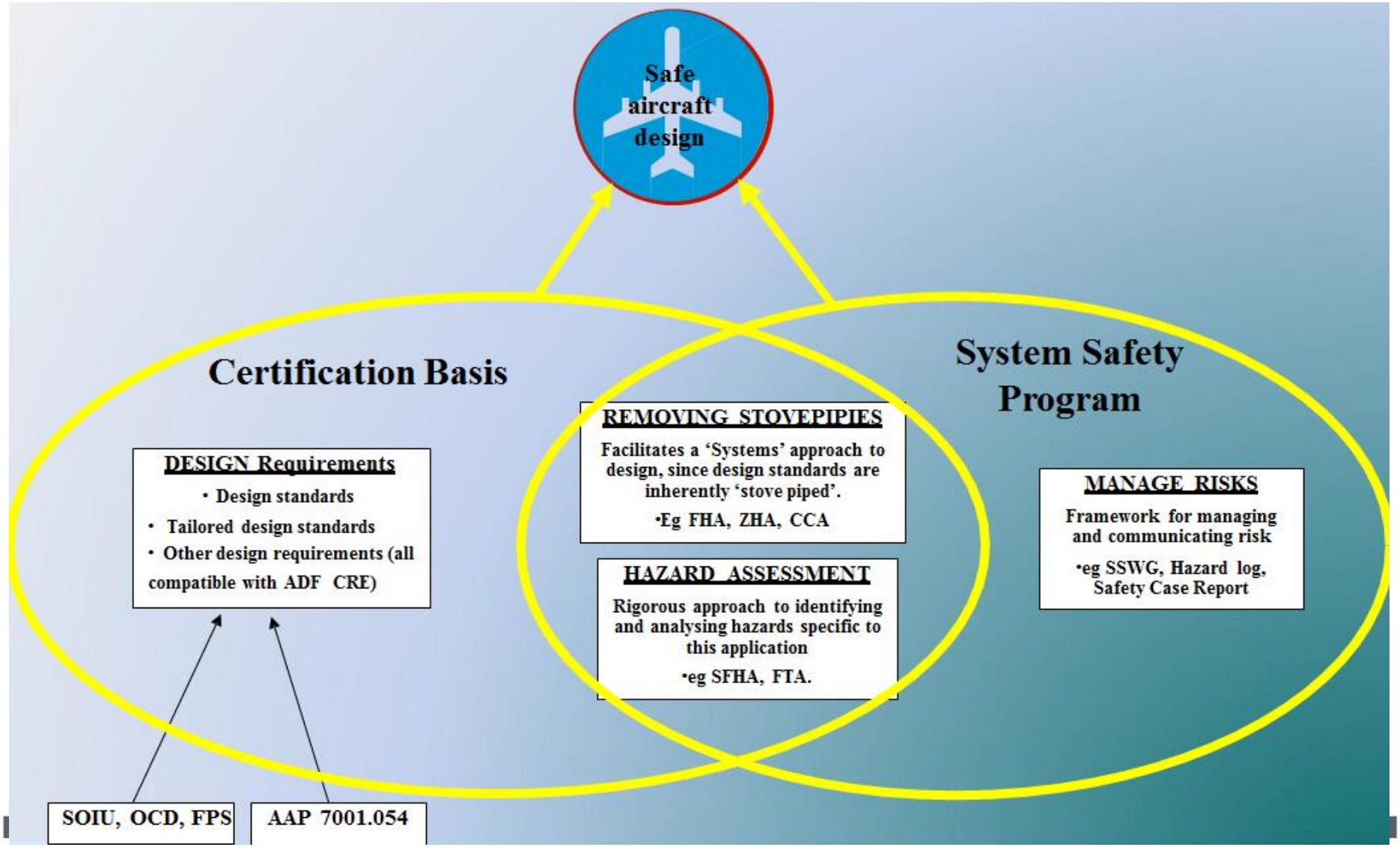

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Defence & System Safety

- System Safety program outcomes used to establish whether a hazard (and associated risk) was ‘unacceptable’
- Missing robust in-service safety risk management
- In 2012 published regulations for in-service safety risk management – very prescriptive (detailed process/procedure not outcomes required)
- This also muddied the waters as what was “System Safety”

