INTRODUCTION

1. DASR 21.A.17A requires an aircraft Type Certification Basis (TCB) to consist of: the applicable airworthiness codes, special conditions prescribed by the Authority and tailoring of the European Military Airworthiness Certification Criteria (EMACC) based on military use of the aircraft when appropriate airworthiness codes are not available. Apart from the EMACC element, the remaining two elements in this DASR are common to Defence’s extant approach. The EMACC element was retained only following a critical Authority assessment of its relevance to Defence, which concluded:

   a. The EMACC is in widespread use\(^1\), and is therefore likely to represent good practice.

   b. The EMACC will inherently standardise the scope of aircraft systems/functions that are included in the TCB (and are therefore relevant to ‘airworthiness’); this has historically been an area of inconsistency within Defence.

   c. The EMACC provides a very useful framework for identifying the subset of the aircraft’s TCB that requires assessment for Major changes to type design; this also has historically been an area of inconsistency for Defence.

2. For the above reasons, the Authority has concluded the EMACC provides a valid contribution to deriving the Type Certification Basis for Defence aircraft, and has retained it in DASR 21.A.17A. While the EMACC presents a range of standards that might be relevant to each of its certification criteria, the onus is still on the Authority to approve the standards for a particular applicant. Further, the EMACC inherently needs to be underpinned by a Primary Certification Code (PCC) when applied to a new aircraft design. This paper describes how the Authority-recognised Airworthiness Codes and supplementation in AAP 7001.054 are applied to derive the TCB for a new aircraft and to update the TCB for Major design changes.

3. Further, there are other on-board and ground-based systems, all outside the scope of the TCB (and therefore ‘airworthiness’), that can contribute to safe flight. This paper defines the Authority’s criteria for defining design requirements for these systems, and describes an approach to prescribing/revising/interpreting those design requirements.

AIM

4. The aim of this document is to define guiding principles for the promulgation and management of aviation design requirements under the DASR.

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\(^1\) The EMACC is based heavily off MIL-HDBK-516, which presents the US military’s Airworthiness Certification Criteria. Consequently, the EMACC reflects a framework for Type Certification, that is (or will be) used by both the European and US militaries
IMPLEMENTATION PRINCIPLES

Principle 1. The EMACC does not present an Airworthiness Code.

The EMACC articulates a comprehensive suite of airworthiness certification criteria. For each criterion, a range of standards and requirements are provided that may be suitable for demonstrating compliance. At face value, it therefore appears that the EMACC presents an Airworthiness Code. This is not the case. An essential attribute of an Airworthiness Code is that it presents a complete and consistent set of design requirements. While cherry-picking of EMACC standards might provide a complete set of standards/requirements, this approach is unlikely to provide an internally consistent set. For example, there are many FAR 25 requirements that inherently rely on the relevant element of the aircraft design also satisfying FAR 25.1309 and other pervasive FAR requirements; replacing those pervasive requirements (even with something similar) from another Airworthiness Code threatens the internal consistency of the FARs as a suite of design requirements. In essence, while the EMACC provides a comprehensive process basis for establishing a TCB, it is not a product code.

Principle 2. Application of the EMACC to derive a Defence aircraft TCB requires the adoption of an underpinning PCC.

5. Satisfaction of the EMACC criteria is underpinned by the adoption of a Primary Certification Code (PCC) for a particular Defence aircraft type. A PCC is an Airworthiness Code that has been prescribed by a National Airworthiness Authority (NAA)/National Military Airworthiness Authority (NMAA) and is recognised by the Authority as providing a sound foundation for the safe design of Defence aircraft. Employing a PCC confirms that certification against the applicable EMACC criteria is supported by a complete and consistent set of airworthiness design requirements. This same requirement is entirely relevant to Defence aircraft. That is, when deriving a TCB for a Defence aircraft using the EMACC, there must be an underpinning PCC.

Principle 3. Airworthiness Codes, suitable for employment as the PCC for a Defence aircraft, will be promulgated in AAP 7001.054. The Authority may prescribe supplementation to the recognised Airworthiness Codes in AAP 7001.054.

