USER REQUIREMENT DOCUMENT (URD)
FOR THE SUSTAINMENT OF
MILITARY AIR TRAFFIC CONTROL (ATC) PRIMARY SURVEILLANCE CAPABILITY WITH WIND TURBINES IN RADAR LINE OF SIGHT

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APPROVALS

Post	Name	Date	Signature
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1 BACKGROUND

1. Between now and the capability provided by Project MARSHALL being accepted into service, there is a requirement to sustain the capability, in the presence of wind farms, currently provided by the fixed Watchman ATC primary surveillance radars (PSR) in the UK, Cyprus, Gibraltar and the Falkland Is.

1.1 SINGLE STATEMENT OF USER NEED

2. This requirement is to provide a solution to sustain military ATC capability (that is currently provided by primary radar) in the presence of wind turbine developments until such time as the responsibility for the surveillance volume(s) is transferred to Proj MARSHALL.

1.2 OPERATIONAL CONTEXT

3. Wind turbines degrade surveillance systems as documented in CAP 670[1] and CAP 764[2]. This degradation reduces the capability of ATC operators to deliver safe and effective Air Traffic Services. The Government is committed to increasing the UK's use of 'renewable' energy including energy provided by wind farms. Increasing numbers of wind turbines inevitably mean that planning permission will be sought for wind turbines in locations in which turbines would cause detrimental interference to military radars. The MOD has historically objected to wind farm developments in radar line of sight of military radars. Following legal advice MOD may now accept certain planning consent conditions subject to the developer providing measures which mitigate unacceptable wind turbine interference. The MOD has agreed to work with the Department of Energy and Climate Change (DECC) to try and resolve the problems of wind turbines versus radars by signing a Memorandum Of Understanding (MoU) on Aviation and Wind Turbines[3]. This committed the signatories to work together to implement an Aviation Plan. The Aviation Plan is aimed at ensuring the timely & effective delivery of solutions to mitigate the effects of wind turbines whilst taking all necessary steps to protect the provision of safe and effective air traffic services and air defence requirements. For progress to be made by companies proposing potential solutions to wind turbine interference on radar/surveillance systems, a clear, measurable set of requirements is essential. This document will set out such requirements. Any replacement or enhancement system should not offer inferior performance in any area of the existing capability.

4. **Task**. The Watchman PSR is a key item of equipment that provides the capability for the MOD to fulfil its legal requirement to ensure the safe operation of military and civil aircraft within UK airspace, at overseas airfields and during deployed operations. Any loss or degradation in performance of the Watchman PSR would severely impact the MOD's ability to provide Air Traffic Service (ATS) to both military and civil aircraft.

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[1] CAP 670 – Air Traffic Services Safety Requirements
[2] CAP 764 – CAA Policy and Guidance on Wind Turbines
[3] DECC-MOD MoU Update 2010 Wind Turbines and Aviation Radar (Mitigation Issues), signed by reps from: CAA, DECC, MOD, AOA, Scot Exec, DfT, NATS/NERL, RUK, CE.

5. **Policy**. The following documents are used as guidelines for the provision of military ATM to follow: CAP670, CAP764, DefStan 00-972, MAA Regulations Publication (MRP), Manual of Military ATM (MMATM).

6. **CONOPS**. The policy for military ATC is that it should provide, in time of peace and war, aeronautical facilities and a ground organization which will: a. Enable pilots of military aircraft to operate safely and effectively with tactical freedom in all weather conditions. The objectives are to:

a. Prevent collisions between aircraft or, on the manoeuvring area, between aircraft and obstructions.

b. Expedite and maintain an orderly flow of air traffic.

c. Provide a suite of Air Traffic Services.

d. Alert emergency services and initiate search and rescue activity when required.

e. Meet the requirements of the air defence organization for the notification of aircraft movements.[4]

1.3 SCOPE, CONSTRAINTS AND ASSUMPTIONS

7. In scope is the capability currently provided by the fixed Watchman ATC PSR, with the additional capability of mitigating the effects of wind turbines. Tactical Watchman radars may be in scope, depending on the mitigation, as one of the roles of the 'tac' Watchman is as an infill radar in the event of long-term problems with a fixed system.[5] The mitigation solution shall integrate with current ATC infrastructure, particularly operator displays.

