Defence Awarding Organisation

Qualification Handbook

DAO Level 5 Diploma in Applied Aviation Studies (Air Electronics Management)

QN: **603/0779/1**

The Qualification

Overall Objective for the Qualifications

This handbook relates to the following qualification:

DAO Level 5 Diploma in Applied Aviation Studies (Air Electronics Management)

This Level 5 Diploma provides the standards that must be achieved by individuals that are working within the Armed Forces.

Pre-entry Requirements
Learners who are taking this qualification should be employed in the WSOp trade

Unit Content and Rules of Combination

This qualification is made up of a total of 25 mandatory units and no Optional units. To be awarded this qualification the candidate must achieve a total of 48 credits as shown in the table below.

Unit number	Unit of assessment	Level	GLH	TQT	Credit value
L/615/3543	ISTAR Concept Knowledge	4	14	17	2
M/615/3552	Electronic Warfare Fundamentals	5	18	20	2
T/615/3553	Weapons Control Systems	5	18	20	2
L/615/3560	Electronic Warfare Receiver Technology	5	8	10	1
H/615/3564	Functional Analysis	5	26	30	3
A/615/3568	Waveform Generation Techniques	5	20	20	2
F/615/3569	Antenna Design and Beam Shaping	4	10	10	1
T/615/3570	Low Probability of Intercept Radar (LPI) Principles	3	7	10	1
A/615/3571	Synthetic Aperture Radar (SAR)	4	6	10	1
F/615/3572	Electronic Warfare Platform & Weapons Databases	4	6	10	1

J/615/3573	Radar Operating Theory	5	48	50	5
L/615/3574	MWS / LWR / RWR / DAS Technology	4	10	10	1
R/615/3575	Communications Systems Knowledge	3	10	10	1
Y/615/3674	EMCON and COMSEC Knowledge	3	16	20	2
D/615/3577	Data Links	4	16	20	2
H/615/3581	Alternative Data Sources	4	10	10	1
F/615/3586	Electro-Optic and Infra-Red cameras	5	22	30	3
L/615/3588	Flight monitoring	4	10	10	1
R/615/3592	Practise in-flight EW procedures.	4	12	20	2
Y/615/3593	Apply EW practices whilst airborne.	4	10	20	2
T/615/3245	Aircraft Systems	3	14	10	1
H/615/3595	Demonstrate Aircraft on/off task procedures	3	10	10	1
A/615/359	Practise unscheduled events	3	6	10	1
H/615/3600	Post flight tasks	3	7	10	1
K/615/3601	Core Aviation Skills	5	60	80	8
			394	**477**	**48**

Age Restriction

This qualification is available to learners aged 18 years and over.

pportunities for Progression

This qualification creates a number of opportunities for progression through career development and promotion.

Exemption

No exemptions have been identified.

Glossary

For the purposes of this qualification the definitions below apply.

Apply	Places in contact with; puts to use, employs; applies to a situation

Calculate	Determines by mathematical processes, implies highly intricate processes as against computes, which implies simple arithmetical process and exact results; forecast consequences or results, as in taking risks
Carry out	Takes action on basis of
Conducts	Supervises and personally performs work necessary to accomplish the results desired; to perform; does not imply management Takes by preference from among others: Picks out from
Define	Determines or sets down the boundaries of, sets down or show the precise outlines of; determines and states the limits and nature of; describes exactly; gives the distinguishing characteristics of; states or explains the meaning of Makes by hand, machinery or other agency. Manufactures a product
Demonstrate	Gives evidence of, displays; shows with the intent of proving explains or illustrates; demonstrates results an analysis
Describe	Tells or writes about; gives a detailed account of; describes symptoms of a problem Make ready or get ready for
Determine	Sets bounds or limits to, comes to a decision concerning, obtains definite and first-hand knowledge
Discuss	Verbally or in writing. Particularly in considering a question of problem requiring examination and debate preparatory to decision because of uncertainty and lack of precedence Sets up or fixes: Establishes in a place.
Explain	Makes something clear or intelligible; interprets to assure understanding
Identify	Establishes the identity of, distinguishes or discriminates
Interpret	Examines or tells the meaning of; understands or appreciates in the light of individual belief, judgement, or interest; construes. Makes inferences from ambiguous information to provide meaning or make relevant
Manage	Controls; directs; conducts; guides, administers. Plan, organise, staff, direct and control efforts of subordinate
Obtain	Procures, gets possession of; obtains data for inclusion in a survey
Plan	Represents as by a diagram; devises or projects as a method or course of action; prearranges the details of, as to plan a campaign; intends, proposes to do; plans an assignment
Recognise	Perceives a person or thing previously known, recovers or recalls

	knowledge of
Research	Conducts investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted Conducts investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws, in the light of few facts or practical application of such new or revised theories or laws
State	Say or express, fully or clearly, in speech or writing
Use	Employ; partakes of; exploits