6. The Authority recognised Airworthiness Codes, which may be used as a PCC for a particular Defence aircraft, are promulgated in AAP 7001.054 Airworthiness Design Requirements Manual (ADRM).

7. Further, the ADRM promulgates Authority prescribed essential supplementation to these Airworthiness Codes, to accommodate Defence’s unique configuration, role or environment, or to account for shortfalls identified in the recognised Codes. The combination of the PCC and applicable Authority prescribed supplementation defines the TCB for a particular Defence aircraft.

8. Annex A provides a tabulated breakdown of EMACC criteria linked to associated Authority recognised Codes and prescribed supplementation promulgated in AAP 7001.054 and other associated publications/repositories. This annex will assist engineers to understand the scope of Type Certification related design characteristics (ie airworthiness), and the repositories of applicable requirements.

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2 Throughout this document, ‘design requirements’ is used as an encompassing term for both design standards (eg MIL-STD-464) and bespoke single requirements (eg a prohibition on PVC wiring insulation).

3 Principle 7 of the Type Certification Basis (TCB) principles paper states ‘AAP 7001.054 will document Defence-recognised Primary Certification Codes (PCC) as well as essential tailoring of those PCCs’.
Principle 4. The application of a System Safety program is an essential adjunct to a standards-based approach for Defence aircraft Type Certification.

9. Compliance with design standards is the principal means by which safe design of an aircraft is achieved. However, in isolation, a standards-based approach may not provide a complete basis for Type Certification of an aircraft. After all, many standards are inherently stove-piped, and therefore further analytical effort is required to identify and control system-level hazards. Further, standards are often written with ‘vanilla’ applications in mind; novel aircraft design features are likely to pose novel hazards, and these may not be well catered for.

10. System Safety is an engineering discipline that embraces safety as a core aspect of any given system design (or design change). System Safety programs employ a suite of engineering tools and techniques to identify and analyse aircraft hazards during the design process, and provide a management framework to evaluate and control the resultant risks. When applied well, a System Safety program is an essential adjunct to a standards-based design approach.

11. The Authority’s requirements for System Safety programs are prescribed in AAP 7001.054. Formal System Safety programs will be required for all Defence acquisitions and Major changes in a type design (this requirement is also reflected in EMACC 14.1 criteria). Detailed principles for the implementation of System Safety under the DASR will be presented in a forthcoming DASA paper, ‘System Safety Transition - Principles for Implementation’.

12. Note that Defence has elected, via DASR SMS, to regulate Safety Management Systems (SMS) across the aviation safety domain. Consequently, organisations undertaking aircraft design will be required to implement an SMS. System Safety tools and techniques can be used to identify and manage hazards inherent in a product’s design, and are therefore a key (but not complete\(^4\)) contributor to satisfying DASR SMS.

Principle 5. Major changes in a type design must comply with contemporary airworthiness design requirements or, as a minimum, with the Defence aircraft TCB.

13. DASR 21.A.101 prescribes the requirements for establishing the certification basis for Major changes in a type design. DASR 21.A.101 requires, inter alia, that the changed product complies with the applicable design requirements that are in effect at the time of the change. While the Authority may approve compliance with previous versions of the design requirements, the change must, as a minimum, comply with the requirements prescribed in the aircraft’s TCB.

14. The design requirements prescribed in AAP 7001.054 represent the Authority approved acceptable means of compliance with DASR 21.A.101 with respect to establishing the certification basis for Major changes in a type design. Where Authority approval is required for compliance with design requirements that are not prescribed in AAP 7001.054, or with a previous version of a design requirement, a Military Certification Review Item (MCRI) must be approved by the Authority.

15. The AMC to DASR 21.A.101 will be amended to include reference to AAP 7001.054 as the Authority approved repository of airworthiness design requirements for Major changes in a type design.