8. Certain wind farms may not be able to achieve mitigation due to their proposed geographical location and/or technical limitations, therefore, MOD will need to continue to assess the impact of wind turbines on airfield operations.

9. **Constraints**. The following constraints are placed on the project:

a. The solution shall not require aircraft to deviate from desired track, when receiving an Air Traffic Service when in proximity to wind turbines that are within radar line of sight of the PSR(s) being used to provide that service.

b. There shall be no compromise to the Minimum Military Requirement and FE@R training requirements.

c. Compatibility should be sought with Project MARSHALL.

[4] Military Aviation Authority (MAA) Regulations – Air Traffic Management.
[5] This would not be the case under Project MARSHALL as it is Service Provision based on availability.

d. Any capability using the EM spectrum must use it efficiently[6] and ensure that spectrum interference is neither caused nor suffered. Increased pressure on the use of the EM spectrum in both the UK and overseas means that any use of the spectrum by a capability should be efficient and cost-effective.

e. Latest European Union Single European Sky ATM Research (SESAR) rules and regulations.

f. Compliance with direction of the Network Capability Authority (NCA) and the Defence Spectrum Organisation (DSO). This includes a requirement to be 4G-compliant.

g. Procedural constraints. Any mitigation solution must be transparent to the operator and must include all necessary work and equipment to make this so.

h. Current equipment. The solution should be compatible with any parts of the existing system that is retained including current user consoles and communication systems.

10. **Assumptions**. The following assumption is made about the requirement:

The mitigation shall be provided prior to the dates by which the capability provided by Project MARSHALL will come into effect. The exact dates when any long term mitigation solution is to be adopted will be dependent on the Project MARSHALL transition plan.

1.4 SIGNIFICANT DATES

11. The MOD will undertake a technology demonstration in the summer of 2013. Following this, an acquisition strategy will be agreed with the wind farm developers for the implementation of the first mitigation measures and solutions. The first mitigation solutions are expected to be implemented in 2014/2015.

12. Project MARSHALL. The planning assumption is for contract award in Apr 15 with all transition activity scheduled for completion by end FY 20/21.

1.5 PRIORITIES

13. **Priorities.** The reason for setting Priorities is to identify the potential for trading, relative to statements in the same URD. Each requirement or constraint has its Priority set to indicate its scope for trading, and is marked with one of the following:

- **M** = **Mandatory** Must be met for statutory or legal reasons.
- **K** = **Key User Requirement** (KUR) included in Part 2. Represent the requirements that are considered to be essential to the achievement of the

[6] A Strategy for Management of Major Public Sector Spectrum Holdings, Mar 07.

required capability. Once formally agreed (at MG) can only be traded with IAC approval.

- **1** = A **high priority** requirement. Trading will require reference back to the CIWG.
- **2** = A **medium priority** requirement. Can be traded at Air Cap Desk Officer Level (CAP TA-SO2 Air C2 ATC).
- **3** = A **low priority** requirement. Trading can be decided by the Requirements Manager (DES ADATS-reqmgr).

It is implicit within the trading out process that the FLCs and other relevant stakeholders will be involved in the discussions leading up to the proposed trade out. Priorities are not normally applied to Capability Constraints, though they may be if appropriate.

14. **Status.** The Status records the current validity of the individual user requirement or Capability Constraint. The codes used for this are:

- **Candidate** - on first addition to the URD, or re-instatement.
- **Traded** - if the need is still valid, but satisfaction is deferred indefinitely, typically as a consequence of trade-off activity.
- **Transferred** - if relocated out of the URD into another URD, typically as a consequence of trade-off activity.
- **Cancelled** - if no longer valid because the operational need has changed.