System Safety in DASR

- Product based System Safety Programs required for any Major Change to a aircraft or in a new aircraft acquisition
  - Required as per Certification Basis (ADF Design Requirements)

- Product based in-service hazard/risk management
  - Required via DASR 21 MTC holder obligations

- Organisational Safety Programs – Overarching both acquisition system safety and in-service hazard management
  - Required as per DASR SMS
  - Management of hazards to WHS SFARP requirements

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Defence & System Safety

- DASR introduced regulatory direction in regards to 'in-service systems safety' as understood by ADF:

DASR 21.A.3A - Failures, malfunctions and defects

(a) System for Collection, Investigation and Analysis of Data.

The holder of a type-certificate, restricted type-certificate, supplemental type-certificate, …. shall have a system for collecting, investigating and analysing reports of and information related to failures, malfunctions, defects or other occurrences which cause or might cause adverse effects on the airworthiness of the product, part or appliance covered by the type-certificate, restricted type-certificate, supplemental type-certificate, ….. Information about this system shall be made available to all known operators of the product, part or appliance and, on request, to any person authorised under other associated DASR.

SMS in ADF Aviation and link to System Safety

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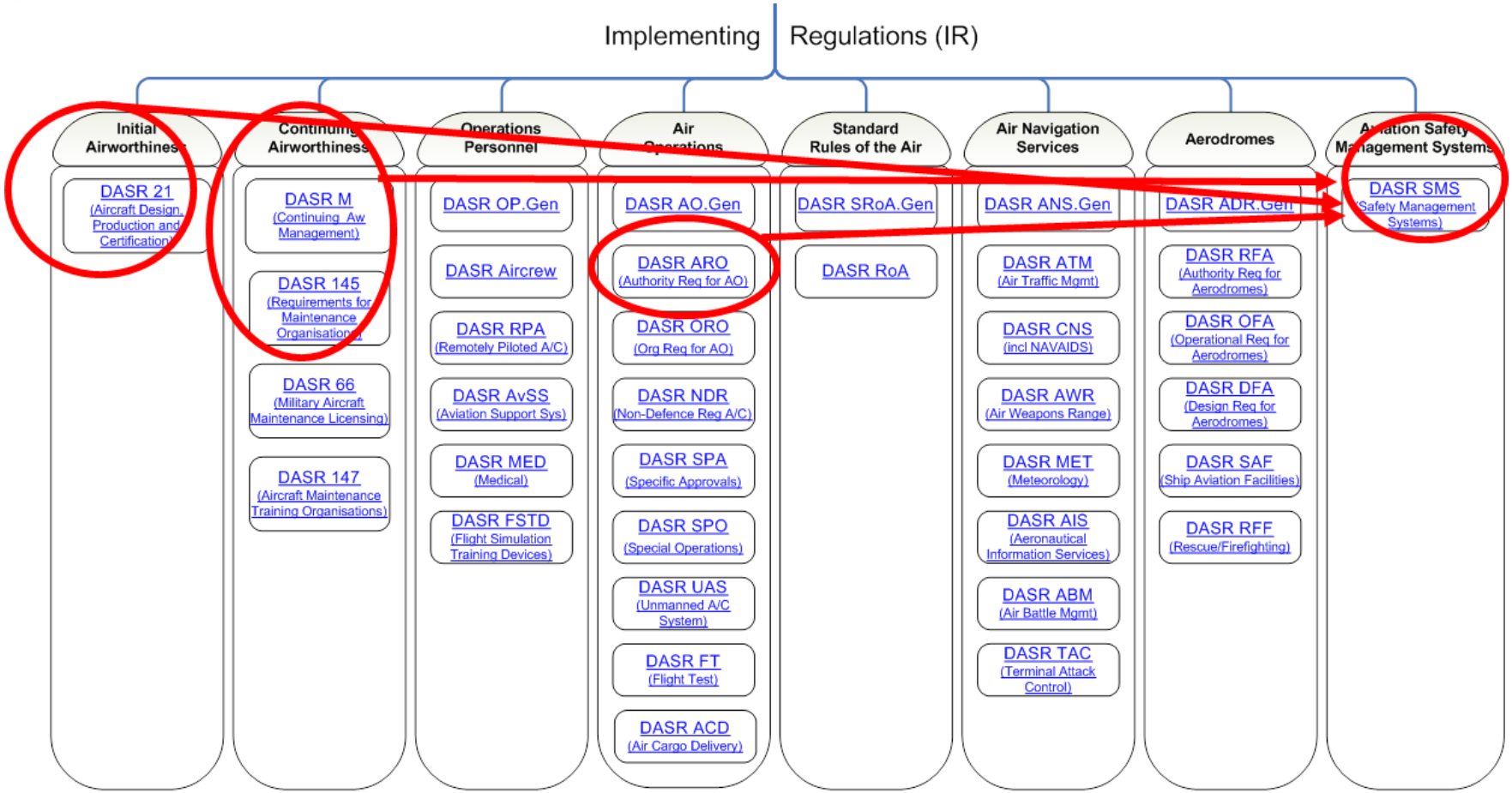
DASR Safety Management Systems (SMS)