\(^4\) DASR SMS requires organisations to identify and manage hazards induced via errors in design processes, hazards induced via erroneous behaviour of people involved in aircraft design, and hazards inherent in the product. System Safety tools and techniques contribute primarily to the last. The forthcoming DASA paper, ‘System Safety Transition - Principles for Implementation’, examines this in more detail.
**Principle 6.** **Minor changes in a type design must, as a minimum, comply with airworthiness design requirements prescribed in the Defence aircraft TCB.**

16. GM to DASR 21.A.101 notes that ‘Minor type design changes are automatically considered not significant under DASR 21.A.101(b) and the existing type-certification basis is considered adequate for their approval under DASR 21.A.95’. Given that Minor changes in a type design should, at most, have a minor impact on safety, assessing and establishing compliance against contemporary design requirements for Minor changes is likely to be grossly disproportionate to the potential safety improvement. Therefore, the Authority does not mandate that Minor changes in a type design comply with the requirements prescribed in AAP 7001.054.

17. Nevertheless, to satisfy Australia’s WHS Legislation, designers must exercise ‘reasonable knowledge’ when determining that any risk inherent in designs has been reduced so far as is reasonably practicable. Updates to applicable standards may provide insight into hazards and potential controls that are not identified in the version of the standards prescribed in the aircraft’s TCB. Consequently, while the Authority does not mandate compliance, AAP 7001.054 provides a source of requirements that can assist engineers to satisfy their obligation to exercise reasonable knowledge of hazards and associated controls in aircraft design. TAAC 01/2016 Exercising ‘Reasonable Knowledge’ in Aircraft Design provides further guidance. The GM to DASR 21.A.101 will be amended to include reference to a designer’s obligation to exercise reasonable knowledge.

**Principle 7.** **An MCRI will be raised for approval by the Authority for all tailoring of standards unless the tailoring applies to non-safety elements of the standard or has a trivial effect on safety.**

18. A number of standards cannot be employed without tailoring to suit the specific aircraft type or application. For example, some electromagnetic environmental effects (E3) standards require tailoring to define appropriate EMI/EMC limits for the design and its criticality. With the exception of tailoring that occurs under the conditions described in paragraphs 19 and 20 below, all tailoring proposed for standards prescribed in a Defence aircraft’s TCB will be approved by the Authority via an MCRI. Even standing Authority approvals for tailoring of standards (documented in AAP 7001.054) will be recorded in an MCRI.

19. Some design standards include both safety and capability/functionality requirements. Where capability/functionality requirements that have no safety impact are tailored, Authority approval via an MCRI is not required.

20. Finally, some requirements prescribed in standards provide a very minor contribution to the overall level of safety afforded by the standard. Authority approval of every small non-compliance would impose a considerable burden on acquisition/design organisations and the Authority, without a commensurate safety improvement. Therefore, as a matter of pragmatism, the MDOA may approve tailoring of such requirements, without Authority approval via an MCRI, where the non-compliance:

a. would have no discernible effect on the level of safety afforded by the standard,

b. would have no discernible effect on the level of safety for future design changes and therefore does not require visibility via the TCB for future design change consideration, and

c. does not require ongoing oversight and management of any associated risk posed by the non-compliance.
Principle 8. Design requirements for on-aircraft systems and equipment not included in the scope of the TCB, but potentially impacting safe flight, may be prescribed by the Authority.

21. Principles 1 through 7 apply to aircraft systems and equipment within the scope of ‘airworthiness’ (and therefore included in the aircraft TCB). However, there are other on-aircraft systems/equipment, outside the scope of ‘airworthiness’, that may impact safe flight. Examples include electronic flight bags, aeronautical data, portable electronic devices (PEDs), certain types of role equipment and air cargo. The Authority may elect to prescribe design requirements for these additional on-aircraft systems if they present a credible risk to safe flight and procedural controls are insufficient to manage that risk.

22. Annex A summarises those systems/equipment for which the Authority currently elects to prescribe design requirements. The annex also lists the various repositories for those design requirements. The Authority will commence an activity in 2017 to:

   a. confirm there are no additional on-aircraft systems/equipment that warrant Authority-promulgated design requirements;

   b. normalise the approach taken to prescribing and documenting these design requirements; and

   c. confirm the adoption of the design requirements is appropriately obligated by the relevant DASR operations regulations (eg DASR ACD, DASR ORO, etc).