1.6 CAPABILITY STAKEHOLDERS

15. The following table details the stakeholders involved in producing the User Requirements.

		Air-1GP-BM ATM Force Commander
		MAA-AP-Analysis-ATM
		FLEET-CAP AV OPS SPT SO1
		CAP TA SO1
		Cap TA-SO2 Air C2 ATC (and DES ISTAR PSF3-RM desig)
		DES ADATS-COS
		Air Cmd 1 Gp ATM
		FLEET-CAP AV ATC SO2
		JFC-JW-Contingency-SO2
		DES ADATS-RadarsATC
		Air Cmd 1 Gp Safeguarding (WF)
		DES MARSHALL RM
		AWC-56RSqn ABM TEF OC
		JFC-PJOBs-SO2-C
		Air-1Gp-BM ATM Ops UK SO2 - for SATCOs
		Air-1Gp-ATM Eng Role Office
		Air-1Gp-BM ATM Training SO2
		JHC-Safety Policy-SO2

		AWC-56RSqn ABM Sensors 2 & CRAM
		DES ISTAR-PDG3-Hd
		DES ISTAR Wind Farm for ISTAR WF Team
		DES MARSHALL-CM6 (Commercial)
		DES ADATS-ChiefEngineer
		DES ADATS-Radars-Prog Mgr
		CLS-GL2 (LEGAL)

2 KEY USER REQUIREMENTS

ID	User Requirement	Status
K1	The User shall be able to provide Air Traffic Services to non-co-operating air targets.	Candidate
K2	The user shall be able to provide ATS to vehicles of a defined RCS.	Candidate
K3	The user shall be able to provide ATS to all air targets within the required coverage.	Candidate
K4	The user shall be able to conduct all ATS with a solution that mitigates the effects of wind turbine developments.	Candidate

3 USER REQUIREMENTS TABLE

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
1	Functional Requirements											
1.1	**Operability**											
1.1.1		The User shall be able to provide Air Traffic Services to non-co-operating air targets.	Y	Y	Candidate	K	To meet current requirements of the ATM Concept of Operations, MRP, CAP670 Part C Sect 3 SUR 01-04 requirements.	Provision of Air Traffic Services (ATS) in all airspace classes.	Same as threshold.	Document Review Validation of Records User Trial		Joint User
1.1.2		The user shall be able to provide ATS to vehicles of a defined RCS.	Y	Y	Draft	K	Def Stan 00-972	RCS 1m²*. 90% probability of detection (PD) in all areas. Blind speed fading shall not occur between 5-600kts. NB. Existing mil systems may retain 80% probability of detection (PD)** in all areas of stated coverage envelope except 90% PD inside 10nm of airfield. SUR49	RCS 0.5m² 90% probability of detection (PD) in all areas.	Modelling Flight Trials	* Swerling Case 1. ** Subject to final approval by MAA depending on extent of modification or solution. To include airfield vehicles. Inter-clutter performance shall be preserved.	Joint User

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
1.1.3		The user shall be able to provide ATS to all necessary air targets within the required coverage.	Y	Y	Draft	K	Def Stan 00-972 CONOP MARSHALL OBS	From airfield datum: Base of cover: 150' @ 5nm 500' @ 10nm 1500' @ 20nm 2000' @ 30nm 2500' @ 40nm 3000' @ 50nm Up to 30k' 180m – 60nm (80nm for RN sites) Deployed capability 60nm/60k' SUR FS48, 52	From airfield datum: Base of cover: 150' @ 5nm 500' @ 10nm 1000' @ 20nm 1500' @ 30nm 2000' @ 40nm 2500 @ 50nm Up to 60k'	Document Review Validation of Records Flight Check Demonstration		Joint User
1.1.4		The user shall be able to detect 'pop-up' targets in real-time.	Y	Y	Draft	1	Def Stan 00-972	No worse than SUR FS30, 32, 35, 62 & 64 Latency <1/4 periodic update rate Runway MTIs to be displayed		Document Review Validation of Records Modelling User Trial		Joint User
1.1.5		The user shall be able to conduct ATS using accurate data.	Y	Y	Draft	1	Def Stan 00-972	No worse than 60m/0.1^{o} System Error 60m/0.1^{o} Random Error SUR FS 27, 47		Document Review Validation of Records Modelling User Trial	Based on the geometry of existing PSR.	Joint User

