Ministry of Defence

Defence Standard 00-972

Issue 1 **Date: 14 September 2019**

Military Air Traffic Services Equipment Safety and Performance Standards (Aerodrome, Terminal and Naval Air Traffic Services)

Section 1

Foreword

Defence Standard Structure

Section 1 (Generated by the StanMIS toolset)

- Revision Note
- Historical Record
- Warning
- Standard Clauses

Section 2 (Technical information provided by Subject Matter Expert)

- Title
- Introduction (optional)
- Table of Contents
- Scope
- Technical Information to include Tables and Figures
- Annexes (as required)

Section 3 (Generated by StanMIS toolset)

- Normative References
- Definitions
- Abbreviation

REVISION NOTE

HISTORICAL RECORD

This standard supersedes the following:

Defence Standard 00-972

Part No: 0 - "Procedures for Use, Content and Definitions"
Part No: 1 - "Generic and Software"
Part No: 2 - "Communications"
Part No: 3 - "Surveillance"
Part No: 4 - "Navigation"
Part No: 5 - "Satellites"
Part No: 6 - "Meteorological Systems"
Part No: 7 - "Flight Data Information Management Systems"
Part No: 8 - "Airfield Ground Lighting (AGL) and Arrestor Systems"
Part No: 9 - "Systems Assurance (Safeguarding and Flight Inspection)"
Part No: 10 - "Air Traffic Control (ATC) Support Systems"
Part No: 11 - "Recording and Replay Systems"
Part No: 12 - "Alarm and Alerting Systems"
Part No: 13 - "Master Time Sources"

WARNING

The Ministry of Defence (MOD), like its contractors, is subject to both United Kingdom and European laws regarding Health and Safety at Work. Many Defence Standards set out processes and procedures that could be injurious to health if adequate precautions are not taken. Adherence to those processes and procedures in no way absolves users from complying with legal requirements relating to Health and Safety at Work.

STANDARD CLAUSES

a) This standard has been published on behalf of the Ministry of Defence (MOD) by UK Defence Standardization (DStan).

b) This standard has been reached following broad consensus amongst the authorities concerned with its use and is intended to be used whenever relevant in all future designs, contracts, orders etc. and whenever practicable by amendment to those already in existence. If any difficulty arises which prevents application of the Defence Standard, DStan shall be informed so that a remedy may be sought.

c) Please address any enquiries regarding the use of this standard in relation to an invitation to tender or to a contract in which it is incorporated, to the responsible technical or supervising authority named in the invitation to tender or contract.

d) Compliance with this Defence Standard shall not in itself relieve any person from any legal obligations imposed upon them.

e) This standard has been devised solely for the use of the MOD and its contractors in the execution of contracts for the MOD. To the extent permitted by law, the MOD hereby excludes all liability whatsoever and howsoever arising (including, but without limitation, liability resulting from negligence) for any loss or damage however caused when the standard is used for any other purpose.

Section 2

Military Air Traffic Management Equipment Safety and Performance Standards Procedures for Use, Content and Definitions

Military Air Traffic Management Equipment Safety and Performance Standards Procedures for Use, Content and Definitions

1. Scope

1.1. This Defence Standard provides Acceptable Means of Compliance and Guidance Material, together with definitions of the terms used throughout this document. Specific technical definitions may be separately defined as they are used.

1.2. The material contained in all parts of this Def Stan set out the requirements for System Safety and Functional Performance of Military ATS Systems. All equipment that has the capability to be used for ATS or ATM, **shall** comply with all the appropriate requirements within this Def Stan for the full coverage area, hardware and software used when in this mode regardless of the location of the equipment, platform it is situated on or the operational context in which it is being used. Application of the appropriate contents within this Def Stan **shall** be made at the time of any significant change to an ATS System Design or Architecture[1]. The scope of the contents of this Def Stan covers Safety, Performance and Regulatory aspects.

1.3. The legal framework for regulatory powers of the MAA is vested in the Secretary of State, with specific exclusions stated in both European Unions (EU) Regulations and the UK Air Navigation Order (ANO). Consequently, provisions within International Civil Aviation Organization (ICAO), EU and UK ANO Regulation are not directly legally applicable to Military ATS Systems, although Military ATS Systems **should** be demonstrably at least equivalent in Safety and Performance.

1.4. 'SofS' instruction to Defence is that Health, Safety and Environment Protection (HS&EP) policy statement requires that "….where Defence has exemptions, derogations or dis-applications from HS&EP legislation, we maintain Departmental arrangements that produce outcomes that are, so far as reasonably practicable, at least as good as those required by UK legislation"[2]. Military ATS Systems are regulated by the MAA.

1.5. The purpose of all chapters of this Def Stan is to define Military ATS Equipment System Safety and Performance Standards to providers of Military ATS.

1.6. Military ATS providers are expected to demonstrate compliance with applicable requirements either directly or through the provision of Safety Assurance documentation (Safety Case) to the MAA and Military Aviation Duty Holder chain.

1.7. Where an ATS provider in support of application for approval submits material produced by a third party (and equipment manufacturer for example), the provider must endorse the content.

1.8. This Defence Standard is for regulation and enabling assurance of equipment listed in CAP 670 Appendix A to Part A: Schedule of Equipment to be Regulated under the ANO Articles 205 and 206. To provide guidance on the stement in this Appendix "Any other specific item or class of equipment/system deemed to be safety-related and used to support the provision of an air traffic service. These items or classes of equipment/system are to be promulgated in CAP 670." DT's and equipment providers are to engage with the MAA to seek advice of if the equipment is in or out of scope regarding assurance activities.

2. Warning

2.1. The MOD, like its contractors, is subject to both UK and European laws regarding Health and Safety at Work. Many Def Stans set out processes and procedures that could be injurious to health if adequate precautions are not taken. Adherence to those processes and procedures in no way absolves users from

[1] RA 3120 ATM Equipment Standards.

[2] MAA01 – Chapter 1 Para. 1.

complying with legal requirements relating to Health and Safety at Work or legal obligations regarding Duty of Care.

2.2. Where a design to the requirements of this document may result in an adverse environmental impact the MOD Project Team (PT)/ Delivery Team (DT) Leader **shall** be advised.

2.3 Where the term Aerodrome appears, this is applicable to Maritime Afloat and advice and guidance should be sought from the MAA regarding ATM equipment provision.

3. Normative References

3.1 The normative references which shall be utilised as Guidance Material for all chapters of this Def Stan are in section 3 of this document.

3.2 Demonstration of compliance is to be carried out against all applicable normative references

3.3. Note: Defence Standards can be downloaded free of charge from the DStan web site by visiting http://dstan.uwh.diif.r.mil.uk (internal site for MOD users) with MODNET access or https://www.dstan.mod.uk (all customers - registration required). All referenced standards were correct at the time of publication of this standard (see below for further guidance); if you are having difficulty obtaining any referenced standard please contact the DStan Helpdesk in the first instance.

3.4. Reference in this Standard to any normative references means in any Invitation To Tender (ITT) or contract the edition and all amendments current at the date of such tender or contract unless a specific edition is indicated. Care **should** be taken when referring out to specific portions of other standards to ensure that they remain easily identifiable here subsequent amendments and supersessions might be made. The most recent version **shall** always apply when applicable to improvements in safety and regulatory requirements.

3.5. In consideration of paragraph 3.3 above, users **shall** be fully aware of the issue, amendment status and application of all normative references, particularly when forming part of an ITT or contract. Correct application of standards is as defined in the ITT or contract.

3.6. DStan can advise regarding where to obtain normative referenced documents. Requests for such information can be made to the DStan Helpdesk. Details of how to contact the helpdesk are shown on the outside rear cover of Defence Standards.

3.7. Any reference to a governing body (e.g. CAA) requiring contact or notification in normative reference documents **shall** be read as the MAA.

4. Definitions

4.1. All definitions in this standard are listed in section 3 of this document**,** Common use definitions are also listed in CAP 670.

4.2. In addition, verbal forms for the expression of provisions (**shall**, **should** etc.) **shall** be in accordance with CAP 670. Where they cannot be found in CAP 670, they will be in accordance with Annex H of ISO/IEC Directives, Part 2, Sixth Edition, 2011.

5. Abbreviation

5.1. Abbreviations contained in this document are referenced in section 3 of this document.

6. Format of Def Stan 00-972

6.1. This Def Stan is primarily a Military Delta to Civil Aviation Publication (CAP) 670 ATS Safety Requirements. CAP 670 **shall** be used as a baseline in establishing appropriate design and air safety requirements taking account of the procurement strategy to be adopted, unless otherwise stated within this Def Stan. In the event of a requirement being deemed as non-applicable or out of scope of the

equipment or systems function/design, MAA approval **shall** be obtained before the design/project progresses to the next stage.

6.2. Additionally maximum use has been made of civilian regulations (ICAO and European standards and specifications) where these are applicable to both military and civil roles and incorporated into this Def Stan for compliance.

6.3. This document is intended to provide a modular set of requirements that define the fundamental design considerations necessary to produce equipment and services that are considered safe. These are the minimum requirements and do not represent a standard specification. The requirements are broken down into thirteen chapters, each focused on a different application.

6.4. The Organizational framework currently in place for Military ATS systems, is diverse in scope and spread between disparate authorities, including, but not limited to:

6.4.1. Defence Equipment and Support (DE&S).

6.4.2. The Directorate of Information Systems and Services (D ISS). The Site Coordinating Installation Design Authority (SCIDA) of ISS, helps ensure the Resilience, Integrity, Confidentiality and Availability of MOD Command, Control, Communications, Computing and Intelligence (C4I) systems; including ATS Systems.

6.4.3. The appointed Office will perform an internal Safety and Engineering Quality function for Royal Air Force (RAF) and Joint Helicopter Command (JHC) and other ATS Systems.

6.4.4. Navy Command Aviation Ops, are the focal point for internal Safety and Engineering function for Royal Navy (RN) ATS systems at land-based Naval Air Stations and afloat; with Air Traffic Control (ATC) Engineering representation

6.4.5. Safety. The MAA and Ship Safety Management Office, along with Aviation Duty Holders (ADH).

6.5. Guidance on the Hierarchy of applicable and referenced regulations is available from DStan; but in essence includes:

6.5.1 North Atlantic Treaty Organization (NATO) STANAGs.

6.5.2. International Regulations (ICAO SARPs).

6.5.3. European Standards and Regulations (EU Regs).

6.5.4. UK Regulations (Civil Aviation Authority (CAA) Publications).

6.6. This standard utilises a broad approach to Regulatory Hierarchies. Figure 1 below is a representation of some provenance and source influences and intended audiences for this Defence Standard.

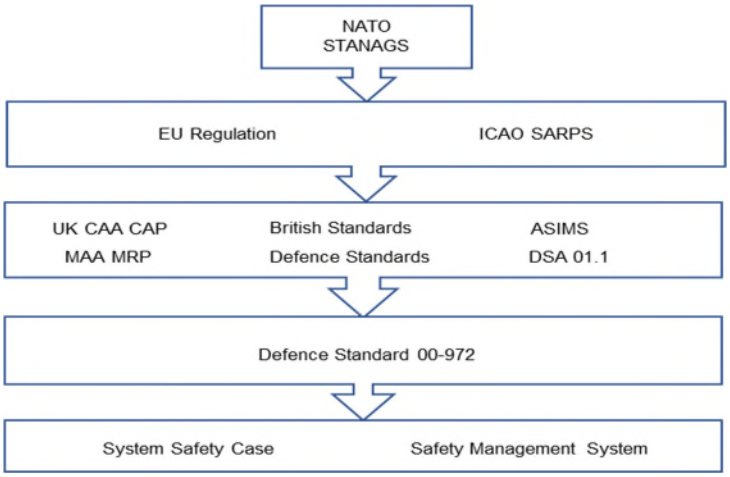

Figure 1 - Regulatory Hierarchies

6.7. Each part typically contains individual requirements and guidance material which are divided into sections:

6.7.1. Safety Integrity Requirements

6.7.2. Functional and Performance Safety Requirements

6.7.3. Front Line Command, Danger Area Crossing/Range, Military Deployed and other differences

6.7.4. Statutory and Regulatory References.

6.8. Each Section may contain:

6.8.1. Safety Objectives

6.8.2. Mandatory Requirements

6.8.3. Recommendations

6.8.4. Acceptable Means of Compliance

6.8.5. Guidance and/or notes providing additional information

6.9. Externally provided services not specifically covered in this Standard are assumed to meet all other relevant requirements and Standards. It is the responsibility of the ATS provider to ensure that the consequences of safety-related failures associated with externally provided data or services are adequately considered and mitigated against[3]. This Def Stan does not cover ATC Human Resources issues.