23. Finally, it is worth noting that the onus for verifying compliance with these standards falls on the organisation having operational control of the aircraft. This is quite unlike the Type Certification process, where the Authority itself assures compliance. For example, DASR ACD requires the MAO to ensure an operational document is established that details Air Cargo Delivery procedures, while DASR AIS requires the MAO to approve the use of certain aeronautical information.

Principle 9. Design standards for ground based systems that potentially impact safe flight may be prescribed by the Authority.

24. The preceding principle discusses the Authority prescription of design requirements for on-aircraft systems that, while not being within the scope of airworthiness, may impact safe flight. There are also many ground based systems where inadequate performance may affect safe flight. While these ground based systems clearly are not within the scope of airworthiness, they are relevant to the broader context of aviation safety and the Authority may therefore elect to prescribe relevant design requirements.

25. The Authority’s decision whether to prescribe design requirements for ground-based systems takes into account the magnitude of the risk to safe flight, and whether common design practices and/or procedural controls are likely to be sufficient to manage that risk. For example, automatic test equipment and ground support equipment would ordinarily provide only a minor contribution to safe flight, and therefore do not warrant Authority prescription of design requirements.

26. In deciding whether to prescribe design requirements for ground systems, the Authority is guided in part by the actions of other major NAA/NMAA. For example, major civil NAAs (EASA, FAA and CASA) acknowledge that inadequate or erroneous performance of airfield installations (runways, taxiways, lighting systems, visual navigation aids, and so on) and systems used for the provision of air traffic communications, navigation and safe separation all have the potential to affect safe flight. Consequently, they prescribe relevant design requirements. The Authority has accepted this as good practice, and similarly
prescribes design requirements. The Authority has also elected to prescribe design requirements for several systems where Defence’s unique usage can impact safe flight, including mission planning systems and ships aviation facilities.

27. Further, there are some aircraft consumables (e.g., fuels and oxygen) that could affect safe flight if the quality of the supply was compromised. Ultimately, the MAO is responsible through the CAM to confirm that consumables of the correct quality and that comply with aircraft documentation are used in Defence aircraft. Importantly, the major aviation regulators do not provide oversight nor do they impose design requirements for such consumables, and the Authority will also adopt that approach. This is a change in approach for the Authority, since the extant Technical Airworthiness Regulator does currently prescribe design requirements for fuels, oils, and lubricants. Pending implementation of an alternate approach in Defence, the Authority will retain this role. For that reason, design requirements for fuels, oils, and lubricants will continue to be hosted in AAP 7001.054 in the short term.

28. Annex A summarises those ground-based systems for which the Authority currently elects to prescribe design requirements. The annex also lists the various repositories for those design requirements. The Authority will commence an activity in 2017 to:

a. confirm there are no additional ground-based systems that warrant Authority-promulgated design requirements;

b. normalise the approach taken to prescribing and documenting these design requirements;

c. confirm the adoption of the design requirements is appropriately obligated by the relevant DASR operations regulations, and

d. confirm an arrangement has been implemented, with clear accountability, for verifying compliance with the design requirements (e.g., for DEPSEC E&IG to confirm that contracted organisations that design Defence aerodromes for military unique flying operations comply with the Defence design requirements for aerodromes).

Principle 10. Design requirements may be prescribed via an Authority delegation for specific design disciplines or systems. The delegate will be known as an ‘Aviation Standards Representative (ASR)’.

29. As described in the previous Principles, the Authority prescribes design requirements for aircraft, certain other airborne systems, and for selected ground-based systems. Authority prescription of these design requirements involves the following actions:

a. prescribing the design requirement based on a clear understanding of the relevance of the requirement to achieving safe flight for the Defence CRE,

b. revising the requirement to reflect contemporary knowledge, based on monitoring advances by others (e.g., NAA/NMAA, OEMs) and through local research (e.g., DSTG), and

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5 The contribution of flight simulators to safe flight can be contentious. After all, a less-representative flight simulator can often be offset by more on-aircraft training, so the effect on aviation safety can be moderated. Nevertheless, Defence, like other Authorities, has elected to regulate flight simulators. This is primarily achieved through assessment of the flight simulator against qualification standards; the Authority does not specifically prescribe design standards for flight simulators. Refer DASR FSTD (Flight Simulator Training Devices).