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
1.1.6		The user shall be able to conduct all ATS with a solution that mitigates the effects of wind turbine developments.	Y	Y	Draft	K	Def Stan 00-972 DECC-MOD MOU	Performance should remain as 1.1.2. The False Alarm Rate (FAR) should be no worse than the overall system. Unwanted Turbine Return: same as FAR.	Same as FAR	Document Review Validation of Records Modelling User Trial	The solution shall mitigate the effects of wind turbine developments. Seamless integration of the solution is required. The plot (data) loss effect is not restricted to the area immediately around the wind turbines but may be elsewhere on the display. NB the effects of wind turbines are not limited to clutter or unwanted turbine returns. The effects include but are not limited to: plot loss, plot seduction, shadow effect, distortion of returns at range.	Joint User
1.1.7		The user shall be able to conduct Air Traffic tasks.	Y	Y	Draft	1	Def Stan 00-972	Data update rate every 3s SUR FS46.	As threshold	Document Review Validation of Records Modelling User Trial	E.g. Surveillance Radar Approach (SRA) to 0.5nm. NB. Existing mil systems may retain a 4 sec update for 0.5nm SRAs.	Joint User

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
1.1.8		The user shall be able to distinguish adjacent targets.	Y	Y	Draft	1	Def Stan 00-972 CAP670	FS47 SUR03	As threshold	Document Review Validation of Records Modelling User Trial	To allow 3nm separation standards to be achieved.	Joint User
1.1.9		The user shall be provided with clutter suppression.	Y	Y	Draft	1	Def Stan 00-972	PE, weather and ground clutter suppression shall permit detection on the display of ac returns within the coverage envelope, at all radial target speeds in the range 25kts-800kts in the simultaneous presence of all elements of the clutter environment. SUR FS23		Modelling User Trial		Joint User
1.1.10		The user shall be able to select clutter suppression options.	Y	Y	Draft	2		Clutter suppression circuits selectable.		Modelling User Trial	To allow Users to select the best clutter suppression solution for a particular target in a particular area. Akin to Watchman NR, GCF & MCF filter de-selection.	Joint User
1.1.11		The user shall be able to operate the system in an EMC environment.	Y	Y	Draft	2	DEFSTAN 59-411 part 1 Issue 1.	Minimum laid down by DefStan		Modelling User Trial		Joint User
1.1.12		The user shall be provided with a system that is unaffected by transmissions in adjacent EM spectrum bands.	Y	Y	Draft	1	CONOP	No effect from WMax/LTE tx external transmissions			Eg WiMax/LTE	Joint User

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
1.1.13		The user shall be able to rely on the solution.	Y	Y	Draft	1	Def Stan 00-972 CONOP	No less than SUR 1,3,5, WS 1 & 2. Through Life Capability and no major MOD until 2035. *Op Availability of 99.8%.	*>99.8% Op Availability	Validation of Records Modelling User Trial	*Downtime includes scheduled servicing. 99.8% assumes 24hr ops. For less than 24hr ops the % will be pro rata.	Joint User
1.1.14		The user shall be able to operate the solution in all environments.	Y	Y	Draft	1	Def Stan 00-35 Def Stan 00-40 CONOP	In all UK coastal regions, Akrotiri Gib & MPA (Falklands).	Transportable units - coastal and all land regions excluding polar.	Validation of Records Modelling User Trial		Joint User
1.1.15		The user shall be able to identify which sensor is providing data.	Y	Y	Draft	3	To identify any faults quickly and enable appropriate action to be taken	Sensor identification information displayed on request.		User Trial	In the case of a multiple-sensor solution. Reduction in ATS and/or changing sensor in use necessary if there is a fault.	Joint User
1.2	**Interoperability**											
1.2.1		The solution shall be compatible with existing power supplies.	Y	Y	Draft	2	To reduce infrastructure changes.	No changes to power infra No overall increase to User Authority utilities consumption.		Document Review Validation of Records	Only relevant for deployed static where FEPS are mandated. Unless cost benefit can be proven.	Joint User
1.2.2		The user shall be able to operate the system without having to perform any extra tasks due to the mitigation solution.	Y	Y	Draft	1	To reduce operational burden. Def Stan 00-250	No extra HCI tasks.			Seamless Integration.	Joint User

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
1.2.3		The solution shall not interfere or affect in any way other systems.	Y	Y	Draft	M	Def Stan 59-411	No effects are caused.				Joint User
2	Non- Functional Requirements											
2.1	**Training (Trg)**											
2.1.1		The user shall be provided with suitable operational trg.	Y	Y	Draft	2	JSP 822	ATCOs fully trained, through life of the solution.		Document Review Validation of Records	The solution winner will need to conduct a full trg needs analysis (TNA) & HFI GAP analysis of initial and through-life trg needs.	Joint User
2.1.2		The user shall be provided with suitable technical trg.	Y	Y	Draft	2	JSP 822 Def Stan 00-250	Technical staff fully trained, through life of the solution.		Document Review Validation of Records	The solution winner will need to conduct a full TNA & HFI GAP analysis of initial & through-life trg needs. Tech staff may be MOD or industry.	Joint User
2.2	**Documentation**											
2.2.1		The User shall be provided with relevant operational and technical documentation.	Y	Y	Candidate	2	To conduct routine safe and efficient operational tasks.	To Service Providers & Eng Spt Staff Electronic format: documentation must be readable on Dii standard applications Plus 1x Hard copy of every manual for each instance of installation.	Copyright of User Guide and 1st Line Tech Manuals released to User for internal use	Technical Review Documentation	Configuration management to be undertaken by CLS	Joint User

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
2.3	**Sustainable Development**											
2.3.1		The User shall be able to use a solution that complies with the MOD's policy on sustainable development.	Y	Y	Draft	M	JSP418 ADATS EMS	Supplier is ISO 14001 certified Solution complies with EU and UK Environmental Legislation	Increase in energy efficiency, reduction in GHG emissions, minimizing waste, no restricted or hazardous materials.	Environmental Case In-service Sp Evaluation Tech Field Trial		Joint User
2.4	**Safety Environment**											
2.4.1		The User shall be able to operate a safe system.	Y	Y	Candidate	M	MAA MRP Def Stan 00-56 JSP 815, 454 ASEMS POSMS Def Stan 00-972 part 1	All equipment hazards closed, risks as low as reasonably possible (ALARP) and tolerable.	All equipment hazards closed, risks ALARP and broadly acceptable.	4 Part Safety Case Tech Field Trial Ops Field Trial In-Service Sp Evaluation	Robust, evidence-based safety case: that the system cannot either directly or indirectly contribute to the loss of an aircraft and/or life/lives or injury.	Joint User
2.4.2		The User shall be able to use a solution that complies with RF hazard limitations.	Y	Y	Draft	M	JSP 392, 846 ICNIRP	Power Density levels for Occupational and Gen Public within permitted levels.		Evaluation Tech Field Trial Ops Field Trial		Joint User
2.4.3		The User shall be able to minimize environmental impacts.	Y	Y	Draft	1	JSP 815, 418 ASEMS POEMS ADATS EMS ADATS Sustainable Procurement Charter.	Minimize negative environmental impacts Conformant with ADATS EMS process. Agree to ADATS Sustainable Procurement Charter.	Eliminate negative environmental impacts.	Environmental Case		Joint User
2.5	**Security**											

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
2.5.1		The User shall be able to comply with current Security Standards.	Y	Y	Candidate	M	JSP 440	Compliance with minimum security standards.		Document Review Security Document Set Validation of Records Inspection		Joint User
2.5.2		The User shall be able to use a solution whose Capability Assurance is in accordance with MOD Policy.	Y	Y	Candidate	1	JSP 440 JSP 418	Compliance with minimum Capability Assurance standards.		Document Review Security Document Set Validation of Records Inspection		Joint User
2.6	**Risk & Quality Management**											
2.6.1		The User shall be provided with a service of assured quality.	Y	Y	Candidate	2	MOD Policy AOF Guidance	Provide a Quality Management System. Meets AOF QA minimum standards. BN EN ISO 9001 Certified		In-Service Sp Evaluations		Joint User
2.7	**Availability**											

ID	Object Heading	User Requirement	UK	Overseas	Status	Priority	Justification	Threshold MOE	Objective MOE	Validation Category	Remarks	UR Owner
2.7.1		The user shall be able to depend on an air transportable solution.	N	Y	Draft	1	Def Stan 00-3/3	Inside RAF Air Transport (AT) aircraft. RAF C130J, similar aircraft and larger.	External by Chinook and other aircraft.	Tech Field Trial Ops Field Trial In-Service Spt Evaluation	PJOBs, new overseas operational commitments. Compatible with the MOD's TAC requirement. To met Joint Air Delivery Test and Evaluation Unit (JADTEU) requirements.	Joint User
2.7.2		The User shall be able to operate the capability whilst dressed and equipped for operations.	Y	Y	Draft	2	Cap SUR dated 4 Aug 10	Wearing normal working dress.	IPE: Cat 3R with individual weapon.	Tech Field Trial Ops Field Trial In-Service Spt Evaluation		Joint User
2.7.3		The User shall be provided with any special-to-type test tools or equipment needed to support the system.	Y	Y	Draft	1	Required in an attempt to minimise training needs, reduce in-Service support costs and reduce the time the capability is not available to the User.	Level 1 - servicing and day-to-day preparation. Level 2 - corrective maintenance by replacement, adjustment or minor repair. Minimise STTE		Document Review Validation of Records Demonstration	Support by Service personnel may be limited to Levels 1&2 at 1st Line, all other support will be provided by Industry.	Joint User
2.7.4		The User shall be provided with a capability incorporating Built In Test functionality.	Y	Y	Draft	3	Required in an attempt to minimise training needs, reduce in-Service support costs and reduce the time the capability is not available to the User	In-built or attached laptop which provides performance data on the system.		Document Review Validation of Records Demonstration		Joint User

4 CONTEXT DOCUMENTS

Ref	Description	Document Link
1	ADATS Sustainable Procurement Charter.	
2	Annex C to 5052952-11-rep-01 - Functional Hazard Identification and Safety Requirement Derivation.	
3	AWC/WAD/72/665/TRIALS - The Effects of Wind Turbine Farms on ATC Radar dated 10 May 05.	
4	CAP670 - Air Traffic Services Safety Requirements.	
5	CAP764 - CAA Policy and Guidelines on Wind Turbines.	
6	DEFSTAN 00-972 - Military Air Traffic Control Equipment Safety and Performance Standards.	
7	DEFSTAN 00-35 - Environmental Handbook for Defence Materiel	
8	DEFSTAN 00-40 - Reliability and Maintainability	
9	DEFSTAN 00-56 - Safety Management Requirements for Defence Systems	
10	DEFSTAN 00-250 – Human Factors for Designers of Systems	
11	DEFSTAN 59-411 – Electromagnetic Compatibility	
12	D/DOR(Sea)/63/28/1/14/1 - Enhancements to WATCHMAN Crown Radar including an airfield training aid package (ATAP). Dated Jan 86. RESTRICTED	
13	EUROCONTROL-GUID-0130 - Guidelines on How to Assess the Potential Impact of Wind Turbines on Surveillance Sensors Ed 1.1 dated 09 Jun 10.	
14	JSP 392 – Instruction for Radiation Protection	

Ref	Description	Document Link
15	JSP 418 – MOD Corporate Environmental Protection	
16	JSP 440 – Defence Manual of Security	
17	JSP 454 – Land Systems Safety & Environmental Preotection	
18	JSP 480 - Manual of Regulations for Installation of Communication & Information Systems	
19	JSP 815 – Defence Environment& Safety Management	
20	JSP 822 – Governance and Management of Defence Individual Training & Education	
21	JSP 846 – MOD Radio Site Clearance and Protection Manual	
22	Manual of Military Air Traffic Management	
23	Military Aviation Authority (MAA) Regulatory Publications (MRP) 3000 Series	
24	Trial CELTIC STORM report Dated 30 Nov 06. RESTRICTED.	
25	Watchman Primary Surveillance Radar Safety Case Report, 5052952-05-rep-01, September 2011 v3.0.	
26	Wind Farm Mitigation for Airfield ATC Radar, by Kate Shave. Dated 12 Apr 10. RESTRICTED.	
27	20090907-ATMPC - Performance Criteria for MoD Terminal Air Traffic Control Primary Surveillance Radar (Watchman) dated 01 Oct 09.	

5 GLOSSARY

5.1 Definitions

Term	Definition
Air Cmd	Headquarters Air Command
ALARP	As Low As Reasonably Practicable
ATC	Air Traffic Control
AMSL	Above Mean Sea Level
ATS	Air Traffic Services
BS	British Standard
C2	Command and Control
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CIDA	Coordinating Installation Design Authority
CIWG	Capability Integration Working Group
CJO	Chief of Joint Organisation
CONEMP	Concept Of Employment
CONOPS	Concept Of Operations
COTS	Commercial Off The Shelf
CLS	Contractor Logistic Support
DCSA	Defence Communications Services Agency
DE&S	Defence Equipment & Support
DEFSTAN	Defence Standards
Deg	Degrees
DT	Delivery Team
EM	Electromagnetic
EMC	Electromagnetic Compatible/Compatibility
EW	Electronic Warfare
Failure	Impedes operational use. Fails to deliver data for more than 30 seconds
FAT	Factory Acceptance Test or First Article Test
Fault	Does not impede operational use
FE@R	Force Elements at Readiness
FI	Falkland Islands
FOC	Full Operating Capability
GCF	Ground Clutter Filter
GFE	Government Furnished Equipment
GFF	Government Furnished Facilities

Term	Definition
HCI	Human-computer interface
HF	Human Factors
H&S	Health and Safety
HSW	Health and Safety at Work
ILS	Integrated Logistic Support
IOC	Initial Operating Capability
ISD	In Service Date
ISO	International Standards Organisation
ITEA	Integrated Test Evaluation and Acceptance
ITEAP	Integrated Test Evaluation and Acceptance Plan
JADTEU	Joint Air Delivery Test and Evaluation Unit
JSP	Joint Services Publication
JFC	Joint Force Command
KUR	Key User Requirement
LRU	Line Replaceable Unit
MAA	Military Aviation Authority
MCF	Moving Clutter Filter
MRP	MAA Regulatory Publications
MT	Military Task
Mts	Metres
MOD	Ministry Of Defence
NATO	North Atlantic Treaty Organisation
NATS	NATS (National Air Traffic Services)
NCHQ	Navy Command Head Quarters (used to be known as ‘FLEET’)
NR	Normal Radar
OOA	Out of Area (Operations outside the UK)
OSD	Out of Service Date
PJOB	Permanent Joint Operating Base
POEMS	Project Oriented Environmental Management System
POSMS	Project Oriented Safety Management System
PSR	Primary Surveillance Radar
RMA	Reliability Maintainability and Availability
RMS	Root Mean Square
SEOMA	Safe Environment with Operating and Maintenance Activities report
Sp/Spt	Support
SRA	Surveillance Radar Approach

Term	Definition
SRD	System Requirement Document
SSR	Secondary Surveillance Radar
TG	Trade Group
TLMP	Through Life Management Plan
TNA	Training Needs Analysis
UK	United Kingdom
URD	User Requirement Document
VVRM	Validation & Verification Requirements Matrix
WG	Working Group
WLC	Whole Life Costs

5.1 GLOSSARY of TERMS

Term	Description	Ref
False alarm (FA)	A false alarm is an erroneous radar target detection decision caused by noise or other interfering signals exceeding the detection threshold. In general, it is an indication of the presence of a radar return when there is no valid target.	Def Stan 00-972 Pt 3
First Line / 1st Line maintenance	The organisation immediately responsible for day-to-day maintenance and the preparation of the equipment for operational use.	Commonly understood.
Non-cooperating air targets	Passive air targets which are detected using PSR alone ie not required to emit a signal in order to be detected by the system. (NB this is different to the AD definition of a non-cooperating air target.)	
Permanent echo (PE)	Radar signals reflected from fixed objects on the earth's surface; objects such as buildings, towers, and terrain that under certain conditions may be used to check radar alignment. Permanent echoes are distinguished from ground clutter by being definable locations rather than large areas.	Def Stan 00-972 Pt 3
Seamless integration	The provision of primary sensor data into an air traffic surveillance and/or control system to provide a composite picture with no reduction in the level of service provision within airspace of defined dimensions. A process which results in transparency of service provision to the ANSP user.	Wind Turbine and Wind Farm Mitigation Guidance on the Use and Integration of In-Fill Radar.
Spurious returns	Spurious returns include clutter, garble, spurious reflections etc, including those introduced by wind turbines.	Def Stan 00-972 Pt 3 SUR FS23
Tactical (TAC) Watchman	An air and road transportable Watchman system with associated Cardion SSR operating on a common rotating joint.	
Unwanted turbine returns (UTR)	Radar returns caused solely by wind turbines which have not been eliminated by processing. Expressed as a probability of being displayed at each data update.	This URD
Wind farm (WF)	More than one wind turbine.	
Wind turbine development	One or more wind turbines at a single site.	