Abbreviations used throughout this document

ACINT	Acoustic Intelligence	ISAR	Inverse Synthetic Aperture Radar
BCPT	Basic Comms Procedural Trainer	ISTAR	Intelligence, Surveillance, Target Acquisition, and Reconnaissance
COMINT	Communications Intelligence	JTIDS	Joint Tactical Information Distribution System
COMSEC	Communications Security	LPI	Low Probability of Intercept
CW	Continuous Wave	LWR	Laser Warning Receiver
DEAD	Destruction of Enemy Air Defence	MAS	Mission Avionics System
DAS	Defensive Aids Suite	MASINT	Measurement And Signature Intelligence
DEWDB	Defensive Electronic Warfare Data Base	MDR	Minimum Detection Range
DCVR	Digital Crystal Video Receiver	MIRC	Microsoft Internet Relay Chat
DNCS	Duty Net Control Station	MTI	Moving Target Indicator
DOA	Direction OF Arrival	MUR	Maximum Unambiguous Range
EA	Electronic Attack	MWS	Missile Warning System
ELINT	Electronic Intelligence	OSINT	Open Source Intelligence
EMCON	Emissions Control	PPLI	Precise Participant Location and Identification
EO	Electro-Optical	PRF	Pulse Repetition Frequency
EP	Electronic Protection	PRI	Pulse Repetition Interval
ESM	Electronic Support Measures	PU	Participating Unit (or Picket Unit)

EW	Electronic Warfare	PW (PD)	Pulse Width (also called Pulse Duration)
FIH	Flight Information Handbook	RADAR	Radio Detection And Ranging
FMCW	Frequency Modulation Continuous Wave	RF	Radio Frequency
FMOP	Frequency Modulation On Pulse	RWR	Radar Warning Receiver
FRC	Flight Reference Card	SAR	Synthetic Aperture Radar
FTC-A	Force Track Co-ordinator Air	SATCOM	Satellite Communications
GMTI	Ground Moving Target Indicator	SEAD	Suppression of Enemy Air Defence
GPS	Global Positioning System	SIGINT	Signals Intelligence
GRU	Gridlock Reference Unit	SSR	Secondary Surveillance Radar
HUMINT	Human Intelligence	SSSB	Ship Shore Ship Buffer
HF	High Frequency	STANAG	Standardisation Agreement
HQ	Have Quick	TCAS	Traffic Collision Avoidance System
ICW	Interrupted Continuous Wave	TDMA	Time Division Multiple Access
IFF	Indicator Friend or Foe	TST	Time Sensitive Targeting
IJIMS	Interim JTIDS Message Standard	UHF	Ultra High Frequency
IMINT	Imagery Intelligence	UV	Ultra Violet
IR	Infra-Red	VHF	Very High Frequency

Qualification Units

URN:	L/615/3543	
Title:	ISTAR Concept Knowledge	
Level:	4	
Credit value:	2	
GLH	14	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Apply ISTAR Concept Knowledge	1.1 Discuss the historical development of ISTAR and explain how this has led to the current UK / NATO capability 1.2 Define Reconnaissance, Surveillance, Air Reconnaissance, Air Surveillance, Battlefield Surveillance, Sea Surveillance and ISTAR 1.3 Define Strategic, Tactical and the Operational level of intelligence 1.4 Define the 8 main Reconnaissance and Surveillance tasks used to satisfy information/intelligence requirements 1.5 State the 7 required capabilities of an effective ISR system 1.6 Describe the following Reconnaissance and surveillance systems: Airborne, Space, Ground and Maritime 1.7 Define the Intelligence product available from various UK agencies 1.8 Define intelligence abbreviations 1.9 Describe the Intelligence Surveillance and Reconnaissance process 1.10 Describe the intelligence cycle 1.11 Define the ISR cycle 1.12 Describe the Direction of ISR operations 1.13 Describe the collection process of ISR operations, to include the collection plan 1.14 Define EW terms 1.15 Describe ISTAR platform tasks and duties with reference to recent conflicts 1.16 Explain 'Battle Rhythm' and air tasking cycle 1.17 Explain the division of Battle Space 1.18 Conduct PC/classroom based ISTAR planning event with reference to exercise ATO/ACO/SPINS	