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DASR Safety Management Systems (SMS)

The All-Seeing Regulator?

'Regulators cannot foresee all the possible scenarios of failure in complex, tightly-coupled and highly interactive systems, and so cannot universally proscribe particular types of human response.'

- *James Reason*

SMS aims to address this shortfall.

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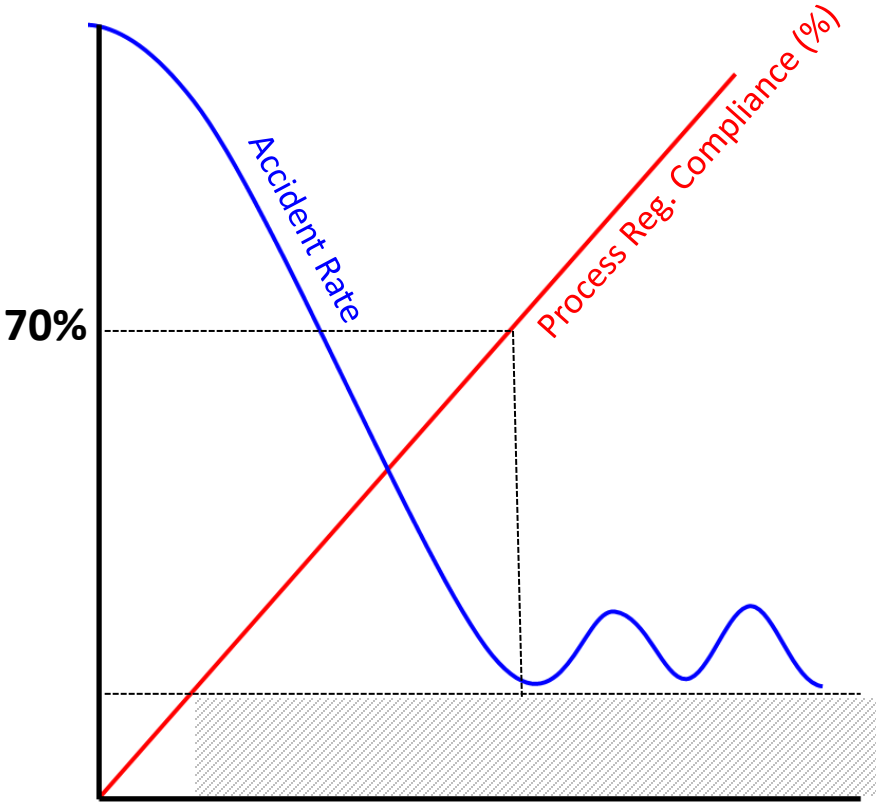
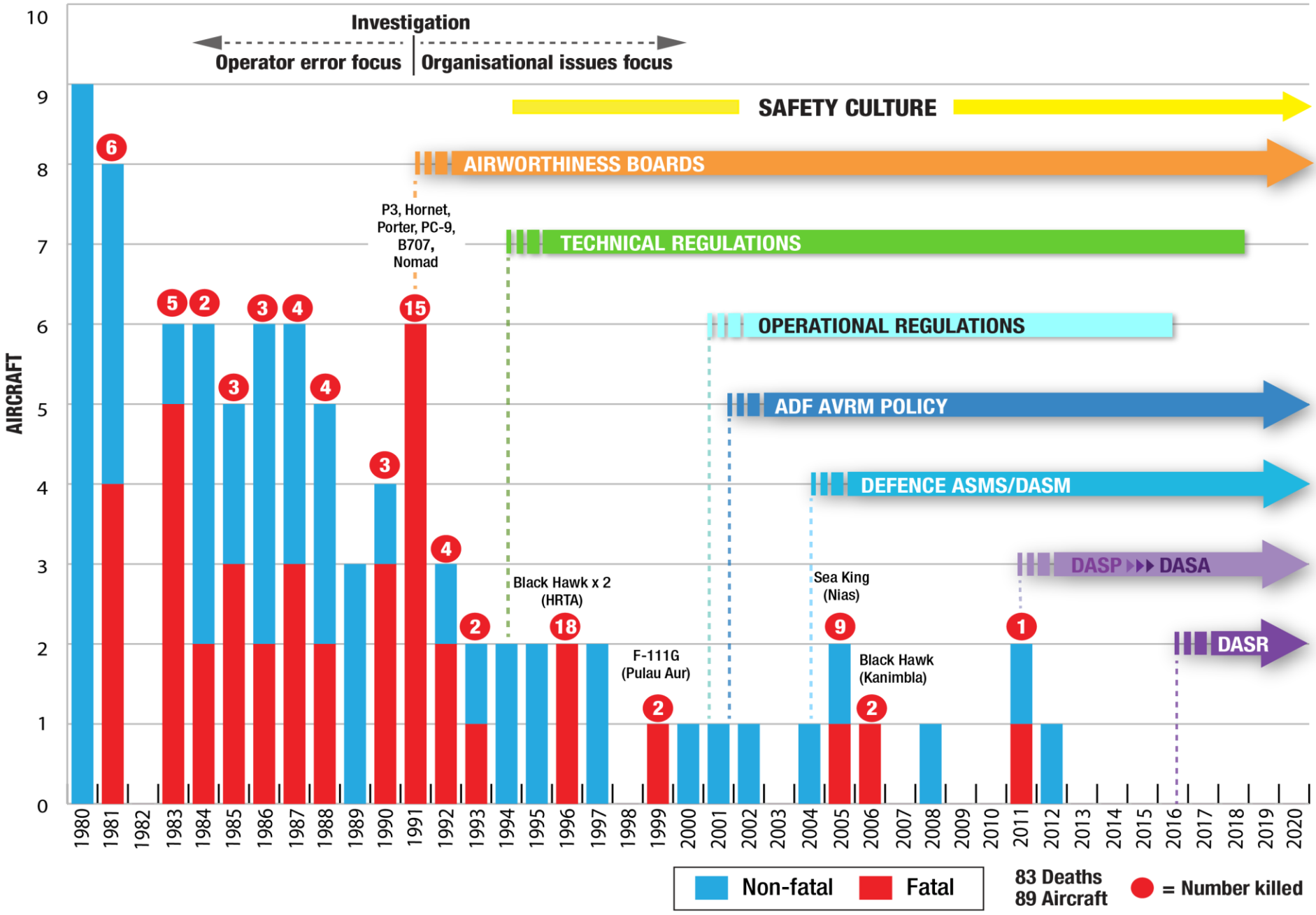
DASR Safety Management Systems (SMS)