6.10. Broad formatting within parts will attempt to reflect CAP 670 order, where possible. The contents of this Def Stan will either be:

6.10.1. Referring to a comparable Civil Requirement with some additions or changes.

6.10.2. A Military Requirement

7. Use of Def Stan 00-972

7.1. Regulation of Military ATS and technical elements of associated services is achieved through oversight, approvals and/or Release into Service Processes (RiSP)[4], along with the approval of organizations[5] and the sampled Audit and Inspection of ATS Systems and service provision.

[3] RA 3140 Air Traffic Management Equipment End to End Safety
[4] RA 3134 Air Traffic Management Equipment Release into Service Process (RiSP)
[5] RA 1027 Air Traffic Management Equipment Organizations - Responsibilities

The details of these processes are in the Military Regulation Publications (MRP).

7.2. Adherence to MAA Safety Management System Requirements[6] is required for all aspects of the Air System, including ATS Equipment. Audit and Inspection of these processes and the activities underpinning them will occur as part of the MAA Assurance programme.

7.3. The MAA and ADH, require to be notified of planned safety related changes at ATC Units. These include planned changes to ATM Equipment and engineering procedures; any related Safety Management Systems (SMS) and associated documentation and unit organization.

7.4. The standard has been formulated as the UK baseline against which a PTL/DTL can make judgements to determine the requirements for a specific project. The requirements, with or without explanatory matter, **shall** not be regarded as constituting a text-book of current knowledge. Their interpretation against a background of such knowledge is essential. Where the Def Stan cannot be met or an Alternative Acceptable Means of Compliance[7] another means of compliance is proposed this **shall** be put to the MAA for approval.

7.5. As per RA 3120, all new ATM Equipment is to be compliant with Def Stan 00-972 as the AMC to achieve the standards required for air safety. Additional specification requirements will be necessary to ensure that the design meets all 'fitness for purpose' attributes necessary for full operational capability. Where equipment is procured 'Off the Shelf', the requirements of Def Stan 00-972 are applicable.

7.6. All future equipment, systems, designs and upgrades **shall** as a minimum, whilst being at least tolerable and ALARP, meet the safety requirements of existing equipment.

7.7. Where more than one safety principle or target could be applied due to an accumulation of services or where a common mode failure is introduced the most onerous standard/target **should** be used.

8. Amendment Procedure

8.1. This document **shall** be reviewed periodically by the technical sponsor (DSA-MAA-Cert-ES3-ATM@mod.gov.uk) and updated where necessary.

8.2. The Unsatisfactory Text / Content Reporting Form at **Annex D** is to be used to notify the Editorial Team, and for the Editorial team to document subsequent actions relating to proposed amendments or textual reviews to Def Stan 00-972, it may also be used to notify the editorial team of requirements not covered by the Def Stan. Where there is a perceived discrepancy in the text, the originator can forward details to: DSA-MAA-Cert-ES3-ATM@mod.gov.uk

8.3. Where responsibility is held by the editorial team for ensuring that the proposal is assessed and, where approved, incorporated in the next issue.

[6] RA 1200 Defence Air Safety Management
[7] MAA03 Annex B

Chapter 1: Generic and Software

1. Generic Safety and Regulatory Requirements

1.1. **EU Regulations:** Air Traffic Service (ATS) Systems or Capabilities **shall** demonstrate equivalence with the Service provision regulation (550/2004), the Airspace Regulation (551/2004), the Framework regulation (549/2004) and the Interoperability Regulation (2018/1139) as amended by Single European Sky 2 (SESII) where appropriate.

1.2. **UK CAA Regulation:** Organisations and projects providing equipment as ATS Systems or Capabilities **shall** endeavour to demonstrate equivalence with Civil Aviation Authority (CAA) Regulations, where appropriate. Discussions with MAA and CAA may be made to qualify areas of Regulatory overlap. Air Traffic Control (ATC) Units approved under Article 169 of the Air Navigation Order (ANO) (CAP393) and located at Military Aerodromes and Military Units employing Civil Air Traffic Control Officers (ATCO) **shall** hold documents as shown in CAP670.

1.3. **Military Aviation Regulations:** Military ATM Systems **shall** meet the relevant requirements embedded in the Military Regulatory Publication (MRP).

1.4. **MOD Safety Regulation:** ATS Systems Safety Process **shall** adhere to Def Stan 00-55, Def Stan 00-56, MRP Regulation, DSA01.1, DSA02.DLSR. LSSR, along with JSP604. BRd0765, BRd0766, BRd0767 and BRd9424 may also apply for Royal Navy (RN). AFSP-1(A) may apply for North Atlantic Treaty Order (NATO) Systems.

1.5. **Safety Assurance:** Safety Management System (SMS) Assurance **shall** be an embedded part of organisations governance and **shall** comply with MRPs. It **shall** also demonstrate equivalence with CAP670 and European Union (EU) Regulation 1035/2011 via ESARR3. Note: All references referring to submission of documents to the CAA **shall** be taken to mean to the MAA.

1.6. **MOD Human Factors:** Human Factors assessments related to ATS Equipment or environment **shall** be made for each project in accordance with Def Stan 00-251 and in liaison with MOD Human Factors Integration Team (or a suitable equivalent Human Factors Team).

1.7. **MOD Reliability Case:** ATS System Reliability **shall** be defined and supported by a body of evidence against the Safety Requirements explained in this document. This evidence shall be further documented within the supporting ATS System Safety Case.

1.8. **MOD Environmental Factors:** The ATS System **shall** be capable of ongoing operation within the Operating Environment. All potential environmental conditions (normal and adverse) shall be assessed to confirm the impact to ATS operations. Environmental factors **should** be considered in accordance with Def Stan 00-35, DSA 01.1 and DSA02.DLSR. LSSR: Land systems Safety and Environmental Protection.

1.9. **Engineering Training:** Engineering Training and certification of ATS Equipment Maintainer and System Manager Competence **shall** be in accordance with the MRP.

1.10. **Installation Standards:** All MOD ATS Engineering Systems **shall** be installed in accordance with AP600, JSP604 and BS7671 in force at the time installation occurs. Liaison with Site Coordinating Installation Design Authority (SCIDA) or the appropriate Installation Authority **shall** occur. Installations **shall** comply with Def Stans; 59-188 Part 1; 59-411 Part 5.

1.11. **System Security:** All systems and processes **shall** adhere to JSP 440.

1.12. **ATM Equipment Infrastructure:** Where utilised for or in support of ATS, relevant parts of the ATM infrastructure (e.g. power, ducting, cabling) **shall** be considered as part of the overall Safety argument.

1.13. **Health and Safety:** Military ATM Systems **shall** meet the requirements laid down in MOD H&S Handbook, JSP375.

1.14. **Radio Frequency Compliance:** All ATM Systems **shall** comply with the Radio and Telecommunications Terminal Equipment Directive (R&TTED) and Electro Magnetic Capability (EMC) Directives in peacetime environments (see Def Stan 59-411). All ATM Systems **shall** comply with JSP604 for Radio Site Clearances in the UK and Regulatory Article (RA) 3136. NATO RN Radiation Hazard (RADHAZ) STANAG 1380 and AECP-2(D) may also apply when operating in Overseas environments.

1.15. **The UK EMC Regulations 2006:** 3418 and the EMC Directive 2004/108/EC do not include a specific military exemption. Organisations and projects providing ATS equipment should ensure that EMC is assessed appropriately in their safety argument. R*&TTED: (1999/5/EC) (EMC:(2004/108/EC)) (Def Stan 59-411) (JSP604) (STANAG 1380) (AECP-2(B))*

1.16 **ED-205:** Organisations and projects should utilize ED 205 as the process standard for security certification and declaration of ATM ANS Ground Systems. This document provides guidance material for the certification of the systems providing ATM services.

1.17 **CAP 670 Appendix A to Part A: Schedule of Equipment to be Regulated under the ANO Articles 205 and 206:** This schedule lists ATM equipment requiring regulation and assurance activities supporting the requirements of this document. All DT's procuring equipment within this list or proposing to provide a ATS should engage with the MAA at the beginning of projects or implementing change to ensure compliance.

2. Software Safety and Regulatory Requirements

2.1. **Software Safety Equivalence:** Software Safety Assurance **should** be mapped against EUROCAE ED153. (Guidelines for ANS Software Safety Assurance), Software Integrity Assurance **should** be mapped against EUROCAE ED109A (Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems). These are listed as the guidance material in CAP670 and EU 482/2008.

2.2. **Software Quality Assessment:** As detailed in ED 109A and ED 153**,** System Software Quality processes **shall** be Audited and assessed as part of any Equipment Safety Case; by a project team and an independent Approval Authority, in liaison with the manufacturer.

2.3. **Software Safety and Security:** Organisations and projects providing ATM systems where utilising networked software and Internet Protocols (IP) **shall** ensure that Security considerations are in accordance with Def Stan 00-56 & 05-138 and JSP440. In addition, ATM systems / networks **should** be able to detect intrusion into IP networks; whereupon they **should** fail-safe and operate autonomously, with procedural backups where necessary.

2.4. **Design Integrity (DI) of Programmable Elements (PE) in Defence Systems:** The DI of PE in Products, Services and Systems **shall** comply with the requirements of Def Stan 0055, Part 1.

3. Generic Static Deployed and Tactical Safety and Regulatory Requirements

3.1. Organisations and projects supplying equipment for ATS should recognise the environmental parameters for Static Deployed and Tactical Environments may be more demanding than Fixed. These additional requirements and safety arguments **shall** be defined and tested as part of the Operational Requirement (OR).

3.2. Projects and organisations providing ATS Deployable Tactical Equipment **should** consider Air Safety implications required for operation and transportation of all applicable ATM equipment, this list includes the following but is not exhaustive:

3.2.1. Reduced EMC Compliance

3.2.2. ECM Performance

3.2.3. Vibration

3.2.4. Air Delivery

3.2.5. Transportation and Mobility

3.3. **Tactical Systems Performance assurance:** To provide equipment assurance supporting tactical operations, Systems Performance Inspections (Flight Checking or equivalent) **shall** be performed on Static Deployed ATS systems. These **should** be performed on Tactical ATS systems as required Operationally.

3.4. **Tactical EMC and Radio Frequency:** Radio Frequency (RF) Regulations may differ on Operations outside of UK/EU. These **should** comply with International Telecommunication Union (ITU)/NATO Regulations; such as AECTP-500. Contact the Defence Spectrum Org for advice.

4. Risk Classification

4.1. MAA RA 3130 (ATM Equipment Safety Management) **should** be read for a full explanation of how to apply the Risk Classification Schema and Matrix.

4.2. **Defence ATM Risk Severity Classification:** MAA RA 3130 and EU Reg 373/2017 provide legislation and regulation for risk.

4.3. **Defence ATM Risk Classification Matrix:** ESARR 4 states that the Maximum Tolerability (of ATM direct contribution) to a Severity Class 1 Incident in the European Civil Aviation Conference (ECAC) Region is quoted as being **1.55×10^{-8}** per flight hour (controlled). It is agreed that this is broadly suitable for use in a Military/Civil Joint and Integrated ATM environment. Further EU Target levels for Severity Classes 2-5 are not given due to the lack of current evidence for creating these figures ESARR 2 is currently being utilised to collect information for future use in ESARR4.

Chapter 2: Communications (Including Cyber)

1. Communications Safety Integrity Requirements

1.1. Communication System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. Communications Functional and Performance Safety Requirements

2.1. CAP 670 provides Guidance Material for ATS safety requirements in addition to the functional and performance criteria required for communication equipment. Those responsible for the provision or maintenance of communication equipment should provide evidence of its AMC. Military deltas and additional regulations listed below are also to be followed.

2.2. Equipment and systems at Aeronautical Radio Stations must be capable of operation in both 8.33 kHz and 25 kHz to ensure their compliance with Commission Implementing Regulation (EU) No 1079/2012.

2.3. Military VHF Equipment **shall** be capable of 8.33 kHz spacing. Military Ultra High Frequency (UHF) AGA and UHF GG equipment is not subject to this requirement. STANAG 4204/4205 also applies to Military AGARTF Equipment and agile tactical radio. *(4204 VHF/ 4205UHF)*

2.4. Radio Licensing, which will trigger the process of issuing a Wireless Telephony (WT) Act aeronautical radio license. New/relocated Radio Frequency (RF) emitter installations, sponsored by or on behalf of the Defence Standard 00-972 chapter 2 and intending to operate on aeronautical frequency assignments, **shall** be achieved in accordance JSP 604.