	1.19 Demonstrate the ISR process
Additional information about the unit	
Unit aim(s)	On completion of this unit learners will be able to describe the concept of Intelligence, Surveillance, Targeting and Reconnaissance relevant to WSOp.
Unit expiry date	2 years
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS **PPLFDC06** Check and operate navigation, surveillance and communication equipment **SEMAE3137** Carrying out tests on aircraft passive warning and optical/surveillance systems
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	M/615/3552	
Title:	Electronic Warfare Fundamentals	
Level:	5	
Credit value:	2	
GLH	18	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Apply Electronic Warfare Fundamentals	1.1 Describe the principles of electromagnetic wave propagation 1.2 State the speed of EM waves in free space 1.3 Describe Electric and magnetic fields and the production and propagation of EM signals, including how polarisation is defined 1.4 State the relationship between frequency and wavelength. 1.5 Describe waveform terms 1.6 Explain briefly waveform composition 1.7 Calculate RF and wavelength values 1.8 Discuss the following factors and their effects on EM propagation 1.9 Describe EM wave propagation paths 1.10 Explain the effect of absorption and refraction on EM waves in the ionosphere 1.11 Describe the effect that conditions have upon the choice of HF radio frequencies 1.12 Calculate the approximate space wave slant range of an aircraft radio/radar transmission 1.13 Describe the sources of noise in an RF signal and its effects on RF reception 1.14 Define EW principles and its military applications	
2. Apply Transmitters and Receivers Knowledge	2.1 State the basic principles of RF Transmitters 2.2 State the basic principles of RF Receivers 2.3 Describe the principles of modulation and demodulation of RF signals 2.4 Explain radio terms. 2.5 State the form power is normally expressed in 2.6 Carry out decibel calculations 2.7 Explain the function of electronic devices found in avionic systems 2.8 State the function and basic purpose of electronic devices	
3. Carry out Wave Form Analysis	3.1 Explain the relationship between radar function and the choice of radar parameters	

	3.2 State the reasons for the selection of the values for radar parameters 3.3 Describe basic antenna design in relation to scan patterns 3.4 Describe common mechanical/electronic scan patterns 3.5 State function of the common mechanical, electronic and mechanical/electronic scan patterns 3.6 Associate RF values with radar bands 3.7 Describe radar techniques and their functions
Additional information about the unit	
Unit aim(s)	On completion of this unit learners will be know the fundamental principles of Electronic Warfare, apply that knowledge to radio transmitters and carry out wave from analysis.
Unit expiry date	2 years
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS **PPLFDC06** Check and operate navigation, surveillance and communication equipment **SEMAE3137** Carrying out tests on aircraft passive warning and optical/surveillance systems
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	T/615/3553	
Title:	Weapons Control Systems	
Level:	5	
Credit value:	2	
GLH	18	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Explain Weapons Control Systems	1.1 Recognise the main features of modern Weapon Control Systems 1.2 Explain the factors that affect weapon system performance 1.3 State the expected radar parameters of modern radar controlled weapon systems 1.4 Explain the principles of operation of guidance and homing methods 1.5 Discuss the advantages / disadvantages and countermeasures employed against types of guidance techniques 1.6 Describe the concept of the operation of non-radar controlled weapon systems 1.7 Describe the factors which can affect weapon system performance	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will know about weapons control systems and discuss the different types of guidance techniques.	
Unit expiry date	2 years	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	L/615/3560	
Title:	Electronic Warfare Receiver Technology	
Level:	5	
Credit value:	1	
GLH	8	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Apply Electronic Warfare Receiver Technology	1.1 Describe the capabilities required of different types of EW equipment 1.2 Describe the operation and signal processing techniques employed for typical ESM, RWR and ELINT surveillance systems 1.3 State the applications of ESM systems 1.4 Explain the principle operation of ESM receivers, to include the advantages and disadvantages 1.5 Define the term 'dwell' 1.6 Explain the various types of dwell that may be used to scan the RF environment (with reference to scanning/non-scanning radars) 1.7 Draw a block schematic diagram and explain the operation of a modern ESM system 1.8 Describe Direction of Arrival (DOA) measurement techniques used in ESM, RWR and ELINT receivers 1.9 Describe Direction of Arrival (DOA) measurement techniques used in ESM, RWR and ELINT receivers 1.10 Describe the principles of DOA measurement using moving aerials 1.11 Describe the principles of DOA measurement using fixed aerials 1.12 Describe the principles of position fixing by ESM equipment	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to describe an Electronic Warfare receiver and describe the functions and uses of the equipment.	
Unit expiry date	2 years	
Assessment requirements specified by a sector	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a	