Process Regulations are only so effective…



ONLY COMMON HAZARDS ARE MITIGATED

DEFENCE AVIATION ACCIDENTS (FATALITIES & HULL LOSSES) 1980-PRESENT



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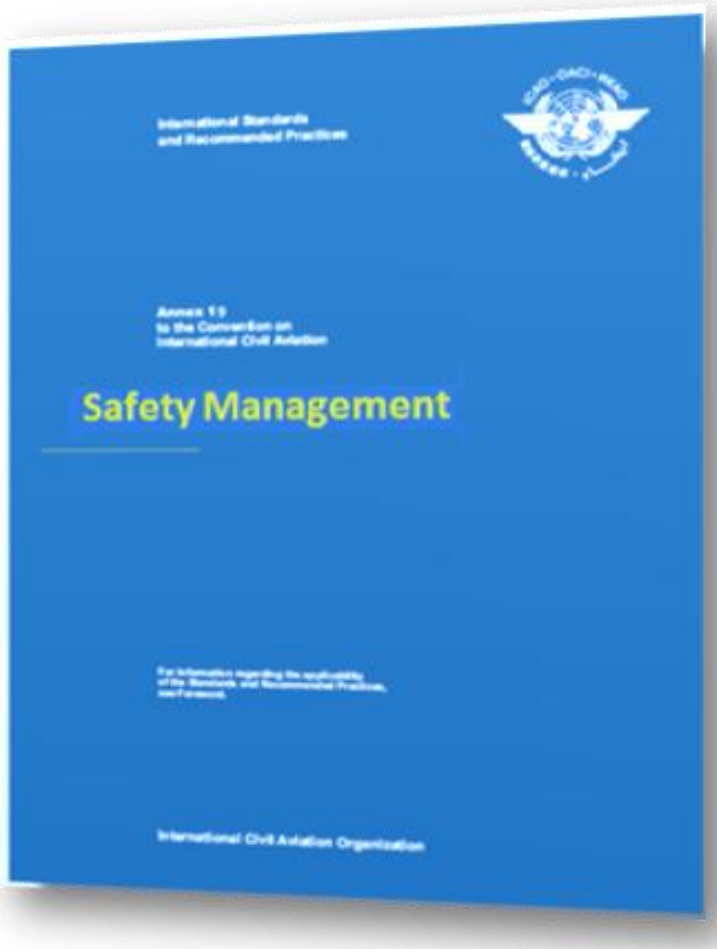
DASR Safety Management Systems (SMS)



1. Safety policy and objectives

1.1 Management commitment and responsibility
1.2 Safety accountabilities
1.3 Appointment of key safety personnel
1.4 Relevant third party relationships and interactions
1.5 Coordination of emergency response planning
1.6 SMS documentation

2. Safety risk management

2.1 Hazard identification
2.2 Safety risk assessment and mitigation

3. Safety assurance

3.1 Safety performance monitoring and measurement
3.2 The management of change
3.3 Continuous improvement of the SMS

4. Safety promotion

4.1 Training and education
4.2 Safety communication

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DASR Safety Management Systems (SMS)

Product

People

Process

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Competency Requirements in DASR

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DASR Competency Requirements

DASR – Defence Aviation Safety Authority

Military Air Operator (FEG or Equiv)

Accountable Manager
(FEG CDR)

Operations

Quality & Safety

CAMO

145 AMO

MDOA (Contractor)

MDOA Defence

MTC Holder

145 AMO (Contractor)

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DASR Competency Requirements

Initial Airworthiness

MTC Holder
Responsible managers (21G)
Head of Design (21J)
Chief of Office of Airworthiness (21J)
Chief of Independent Monitoring Function (21J)
Certification Verification Engineers (21J)
Office of Airworthiness Personnel (21J)
Competent staff of MAO (MPTF)

Continuing Airworthiness (CAMO)

Continuing Airworthiness Manager
Quality Manager
Airworthiness Review Staff
Deputy (CAM, QM, AR staff)
Maintenance Program Approval Employees (MPAE)

Maintenance (145)

Responsible Manager
Quality Manager

Safety Management Systems (SMS)

Safety Manager

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DASR Competency Requirements

Form 4 holders

Initial Airworthiness

MTC Holder
Responsible managers (21G)
Head of Design (21J)
Chief of Office of Airworthiness (21J)
Chief of Independent Monitoring Function (21J)
Certification Verification Engineers (21J)
Office of Airworthiness Personnel (21J)
Competent staff of MAO (MPTF)

Continuing Airworthiness (CAMO)

Continuing Airworthiness Manager
Quality Manager
Airworthiness Review Staff
Deputy (CAM, QM, AR staff)
Maintenance Program Approval Employees