2.5. Radio Site Clearance **shall** be obtained in accordance with JSP 604.

2.6. Military Terminal and Aerodrome ATC Services - The provision **shall** be of Main (A), Contingency (B) and Emergency (E) equipment.

2.7. Deconfliction, Procedural, Traffic and Basic Services - The provision **shall** be of Main and Emergency equipment.

2.8 Main equipment may be operated as 'System A' and 'System B' where either may be considered as Main whilst in operational service and the other is considered as Standby, awaiting selection. Emergency ‘System E’ equipment **should** be in place with independent access.

2.9 Emergency Speech facilities on other NavAids (incl. ILS) may be utilized in addition to the above and integrated to the Voice Communications Control Systems (VCCS).

2.10. The AGA RTF system architectural design **shall** be non-blocking. Any incidences of blocking may be viewed as an availability interruption.

2.11. European Organisation for Civil Aviation Equipment (EUROCAE) Voice over Internet Protocol (VoIP) Operational and Technical Requirements: Where ATC Voice Systems utilise VoIP technologies they **should** be at least compliant with ED-136 in terms of Operational and Technical requirements, except where the provisions within this Def Stan are more stringent.

2.12. EUROCAE VoIP Interoperability Requirements: Where ATC Voice Systems utilise VoIP technologies they **should** be at least compliant with ED-137 in terms of interoperability, except where the provisions within this Def Stan are more stringent.

2.13. EUROCAE VoIP Network Performance Requirements: Where ATC Voice Systems utilise IP networks to interlink VoIP VCCS and RTF systems, these **should** be at least compliant with ED-137-B. Additional information is available within ICAO annex 10 Vol 3.

3 VCCS Functional and Performance Safety Requirements

3.1 CAP 670 provides Acceptable Means fo Compliance for the VCCS engineering requirements for communications facilities established or used at locations within Defence/military providing Air Traffic Services. Additional guidance is listed in this paragraph for Military functionality and performance requirements.

3.2 Where such devices or functions are incorporated, a signal gain path memory or similar feature can be used to prevent distortion of the initial syllables of speech at the beginning of a transmission or after pauses in speech. The principle of operation being that the last dynamic gain/attenuation setting is stored and used for subsequent transmissions.

3.3 The Voice Switch **shall** be viewed as part of the whole Voice Communications System-of-Systems for the purposes of Non-Blocking.

3.4 Local side tone may be a suitable solution if associated with a test of the “off-air” reception. In this respect a self-proving mechanism for the control of vehicles on the manoeuvring area (system loop check) **should** be provided.

3.5 Where a mix of VHF and UHF AGA ATS frequencies are in use by a controller, these frequencies **should** be duplex cross-coupled. This is also recommended between VHF/UHF and GG UHF.

3.6 Where a Radio channel is used exclusively for active runway crossings it **shall** only be as a cross coupled channel associated with the channel on which runway operations are being controlled and **shall** be such that all users can hear all traffic on both channels.

3.7 This requirement **should** be viewed as the round-trip signalling delay. Whilst 20 milli seconds **should** be achievable in TDM systems, for digital systems, EUROCAE ED136 indicated that round-trip delay may exceed this. Ultimately, the round-trip delay in signalling **shall** be suitable to prevent clipping of ATC or Aircraft speech during operations.

3.8 For multi-site area radio coverage (aka Climax), differentials between each channel speech/signalling **should** be less than 10 milli seconds.

3.9 Implementation direct to Headset **should** be made for normal operation. Implementation of Priority lines or signalling **should** be considered for liaison lines to neighbouring units. Implementation of utilizing Direct Access circuits, with Indirect Access/Dialled backup **should** also be considered.

3.10 Airfield cables and fibres **shall** be considered as part of this.

3.11 A resilient GG Telephone solution may consist of a Direct Access CCT, a protected ATOTN Autodial and a PSTN Autodial. The PSTN Autodial **should** have an independent access via backup telephone.

3.12 For digital systems, where the above may not be a measurable in the same way, the voice transmission quality **shall** achieve at least a Mean Opinion Score (MOS) of 4.

3.13 Radio and Telecommunications Terminal Equipment (R&TTE) approvals may be gained via British Approvals Board for Telecommunications (BABT).

4. Data Link Functional and Performance Safety Requirements

4.1 See CAP 670 – No military delta currently identified.

5. ATIS Functional and Performance Safety Requirements

5.1 See CAP 670 – No military delta currently identified.

6. Ground to Ground Communications Functional and Performance Safety Requirements

6.1 See CAP 670 – No military delta currently identified.

7. Communications Static Deployed Tactical Safety and Regulatory Requirements

7.1. Once ruggedized, the complete Communications system **should** maintain at least the same Safety Performance as noted above when Static Deployed.

7.2. Coverage Trials **should** be performed in the required area of Tactical operations and defined in Deployed ATC Documentation.

7.3. Secure Voice Communication Systems used for ATC Purposes **should** maintain at least the same Safety Performance as noted above.

7.4. Static Deployed equipment (once ruggedized) **shall** have undergone assessment according to Def Stan 00-35, prior to deployment. *(Def Stan 00-35)*

7.5. Limitations of the transceiver operations **shall** be defined and justified.

8. RAF Communications Specific Requirements

8.1. Radio Interfaces to Air Defence Organisation (ADO) Equipment **shall** not affect the ATC system, or vice versa.

8.2. Runway Caravan **shall** enable use of On-Channel Frequency Intercom and priority signalling to the main ATC tower.

8.3 Air Defence radios utilised for provision of Air Traffic Services **shall** conform to CAP 670 requirements.

9. Contracted Airfields and Weapons Range Communications Requirements

9.1. The performance and architecture of Range Air VHF and UHF Communication systems **shall** meet the requirements in this Def Stan.

9.2. This **shall** also apply if Range Air Control is performed remotely.

9.3. The Trial Control Officers **should** have the same Communications System as the Range Air Controllers, to facilitate On-Channel Frequency Intercom and priority signalling.

10. Remotely Piloted Air Systems Communications Requirements

10.1. Remotely Piloted Air Systems (RPAS) Ground-Ground Comms used in-lieu of VHF Communication; the link from RPAS Pilot to ATC Service Provider **shall** meet the same Communications Integrity and Performance Requirements for Air-Ground-Air Communications. *(CAP722) (RA1600)*

11. Communications Statutory and Regulatory Requirements

11.1. The system **shall** be certified as meeting Electro Magnetic Compatibility (EMC) requirements where appropriate. (*ITU-R)(Regs JSP604)*

11.2. Liaison with CAA and Office of Communications (OFCOM) is advisable for VHF RTF licences.

11.3. The entire communications system **should** comply with the Requirements and Provisions within this Def Stan and in doing so, demonstrate equivalence with CAP 393 Air Navigation Order (ANO), Articles 205 and 206.

11.4. The entire communications system **should** be documented as being in compliance with Regulation (EC) 1070/2009 Single European Sky – Interoperability Regulation, where there is a majority of Civil ATS activity being performed.

11.5. The entire communications system **should** demonstrate equivalence with EU Regulations (and ESARR) where appropriate.

11.6. The Radio Equipment Directive 2014/53/EU **should** be met.

12. Cyber Network Communication Requirements

12.1 Cyber system requirements of ATM systems and Network capable equipment should be compliant with CAP 1574.

Chapter 3: Surveillance

1. Surveillance Safety Integrity Requirements

1.1. Surveillance System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

1.2 CAP 670 provides Guidance Material for ATS safety requirements in addition to the functional and performance criteria required for surveillance equipment. Those responsible for the provision or maintenance of surveillance equipment should provide evidence of its AMC, including requirements for performance assessment trials.

2. Surveillance Functional and Performance Safety Requirements

2.1 Non-Cooperative and Cooperative system accuracies are defined in Eurocontrol specifications for ATM Surveillance system performance Vol 1. 3NM and 5NM separation requirements are defined and surveillance functionality and performance listed. Equipment providing these functions **shall** meet the requirements within this document.

2.2 Equipment guidance for resolution and availability for providing Radar Surveillance in En-Route Airspace and Major Terminal Areas can be found in Eurocontrol SUR.ET1.ST01.1000-STD-01-01 and PSR and SSR performance assessment guidance Material in ICAO 8071 Vol 3.

2.3 Equipment coverage defines the areas that can support the provision of radar services to aircraft as defined in Military Reulatory Publications (MRPs). These areas **shall** be in the OR.

2.4 The Surveillance coverage **should** coincide with the use and boundaries of the ATC service that require it. In normal operation, radar data from the known coverage area **shall** be continuously displayed to controllers.

2.5. Detection capabilities for Aircraft with high-energy manoeuvres in wider performance envelopes of Military Aircraft, when operating in or out of segregated Airspace, **should** be Risk Assessed by the Duty Holder (DH) as being As Low As Reasonably Practicable (ALARP).

2.6. The transmission of target reports shall be in accordance with the Euro control standard for Radar Data Exchange (ASTERIX) and B4 Radar Data Networks, this requirement standardises protocols. ASTERIX format **should** be used for data interchange and **shall** be used for data interchange to and between centres.

2.7. An electronic alerting system, reporting status to the maintenance department and to ATC **should** be used. The display system **shall** provide an indication of system faults on each operational display. In normal circumstances, the presentation of these alarms **shall** be at a sufficiently low level so as not to significantly increase controller workload, and the indication provided **shall** provide the controller with a clear indication of which system element has failed

2.8. When it is possible to change the QNH (or QFE) remotely, the equipment **shall** require the change to be drawn to the controller's attention and confirmed on all other displays. Any conversion of Flight Level to Altitude **shall** be carried out in accordance with the data provided in the ICAO document "Manual of the ICAO Standard Atmosphere" (Doc 7488/3).

2.9. Where installing a Short Term Conflict Alert (STCA), Minimum Sector Altitude Warning (MSAW), and APW or APM system it **should** comply with the Relevant EUROCONTROL Specification.

3. Precision Approach Radar

3.1. **PAR Coverage Volume** - The final approach coverage volume for the approach system **shall** meet the requirements of ICAO Annex 10 Vol 1.

3.2. **PAR Aircraft Velocity Range** - The Approach System **shall** be able to provide the required precision approach at relative velocities up to 250 kts with blind speeds minimized between 40 and 250 kts.

4. Mode S

4.1. **Mode S:** functionality, design and operation shall comply with Eurocontrol SUR.ET2.ST03.3114-SPC-01-00.

5. Multilateration

5.1 ICAO SARPS Annex 10 Volume 4 and CAP 670 provides requirements for Multilateration System, additional supporting documentation is listed below.

5.2. Multi-lateration Systems used to provide co-operative surveillance **shall** define the system refresh rate Pd. *(ED-142)*

5.3 To understand the performance of a Wide Area Multilateration (WAM) system, when compared to a secondary surveillence radar system, the "update interval[8]" and "output period[9]" **shall** be defined and justified.*(ED-142)*

6. Windfarm Specific Surveillance Requirements

6.1 CAP 670 provides Guidance Material for windfarm safety requirents.

6.2 CAP 764 provides additional information regarding Wind Turbines guidance.

7. Surveillance Static Deployed Safety Requirements

7.1. The Surveillance System utilised on operations, **should** maintain the same Safety Performance as noted above. Any limitations **shall** be assessed by the DH, Release Authority and the Operating Authority according to MAA Guidelines within this document.

7.2. Mode S Codes **should** be easily adjustable on deployable Mode S Interrogators; using rapid notification of code usage where necessary. *(EU Regulation 2016/2345)*

7.3. Any limitations in Surveillance System Performance during Operational and High Energy Training Manoeuvres **shall** be assessed by the DH, Release Authority and the Operating Authority according to MAA Guidelines.

7.4. SSR / IFF Operations in Military Modes **shall** be facilitated in Tactical Equipment on Operations. *(STANAG 4193)*

8. Surveillance Specific Requirements

8.1. Air Defence Surveillance systems used for the provision of Military ATS **shall** meet the Safety and Performance criteria dependent on the service provided. Eurocontrol Vol 1 lists the mandatory and recommended minima for providing 3NM and 5NM separation requirements. CAP 493 provides guidance for type of service.

8.2. Antenna Stabilisation mechanisms used afloat **should** be included in calculations for Surveillance System Safety Reliability.

[8] The term 'Update Interval' is used to define the time interval over which the performance of the WAM system is measured.
[9] The term 'Output Period' is used to define the selectable period that the WAM system uses to output target reports periodically.