or regulatory body (if appropriate)	learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	H/615/3564	
Title:	Functional Analysis	
Level:	5	
Credit value:	3	
GLH	26	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Define Functional Analysis (FA) Theory	1.1 Explain the relationship between RADAR function and the choice of RADAR parameters 1.2 State the 4 parameters that affect radar function 1.3 List and explain the factors affecting the choice of radar frequency 1.4 List and explain the factors affecting the choice of PRI of radar 1.5 List and explain the factors affecting the choice of PW of radar 1.6 List and explain the factors affecting the choice of ARP of radar 1.7 State the relationship between peak power, average power, PW and PRI 1.8 List the major function types of radar system	
2. Apply Functional Analysis	2.1 Describe the principles of Functional Analysis given specific RF emissions 2.2 Carry out Functional Analysis given specific RF emissions. 2.3 State the functions of a radar, given its parametric emission details 2.4 Conduct voice reporting of emitters 2.5 Conduct basic EW Operation Exercises	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to define and apply functional analysis of RF emissions relating to RADAR	
Unit expiry date	2 years	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation	Defence Awarding Organisation	

submitting the unit	
Availability for use	Restricted

URN:	A/615/3568	
Title:	Waveform Generation Techniques	
Level:	5	
Credit value:	2	
GLH	20	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Define Waveform Generation Techniques	1.1 Describe the techniques used in the generation of radar waveforms 1.2 State the function and purpose of waveform generation devices. 1.3 Explain types of pulse compression 1.4 Explain the principles of Surface Acoustic Wave (SAW) devices 1.5 State the advantages of pulse compression 1.6 Describe Intentional and unintentional modulation on pulse 1.7 Define frequency agility and frequency diversity 1.8 Define terms in relation to PRI 1.9 Describe PRI switch and dwell	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to define and explain radar waveform generation techniques	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS SEMEMI2-36 Carrying out tests on communication-electronic systems	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	

Availability for use	Restricted

URN:	F/615/3569	
Title:	Antenna Design and Beam Shaping	
Level:	4	
Credit value:	1	
GLH	10	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Determine Antenna Design and Beam Shaping	1.1 Explain the factors that affect radar antenna design 1.2 Explain the characteristics and limitations components 1.3 State the function of radar feeds 1.4 State the function of radar reflectors 1.5 Define the term 'Beamwidth' and state how Beamwidth is measured 1.6 Explain the term 'sidelobe' in relation to the main beam 1.7 Describe the shape and draw a polar diagram of scanner types 1.8 Explain the function and advantages of types of antenna 1.9 Describe scan patterns 1.10 State the principles and advantages of types of radar system 1.11 Explain the techniques used to obtain the following information from a radar return 1.12 Define the term 'radar mile' and state its value 1.13 Define the term 'Minimum Detection Range' 1.14 Explain the techniques employed to improve range discrimination 1.15 Explain the term 'Blind Range' and the techniques employed to overcome the effect 1.16 Describe methods of beam steering 1.17 Explain methods of radar height finding 1.18 State and explain the Doppler effect (radar) 1.19 State the formula for deriving speed from Doppler shift in an airborne radar system 1.20 State the effect of tangential fade, Doppler notch and ground effect 1.21 Explain the basic principles of operation of airborne radar systems 1.22 Explain blind speeds and how they are overcome 1.23 Explain the following terms employed in pulsed radar systems	
Additional information about the unit		