6 Per an earlier footnote, the term ‘design requirement’ encompasses both standards and bespoke requirements. Most often, the primary means of prescribing design requirements is through prescribing relevant standards. Bespoke requirements might then be prescribed to account for deficiencies in the standards.
c. *interpreting* the requirement to assess the adequacy of alternative means of compliance, approve proposed tailoring and characterise risks due to any shortfalls in compliance.

30. Executing the above functions for some systems is straightforward; for others it can be extremely complex. In some cases, the Authority will either hold the required expertise in-house or can quickly gain the expertise if needed, and can therefore fulfil the above functions. However, the expertise for some complex systems (eg some ground-based systems) is resident elsewhere in Defence; in those cases, the Authority may elect to delegate this responsibility to a particular Defence individual, who will be designated an *Aviation Standards Representative (ASR)*.

31. The above arrangement is analogous to the extant Airworthiness Standards Representatives (ASRs) provisions of TAREGs, but there are several differences:

a. There is a slight change in the delegate’s title (from ‘Airworthiness’ to ‘Aviation’), to reflect the reduced scope of ‘airworthiness’ under DASRs.

b. There will probably be more ASRs. The Authority is responsible for prescribing/revising/interpreting design requirements not only for airworthiness DASRs, but also for those operations DASRs that promulgate design requirements. In this latter area, the Authority may not hold the expertise in-house, and may require additional ASRs.

c. The Authority is responsible for revising/interpreting every DASR-promulgated design requirement. In every case where the Authority elects not to hold this responsibility in-house, an ASR must be delegated.

d. ASRs will not necessarily be heads of Centres of Expertise (which was a rather nebulous concept) per the extant TAREGs. Rather, the Authority will provide ASR delegations to individuals following an assessment of their ability to fulfil the role.

e. ASRs will not necessarily be engineers; some of the design requirements included in the operations DASRs (for example for simulator qualification) might better be prescribed/revised/interpreted by aircrew.

f. Since aircraft fuels, oils and lubricants are not regulated under DASRs, the extant ASR will no longer be required. However, it will be retained in the short term, pending the implementation of an alternate arrangement in Defence.

32. The Authority will commence an activity in 2017 to implement an ASR network that meets the above requirements. In the meantime, TAAC 02/2016 *DASR Transitional Guidance*, confirms that the ASR function will be maintained under the DASRs with a delegation under DASR 21.A.16A being granted to existing TAREG ASRs.

*Principle 11. The Authority will not prescribe design requirements for capability/interoperability functions.*

33. Historically, Defence has often blurred the line between confirming that an aircraft design is suitable for Type Certification and confirming that the aircraft can achieve mission/capability outcomes. Much of this confusion was due to the dual nature of Design Acceptance, which not only confirmed the safety of the design but also confirmed it was fit for service. Aircraft system safety programs added to the confusion, by using such terms as ‘missionised hazards’ to encompass systems that improved survivability in a hostile environment.
34. The application of airworthiness design requirements to capability/interoperability functions often led to unnecessary cost and schedule impacts for aircraft acquisition programs, without a commensurate safety benefit. Clarification in this space will therefore allow acquisition programs to independently determine the most appropriate suite of design requirements for capability/mission systems at a substantial cost and schedule savings.

35. The DASRs have brought considerable clarity, comprehensively confirming that mission/capability outcomes are not included within DASR scope. The Authority therefore does not prescribe design requirements for capability/interoperability functions, nor are they included in the TCB (or the certified type design).

36. Note that DASA has historically permitted capability/interoperability requirements to be published in AAP 7001.054, to provide designers with the convenience of a single repository of aircraft design information. In the short term, this arrangement will continue; however, a review of this content and a decision regarding its continued publication will be undertaken in 2017. Regardless, the publication of these requirements in AAP 7001.054 does not constitute, or infer, that the standards are promulgated or even reviewed by the Authority.

CONCLUSION

37. This paper examines the principles underpinning the application of airworthiness codes and design requirements under the DASRs. Adoption of these principles, in conjunction with the principles underpinning the creation of TCBs, enables the Authority to prescribe appropriate airworthiness design requirements for Defence aircraft to support safe aircraft operations.

38. The following implementation principles are proposed:

Principle 1. The EMACC does not present an Airworthiness Code.

Principle 2. Application of the EMACC to derive a Defence aircraft TCB requires the adoption of an underpinning PCC.

Principle 3. Airworthiness Codes, suitable for employment as the PCC for a Defence aircraft, will be promulgated in AAP 7001.054. The Authority may prescribe supplementation to the recognised Airworthiness Codes in AAP 7001.054.

Principle 4. The application of a System Safety program is an essential adjunct to a standards-based approach for Defence aircraft Type Certification.

Principle 5. Major changes in a type design must comply with contemporary airworthiness design requirements or, as a minimum, with the Defence aircraft TCB.

Principle 6. Minor changes in a type design must, as a minimum, comply with airworthiness design requirements prescribed in the Defence aircraft TCB.

Principle 7. An MCRI will be raised for approval by the Authority for all tailoring of standards unless the tailoring applies to non-safety elements of the standard or has a trivial effect on safety.

Principle 8. Design requirements for on-aircraft systems and equipment not included in the scope of the TCB, but potentially impacting safe flight, may be prescribed by the Authority.
Principle 9. Design standards for ground based systems that potentially impact safe flight may be prescribed by the Authority.

Principle 10. Design requirements may be prescribed via an Authority delegation for specific design disciplines or systems. The delegate will be known as an 'Aviation Standards Representative (ASR).

Principle 11. The Authority will not prescribe design requirements for capability/interoperability functions.

39. None of these principles are incompatible with EMARs, nor would they jeopardise future mutual recognition activity.

Original signed.

DD SRM (DASA)
11 Aug 16

Annex:
A. Repositories for Promotion of Authority Prescribed Design Requirements
<table>
<thead>
<tr>
<th>ON-AIRCRAFT SYSTEMS/ EQUIPMENT</th>
<th>ON-AIRCRAFT SYSTEMS/ EQUIPMENT</th>
<th>GROUND BASED SYSTEMS</th>
<th>ON-AIRCRAFT SYSTEMS/ EQUIPMENT</th>
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</thead>
<tbody>
<tr>
<td>- AFFECTING SAFE FLIGHT (AIRWORTHINESS)</td>
<td>- AFFECTING SAFE FLIGHT (NOT AIRWORTHINESS)</td>
<td>- POTENTIAL REDUCTION IN FLIGHT SAFETY</td>
<td>- NOT AFFECTING SAFE FLIGHT</td>
</tr>
<tr>
<td><strong>Scope:</strong> Aircraft systems and equipment within the scope of the TCB (per EMACC criteria)</td>
<td><strong>Scope:</strong> On-board systems and equipment that potentially affect safe flight, but are outside the scope of the TCB (per EMACC criteria)</td>
<td><strong>Scope:</strong> Ground based systems where inadequate system performance may impact safe flight</td>
<td><strong>Scope:</strong> Aircraft systems and equipment that do not affect safe flight (includes mission systems)</td>
</tr>
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</table>

**- Crew Systems**
- Escape and egress system
- Crew stations and aircraft interiors
- Air vehicle lighting
- Human performance
- Life support systems
- Transparency integration
- Crash survivability
- Air transportability and airdrop
- Lavatories, galleys, and areas not continuously occupied

*Design reqts repository:*
- AAP 7001.054 Sect 1/Chap 3
*Airworthiness Codes*, Sect 2/Chap 5
*Human Factors Engineering*, Sect 2/Chap 6
*Crash Protection*, Sect 2/Chap 8
*Smoke and Fumes Protection*, Sect 3/Chap 6
*Oxygen Systems*, Sect 3/Chap 7
*Lighting Systems*, Sect 5/Chap 2
*Aeronautical Life Support Equipment*, DEF (AUST) 9009A
*Designing for Aerial Delivery of Equipment by Fixed and Rotary Wing Aircraft*

**- Mission systems**
- NB: while the failure of mission systems may jeopardise safety in a hostile environment, this is not within the scope of aviation safety

*Design reqts repository:*
- Promulgated per CASG direction (airworthiness design reqts may be adopted)

**- Ancillary aircraft functions**
- eg galley operations, in-flight entertainment (refers only to the system functionality, not any aspects of the design that could affect safety - eg E3, electrical interfaces, physical installation and so on).  

*Design reqts repository:*
- Promulgated per CASG direction (airworthiness design reqts may be adopted)
<table>
<thead>
<tr>
<th>ON-AIRCRAFT SYSTEMS/ EQUIPMENT</th>
<th>GROUND BASED SYSTEMS</th>
<th>ON-AIRCRAFT SYSTEMS/ EQUIPMENT</th>
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<td><strong>- POTENTIAL REDUCTION IN FLIGHT SAFETY</strong></td>
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### Air Vehicle Subsystems
- Hydraulic and pneumatic systems
- Environmental control system (ECS)
- Fuel system
- Fire protection
- Landing gear and deceleration systems
- Auxiliary/emergency power system(s) (APS/EPS)
- Aerial refuelling system
- Mechanisms
- External cargo hook systems (rotary wing)
- External rescue hoist (rotary wing)
- Fast rope insertion/ extraction system (FRIES) (rotary wing)

**Design reqts repository:**
- AAP 7001.054 Sect 1/Chap 3

### Role Equipment
**Design reqts repository:**
- AAP 7001.054 Sect 5/Chap 6 Role Equipment and Portable Electronic Devices

### Airfield/airport capabilities
- eg runway length, capacity and surface, visual navigation aids, lighting systems

**Design reqts repository:**
- AAP 7001.054 Sect 5/ Chap 8 Defence Aerodrome Design Requirements

### Ships Aviation Facilities (SAF)
- eg deck strength, navigation aids, lighting systems, sensor systems

**Design reqts repository:**
- DEF(AUST) 5000 Vol 11 ADF Maritime Materiel Requirements Set – Ship Aviation Requirements
<table>
<thead>
<tr>
<th>ON-AIRCRAFT SYSTEMS/EQUIPMENT - AFFECTING SAFE FLIGHT (AIRWORTHINESS)</th>
<th>ON-AIRCRAFT SYSTEMS/EQUIPMENT - AFFECTING SAFE FLIGHT (NOT AIRWORTHINESS)</th>
<th>GROUND BASED SYSTEMS - POTENTIAL REDUCTION IN FLIGHT SAFETY</th>
<th>ON-AIRCRAFT SYSTEMS/EQUIPMENT - NOT AFFECTING SAFE FLIGHT</th>
</tr>
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</table>
| **Avionics**  
- Avionics architecture  
- Avionics subsystems  
- Avionics air vehicle installation  
**Design reqs repository:**  
- AAP 7001.054 Sect 1/Chap 3  
  Airworthiness Codes, Sect 2/Chap 9  
  Equipment Environmental Qualification, Sect 3/Chap 2  
  Communications Systems, Sect 3/Chap 3  
  Indicating and Recording Systems, Sect 3/Chap 4  
  Navigation Systems, Sect 3/Chap 5  
  Surveillance and Avoidance Systems | **Electronic flight bags**  
**Design reqs repository:**  
- AAP 7001.054 Sect 5/Chap 4 Electronic Flight Bags  
**Aeronautical data**  
**Design reqs repository:**  
- AAP 7001.054 Sect 5/Chap 3 Mission Planning Systems | **MPS**  
**Design reqs repository:**  
- AAP 7001.054 Sect 5/ Chap 3  
  Mission Planning Systems  
**ATC systems**  
**Design reqs repository:**  
- AAP 7001.069 Surveillance and Control Equipment Technical Integrity Manual  
- Often promulgated via operational regulations and associated NAA standards manuals | **Armament/Stores Integration**  
- Gun/rocket integration and interface  
- Stores integration  
- Laser integration and interface.  
- Safety interlocks  
**Design reqs repository:**  
- AAP 7001.054 Sect 2/Chap 11 Aircraft Stores Compatibility, Sect 3/Chap 14 Airborne Lasers, DEOP 102 Technical Integrity of Explosive Ordnance |
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<tr>
<td><strong>- Cargo/payload safety</strong></td>
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<td>- Safe carriage, restraint and aerial delivery</td>
<td>- specific cargo characteristics (eg Dangerous Cargo)</td>
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<td><em>Design reqts repository:</em></td>
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<tr>
<td>- AAP 7001.054 Sect 1/Chap 3</td>
<td>- AAP 3631.001 RAAF Manual of Air Movements, AAP 3631.002 Dangerous Goods – Transport by Service Air</td>
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<tr>
<td><em>Airworthiness Codes, Sect 2/Chap 6 Crash Protection, DEF (AUST) 9009A Designing for Aerial Delivery of Equipment by Fixed and Rotary Wing Aircraft, AMTDU Special Cargo Instructions</em></td>
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<td><strong>- Structures</strong></td>
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<td>- Loads</td>
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<td>- Structural dynamics</td>
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| - Electrical System  
- Electric power generation system  
- Electrical wiring system, including power distribution  
*Design reqts repository:*  
- AAP 7001.054 Sect 1/Chap 3  
  *Airworthiness Codes,* Sect 3/Chap 8 *Electrical Power Systems* | | | |
| - E3  
- Component/subsystem E3 qualification  
- System-level E3 qualification  
*Design reqts repository:*  
- AAP 7001.054 Sect 1/Chap 3  
  *Airworthiness Codes,* Sect 2/Chap 4 *Electromagnetic Environmental Effects* | | | |
| - System Safety  
- System safety program  
- Safety design requirements  
- Software safety program  
*Design reqts repository:*  
- AAP 7001.054 Sect 1/Chap 3  
  *Airworthiness Codes,* Sect 2/Chap 2 *System Safety,* Sect 2/Chap 3 *Aviation Software* | | | |
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**- Computer Resources**
- Air vehicle processing architecture
- Functional design integration of processing elements
- Subsystem/processing element

**Design reqs repository:**
- AAP 7001.054 Sect 1/Chap 3
  *Airworthiness Codes*, Sect 2/
  Chap 3 *Aviation Software*

**- Maintenance**
- Instructions for Continued Airworthiness
- Inspection requirements

**Design reqs repository:**
- AAP 7001.054 Sect 1/Chap 3
  *Airworthiness Codes*, Sect 2/
  Chap 2 *System Safety*, Sect 2/
  Chap 7 *Fire Protection*, Sect 2/Chap 10
  *Defence Long Range Operations*, Sect 3/Chap 8
  *Electrical Power Systems*, Sect 3/
  Chap 12 *Aircraft Structural Integrity*, Sect 3/
  Chap 13 *Propulsion Systems*
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<td>- Survivability of passengers</td>
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<td>- Fire resistance</td>
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<td>- Physiology requirements of occupants</td>
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*Design reqs repository:*
- AAP 7001.054 Sect 1/Chap 3
- *Airworthiness Codes*, Sect 2/
  Chap 6 *Crash Protection*, Sect 2/Chap 8
- *Smoke and Fumes Protection*, Sect 3/Chap 6 *Oxygen Systems*

| - Materials | | | |
| - Properties and processes | | | |
| - Corrosion | | | |
| - Non-destructive inspection | | | |
| - Wear and erosion | | | |

*Design reqs repository:*
- AAP 7001.054 Sect 1/Chap 3
- *Airworthiness Codes*