Maintenance (145)

Responsible Manager
Quality Manager

Safety Management Systems (SMS)

Safety Manager

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DASR Competency Requirements

Form 4 (and MTC holder) competencies

Initial Airworthiness

- Bachelor of Engineering degree (in Mechanical, Mechatronics, Aerospace, Aeronautical, Electronics, Software or Electrical Engineering) or industry accepted equivalent
- X years of Aviation experience
- Certified Practicing Engineer (CPEng)
- Lead Auditor qualifications or Diploma in Quality Auditing

Continuing Airworthiness (CAMO)

- Practical experience and expertise
- Comprehensive domain knowledge
- Knowledge of quality systems
- Five years of relevant experience
- Relevant Engineering degree or aircraft technician qualification
- Thorough knowledge of the CAME
- Knowledge of relevant aircraft type
- CPEng, CEngT or CEngA or equiv

Maintenance (145)

- Bachelor of Engineering degree
- X years of Aviation experience
- CPEng, CEngT or CEngA or equiv
- Diploma in Quality Auditing or equiv

Safety Management Systems (SMS)

N/A

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DASR Competency Requirements

Internal Organisation approval

Initial Airworthiness

MTC Holder
Responsible managers (21G)
Head of Design (21J)
Chief of Office of Airworthiness (21J)
Chief of Independent Monitoring Function (21J)
Certification Verification Engineers (21J)
Office of Airworthiness Personnel (21J)
Competent staff of MAO (MPTF)

Continuing Airworthiness (CAMO)

Continuing Airworthiness Manager
Quality Manager
Airworthiness Review Staff
Deputy (CAM, QM, AR staff)
Maintenance Program Approval Employees

Maintenance (145)

Responsible Manager
Quality Manager

Safety Management Systems (SMS)

Safety Manager

Competency Overlay with System Safety

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DASR Competency Overlay

Initial Airworthiness

MTC Holder
Responsible managers (21G)
Head of Design (21J)
Chief of Office of Airworthiness (21J)
Chief of Independent Monitoring Function (21J)
Certification Verification Engineers (21J)
Office of Airworthiness Personnel (21J)

Competent staff of MAO (MPTF)

Continuing Airworthiness (CAMO)

Continuing Airworthiness Manager
Quality Manager
Airworthiness Review Staff
Deputy (CAM, QM, AR staff) Maintenance
Program Approval Employees

Maintenance (145)

Responsible Manager
Quality Manager

Safety Management Systems (SMS)

Safety Manager

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DASR Competency Overlay

Position	DASR Reference	Competency
Head of Design (21J) Chief of Office of Airworthiness	AMC 21.A.243(d)	**Qualifications:** Bachelor of Engineering degree in Mechanical, Mechatronics, Aerospace, Aeronautical, Electronics, Software or Electrical Engineering. **NOTE:** Qualifications shall be Australian accredited or assessed to be equivalent to Australian qualification by Engineers Australia, the Australian Computer Society, or the Australian Institute of Project Management. **Experience:** 1. Chartered Professional Engineer (CPEng) in the Institute of Engineers Australia (IEAust) or equivalent. 2. Ten years (HoD) / Eight years (COoA) of aviation experience. **NOTE:** For Commonwealth applicants: Ten years of aviation experience shall comprise of at least two years combined experience as staff of DASA, or an organisation holding a Design Organisation Approval under EASA, CASA, EMAR or **DASR 21 Section A Subpart J**—Military Design Organisation Approval.

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DASR Competency Overlay

Position	DASR Reference	Competency
Certification Verification Engineer (CVE) or other Personnel of Office of Airworthiness	**GM1 to 21.A.243(d) Statement of qualifications and experience …. 2 Who are the persons?**	(c) the personnel making decisions affecting airworthiness and environmental protection (where applicable): i. compliance verification engineers [see DASR GM1 to 21.A.239(a) paragraph 3.1.3; DASR AMC 21.A.239(b)]; ii. personnel of the Office of Airworthiness making decisions affecting airworthiness and environmental protection (where applicable), especially those linked with the DASR 21.A.263 privileges (signing documents for release, approving classification of changes and repairs, and granting the approval of minor changes and minor repairs, granting the approval of Service Bulletins, and minor revisions to the aircraft flight manual) [see GM1 to 21.A.239(a) paragraph 3.1.4].
	GM1 to 21.A.243(d) Statement of qualifications and experience 3.3 Personnel making decision affecting airworthiness…	c) These personnel should be chosen on the basis of their knowledge, background and experience. d) When necessary, complementary training should be established, to ensure sufficient background and knowledge in the scope of their authorization. The minimum standards for new personnel to qualify in the functions should be established. The training should lead to a satisfactory level of knowledge of the procedures relevant for the particular role.