8.3. Mode S Codes **shall** be easily adjustable on RN Mode S Interrogators Afloat; using rapid notification of code usage where necessary. Interrogator code conflicts **shall** be monitored and avoided by the Ship systems or procedures. *(EU Regulation 2016/2345)*

8.4. Where Ship Navigation Surveillance systems are used for ATS, the system **shall** be subject to assessment against the Safety and Performance criteria in this Defence Standard.

8.5. Where Autonomous Radar Status is required, then Communications to neighbouring ATC units **should** be established to the same Safety Performance as noted in Generic Communications Safety Performance.

8.6 ATC Surveillance Systems Afloat should include notification/alarm of any jamming maps applied to the radar and/or display in use.

8.7. Where Ship Inertial Navigation System (INS) Systems affect Surveillance System mapping accuracy, the limitations of the System and Operational procedures **shall** be defined in the Safety Case.

8.8. Track Initiation and Coasting may be maintained outwith the requirements above, with appropriate Safety assessment. *(BRd0766)*

8.9. If SRAs are performed to RN Afloat facilities positional accuracy **shall** be assured in leiu of Surveillance markers.

8.10. Air Weapons Range / Danger Area Surveillance Systems **shall** meet the performance requirements in this document when utilised for Air Traffic Services. Where this document does not cover the specific nature of the Surveillance Systems, then these Systems **shall** be assessed as part of an end-to-end System Safety Case with resultant Assurance against defined Safety Requirements.

9. Surveillance Statutory and Regulatory Requirements

9.1. All equipment provided **shall** be certified as meeting EMC requirements. This may be derogated per-equipment under Article 296. This derogation **shall** only apply to equipment for Arms, Munitions or War Materiel and **should** not be possible for Dual-Use equipment with a civil component. *(EMC Directive 2004/108/EC) (JSP604)*

9.2. Surveillance Systems **should** demonstrate equivalence with Commission Implementing Regulation (EU) No 1207/2011 and Eurocontrol Spec-0147, where there is a Civil ATS component.

9.3. Approval of the NISC **shall** be obtained for any Cooperative Surveillance system. *(EU Reg 2016/2345) (Eurocontrol Mode S IC Allocation Process 05/09/27-01) (JSP604)*

10. Remote Tower System Functional and Performance Safety Requirements

10.1 Recent technological advancements enable the replication of ‘out of the window’ (OOW) views from aerodrome visual control rooms at remote sites by electronic means. The introduction of this alternate means of providing Visual Air traffic control through a remote tower capability is required to meet the guidelines listed in CAP 1620.

10.2 EUROCAE Document ED-240 - ‘Minimum Aviation System Performance Specification for Remote Tower Optical Systems’ provides guidance in developing these requirements and in verifying compliance.

Chapter 4: Navigation

1. Navigation Safety Integrity Requirements

1.1. Navigation System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. Navigation Functional and Performance Safety Requirements

2.1 CAP 670 provides Guidance Material for ATS safety requirements in addition to the functional and performance criteria required for navigational equipment. Those responsible for the provision or maintenance of navigation equipment should provide evidence of its AMC. Currently there is no Military delta from the civilian requirements.

3. Navigation Safety Requirements

3.1 The Navigation systems performance **shall** maintain at least the same Safety Performance as noted above where possible.

3.2 Stabilise systems (antenna or beam) in use, **shall** be included in calculations for System Safety Reliability.

3.3 Where Ship Inertial Navigation System (INS) impacts Navigation Accuracy at higher/lower latitudes, the limitations **shall** be defined in System and Operational procedures.

3.4 Where Government Airfields or Weapons Ranges are contracted in ATM service provision, they **shall** meet at least the requirements in this document.

3.5 Navigation Systems are required to meet STANAG 3374 flight checking safety guidance.

4. Navigation Statutory and Regulatory Requirements

4.1 The ILS **should** comply with appropriate regulatory requirements and recommendations defined in ICAO Annex 10.

4.2 The IRVR **shall** comply with the provisions within ICAO Annex 3.

Chapter 5: Satellites

1. Satellite Safety Integrity Requirements

1.1. Satellite System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. Satellite Functional and Performance Safety Requirements

2.1 Ground Augmented Satellite Systems used for Military ATS **should** meet criteria laid down in European Organisation for Civil Aviation Equipment (EUROCAE) ED-144.

2.2 The position information provided by the GNSS to the user **shall** be expressed in terms of WGS84, converted if necessary from Global Navigation Satellite System (GNSS) Ephemeris data. *(ICAO Ax10)*

2.3 Time information presented to the user **shall** be expressed as or in reference to; Universal Time Co-ordinated (UTC). *(ICAO Ax10)*

2.4 Positional Accuracy of a Satellite System, without Augmentation, used for Navigation or Surveillance purposes **shall** be better than 13 metres horizontally and 22m vertically. *(ICAO Ax10)*

2.5 GBAS System Lateral and Vertical Accuracy and service volume requirements for Cat I, these shall also meet the time to alert requirement of *(ED-144)*

2.6 SBAS System Vertical Accuracy (APV) An SBAS Open Service System Vertical Accuracy **shall** be less than 4 metres, to a 95% confidence level. *(EGNOS SoL SDD)*

2.7 SBAS System Horizontal Accuracy (APV) An SBAS Open Service System Vertical Accuracy **shall** be less than 3 metres, to a 95% confidence level. *(EGNOS SoL SDD)*

2.8 SBAS Time To Alert (TTA) The maximum allowable time elapsed between the SBAS system Accuracy being out of tolerance to the user equipment enunciating the alert **shall** be less than 10 seconds. *(EGNOS SoL SDD)*

2.9 An SBAS receiver used for Military ATS **should** be capable of supporting at least Localiser Performance with Vertical Guidance (LPV) and APV. *(EGNOS SoL SDD)*

2.10 Where GBAS or SBAS Precision Approaches are utilized to a Military Aerodrome, Signal-In-Space Integrity Monitoring **shall** be in place, with information made directly available to ATC.

3 Satellite Safety Requirements

3.1 Satellite Systems used for Static Deployed Military ATS or Naval Afloat Military ATS **should** maintain at least the same Safety Performance as noted above.

3.2 Where Deployed or Ship location impacts Satellite or Augmentation System Accuracy at higher/lower latitudes, or other locations; the limitations **shall** be defined in System and Operational procedures.

4 Satellite Statutory and Regulatory Requirements

4.1 Satellite Systems used for Military ATS **shall** be in accordance with International Civil Aviation Organisation (ICAO) Annex 10 Volume 1.

4.2 Satellite Systems used for Military ATS **shall** be in accordance with ICAO Doc 9849 GNSS Manual.

4.3 Satellite Systems Communications used for Military ATS **shall** be assessed in accordance with ICAO Doc 9869 RNP.

4.4 Satellite System Datalinks used for Military ATS **should** be assessed in accordance with ICAO Doc 9694 ATS Datalinks.

4.5 Satellite System Navigation Positioning used for Military ATS **should** be assessed in accordance with ICAO Doc 9613 PBN.

Chapter 6: Meteorological Systems

1. Meteorological Safety Reliability Requirements

1.1. Meteorological System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. Meteorological Functional and Performance Safety Requirements

2.1 CAP 670 provides Guidance Material for the functional and performance safety requirements on the use, display and processing of meteorological data within an ATC unit. This document should be read in conjunction with CAP 746 Requirements for Meteorological Observations at Aerodromes.

2.2 The Military ATS provider/Duty Holder facing organization is recommended to ensure that a Service Level Agreement or similar formal arrangement is in force between the Meteorological Information provider and ATC.

2.3 The Accuracy of Meteorological Measurements or Observations for ATS **should** be as follows:

Element to be observed	Operationally desirable accuracy of measurement or observation
Mean surface Direction: ± 5 degree wind	Direction: ± 5 degree Speed: ± 5%
Variations from the mean surface wind	± 4km/h (2kt), in terms of longitudinal and lateral Components
Visibility	± 50 metres up to 600 metres ± 10% between 600 metres and 1500 metres ± 20% above 1500 metres
Runway visual range	± 10m up to 400 metres ± 25m between 400 metres and 800 metres ± 10% above 800 metres
Cloud amount	± 1 okta
Cloud height	± 10 metres (33ft) up to 100 metres (330ft) ± 10% above 100 metres (330ft)
Air temperature and dew-point temperature	± 1 degree celcius
Pressure Value (QNH, QFE)	± 0.5 hPa

2.4. For flight testing purposes, Pressure Values for Military Met systems **should** be accurate to 0.1 hPa. *(ICAO Ax 3) (Def Stan 08-133 Pt 2)*

2.5 Surface winds of 6 km/h (3 kt) or less **shall** include a range of wind directions, whenever possible.

2.6 Where an afloat Met System is integrated, this **shall** accommodate links to Joint Operational Meteorology and Oceanographic Centre (JOMOC), the UKMO Met Office Remote Site Network (MORSN) and RN Environmental Information Network (RNEIN). RNCSS access by RN Ships and Intranet for 'Smart Pull' Met. Information **shall** be accommodated.

2.7 If the RN Meteorological equipment for ATS produces 2 and 10 minute rolling averages of the wind speed and direction, a change in the ships heading or speed which affect the readings validity shall provide an alert displayed to the operator.

3. Meteorological Statutory and Regulatory Requirements

3.1 Military Meteorological Systems for ATS **shall** comply with the provisions in ICAO Annex 3.

3.2 Military Meterological Systems for a Flight Information Service **shall** comply with ICAO Annex 11.

3.3 Military Meteorological Systems **should** comply with the provisions in WMO-No.49 – Technical Regulations Volume II.

3.4 Military Meteorological Systems communicating with other Meteorological facilities **should** comply with the provisions in WMO-No.386 – Manual on the Global Telecommunications System.

3.5 Military Meterological Systems **should** conform to CAP746.

3.6 MAA MRP RA 3301 and RA 3275 and MMATM Chapter 14.

Chapter 7: Flight Data Information Management Systems

1. General Requirements

1.1 The broad content of Functional and Safety Performance Requirements below is selected and derived from International Civil Aviation Organisation (ICAO) Doc 4444 and Civil Aviation Publication (CAP) 694. Further regulations are listed below for providing additional guidance.

2. Flight Data Information Management Systems Safety Integrity Requirements

2.1 Flight Data Information Management System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

3. Flight Data Information Management Systems Functional and Performance Safety Requirements

3.1 Military Flight Data Information Management systems **should** support the provisions within European Organisation for Civil Aviation Electronics (EUROCAE) ED-133, Flight Object Interoperability Specification.

3.2 Military Flight Data Information Management systems **shall** support the processes in place in CAP 694.

3.3 Military Flight Data Information Management systems **shall** provide a method for receiving, interaction, processing and store flight plans and associated messages. These systems **should** support UK Assisted Flight Plan Exchange (AFPEx), AFTN, ICAO FPL and Eurocontrol ATS Data Exchange Presentation (ADEXP) and Military Aerodrome data from the UK En-Route system.

3.4 Military Flight Data Information Management systems **should** support formatting according to Eurocontrol Standard for ADEXP. *(ADEXP DPS.ET1.ST09-STD-01-01)*

3.5 Military Flight Data Information Management systems **should** conform to the Eurocontrol Specification for Interoperability and Performance Requirements for the Flight Message Transfer Protocol (FMTP). *(EUROCONTROL-SPEC-0100)*

3.6 Military Flight Data Information Management systems **should** support the use of existing national interfaces, ensuring that future interfaces can be supported (e.g: EUROCONTROL / Federal Aviation Administration (FAA) Aeronautical Information Exchange Model (AIXM 5); including the eASM Military extension). *(AIXM 5eASM Extension)*

3.7 Military Flight Data Information Management systems **should** address a flight data exchange function and an airspace crossing function. *(DPS.ET1.ST10.200-FS-01-00)*

3.8 Military Flight Data Information Management system Flight Data Exchange **should** be in accordance with Eurocontrol Functional Specifications for System Support to Airspace Data Distribution and Civil/Military Coordination. *(DPS.ET1.ST10.200-FS-01-00)*

3.9 Military Flight Data Information Management system **should** support bilateral forwarding of Flight Data between Military and Civil Units, where appropriate. *(DPS.ET1.ST10.200-FS-01-00)*

3.10 CAP 493 provides guidance for Flight Data Management including the requirements for flight strips.

3.11 Flight Data Management Systems **should** be interoperable between required locations (Royal Air Forces (RAF), Royal Navy (RN), MOD and Civil establishments).

3.12 This time **shall** be presented in Universal Co-ordinated Time (UTC) (Zulu) and **should** be synchronized to a Master Time Source.