Unit aim(s)	On completion of this unit learners will be able to define Radar terms and explain technical factors affecting antenna design and waveform shaping
Unit expiry date	2 years
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	T/615/3570	
Title:	Low Probability of Intercept Radar (LPI) Principles	
Level:	3	
Credit value:	1	
GLH	7	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Define LPI Radar Principles	1.1 Describe the basic principles of low probability of intercept (LPI) radar systems 1.2 State the 3 levels of LPI Radar 1.3 Explain Beam Control 1.4 Explain waveform management 1.5 Explain Power Optimisation 1.6 Describe the term 'Low Observability'	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to define the principles of Low Probability intercept Radar	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLFDC05 - Check and operate radar and radio aids and carry out radiotelephonic communications PPLFDC06 Check and operate navigation, surveillance and communication equipment	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	A/615/3571	
Title:	Synthetic Aperture Radar (SAR)	
Level:	4	
Credit value:	1	
GLH	6	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Explain Synthetic aperture radar (SAR)	1.1 Describe the principles and functions of synthetic aperture radar (SAR) systems 1.2 Describe the principles and functions of the following types of SAR systems 1.3 Describe the principles and functions of GMTI radars 1.4 Describe the principles of Coherent Change Detection (CCD) 1.5 Describe the capabilities and limitations of the SAR imagery assets operated by NATO	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to explain and define principles of synthetic aperture radar systems	
Unit expiry date	2 years	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	F/615/3572	
Title:	Electronic Warfare Platform & Weapons Databases	
Level:	4	
Credit value:	1	
GLH	6	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Evaluate EW / Platform & Weapons Databases	1.1 Research weapon system and platform capabilities for threat levels by conducting open source research 1.2 Identify the elements of an ELNOT	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to describe the findings of their research into Electronic Warfare Platforms & Weapons Databases	
Unit expiry date	2 years	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	J/615/3573	
Title:	Radar Operating Theory	
Level:	5	
Credit value:	5	
GLH	48	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Apply Radar Operating Theory	1.1 Apply the principles behind radar theory 1.2 Demonstrate an understanding of radar theory, including the meaning of the 'radar' acronym and basic range determination (MUR/MDR/Elevation Angle/Range Resolution/Jamming and Burn through) 1.3 Describe the principles and components used in transmitting EM energy for communications and radar systems 1.4 Explain the need for modulation, demodulation and the process of Pulse Compression of an RF signal. 1.5 Describe the fundamentals of Radar signature reduction techniques 1.6 Describe and contrast primary and secondary radar 1.7 Describe the operation and applications of SSR/IFF including an understanding of the terms Fruiting and Garbiling 1.8 Describe the principle operation of IFF Modes 1,2,3,4,S 1.9 Describe the techniques used in pulsed, pulse Doppler and Continuous Wave, waveform generation	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to describe and apply the operating principles of a Radar system	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLFDC05 - Check and operate radar and radio aids and carry out radiotelephonic communications	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	

Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	L/615/3574	
Title:	MWS / LWR / RWR / DAS Technology	
Level:	4	
Credit value:	1	
GLH	10	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Explain MWS / LWR / RWR / DAS Technology	1.1 Describe the applications of Missile Warning Systems (MWS) 1.2 Describe the application of Lasers and Laser Warning Receivers (LWRs) 1.3 Describe the application of IR countermeasures 1.4 Describe the application of Radar warning receivers (RWR) 1.5 Describe the principles of counter-measures and their current applications 1.6 Describe the requirement and fundamental architecture of a DAS platform	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to describe applications of Missile warning systems and how to apply countermeasures	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS SEMAE3137 Carrying out tests on aircraft passive warning and optical/surveillance systems	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	R/615/3575	
Title:	Communications Systems Knowledge	
Level:	3	
Credit value:	1	
GLH	12	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Define Communications Systems Knowledge	1.1 List the frequency coverage of VHF, UHF HF and FM 1.2 Describe the basic concept of frequency modulation and demodulation (AM, FM, Digital) 1.3 Describe internal and external factors effecting signal quality (SNR) 1.4 Explain the need for SATCOM 1.5 Describe the basic Sub-systems of SATCOM 1.6 Explain the different types of orbits associated with SATCOM 1.7 Discuss the advantages and disadvantages of Geosynchronous/Geostationary orbits 1.8 Discuss the limitations of SATCOM systems 1.9 Explain the historical background leading to the development of the HAVEQUICK system 1.10 Define features in the context of HAVEQUICK	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to explain communication systems	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS SEMAE3079 Testing aircraft communication systems	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	

Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	Y/615/3674	
Title:	EMCON and COMSEC Knowledge	
Level:	3	
Credit value:	2	
GLH	16	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Apply and Use EMCON & COMSEC Knowledge	1.1 State what considerations must be taken into account by radio operators with respect to EMCON 1.2 Explain what items are covered by EMCON 1.3 Define COMSEC. 1.4 Explain the 3 divisions of COMSEC 1.5 Describe the attributes of COMSEC 1.6 Explain the need for cryptography 1.7 Define cryptographic terms 1.8 Describe the approach to and aims of cryptography 1.9 Explain the meaning of the brevity code-word 'BEADWINDOW' 1.10 Define the elements that would trigger a BEADWINDOW call 1.11 State the purpose of authentication 1.12 State the different types of security classification in current use 1.13 Define the principles and use of the challenge and reply method of authentication 1.14 Explain when the transmission authentication method should be used 1.15 Explain the principles of 'challenge and reply' authentication 1.16 Use Radios 1.17 Practise radio transmission voice procedures 1.18 State the principles of COMSEC and Comms jamming / counter-measures 1.19 Identify external agencies 1.20 State message formats	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to explain the methods of Communications security and Emissions security	

Unit expiry date	2 years
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLAOG59 Use radiotelephony in the aviation environment
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	D/615/3577	
Title:	Data Links	
Level:	4	
Credit value:	2	
GLH	16	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Explain & Use Data Links	1.1 Describe the need for Data Links in the military environment 1.2 Define the tactical advantage gained from the use of data links. 1.3 Describe the fundamental architecture of a Data link system 1.4 Describe the function of Data Links 1.5 Describe the fundamental architecture of Link 16 and IJIMS 1.6 Explain in basic terms the Link 16 Timeslot Structures 1.7 Explain the process of TDMA. 1.8 List the features within JTIDS that provide message transmission protection 1.9 Describe the principles of JTIDS/Link 16 synchronisation. 1.10 Describe in basic terms the process of synchronisation and NET partitions 1.11 Describe the principles of operation of the Ship Shore Ship Buffer (SSSB) 1.12 State the purpose of the NATO SSSB system 1.13 List the elements within the Command and Control (C2) structure of the UK SSSB 1.14 Describe in basic terms the SSSB Mode of Operation and its limitations 1.15 State the circumstances where requests for SSSB operations are likely to arise 1.16 List the fundamental Link associated Brevity Code words 1.17 Explain the relevance of STANAGS and data link operating guides 1.18 List the platforms capable of data link information transfer 1.19 Discuss the future employment and restrictions of use of tactical data links 1.20 Discuss the restrictions of use of current tactical data links 1.21 Discuss the future of tactical data links 1.22 State the tasking signals associated with data link	

	operations 1.23 Describe the purpose of Tactical Data Link Signals 1.24 Demonstrate the principles relating to the management of Datalinks including the establishment and dis-establishment of the Link and the population of information including ESM strobes 1.25 Describe internet Relay Chat Devices 1.26 Describe ISTAR networks
Additional information about the unit	
Unit aim(s)	On completion of this unit learners will be able to explain the use of data links in electronic warfare across a range of circumstances
Unit expiry date	2 years
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS SEMAE3-136 Carrying out tests on aircraft communication systems
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	H/615/3581	
Title:	Alternative Data Sources	
Level:	4	
Credit value:	1	
GLH	10	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Use Alternative Data Sources	1.1 Identify sources of external data 1.2 Describe the GPS system architecture 1.3 Identify the military applications of GPS 1.4 Identify GPS jamming techniques and their impact on military operations. 1.5 Describe the TCAS system architecture 1.6 Identify the benefits of TCAS employment 1.7 Describe the AIS system architecture 1.8 Identify the reasons for AIS use in the airborne environment 1.9 Conduct practical AIS exercise 1.10 Describe and demonstrate an understanding of the Integrated Broadcast Service (IBS) architecture 1.11 Identify the benefits for IBS use in the airborne environment	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to describe alternative sources of data in Electronic warfare	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS SEMAE3081 Testing aircraft navigational systems PPLFDC17 Safety Management	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation	Defence Awarding Organisation	