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DASR Competency Overlay

Position	DASR Reference	Competency
Safety Manager (SMS)	**AMC SMS.A.25(b)(1)** **Safety Policy and Objectives (AUS)**	…. (c) **Key Safety Personnel.** The organisation has appointed key safety personnel and can demonstrate the following: (i) A competent person with the appropriate knowledge, skills and experience has been nominated to manage the operation of the SMS, and fulfils the required job functions and responsibilities.

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DASR Competency Overlay

Position	DASR Reference	Competency
MTC Holder (delegate)	AMC 21.A.14(c)	**Qualifications:** 1. Bachelor of Engineering degree in Mechanical, Mechatronics, Aerospace, Aeronautical, Electronics, Software or Electrical Engineering. 2. Qualifications must be Australian accredited or assessed to be equivalent to Australian qualification by Engineers Australia, the Australian Computer Society or the Australian Institute of Project Management. **Experience:** 1. Chartered Professional Engineer (CPEng) in the Institute of Engineers Australia or equivalent. 2. Ten years of Aviation experience. The experience must comprise of at least two years' combined experience as staff of DASA or an organisation holding a Design Organisation Approval under EASA, CASA, EMAR or DASR 21 Section A Subpart J.

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DASR Competency Overlay

Position	DASR Reference	Competency
Competent Staff of the MAO	AMC 21.A.709(b)(3)	Flight conditions developed to support flight test activities, and operational endorsement, must be provided by a competent staff of an MAO as determined by the relevant Delegate of the Safety Authority (DoSA) - Flight Test (DoSA(FT)).
	Competency requirements required by DoSA-FT	**Positional:** CO Aircraft Research and Development Unit (ARDU) OIC AMAFTU SO1 AA T&E **Experience:** X years experience (usually 2 tours in T&E organisation) **Qualification:** 12 month aviation T&E course

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DASR Competency Overlay

Defence Training Courses

Aviation system safety engineering / technical risk management course

- Introduction (Level 1) 1 day course
  - covering system safety from an ADF perspective.
  - Provide an overview of the tools and techniques (civil and military) common in system safety engineering for aircraft.
  - Pitched at HoD, CoOA, MTC holder, Safety Manager
- Basic (Level 2) 5 day course.
  - Builds on Level 1 course knowledge across all aspects of tools and techniques applicable to system safety engineering for aircraft.
  - Pitched at DE / CVE developing or reviewing System Safety products
- Applied (Level 3) 5 day course
  - Builds on Level 1 course knowledge across tools and techniques applicable to managing system safety engineering for aircraft.
  - Pitched at DE / CVE developing or reviewing System Safety products

Summary

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Summary

- For Initial System Safety program (part of certification)
  - Authority oversight of Form 4 holders (HoD; CoOA)
  - Organisational oversight of authorised personnel (DE, CVE, CoOA personnel, Safety Manager)
- For in-service hazard management
  - Authority oversight of MTC holder
  - Leverage of supporting design organisation SMS risk management system (DE, CVE, CoOA, Safety Manager)
  - Authority (DoSA-FT) oversight of flight test personnel

- No specific SSP requirements for Form 4 holders
- Organisational judgement on appropriate experience, qualifications, training for organisational personnel
- Suggested System Safety courses available via DASA training

Observations

- Initial certification
  - Sufficient SSP requirements and guidance

- In-service hazard management
  - System Safety tools / methodologies not mandated via regulation
  - Existing MTC holder arrangements may introduce complexities in meeting SMS implementation

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Questions?