3.13 RN and RN Afloat Flight Data Information Management Systems **should** be interoperable.

3.14 RN Afloat FDP Systems **should** be able to accommodate alternative methods for interoperation with other nation Carriers and/or littoral Civil/Military systems.

4. Flight Data Information Management Statutory and Regulatory Requirements

4.1 Military Flight Data Information Management Systems **shall** conform to requirements in ICAO Doc 4444.

Chapter 8: Airfield Ground Lighting (AGL) and Arrestor Systems

1. AGL & Arrestor Safety Reliability Requirements

1.1. AGL & Arrestor Safety Reliability Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. AGL & Arrestor Functional and Performance Safety Requirements

2.1 The AGL System **shall** accurately illuminate airfield lights as selected through the control panel.

2.2 The AGL system **shall** accurately indicate the current light settings, representing the actual status.

2.3 The AGL system **shall** indicate where a service has failed, or cannot be set to the desired setting.

2.4 The response time of an AGL control system **should** be less than 250 milli seconds. The overall response time **shall** be better than 5 seconds. The system **shall** provide a visual and audible alarm within 1 second of a failure.

2.5 In the event of a failure of an AGL or Arrestor control system, the field equipment **shall** default to a safe state.

2.6 Any display equipment **shall** be demonstrated to meet the safety requirements and be fit for purpose.

2.7 Functionality **shall** be provided such that operators can easily determine if the AGL or Arrestor Control panel is frozen.

2.8 When interfaced to and Instrumented Runway Visual Range (IRVR) system, any AGL Failure condition **should** be promulgated to the IRVR system.

2.9 The AGL **shall** meet the requirements specified in Manual of Aerodrome Design and Safeguarding (MADS).

2.10 The AGL **shall** meet the requirements specified in Civil Aviation Publication (CAP) 168. *(CAP 168)*

2.11 The AGL **shall** meet the requirements specified in CAP 670. In particular, the AGL control software **shall** be designed in such a way that evidence is available to satisfy the requirements of Regulatory Objectives for Software Safety Assurance in ATS Equipment.

2.12 All Airfield Lighting Systems **should** be compatible with the Night Vision Device (NVD) Plan. *(RA 3265) (MADS)*

2.13 Arrestor Systems **should** be controllable by ATC, through a control panel.

3. AGL & Arrestor Tactical Safety Requirements on Operations

3.1 Portable Airfield Marking **shall** be NVD compatible in accordance with MADS.

3.2 Deployed Airfield Lighting **shall** be implemented in accordance with MADS.

4. Royal Navy (RN) AGL Specific Requirements

4.1 The AGL **shall** meet the requirements in Def Stan 00-133 Part 3.

Chapter 9: Systems Assurance (Safeguarding)

1. Systems Assurance Functional and Performance Safety Requirements

1.1 CAP 670 details the Acceptable Means of Compliance for the Technical Safeguarding processes which are to be employed to protect radio signals from being affected by physical or electromagnetic changes in their transmission environment – Military delta currently identified as those listed below.

1.2 Radio Spectrum safeguarding processes **shall** be applied as part of the technical safeguarding of all Radio Sites to prevent any development near to a radio transmitter or receiver site, which may degrade the radio signal by enabling harmonic interference. *(CAP670) (JSP604)*

1.3 The Radio Site Clearance process of safeguarding against such third party radio site development is part of a UK wide OFCOM notification activity.

1.4 Military Radio Technical Safeguarding **shall** be performed in accordance with Joint Service Publication (JSP) 604. Duty Holders together with their Duty-Holder-facing Air Traffic Service (ATS) Providers are ultimately responsible for the Technical Safeguarding (or Radio Site Protection (RSP)) of all of the radio sites used in support of a military Air Traffic Service.

1.5 The security aspects of remote access facilities to Military operational systems shall be assessed iaw CAP 670.

1.6 Flight checking organisations completing activities against military ATM equipment should be approved by the MAA. Guidance Material in support of these requirements is found within CAP 670.

1.7 Communication, Surveillance and Navigational Aid systems require performance assessments to be carried out, which includes measurements to verify transmitter frequency, modulation depth, output power and a determination of effective radiated power using calibrated measurement equipment, through flight trials as required. It is also necessary to assess the on-going performance of surveillance systems once commissioned and put into service, and when changes are introduced into existing systems.(CAP 670).

1.8 All Communicaitons, Surveillance and Navigational Aid Flight Inspections **shall** be in accordance with the applicable MOD Flight Checking Instruction and additionally in response to any MAA requirements. *(ICAO Ax10 Vol 1) (MOD FCI) (ICAO Doc 8071 Vol 1&3)(STANAG 3374)*

1.9 Tactical Area Navigation System (TACAN) Systems Assurance by Flight Inspection **shall** be in accordance with MOD Flight Checking Instruction 5. *(FCI No.5) (ICAO Doc 8071 Vol 1)(STANAG 3374)*

1.10 Systems Assurance of Precision Approach Path Indicators (PAPI) **shall** be performed at commissioning in accordance with MOD requirements, examples of parameters that may be assessed are *(MAA MADS) (ICAO 9157-AN901 Pt4)*:

1.10.1 Glide Angle

1.10.2 Light Intensity

1.10.3 Symmetry

1.10.4 Lateral Coverage

1.10.5 Light Colour

1.10.6 Acquisition Range

1.10.7 Obstruction Clearance PAPI, A-PAPI

1.10.8 Heli Obstruction Clearance A-PAPI

1.11 Specific guidelines apply to light displays using lasers and searchlights within 500 metres either side of extended runway centrelines within ten miles of an aerodrome. *(CAP493) (CAP736)*

1.12 Within three miles of an aerodrome but not on the extended centreline, the same guidelines apply but with the addition that any light **should** not stray towards the aerodrome or the extended centreline. In both cases, information **should** be passed to any affected aircraft. If a pilot requests that the lights be extinguished or if Air Traffic Control (ATC) considers this necessary, then action **should** be taken immediately. *(CAP493) (CAP736)*

1.13 The Safety of Aircraft and Aircrew **should** not be compromised when utilising Lasers in UK Airspace. Any subsidiary regulations do not absolve any person from using best judgement to ensure the safety of aircraft and aircrew while operating equipment employing lasers, searchlights or other light sources.

2. Systems Assurance Static Deployed Safety Requirements

2.1 Systems Assurance by Flight Inspection when static deployed, **should** be in accordance with this Def Stan. Where this is not possible, North Atlantic Treaty Order (NATO) Flight Inspection Standards **should** be utilized, or mitigated reasoning applied in-lieu, be subject to Risk Assessment by the relevant DH. *(AetP-1(D)) (STANAG 3374)*

2.2 Abnormal markings of Flight Inspection Aircraft are not required in-Theatre.

2.3 Systems Assurance by Flight Inspection of UK ATS Equipment may be performed using other national ICAO approved Flight Inspection documents. *(IGIA Document 77/4.6G) (DoT Order VN8200.3A)*

2.4 Some examples of these are:

2.4.1 United States (US) Federal Aviation Administration (FAA) in accordance with the Interagency Group on International Aviation (IGIA) Document 77/4.6G.

2.4.2 US Department for Transportation Order VN8200.3A.

2.4.3 FAA Document 8200.1C – US Standard Flight Inspection Manual.

3. RN Systems Assurance Specific Requirements

3.1 Royal Navy (RN) Systems Assurance by Flight Inspection Organisations **shall** be assessed and approved by the MAA/DH for the suitability of their ‘At Sea’ Flight Inspection processes.

Chapter 10: ATC Support Systems

1. ATC Support Systems Safety Integrity Requirements

1.1. ATC Support System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. ATC Support Systems Functional and Performance Safety Requirements

2.1 Providers must satisfy the MAA that the system is adequate for its purpose by design or by procedural mitigation.

2.2 ATC Support Systems incorporating Airspace Management Systems **should** utilize management tools for example EUROCONTROL LARA tools.

2.3 ATC Support systems incorporating Airspace Management Systems **should** be implemented in accordance with EUROCONTROL Concepts and Guidance. *(DCMAC/HS/DEL/08-015)*

Chapter 11: Recording and Replay Systems

1. Recording & Replay Systems Safety Integrity Requirements

1.1. Recording and Replay System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. Recording & Replay Systems Functional and Performance Safety Requirements

2.1 CAP 670 provides the Functional and Performance Safety Requirements for the record and replay requirements of Communication, Surveilance and Met Data.

2.2 Communications between all ATS Units **shall** be recorded. Direct communications, which are not already covered, **should** be recorded, including Crash and Emergency communications. *(CAP 670) (ICAO Annex 11)*

2.3 The Ground-Ground equipment and systems at the Base Station **shall** provide all the necessary signals and information to the Voice / Data Recording Equipment, including Military Management Radio channels utilized for the purposes of ATS. *(CAP 670) (ICAO Ax11)*

2.4 Recorded information **shall** be retained for a minimum of 30 days. It should be possible to recreate reliably the Communications, Meteorological and Surveillance data which was displayed at an operational position from the recorded data when requested by the MAAIB. *(CAP 670)*

2.5 Operating Military ATS Providers shall be responsible for providing synchronized Voice, MET and Surveillance data for use in accident and incident investigations either by the MAA, Military Air Accidents, Investigation Branch (MAAIB), CAA or civil Air Accidents Investigation Branch (AAIB) to support search and rescue, air traffic control and surveillance systems evaluation and training.

3. Recording & Replay Safety Requirements

3.1 Systems redundancy may be reduced in lower intensity Tactical Operational systems, with a commensurate As Low As Reasonably Practicable (ALARP) assessment by the Operational Duty Holder (ODH).

3.2 Where Ship-Time is used, this **shall** be translated to UTC for Royal Navy (RN) ATC Systems.

3.3 Where Recording systems are not fully centralised, procedures and methods **shall** be established to ensure procedural time synchronisation for coordinated and synchronised replay.

3.4 Any Recorder systems procured independently, not as Government Furnished Equipment (GFE), **shall** be managed safely in a similar process implemented for GFE Recorder systems with coordinated end-to-end Safety Arguments in accordance with AMC to CAP 670 SW1.

Chapter 12: Alarm and Alerting Systems

1. Alarm and Alerting Systems Safety Integrity Requirements

1.1. Alarm and Alert System Safety Integrity Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Integrity requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. Alarm and Alerting Systems Functional and Performance Safety Requirements

2.1 CAP 670 provides the Acceptable Means of compliance for the safety requirements of information and alerting systems used at military locations providing ATS.

2.2 Alarms provided to ATC **should** not unduly distract from the provision of the ATS and **should** be easy to interpret.

3. Alarm and Alerting Systems Static Deployed Safety Requirements

3.1 Alarm Handling Requirements may be relaxed on operations. Where they are relaxed, this must be documented in conjunction with the in Theatre Duty Holder, ATM DH facing Organisation, ATM Release Authority and the MAA.

Chapter 13: Master Time Sources

1. Master Time Source Systems Safety Reliability Requirements

1.1 Master Time Source System Safety Reliability Requirements are guidance on comparable Minima found in Civil Air Traffic Control (ATC). Where they are not followed, a process deriving specific Safety Reliability requirements on similar failure modes **shall** be conducted by Suitably Qualified and Experienced Personnel (SQEP) which the equipment should meet. Appropriate analysis to derive the Safety Requirements should be used, these are discussed in Project Oriented Safety Management System (POSMS) and Military Regulatory Publications (MRP).

2. Master Time Source Systems Functional and Performance Safety Requirements

2.1 CAP 670 provides guidance for functional and performance safety requirements.

3. Master Time Source Systems Safety Requirements

3.1 The extent of automated Time Synchronisation for ATM systems may be reduced and performed manually.

3.2 Where Ship-Time is used, this **shall** be translated to Universal Time Co-ordinated (UTC) for Royal Navy (RN) Air Traffic Control (ATC) Systems.

3.3 Where Master Time Sources are not universally distributed, manual synchronisation of systems to the above accuracy may be permitted.

Section 3

Normative References

1 The publications shown below are referred to in the text of this standard. Publications are grouped and listed in alpha-numeric order.

Note: Def Stan's can be downloaded free of charge from the DStan web site by visiting **<http://dstan.uwh.diif.r.mil.uk/>** for those with RLI access or **<https://www.dstan.mod.uk>** for all other users. All referenced standards were correct at the time of publication of this standard (see 2, 3 & 4 below for further guidance), if you are having difficulty obtaining any referenced standard please contact the DStan Helpdesk in the first instance.