submitting the unit	
Availability for use	Restricted

URN:	F/615/3586	
Title:	Electro-Optic and Infra-Red cameras	
Level:	5	
Credit value:	3	
GLH	22	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Identify the use of Electro-Optic and Infra-Red systems	1.1 Identify how the use of Electro-optic and Infra-red systems can support ISTAR operations 1.2 Identify the EO/IR platforms currently employed by the RAF 1.3 Describe the roles associated with EO/IR capable assets. 1.4 Explain the aims of the ISR process and explain how ER/IR (Full Motion Video (FMV)) can fulfil those aims 1.5 Describe how EO/IR systems are used in order to achieve Intelligence Preparation of the Environment (IPoE) 1.6 Describe the principle requirements of IPoE 1.7 Describe the phases of IPoE and identify the major target categories 1.8 Explain the reasons behind establishing a pattern of life in a target area 1.9 Describe Basic Search Techniques associated with FMV assets 1.10 Describe the initial actions that should be employed when approaching a target area 1.11 Explain the principles of relating on screen imagery to mapping 1.12 Describe how to conduct a basic search of a target area 1.13 Describe the fundamentals of an Improvised Explosive Device Search 1.14 Describe FMV search techniques 1.15 Demonstrate the correct use of an EO/IRsystem 1.16 Explain the need for secure tactical communications in the ISR domain 1.17 Interpret the dynamic/Immediate ISR request message (8-Line). 1.18 Explain the CAS check-in and situation update messages. 1.19 Interpret the 9-line CAS message format 1.20 Describe the considerations required for convoy support 1.21 State the FMV associated brevity code-words	

Additional information about the unit	
Unit aim(s)	On completion of this unit learners will be able to describe and demonstrate the use of Infra red and Electro Optic cameras in Electronic Warfare
Unit expiry date	2 years
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	L/615/3588	
Title:	Flight monitoring	
Level:	4	
Credit value:	1	
GLH	12	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. State the aim of a work-cycle in an airborne environment	1.1 Calculate information for a given representative FP route and prepare a suitable fuel plan 1.2 Plan additional information. 1.3 Conduct a Pre-Sortie Brief 1.4 Using pre-prepared resources, brief a representative crew with the relevant pre-sortie information 1.5 Manage AC Systems to safely navigate a FP Route 1.6 Apply the information derived from ac instruments, navigation aids and other resources to safely navigate a FP route	
2. Conduct a suitable work cycle to maintain safety of the Aircraft	2.1 Apply a work-cycle to different phases of flight	
3. Demonstrate appropriate actions during an aircraft emergency	3.1 Assist the ac captain during an aircraft emergency 3.2 Read challenges and confirm the correct responses to a checklist 3.3 Read challenges and confirm the correct responses to an FRC emergency & failure checklist 3.4 Calculate performance data	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to carry out the role of a crewman to contribute to the work cycle of an aircraft	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLAOG41 Maintain the separation of aircraft in the air	

Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	R/615/3592	
Title:	Practise in-flight EW procedures	
Level:	4	
Credit value:	2	
GLH	12	
Learning outcomes The learner will:	Assessment criteria The learner can:	Guidance and unit amplification
1. Review sortie profile and all relevant flight planning information that supports intended flying event including NOTAMS	1.1 Obtain and interpret Meteorological forecast 1.2 Interpret the aircraft's F700 (Flight Servicing Record) 1.3 Attend and demonstrate awareness of information give in a crew out brief 1.4 Demonstrate continuous sortie awareness through mentored Q&A sessions whilst airborne 1.5 Log significant radio and intercom calls 1.6 Respond as directed by crew at all times 1.7 Attend and demonstrate awareness of information given out in a crew debrief	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to carry out Electronic Warfare procedures in flight	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLAOG35 Monitor the weather	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed. This unit to be assessed in an aircraft in flight	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	Y/615/3593	
Title:	Apply EW practices whilst airborne	
Level:	4	
Credit value:	2	
GLH	10	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Contribute to Planning a Mission	1.1 Interpret relevant Flight Documents and regulations 1.2 Interpret Sortie/Mission tasking 1.3 Interpret met data 1.4 Contribute to the preparation of plans 1.5 Contribute to Briefing a Mission 1.6 Produce a brief 1.7 Brief crew/formation members 1.8 Read and interpret checklists 1.9 Conduct checks for relevant aircraft systems 1.10 Conduct external aircraft checks 1.11 Conduct internal aircraft checks 1.12 Set-up Station 1.13 Describe the practices and procedures associated with crypto handling 1.14 Review Pre-Flight Docs	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to contribute to the planning of a sortie and conduct relevant and appropriate pre flight checks on an aircraft	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLFDC02 Conduct pre-flight planning PPLFDC01 - Prepare and implement a flight plan Prepare and implement a flight plan	
Assessment requirements specified by a sector or regulatory body (if	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a	