Def Stans

Number	Title
00-042, Pt 03, Iss 05	Reliability and Maintainability Assurance Activity - R&M Case
00-042, Pt 05, Iss 03	Reliability and Maintainability Assurance Activity - In -Service Reliability Demonstrations
00-042, Pt 07, Iss 01	Reliability and Maintainability Assurance Activity - Reliability Testing
00-055, Pt 01, Iss 04	Requirements for Safety of Programmable Elements (PE) in Defence Systems - Requirements and Guidance
00-035, Pt 03, Iss 05	Environmental Handbook for Defence Materiel - Environmental Test Methods
00-035, Pt 05, Iss 05	Environmental Handbook for Defence Materiel - Induced Mechanical Environments
00-056, Pt 01, Iss 07	Safety Management Requirements for Defence Systems - Requirements and Guidance
00-056, Pt 02, Iss 05	Safety Management Requirements for Defence Systems - Guidance on Establishing a Means of Complying with Part 1
00-133, Pt 03, Iss 02	Aviation Arrangements in Surface Ships - Design, Construction and Provision (Flight Deck)
00-035, Pt 01, Iss 05	Environmental Handbook for Defence Materiel - Control and Management
00-035, Pt 02, Iss 05	Environmental Handbook for Defence Materiel - Environmental Trials Programme Derivation and Assessment Methodologies
00-035, Pt 04, Iss 05	Environmental Handbook for Defence Materiel - Natural Environments

00-040, Pt 01, Iss 08	Reliability and Maintainability - Management Responsibilities and Requirements for Programmes and Plans
00-042, Pt 01, Iss 03	Reliability and Maintainability Assurance Activity - One-Shot Devices/Systems
00-042, Pt 01, Iss 04	Reliability and Maintainability Assurance Activity - One-Shot Devices/Systems

STANAGs

Number	Title
1380 Edition 5	NATO NAVAL RADIO AND RADAR RADIATION HAZARD MANUAL - AECP-02 / MECP-02 EDITION D
3374 Edition 7	FLIGHT INSPECTION OF NATO RADIO/RADAR NAVIGATION AND APPROACH AIDS - AEtP-1 EDITION E
4193 Edition 3 Part PART III	TECHNICAL CHARACTERISTICS OF THE IFF Mk XIIA SYSTEM PART III: INSTALLED SYSTEM CHARACTERISTICS
4204 Edition 3	TECHNICAL STANDARDS FOR SINGLE CHANNEL VHF RADIO EQUIPMENT
4205 Edition 4	TECHNICAL STANDARDS FOR SINGLE CHANNEL UHF RADIO EQUIPMENT - AComP-4205 EDITION A
5034 Edition 3	TACAN POLICY

Allied Publications

Number	Title
AECP-02 Edition D Version 1	NATO NAVAL RADIO AND RADAR RADIATION HAZARD MANUAL
AEtP-01 Edition (E) Version 1	FLIGHT INSPECTION OF NATO RADIO/RADAR NAVIGATION AND APPROACH AIDS
AComP-4205 Edition A Version 1	TECHNICAL STANDARDS FOR SINGLE CHANNEL UHF RADIO EQUIPMENT

Other References

Standard Type	Standard Name

Other	(EC) No 29/2009, Data Link Services For The Single European Sky
Other	ACP190(D), Guide To Spectrum Management In Military Operations
Other	ACP194, Policy For The Coordination Of Military Electromagnetic Spectrum Allocations And Assignments Between Cooperating Nations
Other	ADEXP DPS.ET1.ST09-STD-01-01, Military Flight Data Information Management systems shall support formatting according to Eurocontrol Standard for ATS Data Exchange Presentation (ADEXP)
Other	AECP-2(B), NATO Naval Radio And Radar Radiation Hazards Manual
Other	AECTP-500, Electrical/Electromagnetic Environmental Tests
Other	AetP-1(D), NATO Flight Inspection Standards
Other	AFPEx Quick Start Guide, NATS Assisted Flight Planning Exchange Guide
Other	AFSP-1(A), NATO Aviation Safety
Other	AIXM 5, EUROCONTROL / FAA Aeronautical Information Exchange Model (AIXM 5)
Other	ANO Article 205, Requirement To Notify Aeronautical Radio Station Service
Other	ANO Article 206, Requirement To Keep Air Traffic Service Equipment Records
Other	AP600, RAF Information and CIS Policy
Other	AvP 67, Ministry of Defence. Flying Orders to Contractors
Other	BRd 0761, Naval Aircraft Movements and Marshalling
Other	BRd 0763, Naval Aviation Quality Manual
Other	BRd 0765, Naval Aviation Safety Management System
Other	BRd 0766, RN Embarked Aviation Operating Handbook
Other	BRd 0767, Naval Aviation Orders
Other	BRd 0768, RN Air Traffic Management and Assurance
Other	BRd 9424, RN Fleet Operation Orders
Other	BS7671:2008, Wiring Regulations
Other	CAP 168, Licensing of Aerodromes
Other	CAP 393, Air Navigation: The Order and the Regulations
Other	CAP 413, The UK Radiotelephony Manual

Other	CAP 437, Standards for offshore helicopter landing areas
Other	CAP 493, Manual of Air Traffic Services
Other	CAP 670, ATS Safety Requirements
Other	CAP 694, CAA UK Flight Planning Guide
Other	CAP 720, Flight Crew Training: Cockpit Resource Management (CRM) and Line-Oriented Flight Training (LOFT)
Other	CAP 736, Operation of Directed Light, Fireworks, Toy Balloons and Sky Lanterns within UK Airspace
Other	CAP 746, CAA Meteorological Observations at Aerodromes
Other	CAP 760, Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases: For Aerodrome Operators and Air Traffic Service Providers
Other	CAP 761, Operation of IFF/SSR Interrogators in the UK
Other	CAP 764, CAA Policy and Guidelines on Wind Turbines
Other	DAP Policy Statement, DAP Policy Statement
Other	DCMAC/HS/DEL/08-015, LARA Local and Regional Airspace Management Supporting System Conceptual Description
Other	DPS.ET1.ST10.200-FS-01-00 (B), Eurocontrol Functional Specifications for System Support to Airspace Data Distribution and Civil/Military Coordination
Other	DSA01.1, Defence Policy for Health Safety and Environmental Protection
Other	EC Regulation 262/2009, Coordinated Allocation And Use Of Mode S Interrogator Codes For The Single European Sky
Other	ED-109A, Software Integrity Assurance Considerations For Communication, Navigation, Surveillance And Air Traffic Management (Cns/Atm) Systems
Other	ED-133, EUROCAE Flight Object Interoperability Specification
Other	ED-136, Voice over Internet Protocol (VoIP) Air traffic Management (ATM) System Operational and Technical Requirements
Other	ED-137, Interoperability Standards for VoIP ATM Components (Volume 3 European Legacy Telephone Interworking)
Other	ED-138, Network Requirements and Performances for Voice over Internet Protocol (VoIP) Air Traffic Management (ATM) Systems
Other	ED-142, Technical Specification For Wide Area Multilateration (Wam) Systems

Other	ED-144, High-Level Performance Requirements for a global Navigation Satellite System/Ground Based Augmentation System to support Precision Approach Operations
Other	ED-153, Guidelines For Ans Software Safety Assurance
Other	EGNOS SoL SDD, EGNOS Safety of Life, Service Definition Document
Other	EMC Directive 2004/108/EC, Electromagnetic Compatibility
Other	EMC Regulations 2006:3418, The Electromagnetic Compatibility Regulations 2006
Other	ESARR Publications, ESARR Publications
Other	ESARR3, Use of Safety Management Systems by ATM Service Providers
Other	ESARR4, Risk Assessment and Mitigation in ATM
Other	ESARR6, Software in ATM Functional Systems
Other	EU No 1207/201, Performance And The Interoperability Of Surveillance For The Single European Sky
Other	EU No.1079/2012, Voice channels spacing for the single European sky
Other	EU Regulation (2096/2005), Laying Down Common Requirements For The Provision Of Air Navigation Services
Other	EU Regulation (552/2004), Interoperability Of The European Air Traffic Management Network
Other	EU Regulation (668/2008), Laying Down Common Requirements For The Provision Of Air Navigation Services, As Regards Working Methods And Operating Procedures
Other	Eurocontrol Spec 0147, EUROCONTROL Specification for ATM Surveillance System Performance
Other	Eurocontrol Specification 0122, Eurocontrol specification for short term conflict alert
Other	Eurocontrol SUR.ET1.ST01.1000-STD-01-01, Eurocontrol Specification for Interoperability and Performance Requirements for the Flight Message Transfer Protocol (FMTP)
Other	HSG65, Managing For Health And Safety
Other	ICAO Annex 1, Medical assessment process and ATOs
Other	ICAO Annex 10, Aeronautical Telecommunications
Other	ICAO Annex 11, ATS

Other	ICAO Annex 13, Incident Reporting, Data Systems And Information Exchange
Other	ICAO Annex 14, Aerodromes
Other	ICAO Annex 15, Aeronautical Information Services
Other	ICAO Annex 3, Meteorological Services for International Air Navigation
Other	ICAO Doc 4444, Procedures for Air Navigation Services
Other	ICAO Doc 7488, Manual of the ICAO Standard Atmosphere
Other	ICAO Doc 8071, ICAO Flight Inspection Standards
Other	ICAO Doc 9157, Aerodrome Design Manual
Other	ICAO Doc 9426, Air Traffic Services Planning Manual
Other	ICAO Doc 9613, ICAO Performance Based Navigation
Other	ICAO Doc 9694, ICAO ATS Datalinks
Other	ICAO Doc 9849, ICAO GNSS Manual
Other	ICAO Doc 9869, ICAO Required Comms Performance
Other	IEC 61508, Functional Safety
Other	IGIA Document 77/4.6G, Flight Testing Of Navigation Aids – U.S Policy With Respect To The Flight Inspection Of Air Navigation On A Worldwide Basis
Other	ISO 14001, Environmental Management
Other	ITU-R, ITU Radio communications Regulations
Other	ITU-T G.712, Transmission performance characteristics of pulse code modulation channels
Other	JSP 360, Use of Military Airfields by British and Foreign Civil Aircraft
Other	JSP 375, MOD Health and Safety Handbook
Other	JSP 430, Ship Safety Management
Other	JSP 440, Defence Manual of Security
Other	JSP 454, Land Systems Safety and Environmental Protection
Other	JSP 604, Defence Manual for Information and Communication Technologies (ICT)
Other	JSP 847, Defence Meteorological Services Manual

Other	MAA 02, MAA Master Glossary
Other	MAA MADS, Military Aviation Authority Manual of Aerodrome Design and Safeguarding
Other	MATS Part 2, Manual of Air Traffic Services
Other	MMATM, Manual of Military Air Traffic Management
Other	MOD Stated Policy, from 2nd PUS
Other	MRP and Associated Manuals, MAA Regulatory Publications
Other	NATS Safety Management Manual, NATS Safety Management Manual
Other	NSL Airports Generic Safety Requirements, NSL Airports Generic Safety Requirements
Other	OHSAS18001, Occupational Health and Safety
Other	POSMS, Project Oriented Safety Management System
Other	R&TTED 1999/5/EC, Guide to the R&TTE Directive 1999/5/EC
Other	RA 3000 Series, Air Traffic Management Regulations
Other	RA 3265, Aerodrome Lighting Operating Requirements
Other	RA 3275, Runway Visual Range (RVR)
Other	RA 3301, Meteorological (Met) Information
Other	RAF FCI
Other	WMO-No.386, World Meteorological Organization – Manual on the Global Telecommunications System
Other	WMO-No.49, World Meteorological Organization - Technical Regulations PtII

2 Reference in this Standard to any normative references means in any Invitation to Tender or contract the edition and all amendments current at the date of such tender or contract unless a specific edition is indicated. Care should be taken when referring out to specific portions of other standards to ensure that they remain easily identifiable where subsequent amendments and supersession's might be made. For some standards the most recent editions shall always apply due to safety and regulatory requirements.

3 In consideration of clause 2 above, users shall be fully aware of the issue, amendment status and application of all normative references, particularly when forming part of an Invitation to Tender or contract. Correct identification of standards is as defined in the ITT or contract.

4 DStan can advise regarding where to obtain normative referenced documents. Requests for such information can be made to the DStan Helpdesk. Details of how to contact the helpdesk are shown on the outside rear cover of Defence Standards.

Definitions

For the purpose of this standard, ISO/IEC Guide 2 ‘Standardization and Related Activities – General Vocabulary’ and the definitions shown below apply.

Definition	Description
Accuracy	A degree of conformance between the estimated or measured value and the true value. (ICAO).
Aerodrome	A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft. (MAA02)
Aerodrome	In relation to any aerodrome, the person in charge of the aerodrome.Note: This may relate to the Operational, Senior or Delegated Duty Holder.(MAA 02)
Authority Aerodrome Traffic Monitor	An electronic display indicating the position and distance from touchdown of arriving aircraft relative to the extended centreline of the runway in use. It may also be used for other purposes. It is also known as the Distance From Touchdown Indicator. (MAA 02)
Aeronautical Fixed Service	A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services. (MAA 02)
Aeronautical Ground Lighting	Any light specifically provided as an aid to air navigation, other than a light displayed on an aircraft. (MAA02).
Failure	A loss of function, or malfunction, of a system or part thereof.
Aeronautical Information Service	A service established within the defined area of coverage responsible for the provision of aeronautical information and data necessary for the safety, regularity, and efficiency of air navigation. (EC 549/2004). Note: For No1 AIDU, this may also relate to No1 AIDU.
Aeronautical Mobile Service (RR S1.32)	A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies. (ITU RR S1.32)
Aeronautical Radio Station	A radio station on the surface, which transmits or receives signals for the purpose of assisting aircraft. (ANO).
Aeronautical Station (RR S1.81)	A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea. (ICAO). Note: A Military Aeronautical Station may also operate from an Aircraft, although this is currently out-of-scope of this Defence Standard.
Air-Ground Communication	One/two-way communication between aircraft and stations or locations on the surface of the earth. (MAA 02)

Airspace Management	A planning function with the primary objective of maximising the utilisation of available airspace by dynamic time-sharing and, at times, the segregation of airspace among various categories of airspace users on the basis of short-term needs. (EC 549/2004). Note: In the Military context, this is a jointly performed function, with CAA DAP and DAATM involvement
Air Navigation Services	Air traffic services; communication, navigation and surveillance services; meteorological services for air navigation; and aeronautical information services. (EC 549/2004). Note: Divisions exist in Military structures, between Air Traffic Services, CNS provision, Meteorological provision and Aeronautical Information Services
Air Navigation Service Provider	Any public or private entity providing air navigation services for general air traffic. (EC 549/2004). Note: Military ANSP equivalents are Military Front Line Commands and/or Contracted ATC Organizations, providing services to both Military and Civil Air Traffic.
Air Traffic	All aircraft in flight or operating on the maneuvering area of an aerodrome. (MAA02) Note: See definition of Aerodrome above.
Air Traffic Control Unit	A unit of air traffic controllers established by a person appointed by a person maintaining an aerodrome or other place in order to provide an area control service, an aerodrome control service or an approach control service. (CAP 393)
Air Traffic Control Service	A service provided for the purpose of: a) preventing collisions: i) between aircraft, and ii) On the maneuvering area between aircraft and obstructions; and b) expediting and maintaining an orderly flow of traffic.(MAA 02). Note: This also relates to relevant RN Ships and Range Air Control Units.
Specification	A precise technical definition of the required parameters or performance to be achieved. (CAP 746)
Standard	Characteristics, methods, principles and practices that can be used to satisfy a requirement. (CAP 746)
Air Traffic Flow Management	A function established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilised to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate air traffic Service Providers. (EC 549/2004) Note: Military may have additional objectives for Air Traffic Flow Management, in service of the Military function. (MAA 02)
Air Traffic Management	The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management – safely, economically and efficiently through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground based functions. (ICAO Doc 4444)
Air Traffic Management Equipment	Equipment used for the provision of ATM, including equipment used in the air defence environment. ATM equipment can be land based or part of an aircraft, ship or vehicular platform. (MAA 02)

Air Traffic Services	A generic term meaning variously flight information services, alerting service, air traffic advisory service, air traffic control service area control service, approach control service or aerodrome control service. (MAA 02). Note: This also relates to relevant RN Ships and Range Air Control Units.
Air Traffic Standards Officer	Air Traffic Standards Officers are persons, authorized by the CAA, for the purposes defined within applicable sections of the (Air Navigation Order) ANO. Note: ATS Officer's remit does not cover Military ATS Equipment, as noted in ANO Articles 205(8) and 206(16). The MAA may cover a similar function for Military ATS Equipment.
Airway	A control area or portion thereof established in the form of a corridor (MAA02)
Altitude	The vertical distance of a level, a point or object considered as a point, measured from mean sea level. (MAA 02)
Approval	That which permits something to be done. (MAA 02). Note: Approval may be granted to an individual or an organization verbally or in writing by an appropriately authorized person or authority.
Articulation Index	A measure of a communication systems expected intelligibility, derived from electrical and acoustic measurements on a system.
ATS Message Handling System	The set of computing and communication resources implemented by ATS organizations to provide the ATS message handling service. (ICAO Annex 10 Vol III)
ATS Surveillance Service Authorised	Term used to indicate a service provided directly by means of an ATS surveillance system. (ICAO). An authorisation in writing that amplifies instructions and/or specifies conditions of operation. Note: Authorisations within the Military may be sought from the MAA, the Release Authority or through the Duty Holder
Availability	The ability of a system to perform within specified limits, required function under given conditions at a given time.
Base Turn	A turn executed by the aircraft during the initial approach between the end of the outbound track and the beginning of the intermediate or final approach track. The tracks are not reciprocal. (ICAO). NOTE: Base turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual procedure
Blocking	When a switching matrix cannot make an immediate connection between any input and output it is said to be blocked. This may also be termed "limited availability". The opposite of this condition is "non-blocking" or "full availability".
Code of Practice Conditional	A Code of Practice is nominally a guideline document that provides guidance or recommendations. The document is not mandatory unless it is made a specific requirement by the regulator.
Maintenance	Maintenance performed after an event or specified condition, where the systems function, components, etc. are potentially at risk of degradation to the point where the required system performance / integrity is compromised.

Connection Delay	The time between a request to establish a connection with a system and the corresponding confirmation of connection.
Controlled Airspace	Airspace that has been notified as Class A, Class B, Class C, Class D or Class E airspace. (ANO)
Data Communications Network	The communication equipment, sub-networks and nodes that provide for the routing for the transfer of data from one system to another.
Data Communications Service Provider	An organization that provides the means to transfer data between an ATS facility and aircraft.
Data Link Application	The implementation of data link technology to achieve specific ATM operational functionalities. Note: Military Data Links also exist, which may differ from Civil Data Links. Military Data Links may be suitable for ATM Data Link Services
Data Link Service	A set of ATM related transactions, both system supported and manual, within data link applications, which have a clearly defined operational goal. Each data link application is a description of its recommended use from an operational point of view.
Provider	The organization with overall accountability for the data link service. This includes the operational requirements of the data link system.
Data Link System	The total set of component parts, equipment, software and protocols that is required to provide the data link service.
Dead Band	A term used to describe the cross-over characteristic on a 360o potentiometer or position resolver and optical encoder alignment errors.
Demonstrate Equivalence	This means that an appropriate level of compliance with GATM regulations should be sought where non-compliance would impose an unacceptable level of restriction on Military operations or training, or lead to restricted access to airspace and conflict with European or UK courts of law
Displayed Gust	This is a wind speed, averaged over a 3 second sample, that has increased from the 2 or 10-minute mean wind speed by 10 knots or more. (CAP 746)
Distance From Touchdown Indicator	See Aerodrome Traffic Monitor.
Endorse	Wherever the term "endorse" is used in connection with safety regulation matters this shall be taken to mean acceptance.
Equipment	A non-specific term used to denote any product (which may be called by a specific name) designed and built to perform a specific function as a self-contained unit or to perform a function in conjunction with other units. Units are physical hardware entities, possibly with software and firmware
Error	A deviation in any system output from normal system output parameters.

Error Detection	A process of testing for non-valid data, bit error or syntax, and addressing problems or the event of an error being detected. Error Rate The number of allowable errors detected within a specified time interval
Facility Performance Category I – ILS	An Instrument Landing System (ILS) which provides guidance information from the coverage limit of the ILS to the point at which the localiser course line intersects the ILS glide path at a height of 60m (200 ft) or less above the horizontal plane containing the threshold
Fault Tolerance	The built-in capability of a system to provide continued correct execution, i.e. provision of service as specified, in the presence of a limited or specified number of equipment faults.
Flight Visibility Ground-Ground	The visibility forward from the cockpit of an aircraft in flight. (ICAO)
Communications	Two-way communications between or with ATS facilities located on the surface of the earth. (MAA 02)
Ground Visibility	The visibility at an aerodrome as reported by an accredited observer or by automatic systems. (ICAO)
Gust	The peak wind speed averaged over a 3 second period. (CAP746)
Hazard	An intermediate state where potential for harm exists. (MAA 02)
Heading	The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from north (true, magnetic, compass or grid). (ICAO)
Height	The vertical distance of a level, point or object considered as a point, measured from a specified datum. (MAA 02)
Identification	The process by which the system correctly identifies the users identity. This may be through a machine-readable device (MRD), a user log-in name or another similar system. (MAA 02)
Information Urgency Instrument	The order of display, processing or other action in accordance with the sequencing of essential, routine and time-expired data.
Meteorological Conditions	Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions. (MAA 02)
Integrity	That quality, which relates to the confidence that can be placed in the validity of the information provided by a system.
Integrity Risk	The probability of an undetected failure, event or occurrence within a given time interval
International Airport	Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the

	formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.
Lines of Communication	A communications link which can be accessed at a particular operating position. Selected lines of communication are those available lines which have been selected by the operator for a particular mode of operation.
Luminance	In a given direction at the point on a surface is the luminous intensity in that direction, of an infinitesimal element of the surface containing the point, by the area of the orthogonal projection of this element on a plane perpendicular to the direction considered. (Commission Internationale De L'Eclairage (CIE))
Luminous Intensity	The luminous flux per unit solid angle in a given direction (candelas). NOTE: Luminous Flux is defined by CIE.
Maintenance	The combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or to restore it to, a state in which it can perform a required function (BS 4778). (MAA 02). Note: It includes: inspection, testing, servicing, and classification as to serviceability, repair, rebuilding and reclamation (JWP 0-01.1).
MATS Part 2	The unit specific instructions to controllers produced by the Provider of the Air Traffic Control Service.
Mitigation	Steps taken to control or prevent a hazard from causing harm and reduce risk to a tolerable or acceptable level. (CAP 746)
Non-Radar Separation	The separation used when aircraft position information is derived from sources other than radar.
Operational Control	The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight. (ICAO)
Operational Requirement	The basic operational need in the aeronautical environment from the air traffic service perspective.
Per Controlled Flying Hour	When the ATS is promulgated and/or in active operation, per Air Traffic Service Unit (ATSU)/area of operation
Plan Position Indicator	A surveillance display indicating in plan the positions of objects producing radar echoes.
Position Indication	The visual indication, in non-symbolic and/or symbolic form, on a situation display, of the position of an aircraft, aerodrome vehicle or other object. (ICAO)
Position Symbol	The visual indication in symbolic form, on a situation display, of the position of an aircraft, aerodrome vehicle or other object, obtained after automatic processing of positional data derived from any source. (ICAO)
Primary Radar	A radar system which uses reflected radio signals. (ICAO)

PSR Blip	The visual indication, in non-symbolic form, on a situation display of the position of an aircraft obtained by primary radar. (ICAO)
Provider (of an Air Traffic Service)	A legal person nominated by an aerodrome or other authority to provide an air traffic service. The Provider will usually be a legal entity such as a company and it is to this entity that the ANO refers in the legal form of a "person". Note: In the Military context, the SATCO or Duty Holder or Duty Holder-facing Front Line Command ATM organization may be an equivalent.
QNH	QNH is the atmospheric pressure corrected to mean sea level, assuming International Standard Atmosphere conditions across the height difference. (CAP 746)
Processes	Those analytical processes which are subjective and non-numerical in manner.
Processes Quantitative	Those analytical processes, which are numerical in manner.
Radar	A radio detection device which provides information on range, azimuth and/or elevation of objects. (ICAO)
Radar Approach	An approach in which the final approach phase is executed under the direction of a controller using radar. (MAA 02)
Radar Clutter	The visual indication on a situation display of unwanted signals. (ICAO)
Radar Contact	The situation which exists when the radar position of a particular aircraft is seen and identified on a situation display. (ICAO)
Radar Separation	The separation used when aircraft position information is derived from radar sources. (ICAO)
Radial	A magnetic bearing extending from a VHF Omni-directional Range (VOR) /VORTAC/TACAN
Radiation Shield	A reflective radiation shield housing capable of protecting the internal sensors from direct and reflected solar and terrestrial (long wave) radiation and from precipitation. The shield shall provide adequate ventilation and shall not represent a significant thermal mass.
Reliability	The ability of a system to perform a required function under given conditions for a given time interval. (CAP 746)
Reporting Point	A specified geographical location relative to which an aircrafts position can be reported. (ICAO)
Risk	Is a measure of exposure to possible loss and it combines the severity of loss (how bad) and the likelihood of suffering that loss (how often). (MAA 02
Risk Assessment	Assessment of the likelihood and severity related to a hazard. (MAA 02)

Routine Maintenance	Maintenance at regular periodic intervals, identified at the systems design stage of equipments, functions, components etc., which are known to cause or potentially cause degradation to the required system performance. (CAP 746)
Rule	One of the rules of the ANO. Note: Military ATM Systems are excluded from the ANO
Runway	A defined rectangular area on a land aerodrome prepared for the landing and take-off run of aircraft. (MAA 02)
Runway Visual Range	The range over which the pilot of an aircraft on the centreline of a runway can see the runway surface markings or the lights delineating the runway or identifying its centreline. (MAA 02)
Safety	Freedom from unacceptable risks of personal harm. (MAA 02)
Safety Assurance	Shall mean all planned and systematic actions necessary to afford adequate confidence that a product, a service, an organization or a functional system, achieves acceptable or tolerable safety. (EC2096/2005)
Safety Critical	An item or system the failure of which could lead to, or directly contribute to, the possibility of an accident or serious loss of functionality, integrity, or safety margins will be identified as safety critical.
Safety Objective	Shall mean a qualitative or quantitative statement that defines the maximum frequency or probability at which a hazard can be expected to occur. (EC 2096/2005)
Safety Policy	A safety policy is a declaration of a general plan of action set by the authority of management and Military command.
Safety Related	Since the ability to cause a catastrophic incident is often linked to a series of apparently innocuous and seemingly unrelated events all processes are assumed to be safety related. If something or some process is to be excluded from this precept the burden of proof for exclusion lies with the regulated party.
Safety Regulatory	A systematic and independent examination conducted by, or on behalf of, a competent authority to determine whether complete safety-related arrangements or elements thereof, related to processes and their results, products or services, comply with required safety-related arrangements and whether they are implemented effectively and are suitable to achieve expected results. (EC 1034/2011)
Safety Regulatory	The requirements established by the Union or national regulations for the provision of air navigation services or ATFM and ASM functions or other network functions as well as concerning the technical and operational competence and suitability to provide these services and functions, their safety management, as well as systems, their constituents and associated procedures. (EC 1034/2011)
Safety Requirement	Shall mean a risk-mitigation means, defined from the risk mitigation strategy that achieves a particular safety objective, including organizational, operational, procedural, functional, performance, and interoperability requirements or environmental characteristics. (EC 2096/2005

Secondary Surveillance Radar	A surveillance radar system which uses transmitters/receivers (interrogators) and transponders. (ICAO). Note: Revised parlance is "Cooperative Surveillance"
Sidetone	A speech signal derived from the transmit path and fed back at a reduced level to the receive path with negligible delay.
Situation Display	An electronic display depicting the position and movement of aircraft and other information as required. (ICAO)
Special Event	Any flying activity that is not a Flying Display, and not open to the public, but could involve Display Flying. (MAA 02)
Station Time Marking	All recorded information requires a time label. The time reference or standard used for this shall be the station clock. This will require the system to be interfaced to the station master clock or station operational procedures put in place to ensure that the system clock is within ±5 seconds of the station clock.
Stopway	A defined rectangular area on the ground at the end of take-off run available, prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off. (MAA 02)
Suitably Qualified Engineer Surface Movement	An engineer with appropriate working experience on the equipment or system, or has attended a manufacturer's course or similar that covers the areas necessary to provide a competent response / repair to restore the service.
Control Service	A surface movement control service using a two-way communications facility for the control of vehicles on the maneuvering area.
Surveillance Radar	Radar equipment used to determine the position of an aircraft in range and azimuth. (MAA 02)
System Failure	The inability of a system to fulfill its operational requirements. Failure may be systematic or due to a physical change
System Self Test	An automatic test procedure that ensures the system is free from error.
Technical Response Time	The time from the issue of a triggering event by the originator / user process to the moment a logical system response is received by the originator / user process. It therefore includes the technical data extraction, the composition of the data message, the data transmission and processing, the logical checks at the destination, and the transmission and receipt of a response.
Temporary ATS unit	An ATS unit established to provide a service associated with a Special Event and normally comprising no more than 7 consecutive days of air operations. Note: Military ATS regularly deploy Temporary ATS units and may not have restriction on duration. Military terms are: 'Static Deployed' and 'Tactical' ATS.
Terminal Control Area	A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes. (MAA 02)
Threshold	The beginning of that portion of the runway usable for landing. (MAA 02)

Touchdown	The point where the nominal glide path intercepts the runway. (ICAO). NOTE: 'Touchdown' as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.
Track	The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid). (MAA 02)
Transfer Delay	The time from the issue of a triggering event by the originator user process to the moment the message is received, validated and ready for further treatment at the destination user process. It therefore includes the technical data extraction, the composition of the data message, the data transmission and processing.
Transponder	A receiver/transmitter which will generate a reply signal upon proper interrogation, the interrogation and reply being on different frequencies.
Video Mapping	The electronic superimposing of a map or plan on a situation display.
Visibility	Visibility for aeronautical purposes is the greater of: a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognised when observed against a bright background; b) the greatest distance at which lights in the vicinity of 1000 candelas can be seen and identified against an unlit background. (ICAO). NOTE 1: The two distances have different values in air of a given extinction coefficient and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range. NOTE 2: The definition applies to the observations of visibility in local routine and special reports, to the observations of prevailing and minimum visibility reported in Aerodrome Routine Meteorological Report (METAR) and SPECI and to the observations of ground visibility.
Visual Approach	An approach by an Instrument Flight Rules (IFR) flight when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to terrain. (MAA 02)
Visual Approach Procedure	A series of predetermined maneuvers by visual reference, from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, a go-around (Missed Approach) procedure can be carried out. (ICAO)
Where appropriate	This statement intends to articulate the potential for different scope of application of Civil Standards and Regulations into the Military context. Where there is a difference in scope of application, a narrative contained within Safety Case documentation should be in place to articulate the relevant rationale employed. It may be noted that the proportion of ATS activity devoted to Civil activities at an ATSU may be an indicator of levels of alignment to Civil Standards and Regulations. Guidance on Regulatory overlap shall be discussed with the MAA and CAA.

Abbreviations

Abbreviation	Description
AAIB	Air Accident Investigation Branch
ABS	Anti-Blocking System
ADEXP	ATS Data Exchange Presentation
ADH	Aviation Duty Holder
ADO	Air Defence Organization
AFIS	Aerodrome Flight Information Service
AFPEx	Assisted Flight Plan Exchange
AFTN	Aeronautical Fixed Telecommunications Network
AGA	Air-Ground-Air (Radio)
AGC	Automatic Gain Control
AGL	Aeronautical Ground Lighting
AIXM	Aeronautical Information Exchange Model
ALARP	As Low As Reasonably Practicable
AM	Amplitude Modulation
AMTI	Adaptive Moving Target Indication
ANO	Air Navigation Order
ANSP	Air Navigation Services Provider
APV	Approach with Vertical Guidance
ASMS	Air Safety Management System
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATG	At the Glass
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATS	Air Traffic Service

ATSU	Air Traffic Service Unit
BABT	British Approvals Board for Telecommunications
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAT	Category
CCAMS	Centralised SSR Code Assignment and Management System
CCCC	Civil Code Callsign Conversion
CCDS	Code Callsign Distribution System
CFg/Hr	Controlled Flying Hour
CVF	Carrier Vessel Future
DAATM	Defence Airspace and Air Traffic Management
DE&S	Defence, Equipment & Support
Def Stan	Defence Standard
DFTI	Distance from Touchdown Indicator (also known as Aerodrome Traffic Monitor)
DH	Duty Holder
DI	Design Integrity
DII	Defence Information Infrastructure
DIO	Defence Infrastructure Organization
DISC	Defence IFF/SSR Committee
DME	Distance Measuring Equipment
DOC	Designated Operational Coverage
DSB	Double Sideband
DSO	Defence Spectrum Organization
DT	Delivery Team
EC	Commission Regulation
ECAC	European Civil Aviation Conference
EMC	Electro Magnetic Compatibility

EMC	Electro Magnetic Capability
ERP	Effective Radiated Power
ESARR	EUROCONTROL Safety Regulatory Requirement
EU	European Union
EUROCAE	European Organization for Civil Aviation Equipment
FAA	Federal Aviation Administration
FDP	Flight Data Processing
FMEA	Failure Modes and Effects Analysis
FMTP	Flight Message Transfer Protocol
FPS	Flight Progress Strip
FTA	Fault Tree Analysis
GFE	Government Furnished Equipment
GG	Ground-Ground (Radio or Telephone)
GNSS	Global Navigation Satellite System
GPIP	Glide Path Intercept Point
HAT	Height Above Threshold
HAZID	Hazard Identification (Process)
HDD	Hard Disc Drives
IAP	Instrument Approach Procedures
ICAO	International Civil Aviation Organization
IGIA	Interagency Group on International Aviation
ILS	Instrument Landing System
INS	Inertial Navigation System
IP	Internet Protocol
IRVR	Instrumented Runway Visual Range
ISTAR	Intelligence, Surveillance, Target Acquisition and Reconnaissance
ITT	Invitation To Tender

ITU	International Telecommunication Union
JASC	Joint Air Safety Committee
JOMOC	Joint Operational Meteorology and Oceanographic Centre
JSP	Joint Service Publication
LPV	Localiser Performance with Vertical Guidance
MAA	Military Aviation Authority
MAAIB	Military Air Accident Investigation Branch
MATS	Manual of Air Traffic Services
METAR	Aerodrome Routine Meteorological Report
MilFLIP	Military Flight Information Publications
MMATM	Military Manual of Air Traffic Management
MOD	Ministry of Defence
MORSN	UKMO Met Office Remote Site Network
MOS	Mean Opinion Score
MRP	Military Regulatory Publication
MSAW	Minimum Sector Altitude Warning
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
NATO	North Atlantic Treaty Organisation
NATS	NATS Limited
NDB	Non-Directional Beacon
NERL	NATS En-Route Ltd
NISC	National IFF/SSR Committee
NVD	Night Vision Device
OFCOM	Office of Communications
OR	Operational Requirement
PAPI	Precision Approach Path Indicator

PAR	Precision Approach Radar
PBR	Private Business Radio
PE	Programmable Elements
PE	Permanent Echoes
PESQ	Perceptual Evaluation of Speech Quality
POSMS	Project Oriented Safety Management System
PSR	Primary Surveillance Radar
PSTN	Public Switched Telephone Network
PT	Project Team
PTT	Press To Talk
R&TTE	Radio and Telecommunications Terminal Equipment
R&TTED	Radio and Telecommunications Terminal Equipment Directive
RA	Regulatory Article
RADHAZ	Radiation Hazard
RAF	Royal Air Force
RAID	Redundant Array of Independent Drives
RDP	Radar Data Processing
RF	Radio Frequency
RN	Royal Navy
RNAV	Area Navigation
RNEIN	Royal Navy Environmental Information Network
RPAS	Remotely Piloted Air Systems
RPL	Repetitive Flight Plans
RSP	Radio Site Protection
RTF	Radio Telephony Facility
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minima

SARPS	Standards and Recommended Practices (ICAO)
SCIDA	Site Coordination Installation and Design Authority
SESII	Single European Sky 2
SI	Supplementary Instruction
SID	Standard Instrument Departure
SMS	Safety Management System
SQEP	Suitably Qualified and Experienced Personnel
SRA	Surveillance Radar Approach
TACAN	Tactical Area Navigation System
THD	Total Harmonic Distortion
TLS	Target Level of Safety
TTA	Time To Alert
TTW	Through the Wall
UHF	Ultra High Frequency
UK	United Kingdom
UPS	Un-interruptible Power Supply
US	United States
UTC	Universal Co-ordinated Time
VCCS	Voice Communications Control Systems
VCR	Visual Control Room
VDF	VHF Direction Finding
VFR	Visual Flight Rules
VHF	Very High Frequency
VoIP	Voice-over-Internet Protocol
VOR	VHF Omni-directional Range
WAM	Wide Area Multilateration
WMO	World Meteorological Organization

WT Act	Wireless Telegraphy Act 2006
WXCM	Eurocontrol Weather Information Conceptual Model
WXXM	Weather Information Exchange Model

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