appropriate)	learning and development environment is allowed. *To be conducted via the Surveillance Operators Lead-in Course (SOLIC) 750 NAS RNAS Culdrose*
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	T/615/3245	
Title:	Aircraft Systems	
Level:	3	
Credit value:	1	
GLH	14	
Learning outcomes The learner will:	Assessment criteria The learner can:	Guidance and unit amplification
1. Monitor ac systems	1.1 Identify the components and operation of basic aircraft electrical systems 1.2 Identify the components and operation of basic aircraft hydraulic systems 1.3 Identify the components and operation of basic aircraft fuel systems 1.4 Identify the components and operation of basic aircraft flight instruments 1.5 Identify the components and operation of basic aircraft oxygen delivery systems 1.6 Identify the components and operation of basic aircraft emergency systems	
Unit aim(s)	On completion of this unit learners will be able to identify various aircraft systems appropriate to the crewman role	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLAOG58 Monitor aircraft fuelling system performance PPLFDC05 Check and operate aircraft propulsion units, systems and controls	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	H/615/3595	
Title:	Demonstrate Aircraft on/off task procedures	
Level:	3	
Credit value:	1	
GLH	10	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Establish Aircraft on/off Task	1.1 Operate mission systems 1.2 Handover from Off going station 1.3 Handover to Oncoming station	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to establish Aircraft on/off Task status	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	No comparable NOS found	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed. This unit can be assessed either in a simulator or in an aircraft in flight.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	A/615/3599	
Title:	Practise unscheduled events	
Level:	3	
Credit value:	1	
GLH	6	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. React to Unscheduled events	1.1 Respond to ac emergencies 1.2 Respond to Mission system/Workstation malfunction 1.3 Discuss the responses to be taken in the event of Enemy action 1.4 Respond to Forced Landing	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will have practiced and demonstrated how to respond to various aircraft emergencies	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLAOG38 Contribute to supporting aircraft in difficulty	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	H/615/3600	
Title:	Post flight tasks	
Level:	3	
Credit value:	1	
GLH	7	
Learning outcomes The learner will:	Assessment criteria The learner can:	
1. Conduct Post-Flight Tasks	1.1 Conduct Shut-down procedures 1.2 Retrieve and Store Mission Data 1.3 Complete post sortie docs/admin 1.4 Contribute to Mission Debrief	
Additional information about the unit		
Unit aim(s)	On completion of this unit learners will be able to carry out post sortie tasks appropriate to the crewman role	
Unit expiry date	2 years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	No comparable NOS found	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	K/615/3601	
Title:	Core Aviation Skills	
Level:	5	
Credit value:	8	
GLH	60	
Learning outcomes The learner will:	Assessment criteria The learner can:	Guidance and unit amplification
1. Demonstrate Situational Awareness	1.1 Demonstrate general awareness of the current and projected position of the ac in terms of height, altitude, speed and location and the proximity of other aircraft and geographical, aeronautical and meteorological features 1.2 Recognise the factors that may affect the current and future operation of the aircraft	
2. Prioritise events	2.1 Prioritise multiple recognised events or factors to make plans and, implement actions, in an appropriate order in pursuance of the task	
3. Demonstrate Mental Flexibility	3.1 Make new plans and modify or disregard existing plans as required to suit recognised changed circumstances in pursuance of the task	
4. Communicate decisions.	4.1 Display appropriate knowledge and skills to use all communications systems effectively 4.2 Demonstrate effective communications to pass and acquire information within the ac or formation using standard phraseology if it exists 4.3 Demonstrate effective communications with external agencies to pass and acquire information using standard phraseology if it exists	
5. Manage Systems	5.1 Apply ac systems knowledge to allow efficient and safe operation of the ac	
6. Manage Resources	6.1 Make an effective and timely contribution, and/or direction and management of individual contributions, to enhance team awareness and analysis in pursuance of the task 6.2 Utilise resources to allow efficient and safe operation of the ac	
Additional information about the unit		

Unit aim(s)	On completion of this unit learners will be able to demonstrate the mental capacity and decision making ability to respond appropriately to dynamic situations in an aircraft
Unit expiry date	2 years
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	This unit has some synergy with the following NOS PPLFDC18 Management of human factors CFASAD111 Plan and manage own workload
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the workplace assessment of occupational competence wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted